1R - 279

REPORTS

DATE:

2001

3R279

Highlander Environmental Corp.

Midland, Texas

December 15, 2001

Mr. William C. Olson, Hydrogeologist
Environmental Bureau
Oil Conservation Division
Energy, Minerals and Natural Resources Department
2040 S. Pacheco
Santa Fe, New Mexico 87505

Re: 2001 - Annual Groundwater Monitoring Report at the ChevronTexaco, Buckeye Vacuum Field Unit, Lea County, New Mexico, Section 1, T-18-S, R-34-E.

Dear Mr. Olson:

Highlander Environmental Corp. (Highlander) has been requested by ChevronTexaco Corporation to continue to conduct monitoring of groundwater at the Vacuum Field Unit, located in Buckeye, Lea County, New Mexico. The Site is located in Section 1, Township 18 South, Range 34 East. The Site location is shown in Figure 1. The monitor wells are shown in Figure 2. This report presents the results of groundwater monitoring activities conducted at the Site during 2001.

Background

In 1989, a total of twenty-three (23) monitor wells were installed at the Site to locate the source and delineate the extent of chloride in groundwater. The wells were drilled to the base of the Ogallala aquifer, which coincides with the top of the Triassic redbed in this area. Based on the investigation, a casing leak was detected in producing well VG SAU #58. This was suspected to be the source for the chloride plume. The casing leak was detected in the well at a depth of 59 feet below ground surface and was repaired in 1990. Two (2) extraction wells #1 and #2 were installed in the plume area to remediate the groundwater impact. These wells have been pumping continuously to remediate the groundwater at the Site. During monitoring events in 1999, the concentrations in selected monitor wells showed chloride levels below the New Mexico Water Quality Control Commission (WQCC) standard of 250 mg/l.

As approved by the New Mexico Oil Conservation Division (NMOCD), a total of thirteen (13) monitor wells have been plugged at this site, leaving ten (10) monitor wells and two (2) extraction wells at the Site. The chloride levels detected in the plugged wells did not show impact to the groundwater. In 1999, Highlander Environmental performed quarterly sampling of ten (10) monitor wells and two (2) extraction wells at the Site. Based on 1999 sampling results, a total of six

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(6) monitor wells and two (2) extraction wells were sampled on a semi-annual basis for 2000. The 1999 and 2000 sampling events are summarized in Tables 2 and 3. In 2001, Highlander Environmental performed semi-annual sampling of six (6) monitor wells and two (2) extraction wells at the Site. Historically, the chloride levels in TW-23 (near source well VG SAU #58) have widely fluctuated, but remained well above the WQCC standard of 250 mg/l. Well VG SAU #58 was plugged in 2000.

Groundwater Monitoring Activities

Prior to sampling, static water levels were collected from the monitor wells. No water level measurements were collected from the two extraction wells due to cascading water in the wells. Table 1 shows the cumulative water level data and groundwater elevations. A current water table map is presented in Figure 3. The Site groundwater gradient shows a north trend toward the pumping extraction wells. The hydrographs for each well gauged are shown in Appendix A.

On June 14, 2001 and November 14, 2001, Highlander performed the semi-annual monitoring on the monitor wells and the two extraction wells. In addition, quarterly sampling was performed on TW-23. A minimum of three (3)-casing volumes of groundwater were removed from each well and contained in a portable tank. The two extraction wells (#1 and #2) were pumping at the time of sampling. Following purging, groundwater samples were collected from the discharge from the pump. The groundwater samples were carefully transferred to appropriate containers, preserved, and transported under chain-of-custody control to Trace Analysis, Inc., Lubbock, Texas. The samples were analyzed for chloride by method EPA SM 4500 Cl-B. Appendix B presents the laboratory report.

Laboratory Analysis and Results

Referring to Table 4, the chloride levels from the monitor wells were all below the WQCC standard of 250 mg/l, with the exception of TW-9, TW-15 and TW-23. Historically, TW-9 and TW-15 have shown fluctuating chloride levels ranging from 170 mg/l to 303 mg/l and 120 mg/l to 383 mg/l, respectively.

Referring to Table 3, the two sampling events in 2000 showed increasing chloride levels in TW-23 from 830 mg/l (4/26/00) to 2,300 mg/l (11/21/00). Referring to Table 4, the 2001 sampling showed chloride levels ranging from 1,070 mg/l to 5,330 mg/l. On June 14, 2001, the water level in TW-23 had dropped to a low of 127.56' and the chloride level had risen to a high of 5,330 mg/l for the year. On August 10, 2001, the water level rose to 215.86' and the chloride level was 2,420 mg/l/. The TW-23 hydrograph and chloride concentration graph may indicate that there is a cycle between water level fluctuation and chloride content. As water levels rise, residual salts in soil from the original casing leak may be flushed out of the soil in the vicinity of TW-23. This influx of additional chloride may not fully manifest itself until water levels fall and chloride is concentrated in the vicinity of the wellbore. Based on the chloride levels detected in the surrounding monitor wells and the two recovery wells, the chloride level encountered in TW-23 appears to be confined and shows no indication of horizontal migration.

Water Well Installation (Extraction Well #3)

Historically, TW-23 has showed fluctuating chloride levels above WQCC standards. Based upon water sampling data, it appears the pumping of the two existing extraction wells (#1 and #2) has remediated the chloride plume, except in the vicinity of TW-23. As a result, Highlander supervised of the installation of a new water well (Extraction Well #3) to remediate the groundwater in the vicinity of TW-23. The location of the new extraction well #3 is shown in Figure 2. On October 11-12, 2001, Highlander personnel supervised the installation of the well. The well was drilled by Scarborough Drilling, Inc., Lamesa, Texas, using a truck-mounted air rotary drill rig. The water well was completed to a total depth of 218' below surface into the redbed. The well was constructed using 6-inch diameter schedule 40 PVC threaded casing and 60 feet of screen (0.035 mill-slot). The well screen was surrounded with pea gravel, which was placed from the bottom of the well to about 85 feet below surface, above the screen. A layer of bentonite pellets, approximately 3 feet thick, was placed over the filter sand pack and hydrated with water. The annular space from the top of the bentonite pellets was filled with Portland cement and bentonite grout. The well was developed using the rig bailer. The well completion and sample description logs are shown in Appendix C.

On November 14, 2001, Highlander purged and sampled Extraction Well #3, which had a chloride level of 4,050 mg/l. The submersible pump from Extraction Well #2 was removed and installed into Extraction Well #3.

Conclusions

1. Three wells (TW-9, TW-15 and TW23) showed chloride levels fluctuating above and below the WQCC standard of 250 mg/l for samples taken in 2001. Historically, TW-9 and TW-15 have shown chloride levels below the WQCC standard. All other wells, including Extraction Wells #1 and #2 were below WQCC standards.

2. On June 14, 2001, the water level in TW-23 had dropped to a low of 127.56' and the chloride level had risen to a high of 5,330 mg/l for the year. On August 10, 2001, the water level rose to 215.86' and the chloride level was 2,420 mg/l/. The TW-23 hydrograph and chloride concentration graph may indicate that there is a cycle between water level fluctuation and chloride content. As water levels rise, residual salts in soil from the original casing leak may be flushed out of the soil in the vicinity of TW-23. This influx of additional chloride may not fully manifest itself until water levels fall and chloride is concentrated in the vicinity of the wellbore. Based on the chloride levels detected in the surrounding monitor wells and the two recovery wells, the chloride level encountered in TW-23 appears to be confined and shows no indication of horizontal migration

3. Highlander personnel supervised the installation of Extraction Well #3, near monitor well TW-23 to aid in remediation of residual salt near the source of the original casing leak (Well

VG SAU #58). Extraction Well #3 was completed to a total depth of 218' below surface into the top of the Triassic redbed. When sampled upon completion, the chloride level was 4,050 mg/l. After development of the well, the submersible pump from Extraction Well #2 was removed and installed into Extraction Well #3. Extraction Well #3 will be included in the monitoring program.

Recommendations

Based on the chloride levels detected in TW-23, Highlander proposes to monitor the Site for one additional year. Semi-annual monitoring is proposed on wells TW-9, TW-11, TW-14, TW-15, TW-17, TW-19 and TW-23, as well as Extraction Wells #1, #2 and #3 for chloride evaluation. Quarterly sampling is proposed on TW-23 and Extraction Well #3 to monitor the progress of the remediation at the Site.

Highlander appreciates the opportunity to support ChevronTexaco on this project. Please call if you have questions.

Sincerely,
Highlander Environmental Corp.

Ike Tavarez by MK
Ike Tavarez
Geologist/Project Manager

CC: Rodney Bailey - ChevronTexaco Corporation.

ChevronTexaco Corporation
Buckeye Vacuum Field Unit
Lea County, New Mexico

Chronology of Events

1989	Texaco and NMOCD installed twenty-three (23) monitor wells (TW-1 through TW-23) and two extraction wells (#1 and #2) to locate the source and define the extent of chloride contamination.
2-19-90	Unichem International sampled monitor wells (TW-1 through TW-23) for chloride.
3-26-90	Unichem International sampled monitor wells (TW-1 through TW-23) for chloride.
5-1-90	Unichem International sampled monitor wells (TW-1 through TW-23) for chloride.
1-7-98	Highlander personnel performed groundwater monitoring. Sampled monitor wells (TW-1 through TW-23) and two (2) extraction wells (#1 and #2) for chloride.
2-24-98	Highlander resampled monitor well TW-23.
4-7-98	Highlander performed groundwater monitoring. Sampled monitor wells (TW-1 through TW-23) and two (2) extraction wells (#1 and #2) for chloride.
May 1998	Highlander submitted Report " Results of Groundwater Monitoring" to the NMOCD. The report contained recommendations for monitor well plugging and future closure of the Site.
8-19-98	NMOCD response letter requested BTEX samples from all (23) monitor wells and (2) extraction wells.
9-2-98	Highlander performed groundwater monitoring. Sampled monitor wells (TW-1 through TW-23) and two (2) extraction wells (#1 and #2) for chloride and BTEX.
October 1998	Highlander submitted "Groundwater Monitoring Report" to NMOCD. Proposed to plug sixteen (16) monitor wells and continue to monitor seven (7) monitor wells and two (2) extraction wells (#1 and #2) on a quarterly basis for 1 year.

1-29-98	NMOCD response letter approved recommendation to monitor the seven (7) monitor wells listed in the Groundwater Monitoring Report. However, three additional monitor wells, TW-10, TW-13, and TW-20, were included in the quarterly monitoring program. NMOCD requested a work plan for the plugging and abandonment of the monitor wells.
2-22-99	Highlander performed 1st quarter monitoring, sampling ten (10) monitor wells, and two extraction wells (#1 and #2) at the Site.
4-14-99	Highlander submitted "Workplan for Plugging of Monitor wells" to plug 13 monitor wells.
5-26-99	Highlander performed 2nd quarter monitoring, sampling ten (10) monitor wells, and two extraction wells (#1 and #2) at the Site.
6-14-99	NMOCD response letter approved the workplan for plugging (13) monitor wells.
7-22-99 11-18-99	Scarborough Drilling Inc. plugged (13) monitor wells. (TW-1, TW-2, TW-3, TW-4, TW-5, TW-6, TW-7, TW-8, TW-12, TW-16, TW-18, TW-21, and TW-22)
8-19-99	Highlander performed 3rd quarter monitoring, sampling ten (10) monitor wells, and two extraction wells (#1 and #2) at the Site.
9-21-99	Highlander sampled TW-23 (monthly basis).
10-25-99	Highlander sampled TW-23 (monthly basis).
11-22-99	Highlander performed 4th quarter monitoring, sampling ten (10) monitor wells, and two extraction wells (#1 and #2) at the Site.
12-22-99	Surveyed current monitor wells and extraction wells.
2000	Texaco plugged VG SAU Well #58.
4-26-00	Highlander performed semi-annual monitoring, sampling (6) monitor wells, and two extraction wells (#1 and #2) at the Site. As directed by the NMOCD.
11-21-00	Highlander performed annual monitoring, sampling (6) monitor wells, and two extraction wells (#1 and #2) at the Site.

Dec. 2000	Highlander submitted the 2000 Annual Groundwater Monitoring Report to the NMOCD for review.
2-23-01	Highlander performed quarterly monitoring sampling on TW-23.
6-14-01	Highlander performed annual monitoring, sampling (6) monitor wells, and two extraction wells (#1 and #2) at the Site.
8-10-01	Highlander performed quarterly monitoring sampling on TW-23.
10-11-01	Highlander supervised the installation of water well (extraction well #3) near TW-23 for remediation.
11-14-01	Highlander performed annual monitoring, sampling (10) monitor wells and two extraction wells (#1 and #2) at the Site.
12-12-01	The submersible pump from extraction well #2 was removed and installed into extraction well #3.
12-17-01	ChevronTexaco started pumping Extraction Well #3.

FIGURES

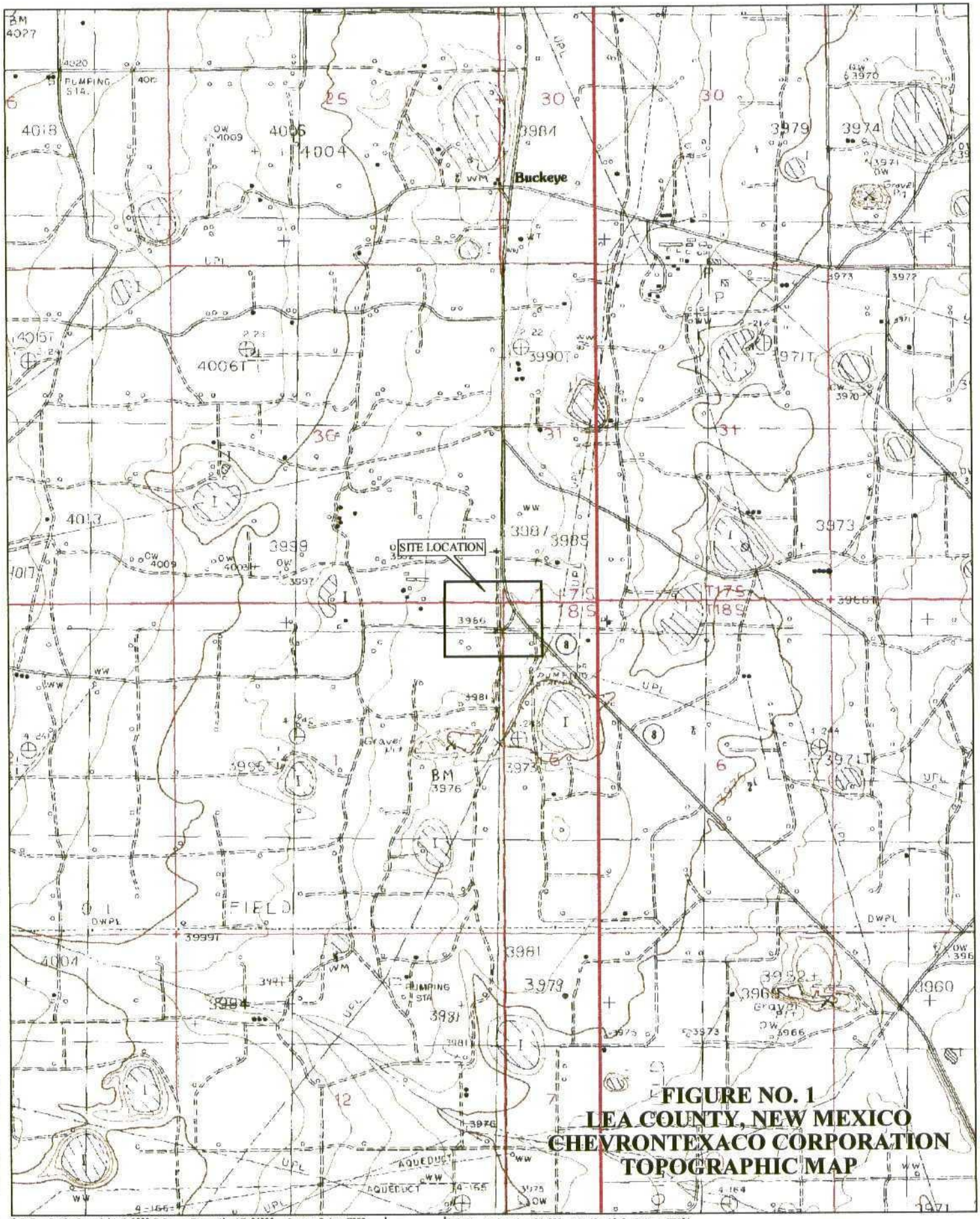
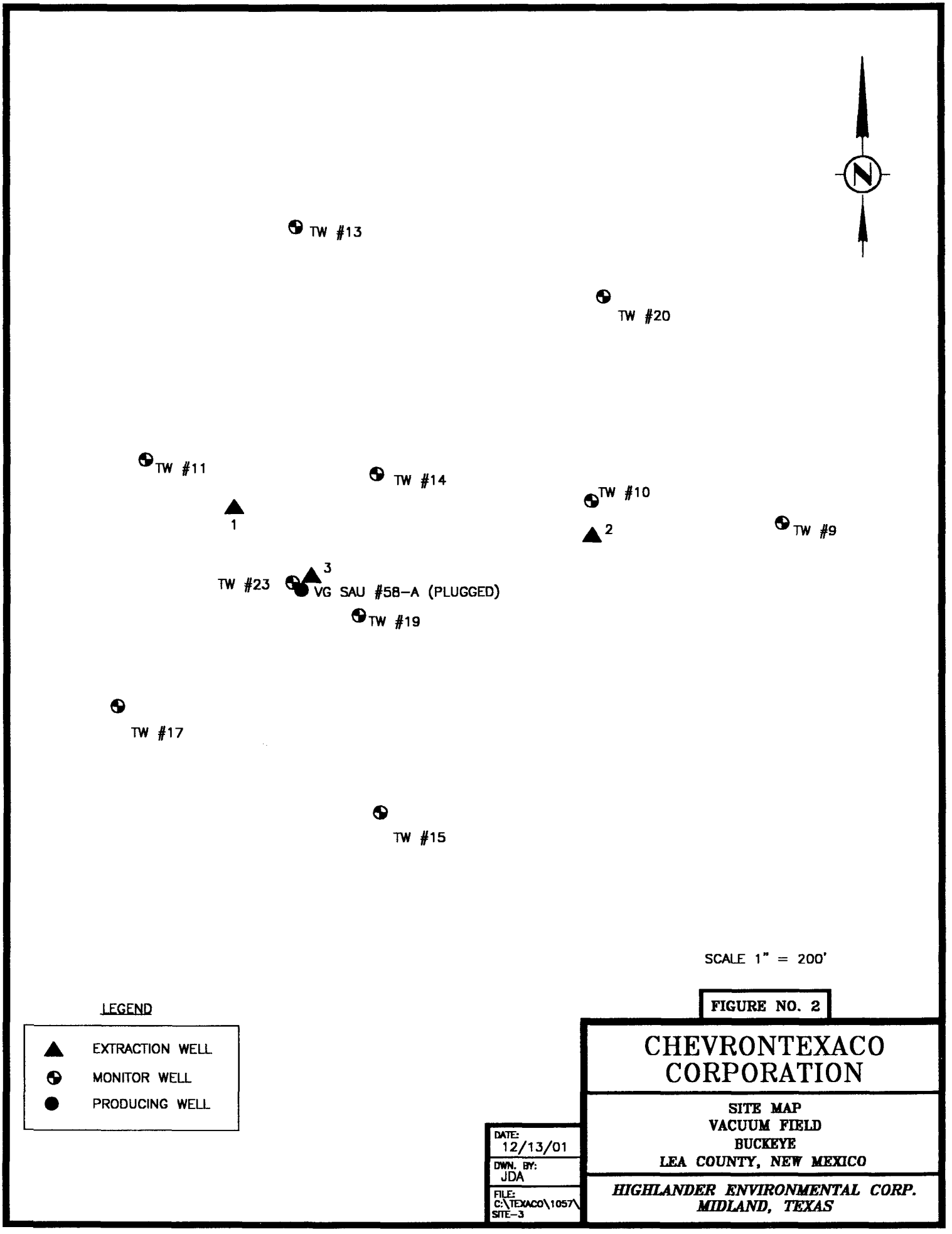


FIGURE NO. 1
LEA COUNTY, NEW MEXICO
CHEVRONTEXACO CORPORATION
TOPOGRAPHIC MAP



SCALE 1" = 200'

LEGEND

- EXTRACTION WELL
- MONITOR WELL
- PRODUCING WELL

FIGURE NO. 2

CHEVRONTEXACO CORPORATION

SITE MAP
VACUUM FIELD
BUCKEYE
LEA COUNTY, NEW MEXICO

DATE: 12/13/01
DWN. BY: JDA
FILE: C:\TEXACO\1057\SITE-3

HIGHLANDER ENVIRONMENTAL CORP.
MIDLAND, TEXAS

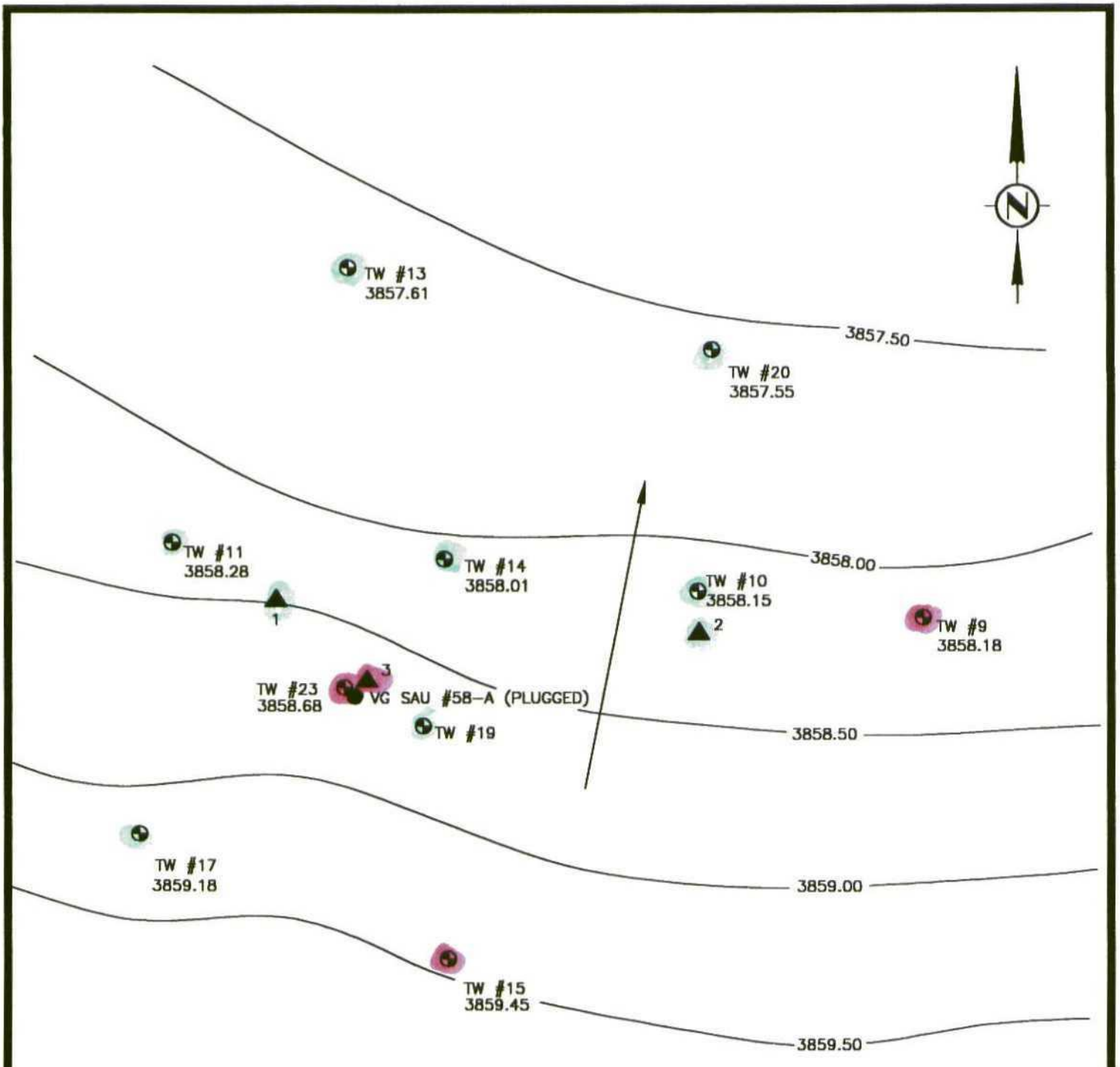


FIGURE NO. 3

CHEVRONTEXACO CORPORATION

WATER TABLE MAP (11/13/01)
VACUUM FIELD
BUCKEYE
LEA COUNTY, NEW MEXICO

DATE: 12/13/01
DWN. BY: JDA
FILE: C:\TEXACO\1057\GW-TABLE-11-01

HIGHLANDER ENVIRONMENTAL CORP.
MIDLAND, TEXAS

TABLES

Table 1
ChevronTexaco Corporation
Cumulative Depth to Water Measuement
Buckeye, Vacuum Field Unit
Lea County, New Mexico

Monitoring Date	TW-9	TW-10	TW-11	TW-13	TW-14	TW-15	TW-17	TW-19	TW-20	TW-23	EW-1	EW-2	EW-3
2/22/99	-	-	-	-	-	-	-	-	-	-	-	-	
05/26/99	129.97	129.49	130.29	130.20	128.19	124.04	125.26	124.69	130.25	125.82	-	-	
08/19/99	130.15	129.74	130.50	130.44	128.46	124.23	125.46	124.90	130.42	126.00	-	-	
11/22/99	129.72	129.25	130.70	129.70	128.03	123.94	125.30	124.55	129.99	125.66	-	-	
12/22/99	129.93	129.58	130.37	130.20	128.23	124.06	125.38	124.77	130.21	125.89	-	**138.6	
4/26/00	-	-	129.33	-	127.12	123.46	124.62	123.80	-	124.78			
11/21/00	129.97	129.51	130.37	130.34	128.21	124.05	125.32	*	130.31	125.82	-	-	
2/23/01	-	-	-	-	-	-	-	-	-	125.62	-	-	
6/14/01	-	-	131.1	-	129.86	124.72	126.01	*127.04	-	127.56	-	-	
8/10/01	-	-	-	-	-	-	-	-	-	125.86	-	-	
11/13/01	130.42	129.62	130.86	131.09	128.66	124.62	126.04	*126.6	130.84	126.08			126.18

Measurements collected top of casing

** Pumping level

(-) No Data

* Damaged Top Casing

EW - extraction well

Elevation of Top of Casing (ft)	TW-9	TW-10	TW-11	TW-13	TW-14	TW-15	TW-17	TW-19	TW-20	TW-23	EW-1	EW-2	EW-3
	3988.60	3987.77	3989.14	3988.70	3986.67	3984.07	3985.22	3983.73	3988.39	3984.76	3986.90	3986.99	-

November 13, 2001 - Data													
Elevation of Top of Groundwater (ft)	TW-9	TW-10	TW-11	TW-13	TW-14	TW-15	TW-17	TW-19	TW-20	TW-23	EW-1	EW-2	EW-3
	3858.18	3858.15	3858.28	3857.61	3858.01	3859.45	3859.18	3857.13	3857.55	3858.68	-	-	-

Groundwater elevations calculated using the 11-13-01 water level data

Table 2

ChevronTexaco Corporation

Cumulative Groundwater Sample Results

Buckeye, Vacuum Field Unit

Lea County, New Mexico

Sample ID	1st Quarter	2nd Quarter	3rd Quarter	Monthly Monitoring	Monthly Monitoring	4th Quarter
	2/22/99	5/26/99	8/19/99	9/21/99	10/25/99	11/22/99
	Chloride (mg/l)					
TW-9	370	290	200	-	-	170
TW-10	36	23	44	-	-	29
TW-11	40	26	42	-	-	32
TW-13	83	45	72	-	-	57
TW-14	42	64	45	-	-	43
TW-15	120	120	170	-	-	180
TW-17	29	23	36	-	-	34
TW-19	27	22	36	-	-	32
TW-20	31	26	20	-	-	33
TW-23	1,100	1,400	2,400	1,000	1,300	1,400
Ex. Well #1	190	160	190	-	-	170
Ex. Well #2	200	150	200	-	-	180

Not Sampled (-)

Table 3
ChevronTexaco Corporation
2000 Cumulative Groundwater Sample Results

Buckeye, Vacuum Field Unit
Lea County, New Mexico

Sample ID	Semi-Annual Sampling 4/26/00 Chloride (mg/l)	Annual Sampling 11/21/00 Chloride (mg/l)
TW-9	-	-
TW-10	-	-
TW-11	43	33
TW-13	-	-
TW-14	39	38
TW-15	260	260
TW-17	29	190
TW-19	36	*
TW-20	-	-
TW-23	830	2,300
Ex. Well #1	170	170
Ex. Well #2	200	200

(-) Not sampled
* damaged top casing

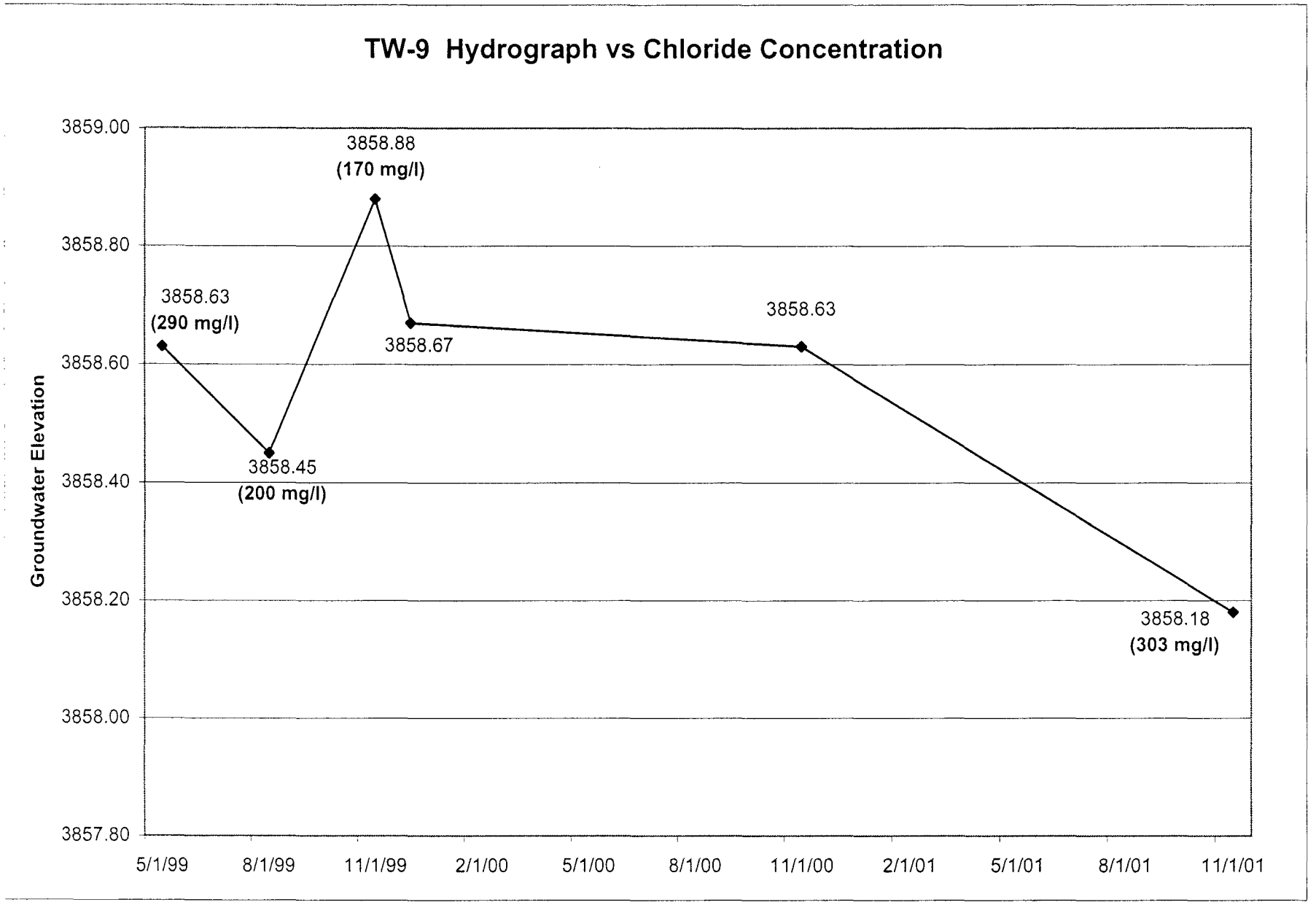
Table 4
ChevronTexaco Corporation
2001 Cumulative Groundwater Sample Results

Buckeye, Vacuum Field Unit
Lea County, New Mexico

Sample ID	1st Quarter	Semi-Annual Sampling	3rd Quarter	Semi-Annual Sampling
	2/23/01	6/14/01	8/10/01	11/14/01
	Chloride (mg/l)			
TW-9	-	-	-	303
TW-10	-	-	-	39.2
TW-11	-	39.6	-	34.8
TW-13	-	-	-	47.8
TW-14	-	39.4	-	41.5
TW-15	-	233	-	383
TW-17	-	31.9	-	27.2
TW-19	-	-	-	25.8
TW-20	-	-	-	37
TW-23	2,700 / 3,000	5,330	2,420	1,070
Ex. Well #1	-	156	-	217
Ex. Well #2	-	205	-	223
Ex. Well #3	-	-	-	4,050

Not Sampled (-)

APPENDIX A


TW-9 Hydrograph vs Chloride Concentration
Groundwater Elevation
3859.00
3858.80
3858.60
3858.40
3858.20
3858.00
3857.80
3858.63
(290 mg/l)
3858.45
(200 mg/l)
3858.88
(170 mg/l)
3858.67
3858.63
3858.18
(303 mg/l)
5/1/99
8/1/99
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5/1/01
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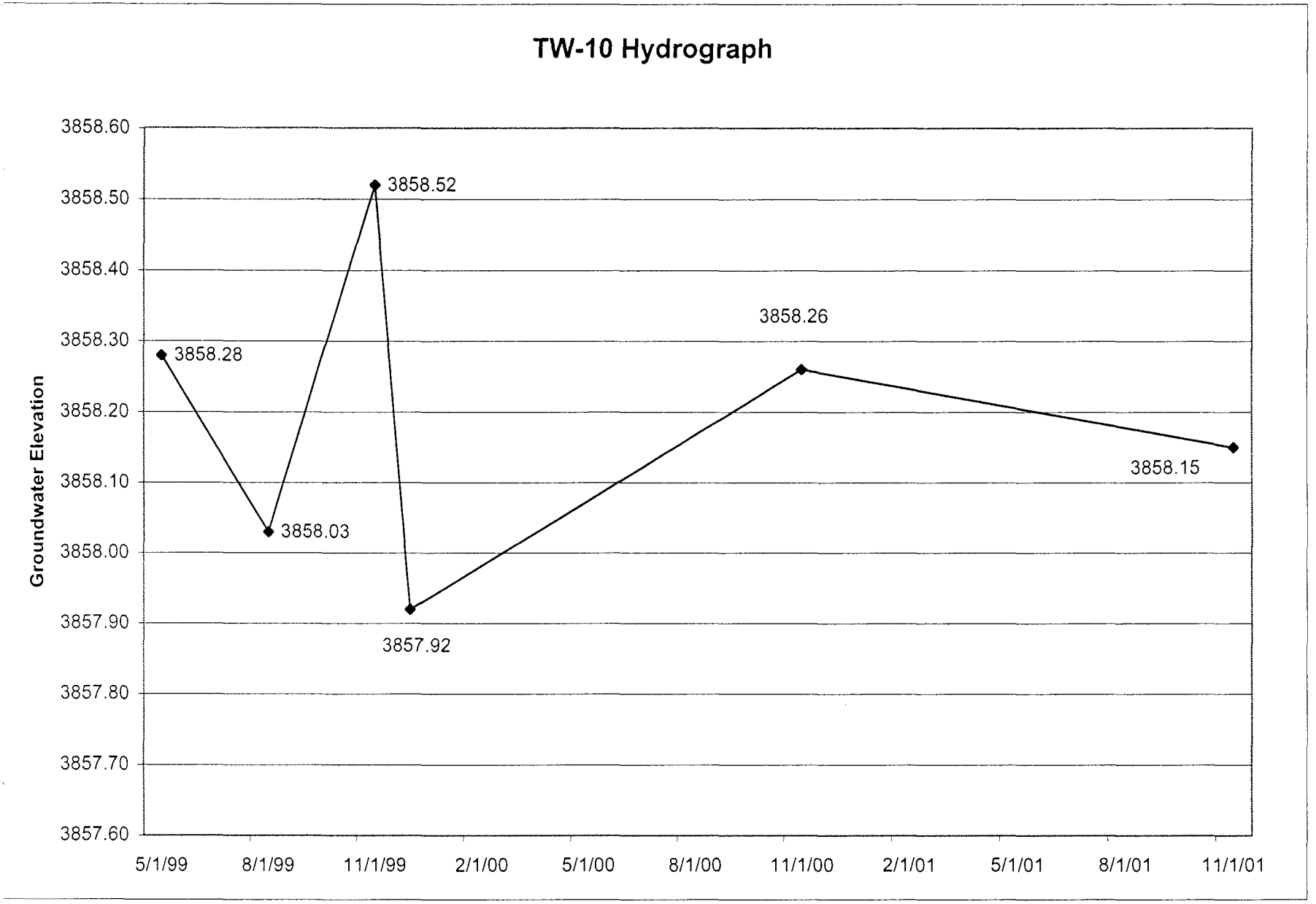
11/1/01


TW-10 Hydrograph
Groundwater Elevation
3858.60
3858.50
3858.40
3858.30
3858.20
3858.10
3858.00
3857.90
3857.80
3857.70
3857.60
3858.28
3858.03
3858.52
3857.92
3858.26
3858.15
5/1/99
8/1/99
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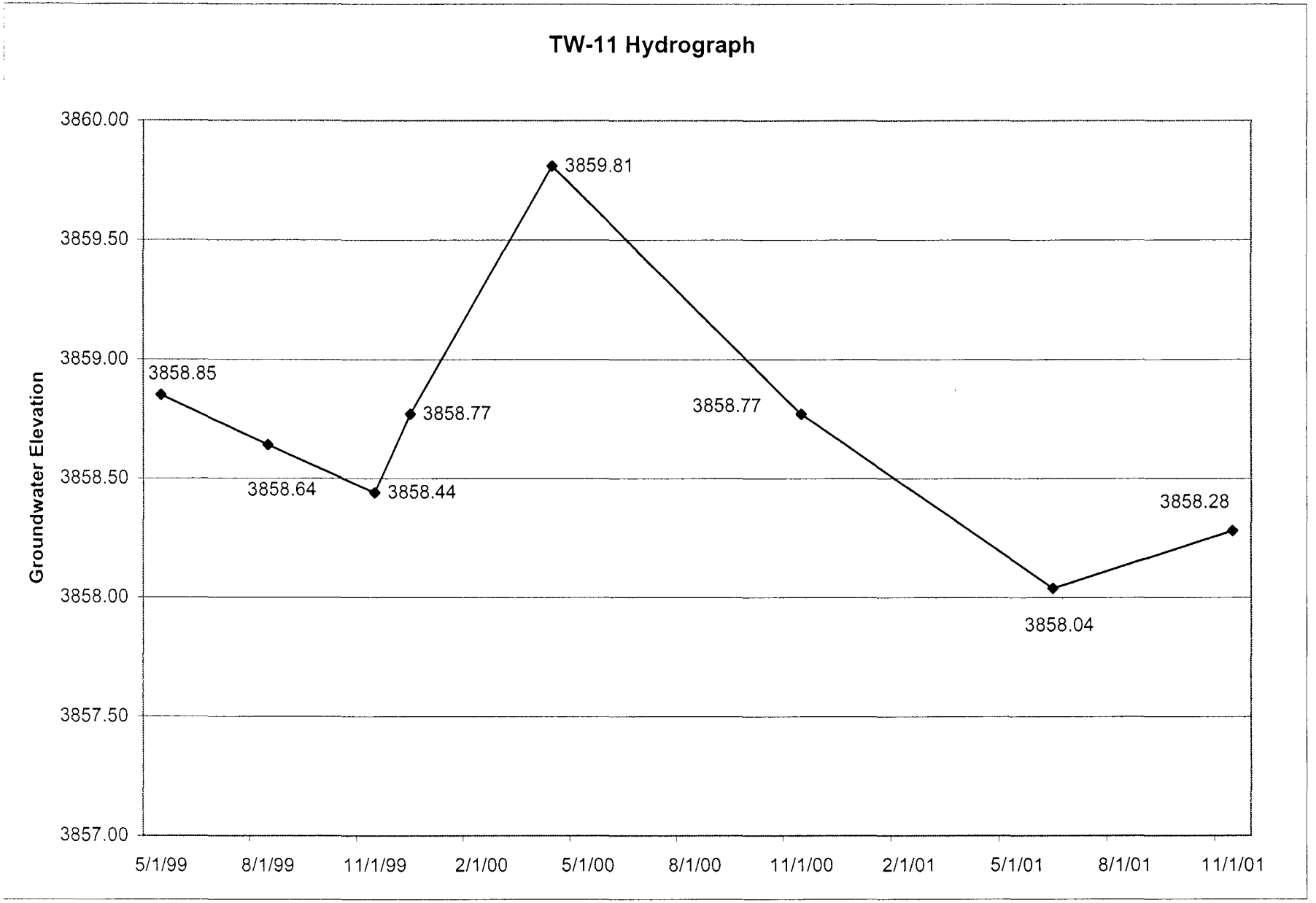
8/1/01
11/1/01


TW-11 Hydrograph
Groundwater Elevation
3860.00
3859.50
3859.00
3858.50
3858.00
3857.50
3857.00
3858.85
3858.64
3858.44
3858.77
3859.81
3858.77
3858.04
3858.28
5/1/99
8/1/99
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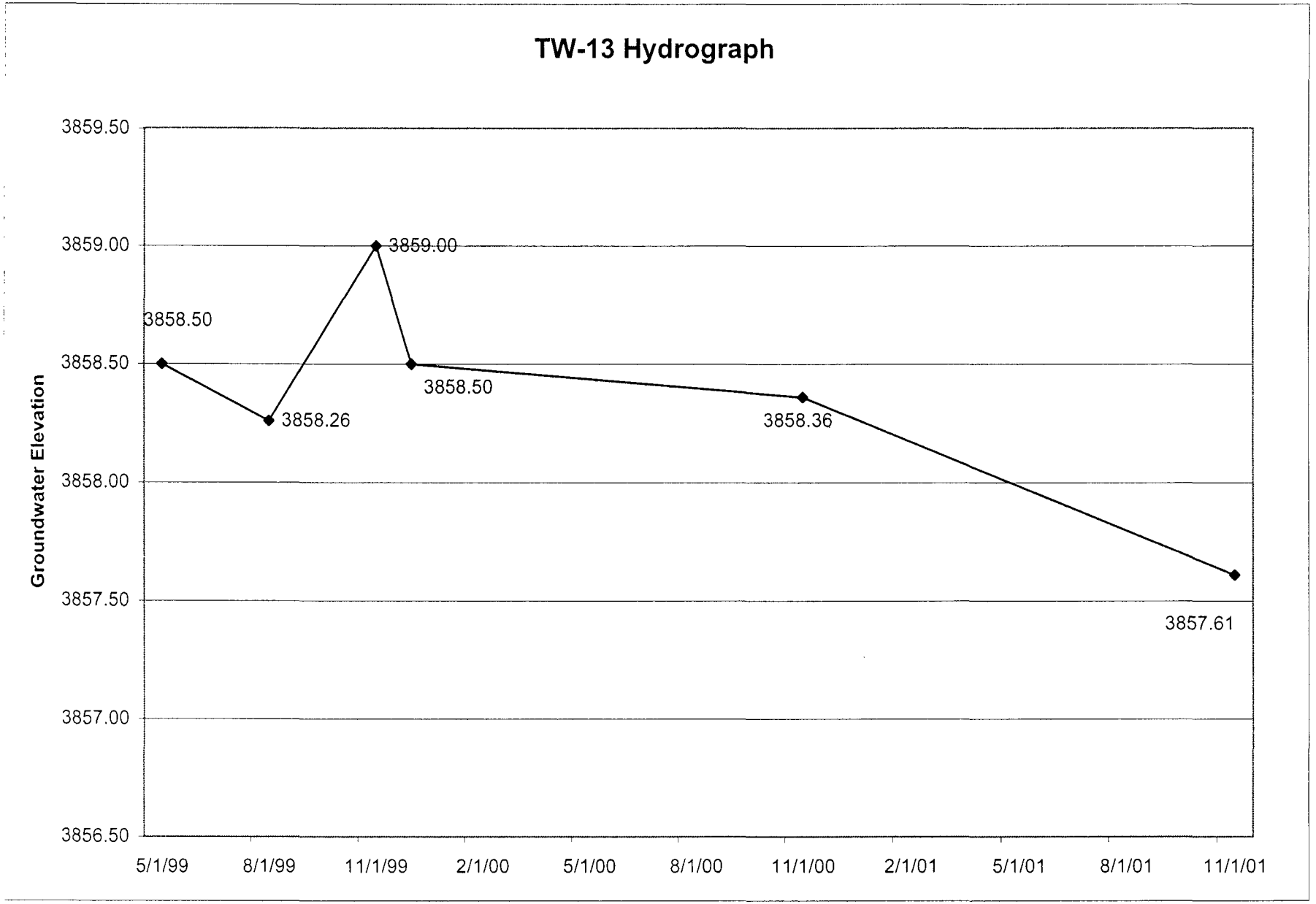
11/1/01


TW-13 Hydrograph
Groundwater Elevation
3859.50
3859.00
3858.50
3858.00
3857.50
3857.00
3856.50
3858.50
3858.26
3859.00
3858.50
3858.36
3857.61
5/1/99
8/1/99
11/1/99
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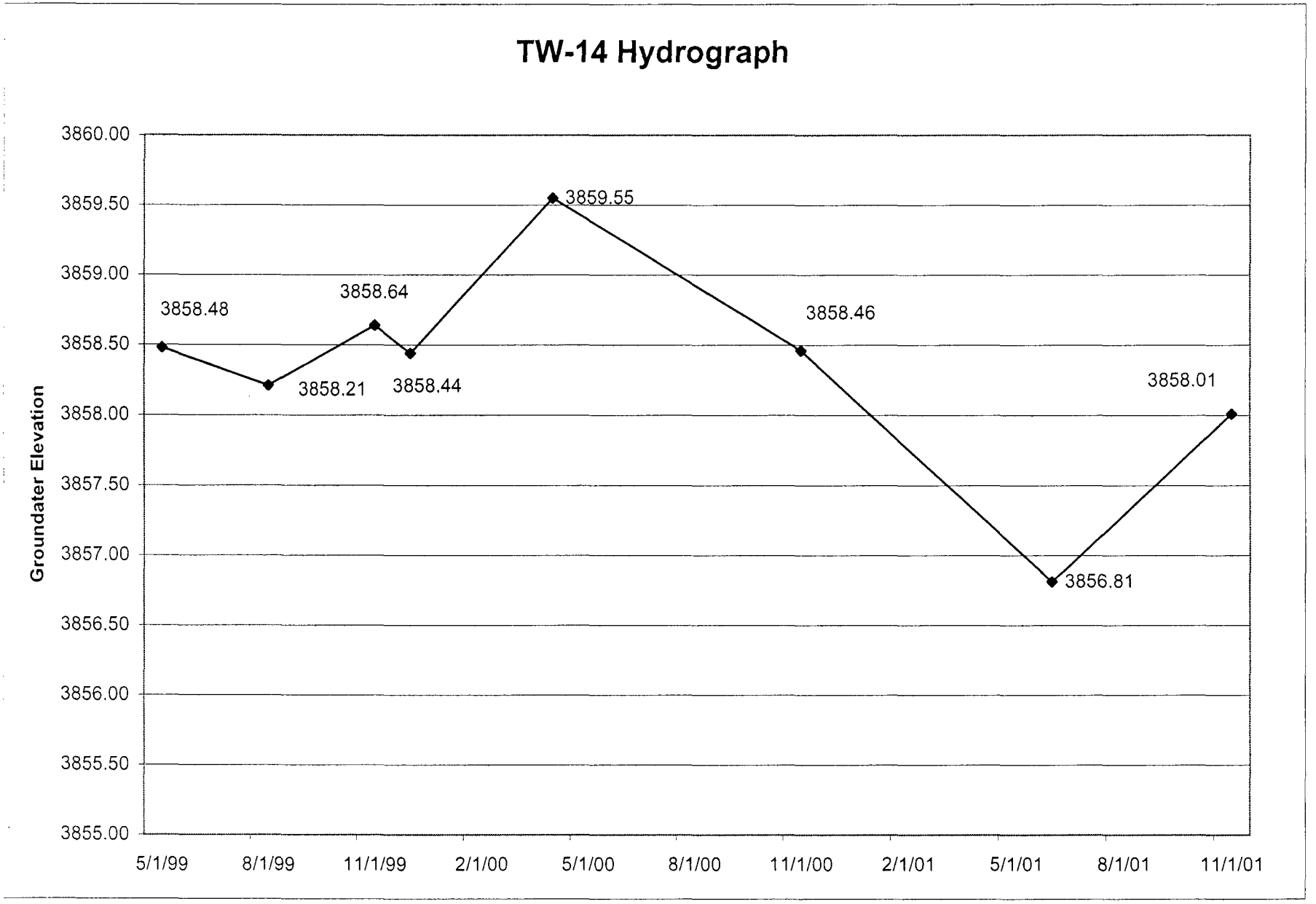
2/1/01
5/1/01
8/1/01
11/1/01


TW-14 Hydrograph
Groundater Elevation
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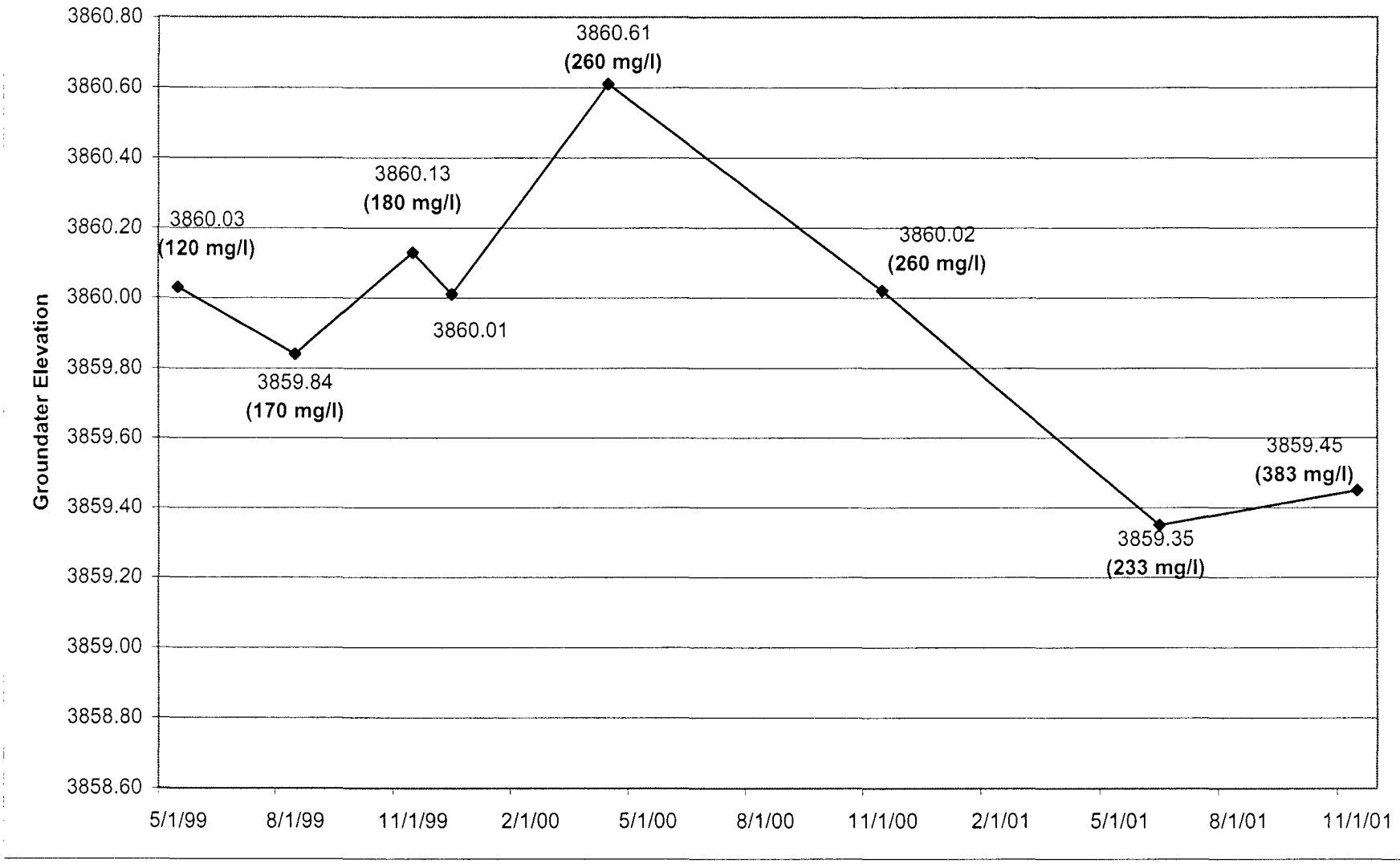
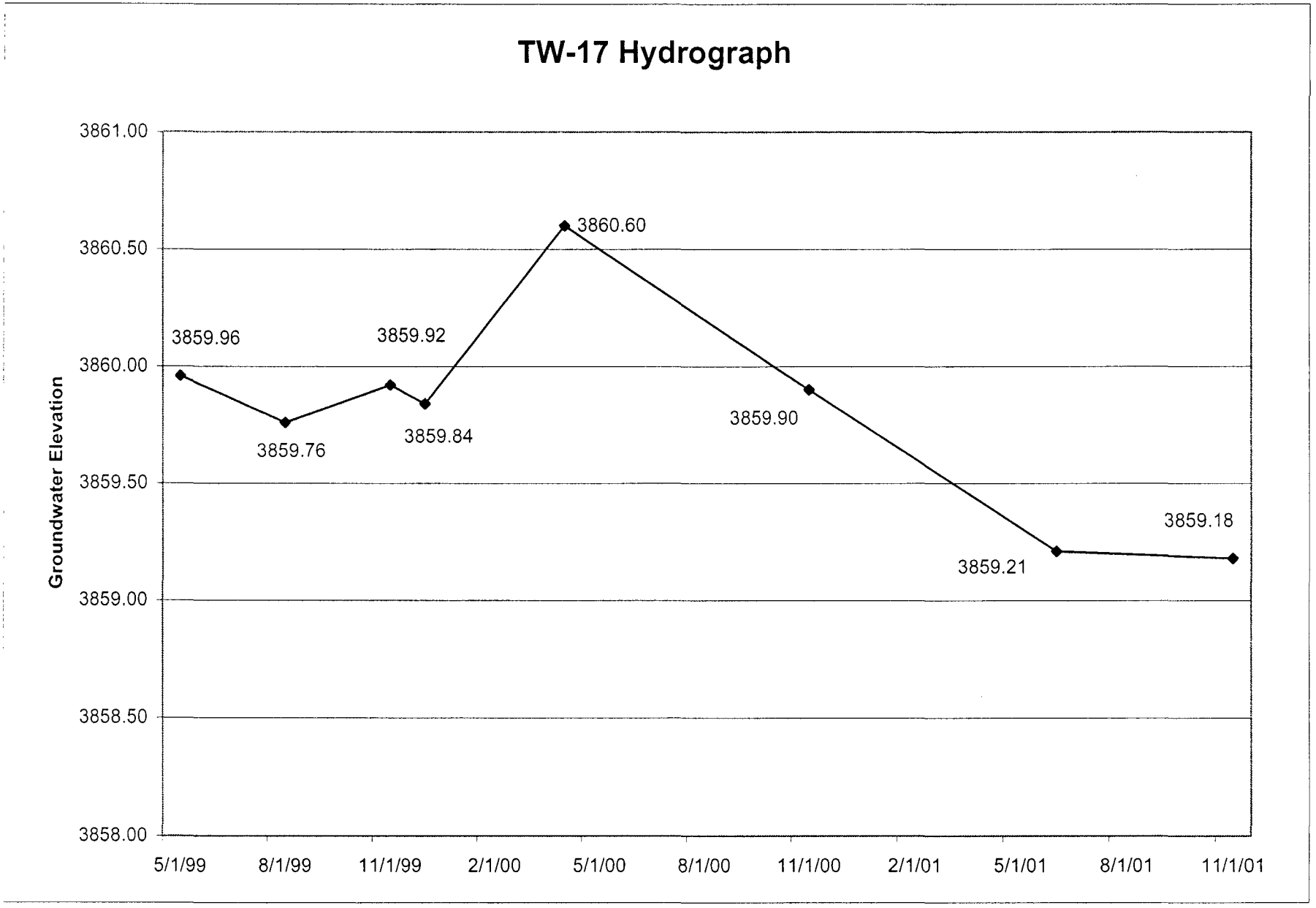
3859.50
3859.00
3858.50
3858.00
3857.50
3857.00
3856.50
3856.00
3855.50
3855.00
3858.48
3858.21
3858.64
3858.44
3859.55
3858.46
3856.81
3858.01
5/1/99
8/1/99
11/1/99
2/1/00
5/1/00
8/1/00
11/1/00
2/1/01
5/1/01
8/1/01
11/1/01

TW-15 Hydrograph vs Chloride Concentrations




TW-17 Hydrograph
Groundwater Elevation
3861.00
3860.50
3860.00
3859.50
3859.00
3858.50
3858.00
3859.96
3859.76
3859.92
3859.84
3860.60
3859.90
3859.21
3859.18
5/1/99
8/1/99
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2/1/01
5/1/01
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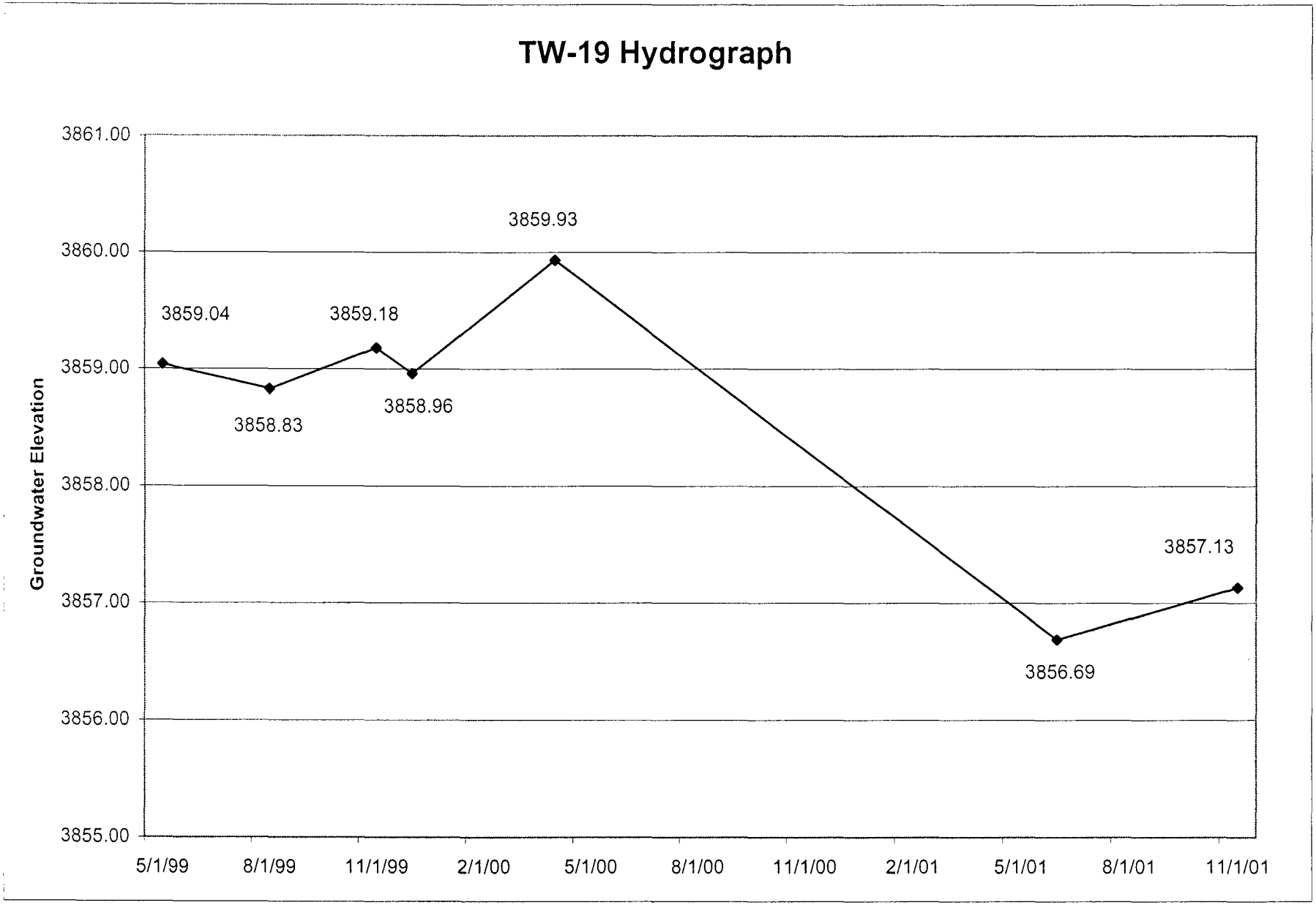
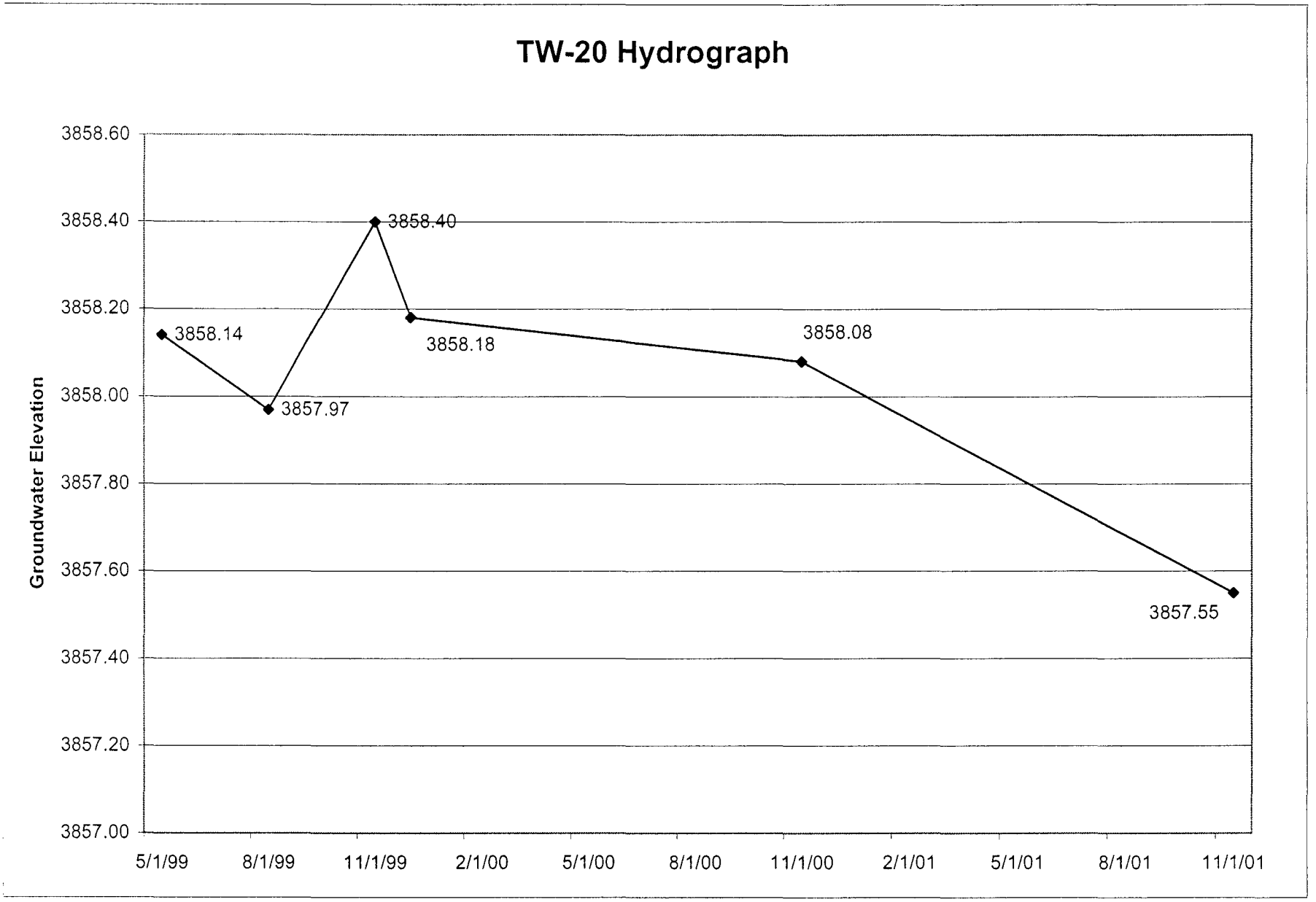
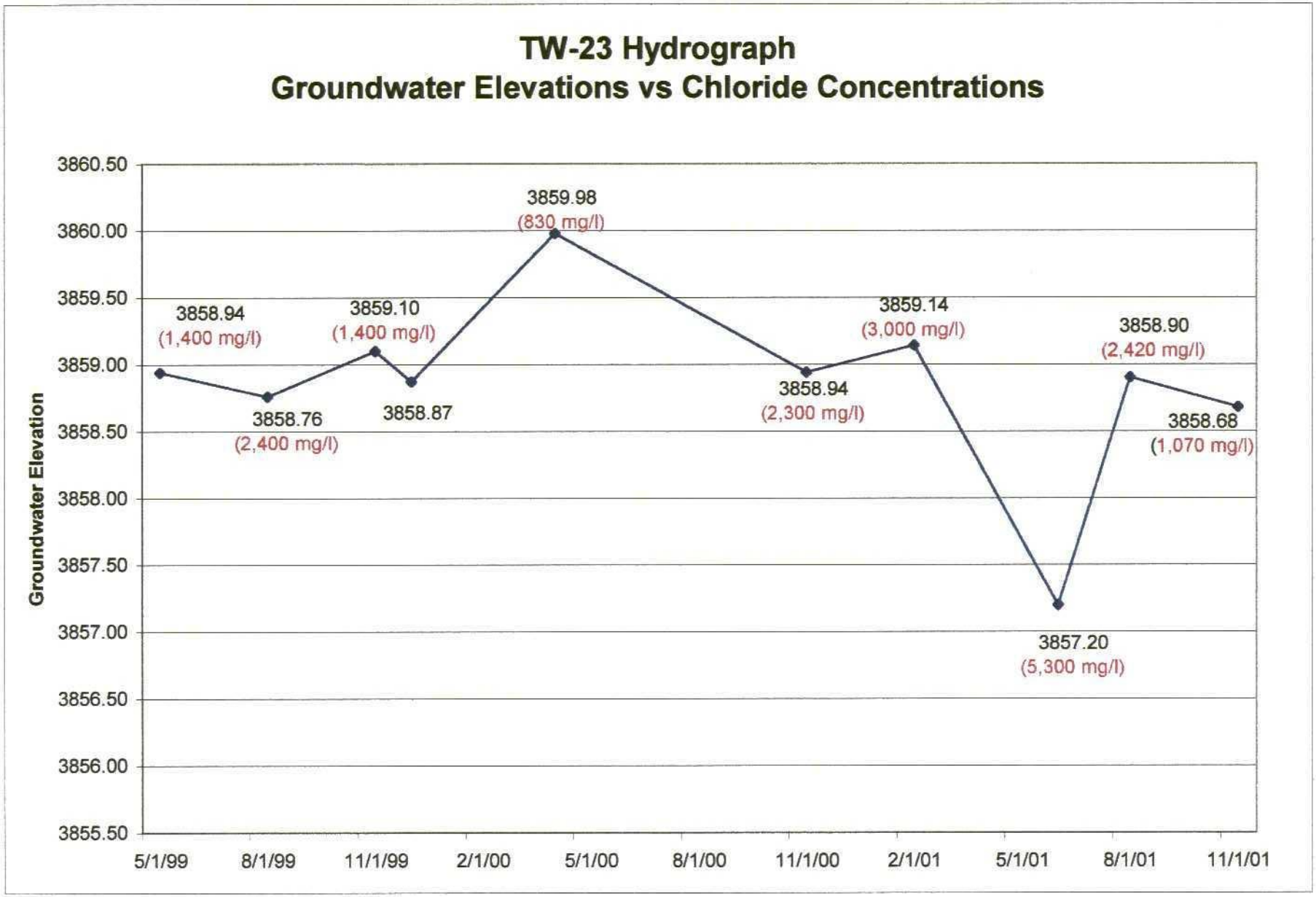
11/1/01


TW-19 Hydrograph
Groundwater Elevation
3861.00
3860.00
3859.00
3858.00
3857.00
3856.00
3855.00
3859.04
3858.83
3859.18
3858.96
3859.93
3856.69
3857.13
5/1/99
8/1/99
11/1/99
2/1/00
5/1/00
8/1/00
11/1/00
2/1/01
5/1/01
8/1/01
11/1/01


TW-20 Hydrograph
Groundwater Elevation
3858.60
3858.40
3858.20
3858.00
3857.80
3857.60
3857.40
3857.20
3857.00
3858.14
3857.97
3858.40
3858.18
3858.08
3857.55
5/1/99
8/1/99
11/1/99
2/1/00
5/1/00
8/1/00
11/1/00
2/1/01
5/1/01
8/1/01
11/1/01


TW-23 Hydrograph
Groundwater Elevations vs Chloride Concentrations
Groundwater Elevation
3860.50
3860.00
3859.50
3859.00
3858.50
3858.00
3857.50
3857.00
3856.50
3856.00
3855.50
3858.94
(1,400 mg/l)
3858.76
(2,400 mg/l)
3859.10
(1,400 mg/l)
3858.87
3859.98
(830 mg/l)
3858.94
(2,300 mg/l)
3859.14
(3,000 mg/l)
3857.20
(5,300 mg/l)
3858.90
(2,420 mg/l)
3858.68
(1,070 mg/l)
5/1/99
8/1/99
11/1/99
2/1/00
5/1/00
8/1/00
11/1/00
2/1/01
5/1/01
8/1/01
11/1/01

APPENDIX B

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

Ike Tavarez
Highlander Environmental Services
1910 N. Big Spring St.
Midland, TX 79705

Report Date: March 7, 2001

Order ID Number: A01022727

Project Number: 1057
Project Name: Texaco/Texaco-Vacuum Field Bukeye
Project Location: Lea County,New Mexico

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
165830	TW-23 #1	Water	2/23/01	12:50	2/27/01
165831	TW-23 #2	Water	2/23/01	14:00	2/27/01

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.

Dr. Blair Leftwich, Director

Analytical Report

Sample: 165830 - TW-23 #1

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC09436 Date Analyzed: 2/28/01
Analyst: JS Preparation Method: N/A Prep Batch: PB08103 Date Prepared: 2/28/01

Param	Flag	Result	Units	Dilution	RDL
CL		2700	mg/L	100	0.50

Sample: 165831 - TW-23 #2

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC09436 Date Analyzed: 2/28/01
Analyst: JS Preparation Method: N/A Prep Batch: PB08103 Date Prepared: 2/28/01

Param	Flag	Result	Units	Dilution	RDL
CL		3000	mg/L	100	0.50

Quality Control Report
Method Blank

Method Blank QCBatch: QC09436

Param	Flag	Results	Units	Reporting Limit
CL		<0.5	mg/L	0.50

Quality Control Report
Lab Control Spikes and Duplicate Spikes

LCS QC Batch: QC09436

Param	Flag	Sample Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec.	RPD	% Rec. Limit	RPD Limit
CL		11.87	mg/L	1	12.50	<0.5	94		80 - 120	20

LCSD QC Batch: QC09436

Param	Flag	Sample Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec.	RPD	% Rec. Limit	RPD Limit
CL		11.89	mg/L	1	12.50	<0.5	95	0	80 - 120	20

Quality Control Report
Matrix Spikes and Duplicate Spikes

MS QC Batch: QC09436

Param	Flag	Sample Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec.	RPD	% Rec. Limit	RPD Limit
CL		4164.07	mg/L	1	1250	3000	93		80 - 120	20

MSD QC Batch: QC09436

Param	Flag	Sample Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec.	RPD	% Rec. Limit	RPD Limit
CL		4171.99	mg/L	1	1250	3000	93	1	80 - 120	20

Quality Control Report
Continuing Calibration Verification Standards

CCV (1)

QC Batch: QC09436

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
CL		mg/L	12.50	11.93	95	80 - 120	2/28/01

ICV (1)

QC Batch: QC09436

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
CL		mg/L	12.50	11.81	94	80 - 120	2/28/01

165830-31

AD102272?

Analysis Request and Chain of Custody Record

HIGHLANDER ENVIRONMENTAL CORP.

1910 N. Big Spring St.
Midland, Texas 79705

(915) 682-4559 Fax (915) 682-3946

PAGE: 1 OF: 1

CLIENT NAME: Texaco E&P, Inc.

SITE MANAGER: IKE Tavarez

PROJECT NO.: 1057

PROJECT NAME: Texaco/Buckeye Vacuum Field Unit Lea County NM.

LAB I.D. NUMBER	DATE	TIME	MATRIX	COMP.	GRAB	SAMPLE IDENTIFICATION	NUMBER OF CONTAINERS	FILTERED (Y/N)	PRESERVATIVE METHOD: HCL	HNO3	ICE	NONE	BTEX 8020/602	MTBE 8020/602	TPH 418.1 8015 MOD. TX1005	PAH 8270	RCRA Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Metals Ag As Ba Cd Cr Pd Hg Se	TCLP Volatiles	TCLP Semi Volatiles	RCI	GC.MS Vol. 8240/8260/624	GC.MS Semi. Vol. 8270/625	PCB's 8080/608	Pest. 808/608	BOD, TSS, pH, TDS, Chloride	Gamma Spec.	Alpha Beta (Air)	PLM (Asbestos)	Chloride
165830	2/23/01	12:50	W		1	TW-23, #1	1				1	-																		X
165831	2/23/01	2:00	W		1	TW-23, #2	1				1	-																		X

RELINQUISHED BY: (Signature) Date: 2/26/01 Time: 3:30PM
RECEIVED BY: (Signature) Allen Skelton Date: 2/26/01 Time: 3:30PM
SAMPLED BY: (Print & Sign) IKE Tavarez Date: Time:

RELINQUISHED BY: (Signature) Allen Skelton Date: 2/26/01 Time: 1830
RECEIVED BY: (Signature) Date: Time:
SAMPLE SHIPPED BY: (Circle) FEDEX BUS UPS HAND DELIVERED AIRBILL # Greyhound OTHER:

RELINQUISHED BY: (Signature) Date: Time:
RECEIVED BY: (Signature) Date: Time:

RECEIVING LABORATORY: Trace Lab
ADDRESS:
CITY: STATE: ZIP:
CONTACT: PHONE:
RECEIVED BY: (Signature) Vicki Hensley
DATE: 2-27-01 TIME: 10:00

HIGHLANDER CONTACT PERSON: IKE Tavarez

Results by:

RUSH Charges Authorized: Yes No

SAMPLE CONDITION WHEN RECEIVED:

MATRIX: W-Water A-Air SD-Solid S-Soil SL-Sludge O-Other

REMARKS:

Please Fill out all copies - Laboratory retains yellow copy - Return original copy to Highlander Enviromental Corp. - Project Manager retains pink copy - Accounting receives Gold copy.

2 samples - H S MS GU-163-573-450-7 5

Summary Report

Ike Tavarez
Highlander Environmental Services
1910 N. Big Spring St.
Midland, TX 79705

Report Date: June 25, 2001

Order ID Number: A01061804

Project Number: 1057
Project Name: Texaco/Texaco-Vacuum Field Bukeye
Project Location: Lea County,New Mexico

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
173404	TW #11	Water	6/14/01	:	6/16/01
173405	TW #14	Water	6/14/01	:	6/16/01
173406	TW #15	Water	6/14/01	:	6/16/01
173407	TW #17	Water	6/14/01	:	6/16/01
173408	Ext. #1	Water	6/14/01	:	6/16/01
173409	Ext. #2	Water	6/14/01	:	6/16/01
173410	TW #23	Water	6/15/01	:	6/16/01

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: 173404 - TW #11

Param	Flag	Result	Units
CL		39.6	mg/L

Sample: 173405 - TW #14

Param	Flag	Result	Units
CL		39.4	mg/L

Sample: 173406 - TW #15

Param	Flag	Result	Units
CL		233	mg/L

Sample: 173407 - TW #17

Param	Flag	Result	Units
CL		31.9	mg/L

Sample: 173408 - Ext. #1

Param	Flag	Result	Units
CL		156	mg/L

Sample: 173409 - Ext. #2

Param	Flag	Result	Units
CL		205	mg/L

Sample: 173410 - TW #23

Param	Flag	Result	Units
CL		5330	mg/L

TRACEANALYSIS, INC.

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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

Ike Tavarez
Highlander Environmental Services
1910 N. Big Spring St.
Midland, TX 79705

Report Date: June 25, 2001

Order ID Number: A01061804

Project Number: 1057
Project Name: Texaco/Texaco-Vacuum Field Bukeye
Project Location: Lea County,New Mexico

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
173404	TW #11	Water	6/14/01	:	6/16/01
173405	TW #14	Water	6/14/01	:	6/16/01
173406	TW #15	Water	6/14/01	:	6/16/01
173407	TW #17	Water	6/14/01	:	6/16/01
173408	Ext. #1	Water	6/14/01	:	6/16/01
173409	Ext. #2	Water	6/14/01	:	6/16/01
173410	TW #23	Water	6/15/01	:	6/16/01

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.

Dr. Blair Leftwich, Director

Analytical Report

Sample: 173404 - TW #11

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC12065 Date Analyzed: 6/18/01
Analyst: JS Preparation Method: N/A Prep Batch: PB10323 Date Prepared: 6/18/01

Param	Flag	Result	Units	Dilution	RDL
CL		39.6	mg/L	5	0.50

Sample: 173405 - TW #14

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC12065 Date Analyzed: 6/18/01
Analyst: JS Preparation Method: N/A Prep Batch: PB10323 Date Prepared: 6/18/01

Param	Flag	Result	Units	Dilution	RDL
CL		39.4	mg/L	5	0.50

Sample: 173406 - TW #15

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC12111 Date Analyzed: 6/18/01
Analyst: JS Preparation Method: N/A Prep Batch: PB10363 Date Prepared: 6/18/01

Param	Flag	Result	Units	Dilution	RDL
CL		233	mg/L	10	0.50

Sample: 173407 - TW #17

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC12111 Date Analyzed: 6/18/01
Analyst: JS Preparation Method: N/A Prep Batch: PB10363 Date Prepared: 6/18/01

Param	Flag	Result	Units	Dilution	RDL
CL		31.9	mg/L	5	0.50

Sample: 173408 - Ext. #1

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC12111 Date Analyzed: 6/18/01
Analyst: JS Preparation Method: N/A Prep Batch: PB10363 Date Prepared: 6/18/01

Param	Flag	Result	Units	Dilution	RDL
CL		156	mg/L	10	0.50

Sample: 173409 - Ext. #2

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC12111 Date Analyzed: 6/18/01
Analyst: JS Preparation Method: N/A Prep Batch: PB10363 Date Prepared: 6/18/01

Param	Flag	Result	Units	Dilution	RDL
CL		205	mg/L	10	0.50

Sample: 173410 - TW #23

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC12111 Date Analyzed: 6/18/01
Analyst: JS Preparation Method: N/A Prep Batch: PB10363 Date Prepared: 6/18/01

Param	Flag	Result	Units	Dilution	RDL
CL		5330	mg/L	500	0.50

Quality Control Report
Method Blank

Method Blank

QCBatch: QC12065

Param	Flag	Results	Units	Reporting Limit
CL		<2.0	mg/L	0.50

Method Blank

QCBatch: QC12111

Param	Flag	Results	Units	Reporting Limit
CL		<2.0	mg/L	0.50

Quality Control Report
Lab Control Spikes and Duplicate Spikes

Laboratory Control Spikes

QCBatch: QC12065

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
CL	11.99	12.23	mg/L	1	12.50	<2.0	95	1	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: QC12111

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
CL	5.19	5.23	mg/L	1	5	<2.0	103	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: QC12065

Param	MS Result	MSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
CL	97.57	99.18	mg/L	1	62.50	39.4	93	2	52 - 131	20

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

Matrix Spikes

QCBatch: QC12111

Param	MS Result	MSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
CL	91.59	90.45	mg/L	1	62.50	31.9	95	1	52 - 131	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: QC12065

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
CL		mg/L	12.50	12.07	96	90 - 110	6/18/01

ICV (1)

QCBatch: QC12065

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
CL		mg/L	12.50	11.89	95	90 - 110	6/18/01

CCV (1)

QCBatch: QC12111

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
CL		mg/L	12.50	12.01	96	90 - 110	6/18/01

ICV (1)

QCBatch: QC12111

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
CL		mg/L	12.50	12.07	96	90 - 110	6/18/01

173404-10

A01061804

Analysis Request and Chain of Custody Record

HIGHLANDER ENVIRONMENTAL CORP.

1910 N. Big Spring St.
Midland, Texas 79705

(915) 682-4559 Fax (915) 682-3946

PAGE: 1 OF: 1

CLIENT NAME: Texaco

SITE MANAGER: Ike Tavarez

PROJECT NO.: 1057

PROJECT NAME: Buckeye Sampling

LAB I.D. NUMBER	DATE	TIME	MATRIX	COMP.	GRAB	SAMPLE IDENTIFICATION	NUMBER OF CONTAINERS	FILTERED (Y/N)	PRESERVATIVE METHOD: HCL	HNO3	ICE	NONE	ANALYSIS REQUEST (Circle or Specify Method No.)
173404	6/14/01	1210	W			TW #11	1				X		Chloride
05	6/14/01	1305	W			TW #14	1				X		
06	6/14/01	1640	W			TW #15	1				X		
07	6/14/01	1500	W			TW #17	1				X		
08	6/14/01	1235	W			Ext. #1	1				X		
09	6/14/01	1238	W			Ext. #2	1				X		
10	6/15/01	1135	W			TW #23	1				X		

BTEX 8020/602
MTBE 8020/602
TPH 418.1 8015 MOD. TX1005
PAH 8270
RCRA Metals Ag As Ba Cd Cr Pb Hg Se
TCLP Metals Ag As Ba Cd Cr Pd Hg Se
TCLP Volatiles
TCLP Semi Volatiles
RCI
GC/MS Vol. 8240/8260/624
GC/MS Semi. Vol. 8270/625
PCB's 8080/608
Pest. 808/608
BOD, TSS, pH, TDS, Chloride
Gamma Spec.
Alpha Beta (Air)
PLM (Asbestos)

RELINQUISHED BY: (Signature) Date: 6/15/0 Time: 14:55
RECEIVED BY: (Signature) Date: 6/15 Time: 1500

RELINQUISHED BY: (Signature) Date: 6/15 Time: 1615
RECEIVED BY: (Signature) Date: Time:

RELINQUISHED BY: (Signature) Date: Time:
RECEIVED BY: (Signature) Date: Time:

SAMPLED BY: (Print & Sign) Lynda Ward Date: 6/15/01 Time:

SAMPLE SHIPPED BY: (Circle) FEDEX RUS HAND DELIVERED UPS AIRBILL # 163566 5780 OTHER:

RECEIVING LABORATORY: Trace Analysis
ADDRESS:
CITY: Lubbock STATE: TX ZIP:
CONTACT: PHONE:

RECEIVED BY: (Signature)
DATE: 06/16/01 TIME: 9:30 am

HIGHLANDER CONTACT PERSON: Ike Tavarez

Results by:

RUSH Charges Authorized: Yes No

SAMPLE CONDITION WHEN RECEIVED: 4°C

MATRIX: W-Water A-Air SD-Solid S-Soil SL-Sludge O-Other

REMARKS: 4/24

Please Fill out all copies - Laboratory retains yellow copy - Return original copy to Highlander Enviromental Corp. - Project Manager retains pink copy - Accounting receives Gold copy.

GLI 163 566 5780

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

Ike Tavarez
Highlander Environmental Services
1910 N. Big Spring St.
Midland, TX 79705

Report Date: August 15, 2001

Order ID Number: A01081406

Project Number: 1057
Project Name: Texaco/Texaco-Vacuum Field Bukeye
Project Location: Lea County,New Mexico

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
177046	MW-23	Water	8/10/01	12:05	8/14/01

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.

This report consists of a total of 4 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: 177046 - MW-23

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC13342 Date Analyzed: 8/14/01
Analyst: JS Preparation Method: N/A Prep Batch: PB11380 Date Prepared: 8/14/01

Param	Flag	Result	Units	Dilution	RDL
CL		2420	mg/L	100	0.50

Quality Control Report
Method Blank

Method Blank

QCBatch: QC13342

Param	Flag	Results	Units	Reporting Limit
CL		<2.0	mg/L	0.50

Quality Control Report
Lab Control Spikes and Duplicate Spikes

Laboratory Control Spikes

QCBatch: QC13342

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
CL	11.88	11.79	mg/L	1	12.50	<2.0	95	0	90 - 110	20
Fluoride	2.35	2.40	mg/L	1	2.50	<0.2	94	2	90 - 110	20
Nitrate-N	2.36	2.35	mg/L	1	2.50	<0.2	94	0	90 - 110	20
Sulfate	11.75	11.83	mg/L	1	12.50	<2.0	94	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: QC13342

Param	MS Result	MSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
CL	3734.90	3699.14	mg/L	1	1250	2420	105	1	52 - 131	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: QC13342

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
CL		mg/L	12.50	12.68	101	90 - 110	8/14/01
Fluoride		mg/L	2.50	2.31	92	90 - 110	8/14/01
Nitrate-N		mg/L	2.50	2.41	96	90 - 110	8/14/01
Sulfate		mg/L	12.50	12.88	103	90 - 110	8/14/01

ICV (1)

QCBatch: QC13342

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
CL		mg/L	12.50	11.83	94	90 - 110	8/14/01
Fluoride		mg/L	2.50	2.33	93	90 - 110	8/14/01
Nitrate-N		mg/L	2.50	2.36	94	90 - 110	8/14/01
Sulfate		mg/L	12.50	11.64	93	90 - 110	8/14/01

Analysis Request and Chain of Custody Record

HIGHLANDER ENVIRONMENTAL CORP.

1910 N. Big Spring St.
Midland, Texas 79705

(915) 682-4559 Fax (915) 682-3946

PAGE: 1 OF: 1

CLIENT NAME: Texaco E&P Inc. SITE MANAGER: Ike Tavarez

PROJECT NO.: 1057 PROJECT NAME: Texaco / Buckeye Vacuum Unit, Lea Co. NM.

LAB I.D. NUMBER	DATE	TIME	MATRIX	COMP.	GRAB	SAMPLE IDENTIFICATION	NUMBER OF CONTAINERS	FILTERED (Y/N)	PRESERVATIVE METHOD: HCL	HNO3	ICE	NONE	BTEX 8020/602	MTBE 8080/608	TPH 418.1 8015 MOD. TX1005	PAH 8270	RCRA Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Metals Ag As Ba Cd Cr Pd Hg Se	TCLP Volatiles	TCLP Semi Volatiles	RCI	GC/MS Vol. 8240/8260/624	GC/MS Semi. Vol. 8270/625	PCB's 8080/608	Pest. 608/608	BOD, TSS, pH, TDS, Chloride	Gamma Spec.	Alpha Beta (Air)	PLM (Asbestos)
177046	8/10/01	1205	W			MW-23	1				X	X														X			

RELINQUISHED BY: (Signature) Date: 8/13/01 Time: 1405
RECEIVED BY: (Signature) Helen Skelton Date: 8/13/01 Time: 1405
SAMPLED BY: (Print & Sign) Lynn Ward / Jim Cornelius Date: Time:

RELINQUISHED BY: (Signature) Helen Skelton Date: 8/13/01 Time: 1830
RECEIVED BY: (Signature) Date: Time:
SAMPLE SHIPPED BY: (Circle) FEDEX BUS UPS HAND DELIVERED Greyhound AIRBILL # OTHER:

RELINQUISHED BY: (Signature) Date: Time:
RECEIVED BY: (Signature) Date: Time:

RECEIVING LABORATORY: Trace Lab.
ADDRESS:
CITY: STATE: ZIP:
CONTACT: PHONE:
RECEIVED BY: (Signature) Vicki Dusek
DATE: 8-14-01 TIME: 10:00

HIGHLANDER CONTACT PERSON: Ike Tavarez
Results by:
RUSH Charges Authorized: Yes No

SAMPLE CONDITION WHEN RECEIVED:

MATRIX: (W-Water) S-Soil A-Air SL-Sludge SD-Solid O-Other

REMARKS: Need Wed. - Aug. 15th

Please Fill out all copies - Laboratory retains yellow copy - Return original copy to Highlander Enviromental Corp. - Project Manager retains pink copy - Accounting receives Gold copy.

Greyhound 1123501057116 1 sample - HS MS

8/15

Summary Report

Ike Tavarez
Highlander Environmental Services
1910 N. Big Spring St.
Midland, TX 79705

Report Date: December 6, 2001

Order ID Number: A01111622

Project Number: Chevron Texaco
Project Name: Buckeye Vacuum Unit
Project Location: Lea County Co.,NM

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
185171	TW-9	Water	11/13/01	12:55	11/16/01
185172	TW-10	Water	11/13/01	13:50	11/16/01
185173	TW-11	Water	11/13/01	16:50	11/16/01
185174	TW-13	Water	11/13/01	11:10	11/16/01
185175	TW-14	Water	11/13/01	14:45	11/16/01
185176	TW-15	Water	11/14/01	10:45	11/16/01
185177	TW-17	Water	11/13/01	16:00	11/16/01
185178	TW-19	Water	11/14/01	10:00	11/16/01
185179	TW-20	Water	11/13/01	12:10	11/16/01
185180	TW-23	Water	11/14/01	11:30	11/16/01
185181	RW-1 (Extraction Well	Water	11/13/01	16:30	11/16/01
185182	RW-2 (Extraction Well)	Water	11/13/01	13:30	11/16/01
185183	RW-3 (Extraction Well)	Water	11/14/01	13:25	11/16/01

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: 185171 - TW-9

Param	Flag	Result	Units
Chloride		303	mg/L

Sample: 185172 - TW-10

Param	Flag	Result	Units
Chloride		39.2	mg/L

Sample: 185173 - TW-11

Param	Flag	Result	Units
Chloride		34.8	mg/L

Sample: 185174 - TW-13

Param	Flag	Result	Units
Chloride		47.8	mg/L

Sample: 185175 - TW-14

Param	Flag	Result	Units
Chloride		41.5	mg/L

Sample: 185176 - TW-15

Param	Flag	Result	Units
Chloride		383	mg/L

Sample: 185177 - TW-17

Param	Flag	Result	Units
Chloride		27.2	mg/L

Sample: 185178 - TW-19

Param	Flag	Result	Units
Chloride		25.8	mg/L

Sample: 185179 - TW-20

Param	Flag	Result	Units
Chloride		37.0	mg/L

Sample: 185180 - TW-23

Param	Flag	Result	Units
Chloride		1070	mg/L

Sample: 185181 - RW-1 (Extraction Well

Param	Flag	Result	Units
Chloride		217	mg/L

Sample: 185182 - RW-2 (Extraction Well)

Param	Flag	Result	Units
Chloride		223	mg/L

Sample: 185183 - RW-3 (Extraction Well)

Param	Flag	Result	Units
Chloride		4050	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

Ike Tavarez
Highlander Environmental Services
1910 N. Big Spring St.
Midland, TX 79705

Report Date: December 6, 2001

Order ID Number: A01111622

Project Number: Chevron Texaco
Project Name: Buckeye Vacuum Unit
Project Location: Lea County Co.,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
185171	TW-9	Water	11/13/01	12:55	11/16/01
185172	TW-10	Water	11/13/01	13:50	11/16/01
185173	TW-11	Water	11/13/01	16:50	11/16/01
185174	TW-13	Water	11/13/01	11:10	11/16/01
185175	TW-14	Water	11/13/01	14:45	11/16/01
185176	TW-15	Water	11/14/01	10:45	11/16/01
185177	TW-17	Water	11/13/01	16:00	11/16/01
185178	TW-19	Water	11/14/01	10:00	11/16/01
185179	TW-20	Water	11/13/01	12:10	11/16/01
185180	TW-23	Water	11/14/01	11:30	11/16/01
185181	RW-1 (Extraction Well	Water	11/13/01	16:30	11/16/01
185182	RW-2 (Extraction Well)	Water	11/13/01	13:30	11/16/01
185183	RW-3 (Extraction Well)	Water	11/14/01	13:25	11/16/01

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.

Dr. Blair Leftwich, Director

Analytical Report

Sample: 185171 - TW-9

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC16310 Date Analyzed: 12/4/01
Analyst: JS Preparation Method: N/A Prep Batch: PB13776 Date Prepared: 12/4/01

Param	Flag	Result	Units	Dilution	RDL
Chloride		303	mg/L	10	0.50

Sample: 185172 - TW-10

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC16257 Date Analyzed: 11/30/01
Analyst: JS Preparation Method: N/A Prep Batch: PB13773 Date Prepared: 11/30/01

Param	Flag	Result	Units	Dilution	RDL
Chloride		39.2	mg/L	2	0.50

Sample: 185173 - TW-11

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC16257 Date Analyzed: 11/30/01
Analyst: JS Preparation Method: N/A Prep Batch: PB13773 Date Prepared: 11/30/01

Param	Flag	Result	Units	Dilution	RDL
Chloride		34.8	mg/L	2	0.50

Sample: 185174 - TW-13

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC16257 Date Analyzed: 11/30/01
Analyst: JS Preparation Method: N/A Prep Batch: PB13773 Date Prepared: 11/30/01

Param	Flag	Result	Units	Dilution	RDL
Chloride		47.8	mg/L	5	0.50

Sample: 185175 - TW-14

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC16257 Date Analyzed: 11/30/01
Analyst: JS Preparation Method: N/A Prep Batch: PB13773 Date Prepared: 11/30/01

Param	Flag	Result	Units	Dilution	RDL
Chloride		41.5	mg/L	5	0.50

Sample: 185176 - TW-15

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC16257 Date Analyzed: 11/30/01
Analyst: JS Preparation Method: N/A Prep Batch: PB13773 Date Prepared: 11/30/01

Param	Flag	Result	Units	Dilution	RDL
Chloride		383	mg/L	10	0.50

Sample: 185177 - TW-17

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC16257 Date Analyzed: 11/30/01
Analyst: JS Preparation Method: N/A Prep Batch: PB13773 Date Prepared: 11/30/01

Param	Flag	Result	Units	Dilution	RDL
Chloride		27.2	mg/L	2	0.50

Sample: 185178 - TW-19

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC16257 Date Analyzed: 11/30/01
Analyst: JS Preparation Method: N/A Prep Batch: PB13773 Date Prepared: 11/30/01

Param	Flag	Result	Units	Dilution	RDL
Chloride		25.8	mg/L	2	0.50

Sample: 185179 - TW-20

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC16258 Date Analyzed: 11/30/01
Analyst: JS Preparation Method: N/A Prep Batch: PB13773 Date Prepared: 11/30/01

Param	Flag	Result	Units	Dilution	RDL
Chloride		37.0	mg/L	5	0.50

Sample: 185180 - TW-23

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC16258 Date Analyzed: 11/30/01
Analyst: JS Preparation Method: N/A Prep Batch: PB13773 Date Prepared: 11/30/01

Param	Flag	Result	Units	Dilution	RDL
Chloride		1070	mg/L	50	0.50

Sample: 185181 - RW-1 (Extraction Well

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC16258 Date Analyzed: 11/30/01
Analyst: JS Preparation Method: N/A Prep Batch: PB13773 Date Prepared: 11/30/01

Param	Flag	Result	Units	Dilution	RDL
Chloride		217	mg/L	5	0.50

Sample: 185182 - RW-2 (Extraction Well)

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC16258 Date Analyzed: 11/30/01
Analyst: JS Preparation Method: N/A Prep Batch: PB13773 Date Prepared: 11/30/01

Param	Flag	Result	Units	Dilution	RDL
Chloride		223	mg/L	5	0.50

Sample: 185183 - RW-3 (Extraction Well)

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC16258 Date Analyzed: 11/30/01
Analyst: JS Preparation Method: N/A Prep Batch: PB13773 Date Prepared: 11/30/01

Param	Flag	Result	Units	Dilution	RDL
Chloride		4050	mg/L	500	0.50

Quality Control Report
Method Blank

Method Blank

QCBatch: QC16257

Param	Flag	Results	Units	Reporting Limit
Chloride		<2.0	mg/L	0.50

Method Blank

QCBatch: QC16258

Param	Flag	Results	Units	Reporting Limit
Chloride		<2.0	mg/L	0.50

Method Blank

QCBatch: QC16310

Param	Flag	Results	Units	Reporting Limit
Chloride		<2.0	mg/L	0.50

Quality Control Report
Lab Control Spikes and Duplicate Spikes

Laboratory Control Spikes

QCBatch: QC16257

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Chloride	11.52	11.57	mg/L	1	12.50	<2.0	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: QC16258

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Chloride	11.42	11.42	mg/L	1	12.50	<2.0	91	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: QC16310

Continued ...

... Continued

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Chloride	11.82	11.88	mg/L	1	12.50	<2.0	94	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: QC16257

Param	MS Result	MSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Chloride	49.02	49.11	mg/L	1	25	25.8	92	0	52 - 131	20

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

Matrix Spikes

QCBatch: QC16258

Param	MS Result	MSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Chloride	1633.03	1635.24	mg/L	1	625	1070	90	0	52 - 131	20

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

Matrix Spikes

QCBatch: QC16310

Param	MS Result	MSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Chloride	409.72	411.93	mg/L	1	125	303	86	1	52 - 131	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: QC16257

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride		mg/L	12.50	11.55	92	90 - 110	11/30/01

ICV (1) QCBatch: QC16257

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride		mg/L	12.50	11.63	93	90 - 110	11/30/01

CCV (1) QCBatch: QC16258

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	11/30/01

ICV (1) QCBatch: QC16258

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride		mg/L	12.50	11.55	92	90 - 110	11/30/01

CCV (1) QCBatch: QC16310

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride		mg/L	12.50	12.15	97	90 - 110	12/4/01

ICV (1) QCBatch: QC16310

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Chloride		mg/L	12.50	11.82	94	90 - 110	12/4/01

185171-03

AOM1 1623

Analysis Request and Chain of Custody Record

HIGHLANDER ENVIRONMENTAL CORP.

1910 N. Big Spring St.
Midland, Texas 79705

(915) 682-4559 Fax (915) 682-3946

PAGE: 1 OF: 2

CLIENT NAME: Chevron texaco

SITE MANAGER: Ike Tavarez

PROJECT NO.:

PROJECT NAME: Chevron texaco / Buckeye Vacuum Unit. - Lea County Co. NM.

LAB I.D. NUMBER	DATE	TIME	MATRIX	COMP.	GRAB	SAMPLE IDENTIFICATION	NUMBER OF CONTAINERS	FILTERED (Y/N)	PRESERVATIVE METHOD: HCL	HNO3	ICE	NONE	BTEX 8020/602	MTBE 8020/602	TPH 418.1 8015 MOD. TX1005	PAH 8270	RCRA Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Metals Ag As Ba Cd Cr Pd Hg Se	TCLP Volatiles	TCLP Semi Volatiles	RCI	GC.MS Vol. 8240/8260/624	GC.MS Semi. Vol. 8270/625	PCB's 8080/608	Pest. 808/608	BOD, TSS, pH, TDS, Chloride	Gamma Spec.	Alpha Beta (Air)	PLM (Asbestos)	Chloride
185171	11-13-01	12:55	W		V	TW-9	1	N			V																			V
72	11-13-01	1:50	W		V	TW-10	1	N			V																			V
73	11-13-01	4:50	W		V	TW-11	1	N			V																			V
74	11-13-01	11:10	W		V	TW-13	1	N			V																			V
75	11-13-01	2:45	W		V	TW-14	1	N			V																			V
76	11-14-01	10:45	W		V	TW-15	1	N			V																			V
77	11-13-01	4:00	W		V	TW-17	1	N			V																			V
78	11-14-01	10:00	W		V	TW-19	1	N			V																			V
79	11-13-01	12:10	W		V	TW-20	1	N			V																			V
80	11-14-01	11:30	W		V	TW-23	1	N			V																			V

RELINQUISHED BY: (Signature) John Mace Date: 11/15/01 Time: 1700

RECEIVED BY: (Signature) Helen Stratton Date: 11/15/01 Time: 1700

RELINQUISHED BY: (Signature) Helen Stratton Date: 11/15/01 Time: 1830

RECEIVED BY: (Signature) Date: Time:

RELINQUISHED BY: (Signature) Date: Time:

RECEIVED BY: (Signature) Date: Time:

RECEIVING LABORATORY:
ADDRESS:
CITY: STATE: ZIP:
CONTACT: PHONE:

RECEIVED BY: (Signature) Vicki Hensley
DATE: 11-16-01 TIME: 10:00

SAMPLED BY: (Print & Sign) Raj Taylor Date: 11-14-01 Time: 4:00

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

HIGHLANDER CONTACT PERSON: Ike Tavarez

Results by:

RUSH Charges Authorized: Yes No

SAMPLE CONDITION WHEN RECEIVED:

MATRIX: W-Water A-Air SD-Solid S-Soil SL-Sludge O-Other

REMARKS: All results @ 4°C

10 samples - HS MS

Please Fill out all copies - Laboratory retains yellow copy - Return original copy to Highlander Enviromental Corp. - Project Manager retains pink copy - Accounting receives Gold copy.

AOIII622

Analysis Request and Chain of Custody Record

HIGHLANDER ENVIRONMENTAL CORP.

1910 N. Big Spring St.
Midland, Texas 79705

(915) 682-4559 Fax (915) 682-3946

PAGE: 2 OF: 2

CLIENT NAME: Chevron texaco

SITE MANAGER: Ike Tavarez

PROJECT NO.:

PROJECT NAME: Chevron texaco/Buckeye Vacuum unit Lea County. NM

LAB I.D. NUMBER	DATE	TIME	MATRIX	COMP.	GRAB	SAMPLE IDENTIFICATION	NUMBER OF CONTAINERS	FILTERED (Y/N)	PRESERVATIVE METHOD: HCL	HNO3	ICE	NONE	BTEX 8020/602	MTBE 8020/602	TPH 418.1 8015 MOD. TX1005	PAH 8270	RCRA Metals Ag As Ba Cd Cr Pb Hg Se	TCLP Metals Ag As Ba Cd Cr Pd Hg Se	TCLP Volatiles	TCLP Semi Volatiles	RCI	GC.MS Vol. 8240/8260/624	GC.MS Semi. Vol. 8270/625	PCB's 8080/608	Pest. 808/608	BOD, TSS, pH, TDS, Chloride	Gamma Spec.	Alpha Beta (Air)	PLM (Asbestos)	Chloride
81	11-13-01	4:30	W		V	RW-1 (Extraction well)	1	N			J																			J
82	11-13-01	1:30	W		V	RW-2 (Extraction well)	1	N			J																			J
83	11-14-01	1:25	W		V	RW-3 (Extraction well)	1	N			J																			J

ANALYSIS REQUEST (Circle or Specify Method No.)

RELINQUISHED BY: (Signature) — Date: 11/15/01 Time: 1700 — RECEIVED BY: (Signature) Helen Shelton — Date: 11/15/01 Time: 1700

SAMPLED BY: (Print & Sign) Raylan Taylor — Date: 11-14-01 Time: 4:45

RELINQUISHED BY: (Signature) Helen Shelton — Date: 11/15/01 Time: 1830 — RECEIVED BY: (Signature) — Date: — Time:

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

RELINQUISHED BY: (Signature) — Date: — Time: — RECEIVED BY: (Signature) — Date: — Time:

RECEIVING LABORATORY: — ADDRESS: — CITY: — STATE: — ZIP: — CONTACT: — PHONE:

RECEIVED BY: (Signature) Vicki Crowley — DATE: 11-16-01 TIME: 10:00

HIGHLANDER CONTACT PERSON: Ike Tavarez

Results by:

RUSH Charges Authorized: Yes No

SAMPLE CONDITION WHEN RECEIVED:

MATRIX: (W-Water) A-Air SD-Solid S-Soil SL-Sludge O-Other

REMARKS: CC# 163 Sublevel 90 40

Please Fill out all copies - Laboratory retains yellow copy - Return original copy to Highlander Enviromental Corp. - Project Manager retains pink copy - Accounting receives Gold copy.

MS 3 samples-HS

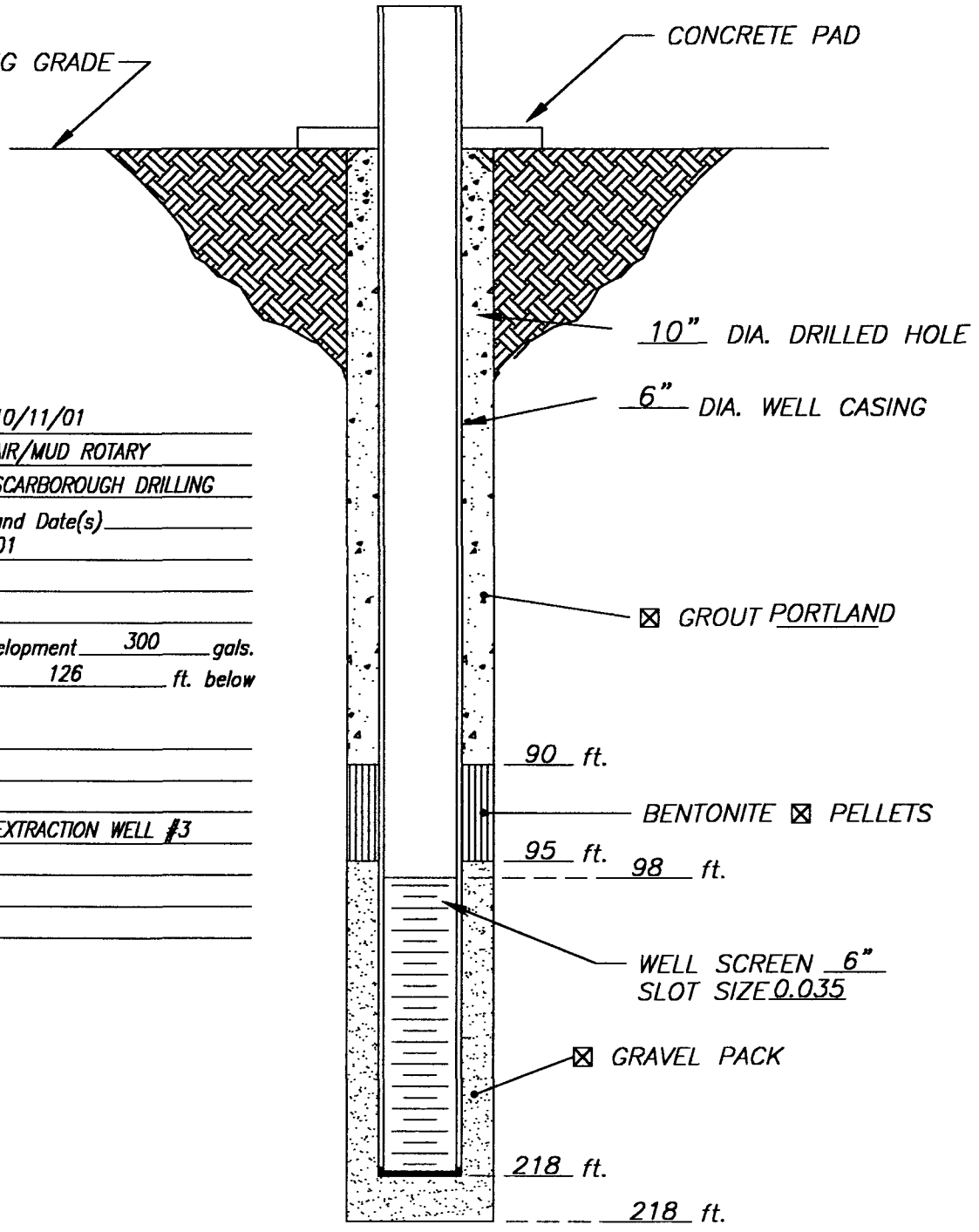
APPENDIX C

SAMPLE LOG

Boring/Well: Water well (Extraction well #3)
Site Location: ChevronTexaco Buckeye Vacuum Field Unit
Location: Lea County, New Mexico
Total Depth: 218'
Date Installed: 10/12/01

DEPTH (Ft)	SAMPLE DESCRIPTION
0-10	Fine grain sand, some loose, gray hydrocarbon staining, caliche at 5.0-10', dense
10-20	Dense, cemented sandstone and fine grain sand, some loose layer of sand
20-30	Dense, cemented sandstone and fine grain sand, some loose layer of sand, becoming sandy with depth.
30-100	Tan, fine grain sand, loose, some layers of dense cemented sandstone
100-150	Tan, fine grain sand, loose, some layers of dense cemented sandstone, trace of gravel at 150'
150-190	Tan, fine grain sand, loose and trace of gravel
190-200	Gravel and fine grain sand
200-225	Reddish/brown clay, some traces of gravel and fine grain sand
225-230	Red clay/red shale
	TD-118'

WATER WELL (EXTRACTION WELL)
WELL CONSTRUCTION LOG



Installation Date(s) 10/11/01
Drilling Method AIR/MUD ROTARY
Drilling Contractor SCARBOROUGH DRILLING
Development Technique(s) and Date(s)
RIG BAILER – 10/15/01

Water Removed During Development 300 gals.
Static Depth to Water 126 ft. below Ground Level
Well Purpose

Remarks
WATER WELL – EXTRACTION WELL #3

DATE: 10/11/01 **Highlander Environmental**	CLIENT: CHEVRONTEXACO CORPORATION PROJECT: BUCKEYE VACUUM FIELD UNIT LOCATION: LEA COUNTY, NEW MEXICO	EXTRACTION WELL NO. 3

Revised June 1972

STATE ENGINEER OFFICE

WELL RECORD

Section 1. GENERAL INFORMATION

(A) Owner of well Texaco Exploration & Production Owner's Well No. FW #3

Street or Post Office Address P.O. Box 3109

City and State Midland, Texas 79702

Well was drilled under Permit No. _____ and is located in the:

Buckeye/18 miles ~~east~~ of Hobbs, ~~Smiths~~ north

a. ____ ¼ ____ ¼ ____ ¼ ____ ¼ of Section ____ Township ____ Range ____ N.M.P.M.

b. Tract No. ____ of Map No. ____ of the ____

c. Lot No. ____ of Block No. ____ of the ____
Subdivision, recorded in Lea County.

d. X= ____ feet, Y= ____ feet, N.M. Coordinate System ____ Zone in the ____ Grant.

(B) Drilling Contractor Scarborough Drilling, Inc. License No. WD1186

Address P.O. Box 305 Lamesa, Texas 79331

Drilling Began 10-11-01 Completed 10-15-01 Type tools water Size of hole 10 in.

Elevation of land surface or ____ at well is ____ ft. Total depth of well 218 ft.

Completed well is ☒ shallow ☐ artesian. Depth to water upon completion of well ____ ft.

Section 2. PRINCIPAL WATER-BEARING STRATA

Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation	Estimated Yield (gallons per minute)

Section 3. RECORD OF CASING

Diameter (inches)	Pounds per foot	Threads per in.	Depth in Feet Top	Depth in Feet Bottom	Length (feet)	Type of Shoe	Perforations From	Perforations To
10	sch 40 pvc	6	+2	218		.035	218	98
10		6	98	+2		PVC		

Section 4. RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Hole Diameter	Sacks of Mud	Cubic Feet of Cement	Method of Placement
218	95	10	gravel packed		poured

Section 5. PLUGGING RECORD

Plugging Contractor ____

Address ____

Plugging Method ____

Date Well Plugged ____

Plugging approved by: ____
State Engineer Representative

No.	Depth in Feet Top	Depth in Feet Bottom	Cubic Feet of Cement
1			
2			
3			
4			

FOR USE OF STATE ENGINEER ONLY

Date Received

Quad ____ FWL ____ FSL ____

File No. ____ Use ____ Location No. ____

Section 6. LOG OF HOLE

Depth in Feet From	Depth in Feet To	Thickness in Feet	Color and Type of Material Encountered
0	10	10	FIne grained, some loose gray hydocarbon
10	20	10	Dense, cemented sandatone fg
20	30	10	Dense cemented fg sand
30	100	70	Tan, fg sand loose some layers of dense sandstone
100	150	50	Tan, fg sand , loose
150	190	40	Tan, fg sand, loose trace of gravel
190	200	10	Gravel and fine grain sand
200	218	18	reddish/brown clay some traces of gravel and fg sand

Section 7. REMARKS AND ADDITIONAL INFORMATION

The undersigned hereby certifies that, to the best of his knowledge and belief, the foregoing is a true and correct record of the above described hole.

Scott Scarborough
Driller

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the appropriate district office [illegible]. All sections except Section 5 shall be answered as completely and accurately as possible when any well is