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REPORTS

DATE:

5/24/2001

GROUNDWATER ASSESSMENT REPORT
J. R. PHILLIPS TANK BATTERY #2
LEA COUNTY, NEW MEXICO

Prepared for:

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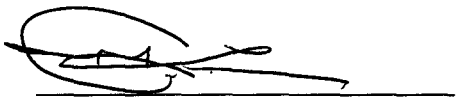
May 24, 2001



Mark J. Larson, CPG, CGWP

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1.0 INTRODUCTION

Texaco Exploration and Production Inc. (Texaco) has retained Larson and Associates, Inc. (LA) to assess potential impacts to groundwater from a former emergency pit once associated with the J. R. Phillips Tank Battery No. 2 (Site) located in the southeast quarter (SE/4) of the northwest quarter (NW/4), Section 6, Township 20 South, Range 37 East, Lea County, New Mexico. The investigation was conducted between April 10, 2001 and May 3, 2001, in accordance with a work plan approved by the New Mexico Oil Conservation Division (NMOCD) on February 23, 2001. The original reporting date was April 23, 2001, however, the NMOCD approved an extension request for submittal by May 25, 2001. Figure 1 presents a Site location and topographic map. Appendix A presents NMOCD correspondence.

2.0 BACKGROUND

In December 1999 Texaco retained Environmental Plus, Inc. (EPI) to excavate the emergency pit, and a small burn pit located adjacent (south-southeast) to the emergency pit. Figure 2 presents a Site drawing showing the location of the former pit. The emergency pit was excavated to approximately 25 to 30 feet below ground surface (BGS), and the burn pit was excavated to approximately 10 to 15 feet BGS. Approximately 33,500 cubic yards of soil was removed from the Site between December 1999 and October 2000, and transported to Texaco's centralized landfarm, located northwest of Jal, New Mexico.

On March 15, 2000, EPI collected groundwater samples from a water well (WW-1) located southeast of the Site. The well is not currently used. The samples were analyzed for benzene, toluene, ethylbenzene, xylene (collectively referred to as BTEX), and chloride. On March 17, 2000, EPI collected groundwater samples from a boring drilled near the southeast corner of the emergency pit (SE boring). The samples were analyzed for chloride, BTEX, and total petroleum hydrocarbons (TPH), including gasoline range organics (GRO) and diesel range organics (DRO).

EPI also installed two (2) monitoring wells (MW-1 and MW-2) north and northeast of the Site, using a trailer-mounted hollowstem auger rig. The wells were constructed with 2-inch diameter schedule 40 PVC casing and screen. Groundwater was observed in wells MW-1 and MW-2 at approximately 36 feet BGS and 35.9 feet BGS, respectively. EPI personnel collected groundwater samples from the wells on April 10, 2000. The samples were analyzed for BTEX, anions and cations, including sodium, calcium, magnesium, potassium, carbonate, bicarbonate, total alkalinity, sulfate, chloride, pH, specific conductance and total dissolved solids (TDS). No BTEX was reported in the samples from the water well or monitoring wells, however, 11 micrograms per liter (µg/L) or 0.011 milligrams per liter (mg/L) of benzene was detected in the sample from the boring (SE boring). The benzene concentration exceeded the New Mexico Water Quality Control Commission (NMWQCC) human health standard of 0.01 mg/L. The laboratory reported chloride values from 7,300 mg/L (MW-1) to 41,300 mg/L (SE boring). The concentrations of sulfate were 2,061 mg/L and 2,611 mg/L in samples from wells MW-1 and MW-2, respectively. The chloride and sulfate concentrations exceeded the NMWQCC standards of 250 mg/L and 600 mg/L, respectively. The concentration of TDS in samples from wells MW-1 and MW-2 was reported at 15,816 mg/L and 19,312 mg/L, respectively. The NMWQCC standard for TDS is 1,000 mg/L.

During August 2000 EPI excavated a trench below the emergency pit near the northwest corner to determine depth-to-groundwater, and to obtain soil samples for analysis. Groundwater was observed approximately 10 feet below the bottom of the excavation, or 35 to 40 feet BGS. LA personnel collected the soil samples on August 17, 2000. LA personnel also collected soil samples from the sides and bottom of the main excavation on September 15, 2000. Trace Analysis, Inc. (Trace) analyzed the samples for BTEX, TPH (GRO and DRO) and chloride. Additional soil (40 cubic yards) was removed from the west side and northwest corner of the excavation following receipt of the laboratory analyses of samples collected on September 15, 2000. Additional soil samples were collected from the excavated area. The soil sample results were submitted to the

NMOCD in a report dated October 16, 2000 ("Preliminary Report and Request to Close Excavation, Texaco Exploration and Production Inc., J. R. Phillips Tank Battery No. 2, SE/4, NW/4, Section 6, Township 20 South, Range 37 East, Lea County, New Mexico, October 16, 2000"). The report included a request to close the excavation, which was approved October 20, 2000. The NMOCD specified, as a condition of its approval, that Texaco would submit an additional report summarizing the laboratory analyses of groundwater samples collected at the Site. A report was subsequently submitted to the NMOCD on November 28, 2000 ("Comprehensive Report and Proposed Investigation Plan, Texaco Exploration and Production Inc., J. R. Phillips Tank Battery No. 2, SE/4, NW/4, Section 6, Township 20 South, Range 37 East, Lea County, New Mexico, November 28, 2000"). The report included a work plan to investigate potential impacts to groundwater from the former pit. The work plan was approved on February 23, 2001.

The excavation was closed during December 2000 and January 2001 in accordance with specifications presented in the report dated September 15, 2000. Clean soil was placed in the bottom of the excavation to approximately 3 feet BGS. A layer of clay was placed above the soil to a uniform thickness of approximately 2 feet. John West Engineering Company (West) performed field density tests on January 12, 2001, to verify compaction of the clay to at least 95% proctor density. Field density tests were performed at seven (7) locations in accordance with method ASTM D-2922. The results were compared to a standard proctor density analysis performed by Pettigrew and Associates, Inc. from a sample of the clay that was collected by West. The standard proctor test was performed in accordance with method ASTM D-698. Additional compaction was required in the vicinity of test locations # 1, # 5 and # 6, and the follow-up tests were successful. A layer of topsoil, approximately 2 feet thick, was placed over the clay, and graded. Appendix B presents the West report.

3.0 CURRENT INVESTIGATION

3.1 Monitoring Wells

On April 10 and 11, 2001, LA supervised installation of four (4) monitoring wells (MW-3 through MW-6) in accordance with the work plan. Two (2) additional wells (MW-7 and MW-8) were installed on April 16, 2001, to assess groundwater quality up gradient and cross gradient to the Site. Well MW-7 was installed approximately 500 feet north (cross gradient), and well MW-8 was installed approximately 1,400 feet northwest (upgradient) of the Site. Well MW-8 was installed adjacent to an abandoned water well. Scarborough Drilling, Inc., located in Lamesa, Texas, drilled the wells from 56 and 66 feet BGS using a truck-mounted air rotary drilling rig. The wells were constructed with 2-inch diameter schedule 40 PVC casing and screen. The well screen, approximately 20 feet in length, was placed in the boring with approximately 3 to 5 feet extending above the groundwater surface observed during drilling, and approximately 15 to 17 feet of the well screen was placed into groundwater. Well MW-8 was constructed with approximately 15 feet of screen placed near the bottom of the boring to evaluate groundwater quality at the base of the aquifer. Graded silica sand was placed in the annular space between the boring and screen to approximately 2 feet above the screen. A layer of bentonite chips, approximately 10 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 wells were secured with locking above-grade covers that were anchored in concrete pads measuring approximately 3' x 3' x 1'. Table 1 presents a summary of well drilling and installation details. Appendix C presents the boring logs and well construction diagrams. Figure 2 presents the well locations.

A New Mexico registered professional land surveyor (Piper Surveying Company) surveyed the wells for top-of-casing elevation, ground elevations, and location. The wells were referenced to the tank battery, emergency pit excavation and existing wells.

3.2 Soil Samples

Soil samples were collected every ten feet to approximately 30 feet BGS (i.e., 10, 20, 30 feet) using a 1-foot long core sampler. The samples were placed in clean glass sample jars for headspace analysis. Each jar was filled to approximately ¾ capacity, and a layer of layer of aluminum foil was placed over the top of the jar before replacing the cap. The samples were set aside to reach ambient temperature (approximately 15 minutes), and a photoionization detector (PID) was used to measure the concentration of organic vapors in the headspace of the sample jar. The PID probe was inserted into the headspace of the sample jar (through the aluminum foil), and the concentration of organic vapors was measured in parts per million (ppm) total ionizable hydrocarbons. The PID was calibrated to isobutylene, and readings were recorded on the boring logs. Table 1 presents a summary of the PID readings. The PID readings were generally within the ambient background concentration (3 to 7 ppm).

The drilling rig, drilling rods, and bit were washed between locations using high-pressure hot water. The core sampler was cleaned between sample events with potable water and laboratory-grade detergent, and rinsed with distilled water. The drill cuttings were placed adjacent to the wells.

3.3 Well Development and Groundwater Samples

The wells were developed using an electric submersible pump, and dedicated polyethylene tubing. Depth-to-groundwater measurements were obtained from the monitoring wells and water well on May 2, 2001, prior to developing the wells. The depth-to-groundwater measurements were recorded using an electric water level meter, and referenced to the top-of-casing (TOC). The water level meter was washed between wells with potable water and laboratory-grade detergent, and rinsed with distilled water. The wells were purged until the water was visibly free of silt. Approximately 3 to 5 casing-volumes of groundwater were removed from the wells. However, wells MW-1, MW-2 and WW-1 produced very little water, and were purged dry several times. Water

was contained in a portable tank, and disposed by a licensed water hauler (Chaparral Services, Inc.). The submersible pump and electric lead were thoroughly clean between wells using potable water and laboratory-grade detergent, and rinsed with potable water. The polyethylene tubing was discarded after each use. Table 1 presents a summary of the depth-to-groundwater measurements.

LA personnel collected groundwater samples from the monitoring wells, and the water well on May 2 and 3, 2001. Dedicated disposable PVC bailers were used to collect the samples. The samples were carefully poured from the bailers into laboratory-prepared sample containers. The sample containers were labeled, chilled in an ice chest, and delivered under chain-of-custody control to Environmental Lab of Texas, Inc., located in Odessa, Texas. The samples were analyzed for BTEX, anions, cations, pH and TDS. A duplicate sample was collected from the water well (WW-1) for quality assurance and quality control (QA/QC). The bailers and line were discarded after each use. The BTEX analyses are summarized on Table 2. The anion, cation, pH and TDS analyses are summarized on Table 3. Appendix D presents the laboratory report.

3.4 Well Records

The State of New Mexico, Office of the State Engineer was contacted for records of water wells in Section 6, Township 20 South, and Range 37 East. The only record available was for a well in the SE/4, NW/4 that was drilled in March 1958. The well was drilled to about 82 feet BGS, and perforated from 42 to 82 feet BGS. The principal water-bearing sand occurred between 40 to 68 feet BGS. The depth of the inactive well southeast of the Site is 69.95 feet TOC. Appendix E presents the well record.

4.0 INVESTIGATION RESULTS

Depth-to-groundwater ranged from approximately 33.90 feet BGS at well WW-1 (down gradient) to 37.71 feet BGS at monitoring well MW-8 (up gradient) on May 2, 2001. The groundwater surface elevation ranged between 3537.31 feet above mean sea level

(AMSL) at well MW-8 (up gradient) to 3528.61 feet AMSL at the water well (down gradient). Groundwater flow was generally from west-northwest to east-southeast at a gradient of approximately 0.03 feet per foot. The direction of groundwater flow is consistent the regional groundwater flow direction. Figure 3 presents a groundwater potentiometric map for May 2, 2001.

Benzene was detected at 5 µg/L in the groundwater sample collected from well MW-4 located adjacent to the SE boring. The benzene concentration was below the NMWQCC human health standard of 10 µg/L or 0.01 mg/L. Toluene was detected at 8 µg/L in the sample from well MW-8 (up gradient), and was below the NMWQCC human health standard of 750 µg/L or 0.75 mg/L.

Regulatory standards have been established by the NMWQCC for chloride (250 mg/L), sulfate (600 mg/L) and TDS (1000 mg/L) in groundwater. Chloride was reported above the regulatory threshold in groundwater samples from the upgradient (MW-8) and cross gradient (MW-7) monitoring wells. The concentrations of chloride ranged from 6,913 mg/L (MW-1) to 12,053 mg/L (WW-1). Chloride was slightly elevated in groundwater samples from wells in the immediate vicinity of the Site, suggesting that the former emergency pit may have been a contributing source. However, the chloride concentrations in groundwater samples from well MW-8 (7,445 mg/L) and MW-7 (8154 mg/L) conclude that a groundwater has been affected from a source located some distance upgradient of the Site. Figure 4 presents an isopleth map showing the concentration and distribution of chloride in groundwater samples.

The concentration of sulfate exceeded the regulatory threshold in samples from the upgradient and cross gradient well. Sulfate was reported at 4,380 mg/L in groundwater from well MW-6, located downgradient of the Site, and was slightly elevated in comparison to the background levels reported in samples from wells MW-7 (2,430 mg/L)

and well MW-8 (1,213 mg/L). The sample from the water well reported a sulfate concentration of 629 mg/L. The sulfate concentrations reported in samples from the background wells indicates that sulfate levels are naturally elevated, or groundwater has been affected from source located some distance upgradient to the Site. Figure 5 presents an isopleth map showing the distribution of sulfate in the groundwater samples.

The TDS concentrations reported in samples from the background wells were 18,578 mg/L (MW-7), and 16, 325 mg/L (MW-8), and exceeded the regulatory threshold. The highest TDS value was reported in the sample from the well WW-1 (22,571 mg/L). The concentration of TDS in the groundwater samples is generally consistent with chloride concentrations. The TDS values reported in the groundwater samples from the background wells suggests that groundwater has been affected from a source located some distance upgradient to the Site.

The pH values reported for the groundwater samples from the monitoring wells ranged from 6.41 to 6.77 standard units. However, the pH of groundwater sample from the water well (WW-1) and duplicate sample were 4.38 and 4.24 su, respectively. The bicarbonate concentration in the water sample from the water well (<2 mg/L) was also low in comparison to the monitoring wells (416 mg/L to 618 mg/L).

5.0 CONCLUSIONS

A general conclusion from the investigation is that groundwater quality has been affected by a source located some distance upgradient to the Site. Groundwater sample collected from wells in the immediate vicinity of the former emergency pit suggest that the pit may have been a contributing source. However, the pit has been removed, and the potential for future impact has limited.

The following specific conclusions are based on data collected during the investigation.

1. Groundwater flows from northwest to southeast at a gradient of about 0.03 feet per foot, and is consistent with regional groundwater flow conditions.

2. Benzene was reported in the sample from well MW-4 (5µg/L), and was below the NMWQCC standard of 10 µg/L or 0.01 mg/L.

3. Toluene was reported in the sample from well MW-8 (8 µg/L), and was below the NMWQCC standard of 750 µg/L or 0.75 mg/L. No organic compounds were detected in the remaining samples.

4. Chloride was reported above the NMWQCC standard of 250 mg/L in samples from all wells, including well MW-7 (cross gradient) and well MW-8 (upgradient). Chloride concentrations ranged from 6,913 mg/L (MW-1) to 12,053 mg/L (WW-1). The background concentrations were 8,154 mg/L (MW-7) and 7,445 mg/L (MW-8). The background concentrations conclude that groundwater quality has been affected from a source located some distance upgradient of the Site.

5. Sulfate was reported above the regulatory threshold (600 mg/L) in samples from background wells MW-7 (2,430 mg/L) and MW-8 (1,213 mg/L). Sulfate was greatest in the sample from well MW-6 (4,380 mg/L) located down gradient of the Site, and least in the sample from the water well (629 mg/L). The data concluded suggest groundwater is naturally high in sulfate, or groundwater has been affected from a source located some distance up gradient to the Site.

6. The NMWQCC standard for TDS (1,000 mg/L) was exceeded in samples from all wells, and was generally consistent with the distribution of chloride. The TDS concentration of samples from background wells MW-7 (18,578 mg/L) and MW-8

(16,325 mg/L) indicates that groundwater quality has been affected from a source located some distance upgradient to the Site.

6.0 RECOMMENDATIONS

Texaco proposes to monitor groundwater on a semi-annual schedule to further assess groundwater quality in the vicinity and downgradient of the Site. Groundwater samples will be collected from the monitoring wells every six (6) months (twice annually) for a period of two (2) years. The program will be reviewed by the NMOCD to determine the need to continue groundwater monitoring after the 2-year period. The groundwater samples will be analyzed for anions, cations and TDS, using EPA approved methods. Depth-to-groundwater measurements will be obtained from the wells during each sample event. The field and laboratory data will be reported to the NMOCD annually, and will include a summary of the laboratory analyses, and depth-to-groundwater measurements.

TABLES

Table 1: Summary of Monitoring Well and Water Well Drilling and Completion Details
Texaco Exploration and Production Inc., J.R. Phillips Tank Battery No. 2
SE/4, NW/4, Section 6, Township 20 South, Range 37 East
Lea County, New Mexico

Well Number	Date Drilled	Ground Elevation (Feet AMSL)	Top of Casing Elevation (Feet AMSL)	Drilled Depth (Feet BGS)	Well Depth (Feet TOC)	Well Diameter (Inches)	Screen Interval (Feet BGS)	Depth-to-Groundwater 02-May-01 (Feet TOC)
*MW-1	31-Mar-00	3568.16	3571.61	42	41.75	2	27 - 42	39.33
*MW-2	31-Mar-00	3568.44	3571.12	42	41.85	2	27 - 42	39.15
MW-3	10-Apr-01	3568.08	3570.70	56	57.95	2	34.73 - 54.20	39.30
MW-4	10-Apr-01	3568.50	3571.07	56	56.95	2	34.68 - 54.15	40.24
MW-5	11-Apr-01	3566.80	3569.31	56	57.93	2	34.78 - 54.25	38.37
MW-6	10-Apr-01	3567.00	3569.53	56	57.60	2	34.80 - 54.20	39.40
MW-7	16-Apr-01	3569.95	3572.46	60	60.02	2	37.31 - 56.82	39.76
MW-8	16-Apr-01	3575.02	3577.66	66	65.38	2	47.41 - 61.94	40.35
WW-1	--	3562.54	3562.54	--	69.95	5	--	33.93

Notes: Wells MW-3 through MW-8 installed by Scarborough Drilling, Inc., Lamesa, Texas

1. BGS: Depth in feet below ground surface
2. AMSL: Elevation in feet above mean sea level
3. --: No data available
4. *: Well installed by Environmental Plus, Inc., Eunice, New Mexico

Table 2: Summary of BTEX Analyses of Groundwater Samples from Monitoring and Water Wells
Texaco Exploration and Production Inc., J. R. Phillips Tank Battery # 2
SE/4, NW/4, Section 6, Township 20 South, Range 37 East
Lea County, New Mexico

Well Number	Sample Date	Benzene mg/L	Toluene mg/L	Ethylbenzene mg/L	Xylene mg/L	Total BTEX mg/L
MW-1	10-Apr-00*	<0.002	<0.002	<0.002	<0.006	<0.012
	03-May-01	<0.001	<0.001	<0.001	<0.001	<0.004
MW-2	03-May-01*	<0.002	<0.002	<0.002	<0.006	<0.012
	03-May-01	<0.001	<0.001	<0.001	<0.001	<0.004
MW-3	03-May-01	<0.001	<0.001	<0.001	<0.001	<0.004
MW-4	03-May-01	0.005	<0.001	<0.001	<0.001	0.005
MW-5	03-May-01	<0.001	<0.001	<0.001	<0.001	<0.004
MW-6	03-May-01	<0.001	<0.001	<0.001	<0.001	<0.004
MW-7	02-May-01	<0.001	<0.001	<0.001	<0.001	<0.004
MW-8	02-May-01	<0.001	0.002	<0.001	<0.001	0.002
WW-1	15-Mar-00*	<0.002	<0.002	<0.002	<0.006	<0.012
	03-May-01	<0.001	<0.001	<0.001	<0.001	<0.004
Duplicate	03-May-01	<0.002	<0.002	<0.002	<0.006	<0.012
(WW-1)						

Notes: Analyses performed by Environmental Lab of Texas, Inc., Odessa, Texas

1. mg/L: Milligrams per liter (equivalent to parts per million)
2. <: Analyte not detected above test method detection limit
3. *: Analysis performed by Cardinal Laboratories, Inc., Hobbs, New Mexico

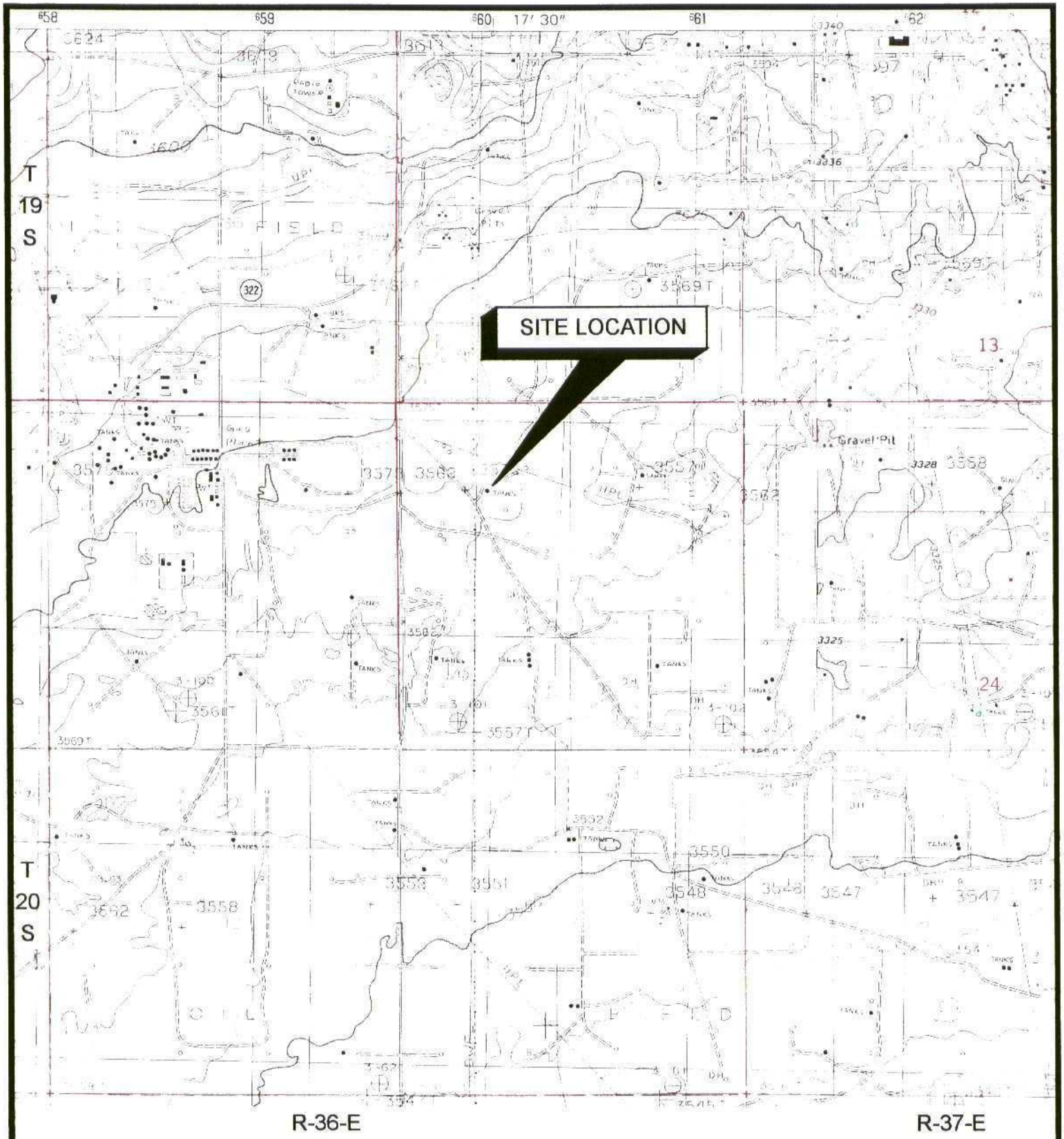
Table 3: Summary of Inorganic Analyses of Groundwater Samples from Monitoring Wells and Water Wells
Texaco Exploration and Production Inc., J. R. Phillips Tank Battery # 2
SE/4, NW/4, Section 6, Township 20 South, Range 37 East
Lea County, New Mexico

Monitor Well	Sample Date	pH (s.u.)	Carbonate (mg/L)	Bicarbonate (mg/L)	Chloride (mg/L)	Sulfate (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Potassium (mg/L)	Sodium (mg/L)	TDS (mg/L)
MW-1	10-Apr-01	7.01	0	556	7300	2061	445	175	44	5058	15816
	03-May-01	6.77	<2	500	6913	2020	323.4	172.5	52.11	3756	14501
MW-2	10-Apr-01	6.91	0	566	8704	2611	569	296	31	5871	19312
	03-May-01	6.77	<2	516	7799	2670	412.4	221.7	30.31	4424	16857
MW-3	03-May-01	6.50	<2	458	11078	3525	984.0	431.9	38.89	6114	24135
MW-4	03-May-01	6.51	<2	618	9572	2755	467.7	299.8	49.25	5435	20118
MW-5	03-May-01	6.60	<2	416	8685	3045	430.9	237.1	44.36	4651	18846
MW-6	03-May-01	6.41	<2	460	11876	4380	1004	429.9	52.27	6281	25288
MW-7	02-May-01	6.70	<2	436	8154	2430	599.5	289.8	34.57	4578	18578
MW-8	02-May-01	6.67	<2	426	7445	1213	766.7	295.7	52.68	2999	16325
WW-1		--	--	--	13152	--	--	--	--	--	--
	03-May-01	4.38	<2	<2	12053	629	1419	387.3	38.95	1486	22571
Duplicate	03-May-01	4.24	<2	<2	12053	688	1337	323.9	42.68	1376	21192
(WW-1)											

Notes: Analyses performed by Environmental Lab of Texas, Inc., Odessa, Texas

1. mg/L: Milligrams per liter (equivalent to parts per million)
2. <: Analyte not detected above test method detection limit
3. --: No data available

FIGURES



TAKEN FROM U.S.G.S.
MONUMENT SOUTH, NEW MEXICO, 1985
7.5' QUADRANGLES

SCALE: 1"=2000'

FIGURE #1

LEA COUNTY, NEW MEXICO

TEXACO EXPLORATION and PRODUCTION INC.

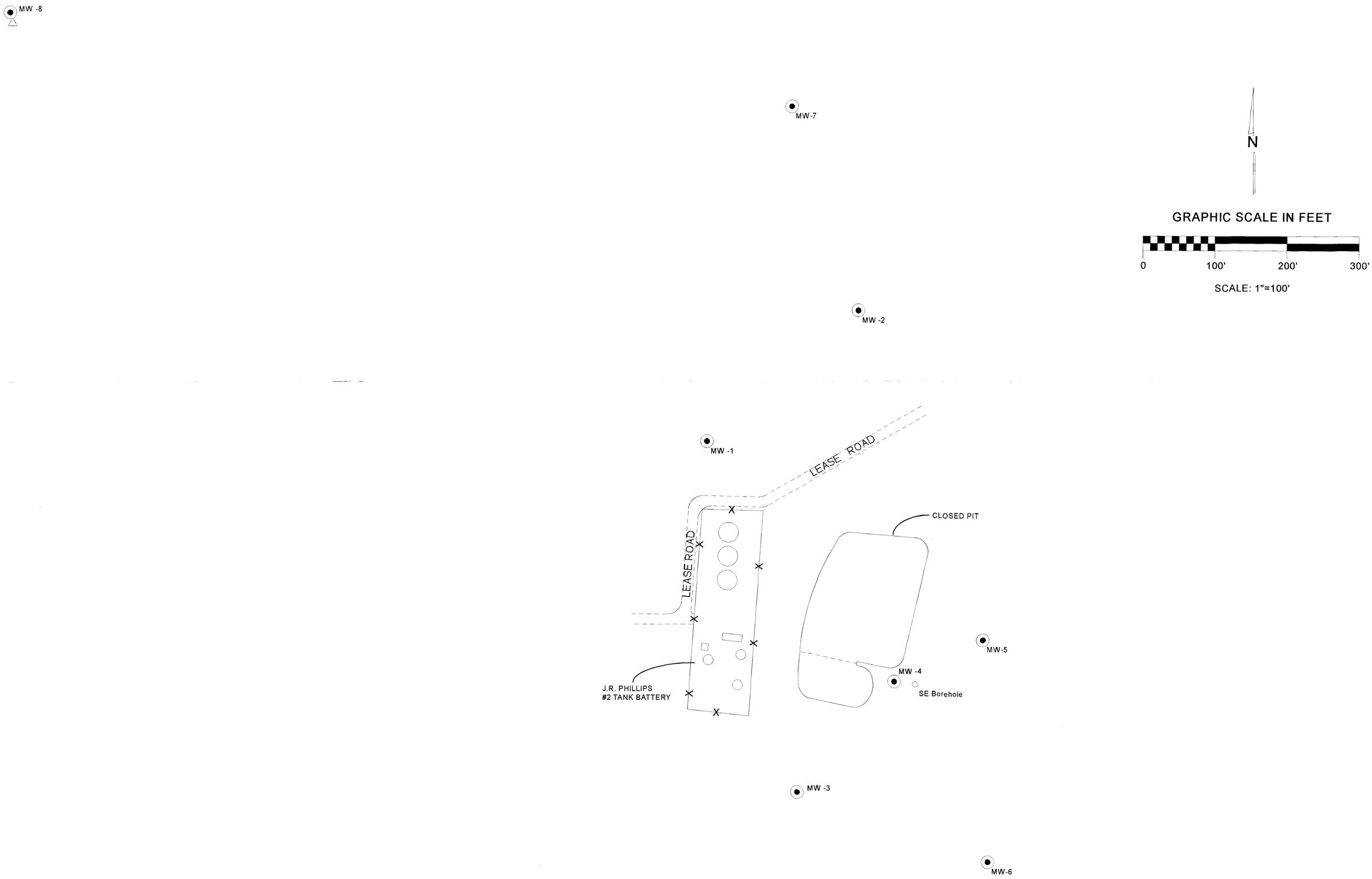
J.R. PHILLIPS TANK BATTERY

NE/1/4, NW/4, SEC. 6, T20S, R36E

TOPOGRAPHIC MAP

DATE: 4/5/01
NAME:
FILE: 00-0104

Larson & Associates, Inc.
Environmental Consultants



WELL DATA

WELL NUMBER	TOP-OF-CASING ELEVATION FEET AMSL	GROUND ELEVATION FEET AMSL
MW-1	3571.61	3568.16
MW-2	3571.12	3568.44
MW-3	3570.70	3568.08
MW-4	3571.07	3568.50
MW-5	3569.31	3566.80
MW-6	3569.53	3567.00
MW-7	3572.46	3569.95
MW-8	3577.66	3575.02
WW-1	3562.54	3562.54

LEGEND

- MW -3 — MONITORING WELL LOCATION
- WW-1 — WATER WELL LOCATION (INACTIVE)
- △ — WATER WELL LOCATION (ABANDONED)
- o — SOIL BORING LOCATION

FIGURE #2

LEA COUNTY, NEW MEXICO

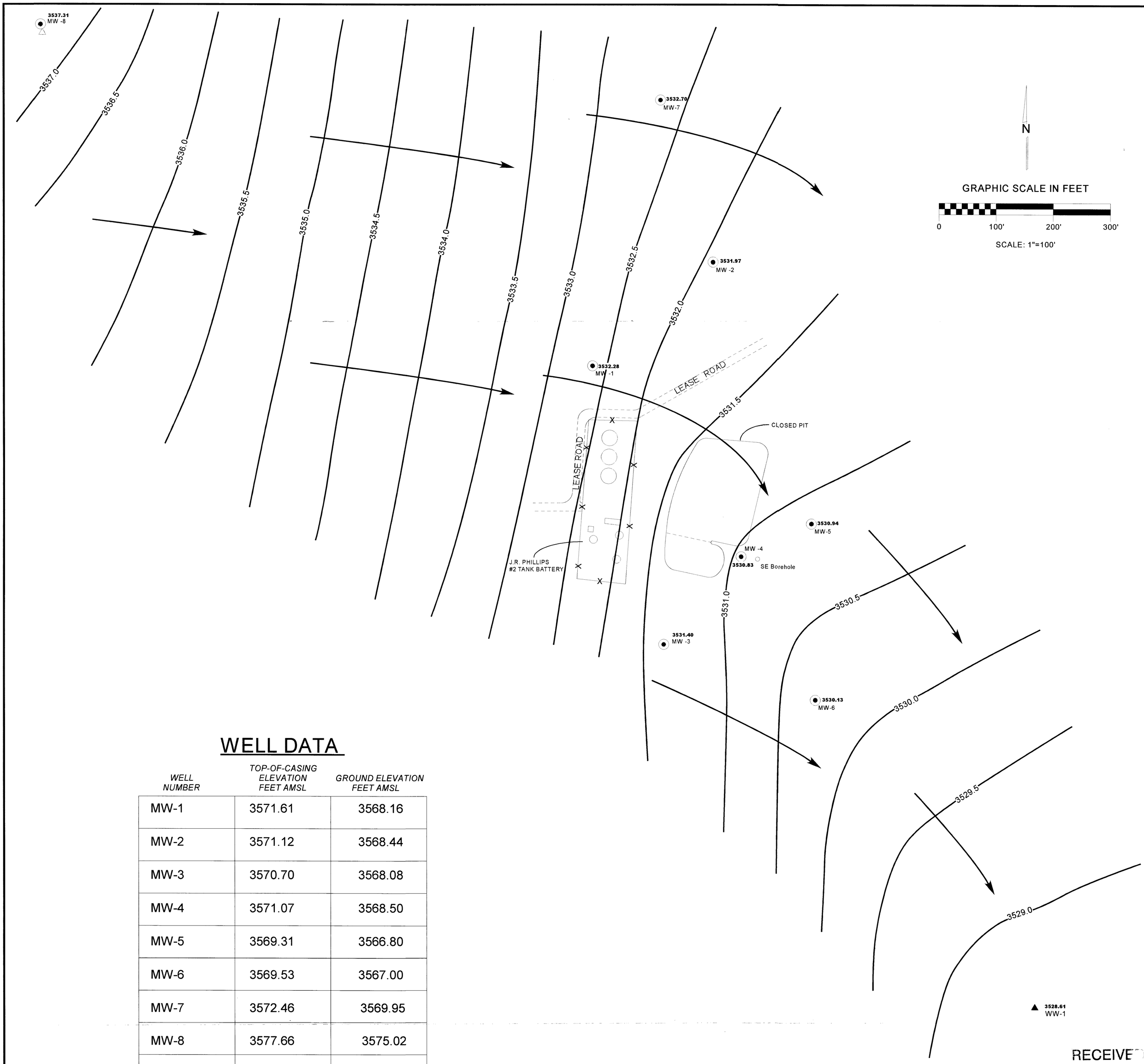
TEXACO EXPLORATION and PRODUCTION INC.
J.R. PHILLIPS #2 TANK BATTERY
SE/4, NW/4, SEC. 6, T20 S, R37E

DATE: 5/22/01

NAME:

FILE: 00-0104

Larson & Associates, Inc.
Environmental Consultants



WELL DATA

WELL NUMBER	TOP-OF-CASING ELEVATION FEET AMSL	GROUND ELEVATION FEET AMSL
MW-1	3571.61	3568.16
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MW-5	3569.31	3566.80
MW-6	3569.53	3567.00
MW-7	3572.46	3569.95
MW-8	3577.66	3575.02
WW-1	3562.54	3562.54

LEGEND

- 3531.40 MW -3 — MONITORING WELL LOCATION and GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION, FEET AMSL, MAY 2, 2001
- 3528.61 WW-1 — WATER WELL LOCATION (INACTIVE), and GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION, FEET AMSL, MAY 2, 2001
- 3535.0 — CONTOUR of GROUNDWATER POTENTIOMETRIC, SURFACE ELEVATION, FEET AMSL, MAY 2, 2001
- DIRECTION of GROUNDWATER FLOW
- CONTOUR INTERVAL: 0.5 FEET

FIGURE #3

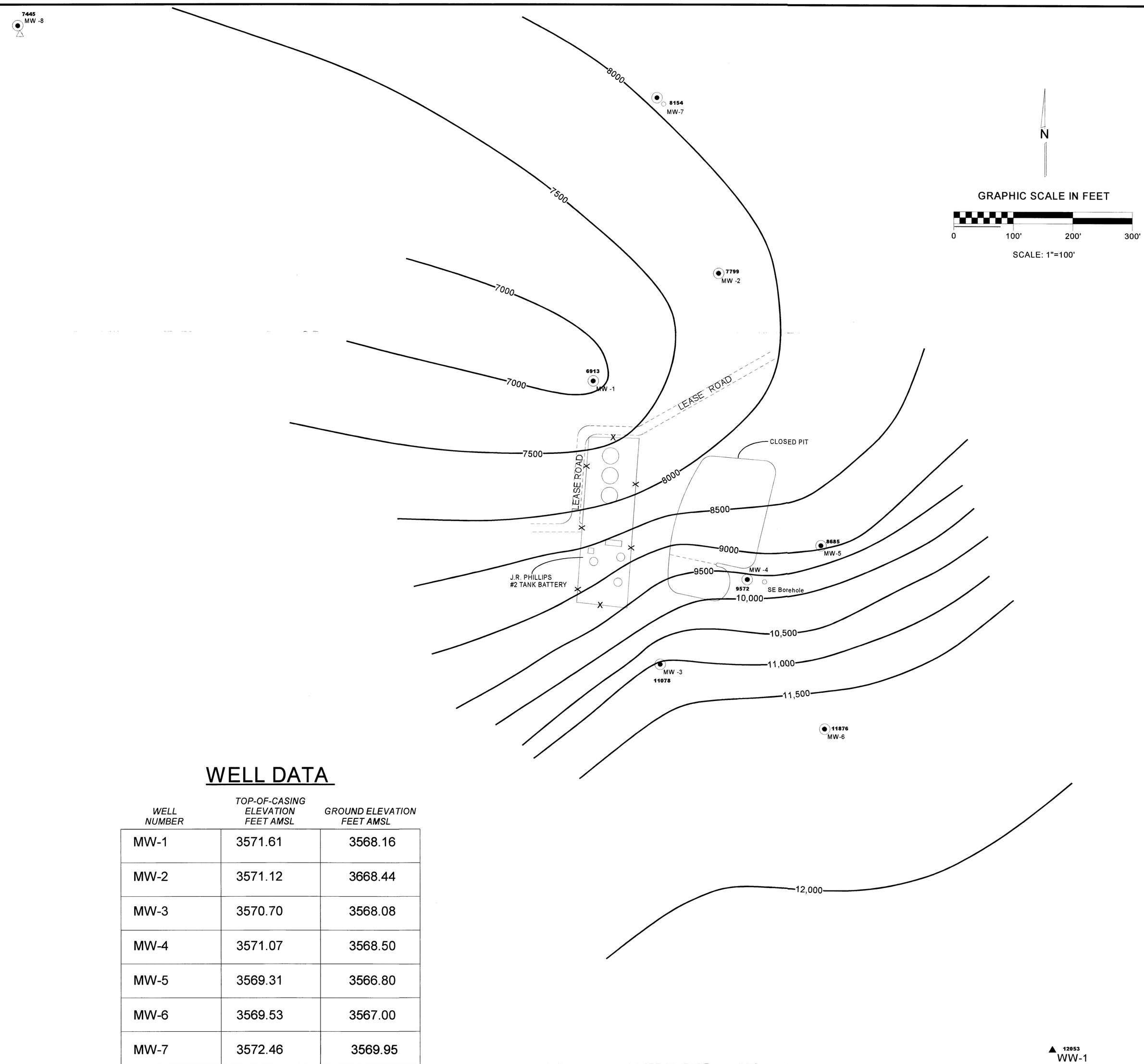
LEA COUNTY, NEW MEXICO

TEXACO EXPLORATION and PRODUCTION INC.
J.R. PHILLIPS #2 TANK BATTERY
SE/4, NW/4, SEC. 6, T20 S, R37E

GROUNDWATER POTENTIOMETRIC SURFACE MAP
MAY 2, 2001

DATE: 5/22/01
NAME:
FILE: 00-0104

Larson & Associates, Inc.
Environmental Consultants



WELL DATA

WELL NUMBER	TOP-OF-CASING ELEVATION FEET AMSL	GROUND ELEVATION FEET AMSL
MW-1	3571.61	3568.16
MW-2	3571.12	3668.44
MW-3	3570.70	3568.08
MW-4	3571.07	3568.50
MW-5	3569.31	3566.80
MW-6	3569.53	3567.00
MW-7	3572.46	3569.95
MW-8	3577.66	3575.02
WW-1	3562.54	3562.54

LEGEND

11078 MW -3 — MONITORING WELL LOCATION and CHLORIDE CONCENTRATION in GROUNDWATER, MG/L, MAY 2-3, 2001

12053 WW-1 — WATER WELL LOCATION (INACTIVE), and CHLORIDE CONCENTRATION in GROUNDWATER, MG/L, MAY 2-3, 2001

9000 — CONTOUR of CHLORIDE CONCENTRATION in GROUNDWATER, MG/L, MAY 2-3, 2001

CONTOUR INTERVAL: 500 MG/L

RECEIVED
MAY 25 2001
ENVIRONMENTAL BUREAU
OIL CONSERVATION DIVISION

FIGURE #4

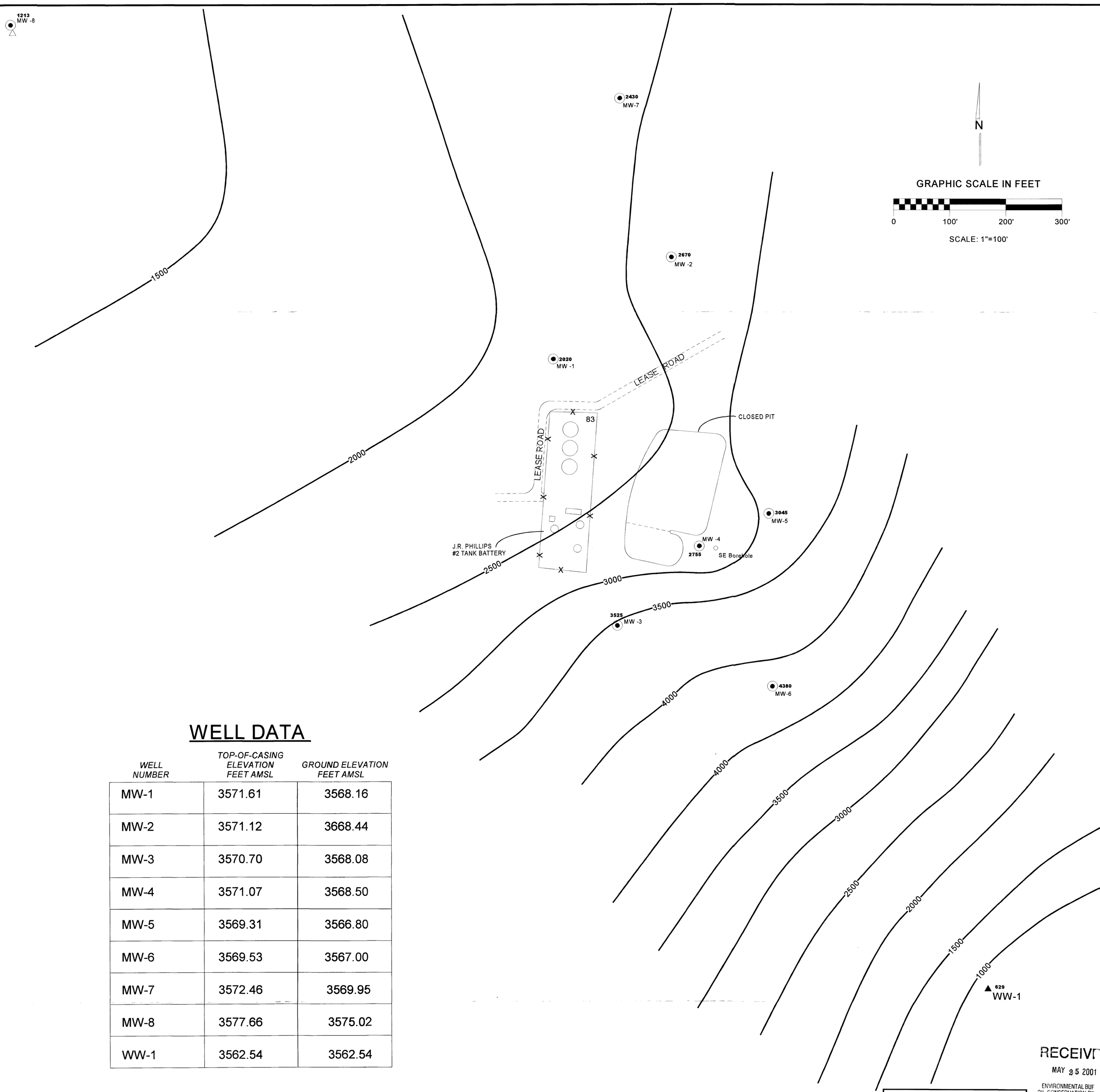
LEA COUNTY, NEW MEXICO

TEXACO EXPLORATION and PRODUCTION INC.
J.R. PHILLIPS #2 TANK BATTERY
SE/4, NW/4, SEC. 6, T20 S, R37E

ISOPLETH MAP of CHLORIDE CONCENTRATION in GROUNDWATER, MAY 3, 2001

DATE: 11/23/00
NAME:
FILE: 00-0104

Larson & Associates, Inc.
Environmental Consultants



WELL DATA

WELL NUMBER	TOP-OF-CASING ELEVATION FEET AMSL	GROUND ELEVATION FEET AMSL
MW-1	3571.61	3568.16
MW-2	3571.12	3668.44
MW-3	3570.70	3568.08
MW-4	3571.07	3568.50
MW-5	3569.31	3566.80
MW-6	3569.53	3567.00
MW-7	3572.46	3569.95
MW-8	3577.66	3575.02
WW-1	3562.54	3562.54

LEGEND

3525 MW -3 — MONITORING WELL LOCATION and SULFATE CONCENTRATION in GROUNDWATER, MG/L, MAY 2-3, 2001

629 WW-1 — WATER WELL LOCATION (INATIVE), and SULFATE CONCENTRATION in GROUNDWATER, MG/L, MAY 2-3, 2001

3000 — CONTOUR of SULFATE CONCENTRATION in GROUNDWATER, MG/L, MAY 2-3, 2001

CONTOUR INTERVAL: 500 MG/L

FIGURE #5

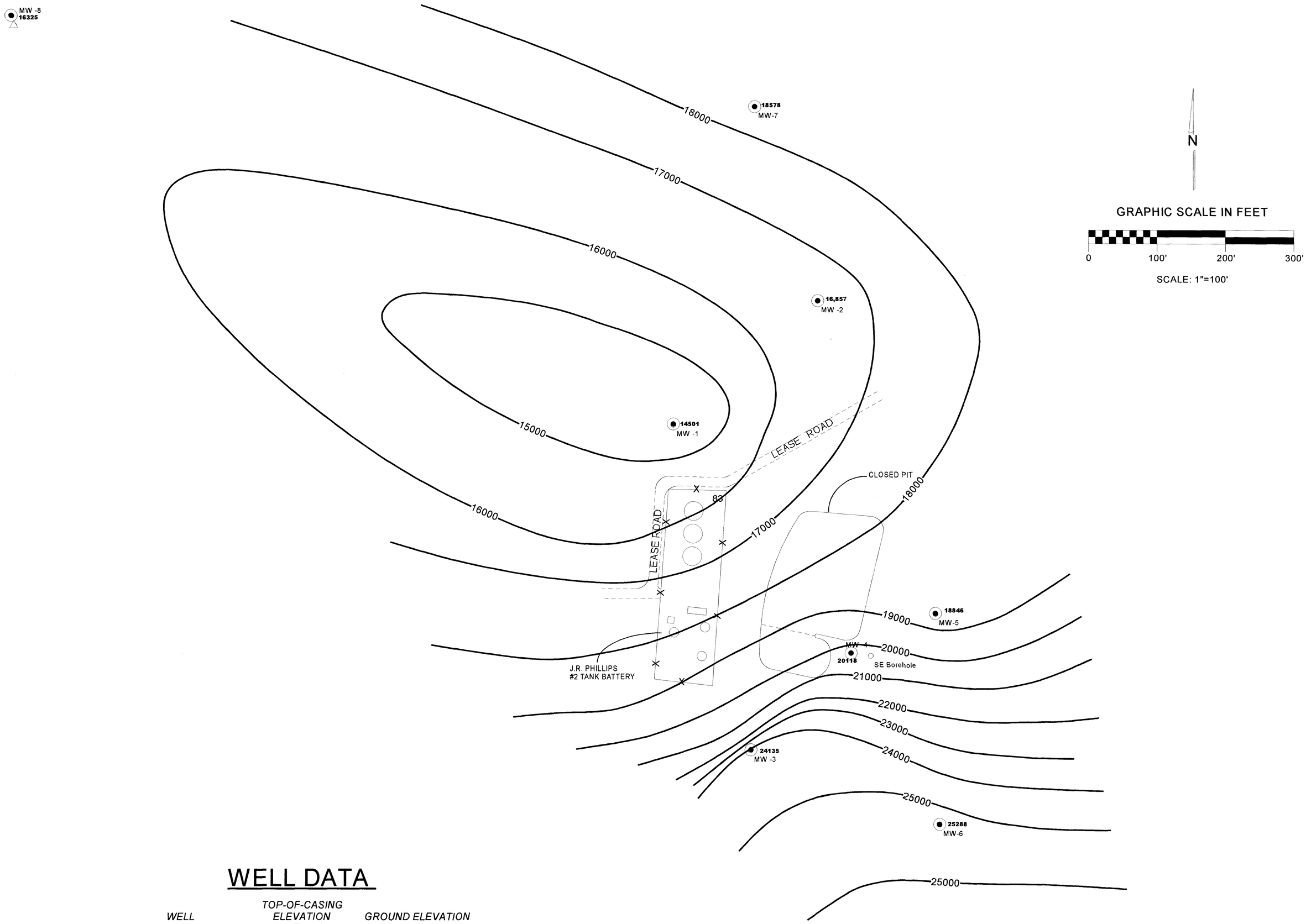
LEA COUNTY, NEW MEXICO

TEXACO EXPLORATION and PRODUCTION INC.
J.R. PHILLIPS #2 TANK BATTERY
SE/4, NW/4, SEC. 6, T20 S, R37E

ISOPLETH MAP of SULFATE CONCENTRATION in GROUNDWATER, MAY 2- 3, 2001

DATE: 5/21/01
NAME:
FILE: 00-0104

Larson & Associates, Inc.
Environmental Consultants



WELL DATA

WELL NUMBER	*TOP-OF-CASING ELEVATION FEET AMSL*	*GROUND ELEVATION FEET AMSL*
MW-1	3571.61	3568.16
MW-2	3571.12	3668.44
MW-3	3570.70	3568.08
MW-4	3571.07	3568.50
MW-5	3569.31	3566.80
MW-6	3569.53	3567.00
MW-7	3572.46	3569.95
MW-8	3577.66	3575.02
WW-1	3562.54	3562.54

LEGEND

24,135 MW -3 — MONITORING WELL LOCATION and TDS CONCENTRATION in GROUNDWATER, MG/L, MAY 2-3, 2001

22,571 WW-1 — WATER WELL LOCATION (INACTIVE), and TDS CONCENTRATION in GROUNDWATER, MG/L, MAY 2-3, 2001

17000 — CONTOUR of TDS CONCENTRATION in GROUNDATER, MG/L, MAY 2-3, 2001

CONTOUR INTERVAL: 1000 MG/L

RECEIVED
MAY 25 2001
ENVIRONMENTAL BUREAU
OIL CONSERVATION DIVISION

FIGURE #6

LEA COUNTY, NEW MEXICO

TEXACO EXPLORATION and PRODUCTION INC.
J.R. PHILLIPS #2 TANK BATTERY
SE/4, NW/4, SEC. 6, T20 S, R37E

ISOPLETH MAP of TDS CONCENTRATION in GROUNDWATER, MAY 2- 3, 2001

DATE: 5/21/01
NAME:
FILE: 00-0104

Larson & Associates, Inc.
Environmental Consultants

APPENDIX A

John West Engineering Report

LABORATORY TEST RESULTS

JOHN WEST ENGINEERING COMPANY

MERCED SANCHEZ., E.I.T.

412 N. DAL PASO
HOBBS, NM 88240
(505)393-3117

TO: Larson & Associates, Inc.
P.O. Box 50685
Midland, TX 79710-0685

MATERIAL: Red Clay

TEST METHOD: ASTM D-2922

PROJECT: Texaco E & P, Inc.
J.R. Phillips #2 Tank Battery

DEPTH: 12"

DATE OF TEST: January 12, 2001

TEST NO.	LOCATION	DRY DENSITY %MAXIMUM	MOISTURE CONTENT %	DEPTH
1	Flag #7, Lift #1	101.75	18.03	12"
2	Flag #6, Lift #1	93.86	18.15	12"
3	Flag #4, Lift #1	98.28	20.17	12"
4	Flag #1, Lift #1	92.40	21.20	12"
5	Flag #5, Lift #1	93.80	20.18	12"
6	Flag #3, Lift #1	99.19	14.20	12"
7	Flag #2, Lift #1	99.56	16.15	12"
Re-Test #1	Flag #5, Lift #1	104.55	15.98	12"
Re-Test #2	Flag #6, Lift #1	96.60	19.67	12"
Re-Test #3	Flag #1, Lift #1	99.70	18.18	12"

CONTROL DENSITY: 105.2 LBS. ASTM D698

OPTIMUM MOISTURE: 22.4%

REQUIRED COMPACTION: 95%

MOISTURE CONTENT

COPIES TO:

JOHN WEST ENGINEERING COMPANY

BY Merced Sanchez

APPENDIX B

NMOCD Correspondence

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

GARY E. JOHNSON
Governor
Jennifer A. Salisbury
Cabinet Secretary

Lori Wrotenbery
Director
Oil Conservation Division

February 23, 2001

CERTIFIED MAIL
RETURN RECEIPT NO: 5051-4157

Mr. Rodney Bailey
Texaco Exploration & Production, Inc.
500 N. Loraine
Midland, Texas 79701

RE: CASE #1R0255
J.R. PHILLIPS #2 TANK BATTERY SITE
MONUMENT, NEW MEXICO

Dear Mr. Bailey:

The New Mexico Oil Conservation Division (OCD) has reviewed Texaco Exploration & Production, Inc.'s (Texaco) November 28, 2000 "COMPREHENSIVE REPORT AND PROPOSED INVESTIGATION PLAN, TEXACO EXPLORATION AND PRODUCTION INC., J.R. PHILLIPS TANK BATTERY NO. 2, SE/4, NW/4, SECTION 6, TOWNSHIP 20 SOUTH, RANGE 37 EAST, LEA COUNTY, NEW MEXICO" which was submitted on behalf of Texaco by their consultant Larson & Associates, Inc. This document contains the results of Texaco's recent investigation of ground water contamination at the J.R. Phillips #2 Tank Battery south of Monument, New Mexico. The document also contains Texaco's work plan for installation of additional ground water monitoring wells at the site.

The above-referenced work plan is approved with the following conditions:

1. Texaco shall install a source monitor well at the approximate location of the SE borehole.

2. All monitor wells shall be developed after construction using EPA approved procedures

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

4. All wastes generated during the investigation shall be disposed of at an OCD approved facility.

5. Texaco shall submit the results of the investigation to the OCD by April 23, 2001. The report shall be submitted to the OCD Santa Fe Office with a copy provided to the OCD Hobbs District Office and shall 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 spills, excavated areas, 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. Isopleth maps for contaminants observed during the investigations.

   e. 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.

   f. The disposition of all wastes generated.

6. Texaco shall notify the OCD at least 48 hours in advance of scheduled activities such that the OCD has the opportunity to witness the events and split samples.

Please be advised that OCD approval does not limit Texaco to the proposed plan should the actions fail to adequately determine the extent of contamination related to their activities, or if contamination exists which is outside the scope of the 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 or comments, please contact me at (505) 476-3491.

Sincerely,

William C. Olson
Hydrologist
Environmental Bureau

xc: Chris Williams, OCD Hobbs District Office
Mark Larson, Larson & Associates, Inc.

Larson & Associates, Inc.
Environmental Consultants

April 20, 2000

Mr. William C. Olson, Hydrologist
New Mexico Oil Conservation Division
Environmental Bureau
1220 South St. Francis Drive
Santa Fe, New Mexico 87505

Re: Request for Extension, Texaco Exploration and Production Inc., J. R. Phillips # 2 Tank Battery Site, SE/4, NW/4, Section 6, Township 20 South, Range 37 East, Lea County, New Mexico

Dear Mr. Olson:

This request is submitted on behalf of Texaco Exploration and Production Inc. for submittal of a report pertaining to a subsurface investigation conducted at the above-referenced facility. An extension is requested until May 25, 2001 for submittal of the report. Your prompt consideration of this request is appreciated. Please call Rodney Bailey at (915) 688-2971 or myself at (915) 687-0901 if you have questions.

Sincerely,
Larson and Associates, Inc.

Mark J. Larson, CPG, CGWP
President

cc: Rodney Bailey, Texaco Exploration and Production Inc.
Chris Williams, New Mexico Oil Conservation Division – District I

[illegible] Suite 202 ◆ Midland, Texas 79701 ◆ Ph. (915) 687-0901 ◆ Fax (915) 687-0456

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

GARY E. JOHNSON
Governor
Jennifer A. Salisbury
Cabinet Secretary

Lori Wrotenbery
Director
Oil Conservation Division

May 3, 2001

Mr. Rodney Bailey
Texaco Exploration & Production, Inc.
500 N. Loraine
Midland, Texas 79701

RE: CASE #1R0255
J.R. PHILLIPS #2 TANK BATTERY SITE
MONUMENT, NEW MEXICO

Dear Mr. Bailey:

The New Mexico Oil Conservation Division (OCD) has reviewed Texaco Exploration & Production, Inc.'s (Texaco) April 20, 2001 "REQUEST FOR EXTENSION, TEXACO EXPLORATION AND PRODUCTION INC., J.R. PHILLIPS # 2 TANK BATTERY SITE, SE/4, NW/4, SECTION 6, TOWNSHIP 20 SOUTH, RANGE 37 EAST, LEA COUNTY, NEW MEXICO" which was submitted on behalf of Texaco by their consultant Larson & Associates, Inc. This document requests an extension of the deadline from April 23, 2001 to May 25, 2001 for submission of a report on Texaco's recent investigation of ground water contamination at the J.R. Phillips #2 Tank Battery south of Monument, New Mexico.

The above-referenced request is approved.

If you have any questions or comments, please contact me at (505) 476-3491.

Sincerely,

William C. Olson
Hydrologist
Environmental Bureau

xc: Chris Williams, OCD Hobbs District Office
Mark Larson, Larson & Associates, Inc.

APPENDIX C

Boring Logs and Well Construction Records

Client: Texaco Exploration and Production Inc.

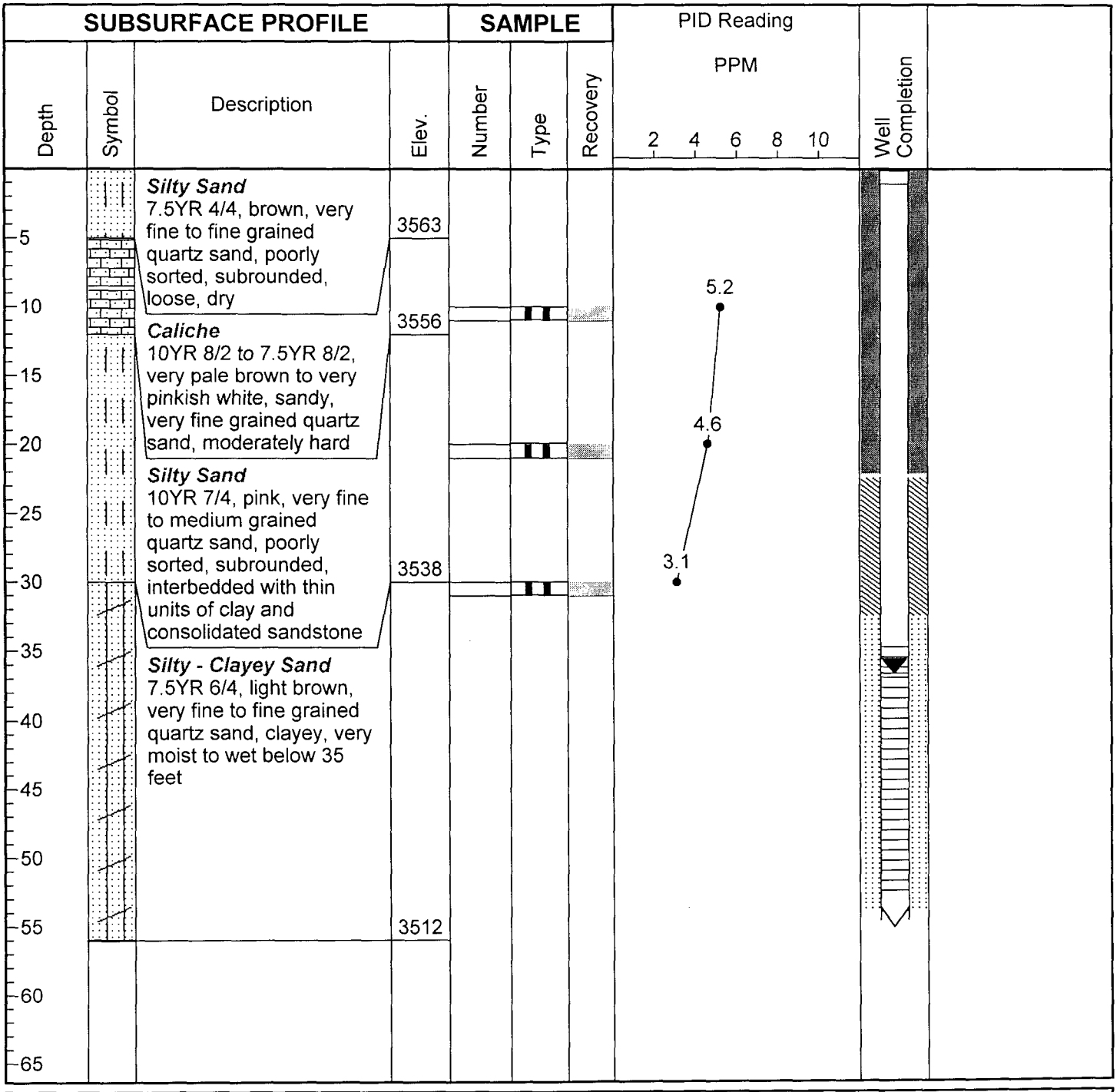
Project: J. R. Phillips

Project No: # 00-0104

Location: Lea County, New Mexcio

Log: MW-3

Geologist: M. J. Larson



Drilling Method: Rotary (air)

Drill Date: 10 - Apr - 01

Hole Diameter: 4.75"

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

Datum: MSL

Checked by: MJL

Drilled by: Scarborough

Client: Texaco Exploration and Production Inc.

Project: J. R. Phillips

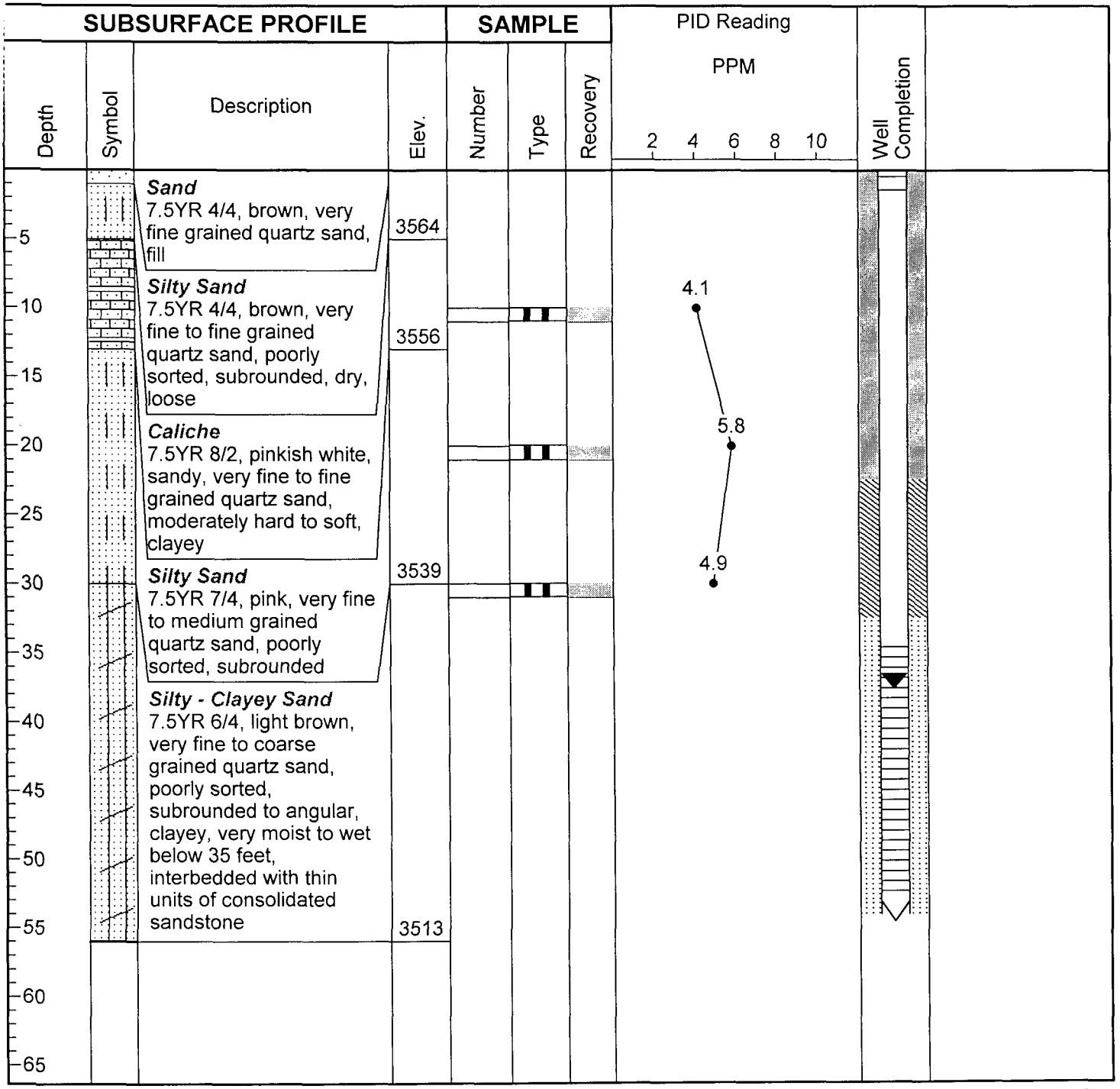
Project No: # 00-0104

Location: Lea County, New Mexico

Log: MW-4

Geologist: M. J. Larson

Page: 1 of 1



Drilling Method: Rotary (air)

Drill Date: 10 - Apr - 01

Hole Diameter: 4.75"

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

Datum: MSL

Checked by: MJL

Drilled by: Scarborough

Client: Texaco Exploration and Production Inc.

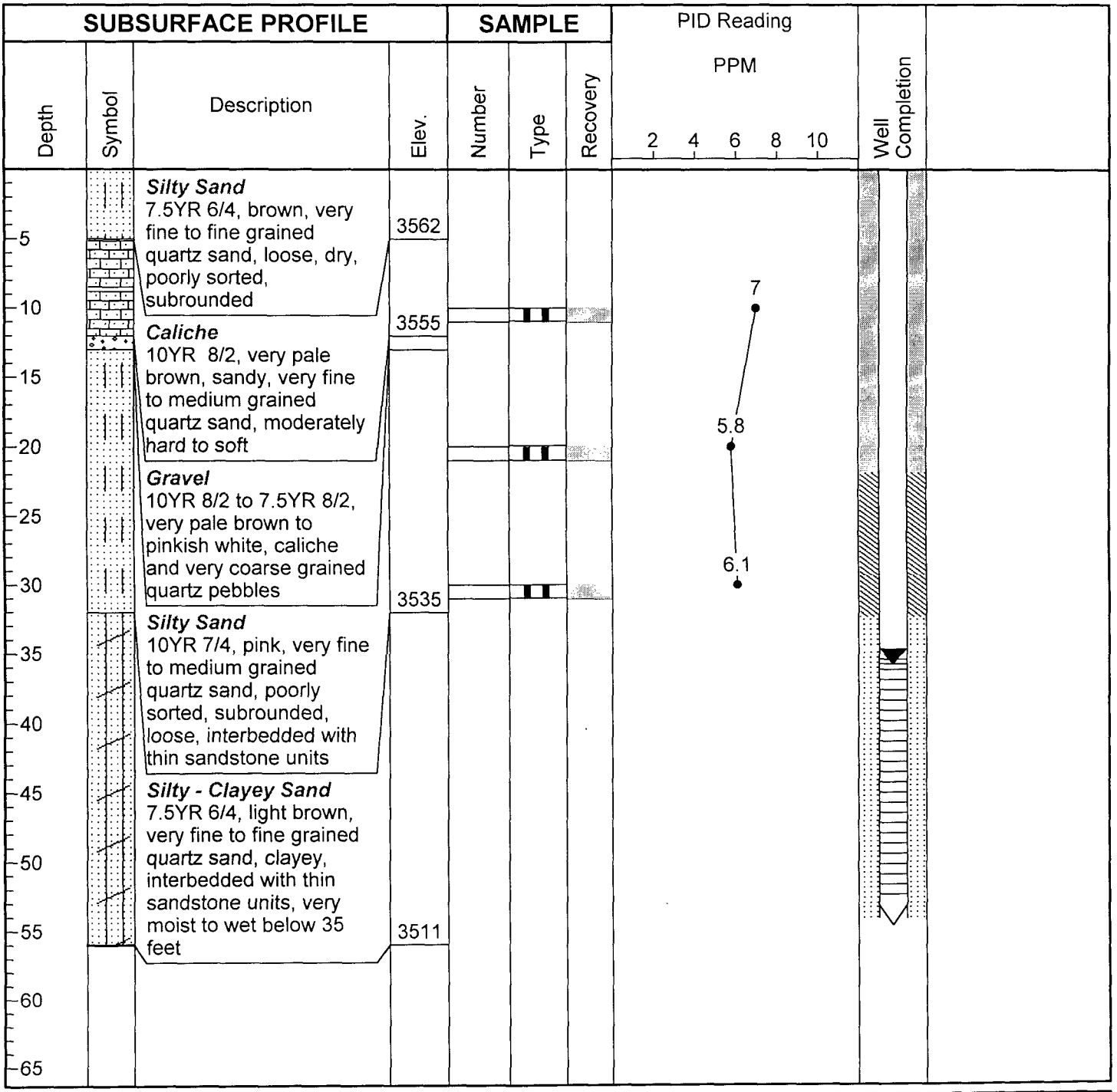
Project: J. R. Phillips

Project No: # 00-0104

Location: Lea County, New Mexico

Log: MW-5

Geologist: M. J. Larson



Drilling Method: Rotary (air)

Drill Date: 11 - Apr - 01

Hole Diameter: 4.75"

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

Datum: MSL

Checked by: MJL

Drilled by: Scarborough

Client: Texaco Exploration and Production Inc.

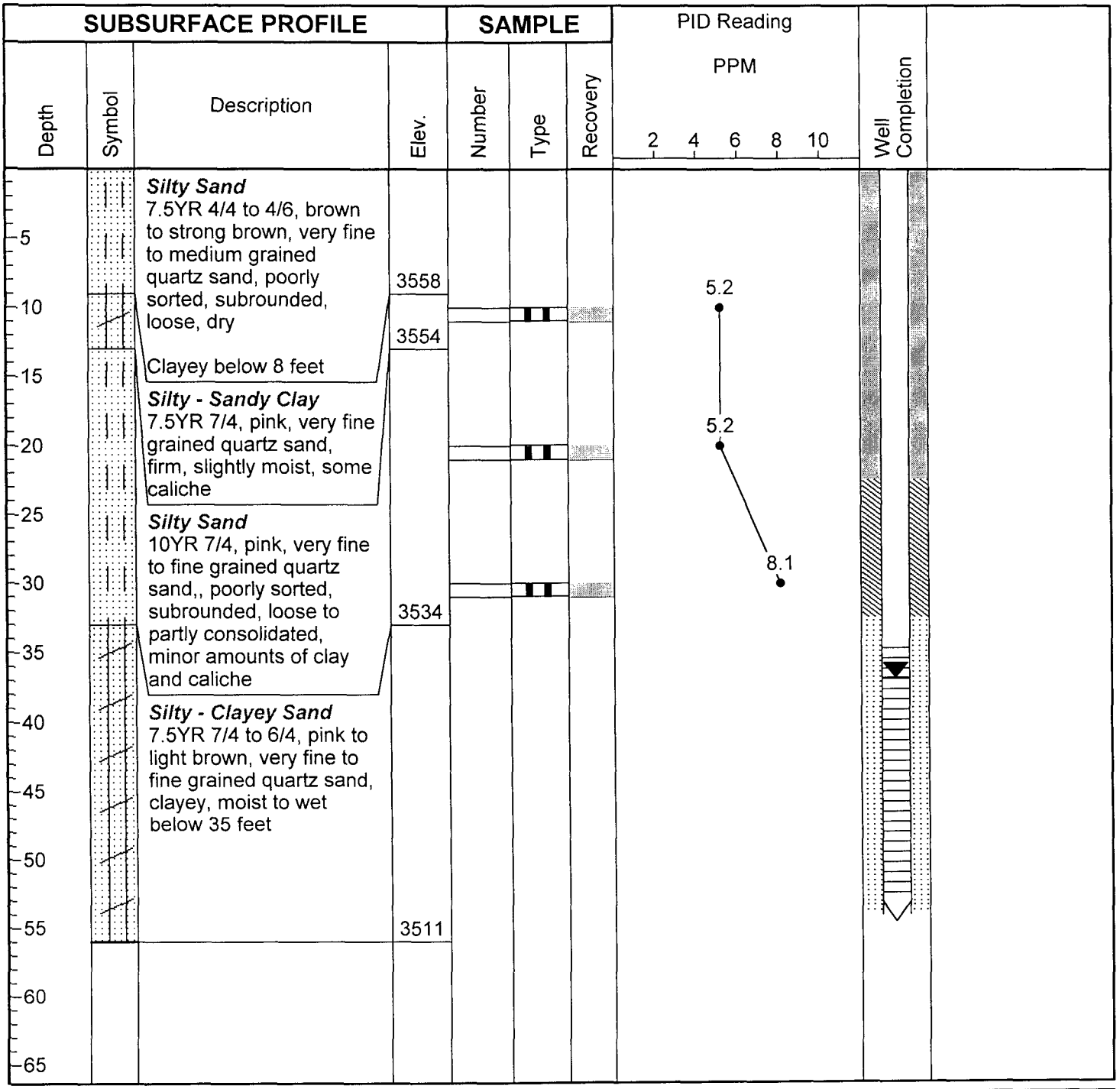
Project: J. R. Phillips

Project No: # 00-0104

Location: Lea County, New Mexico

Log: MW-6

Geologist: M. J. Larson



Drilling Method: Rotary (air)

Drill Date: 10 - Apr - 01

Hole Diameter: 4.75"

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

Datum: MSL

Checked by: MJL

Drilled by: Scarborough

Client: Texaco Exploration and Production Inc.

Project: J. R. Phillips

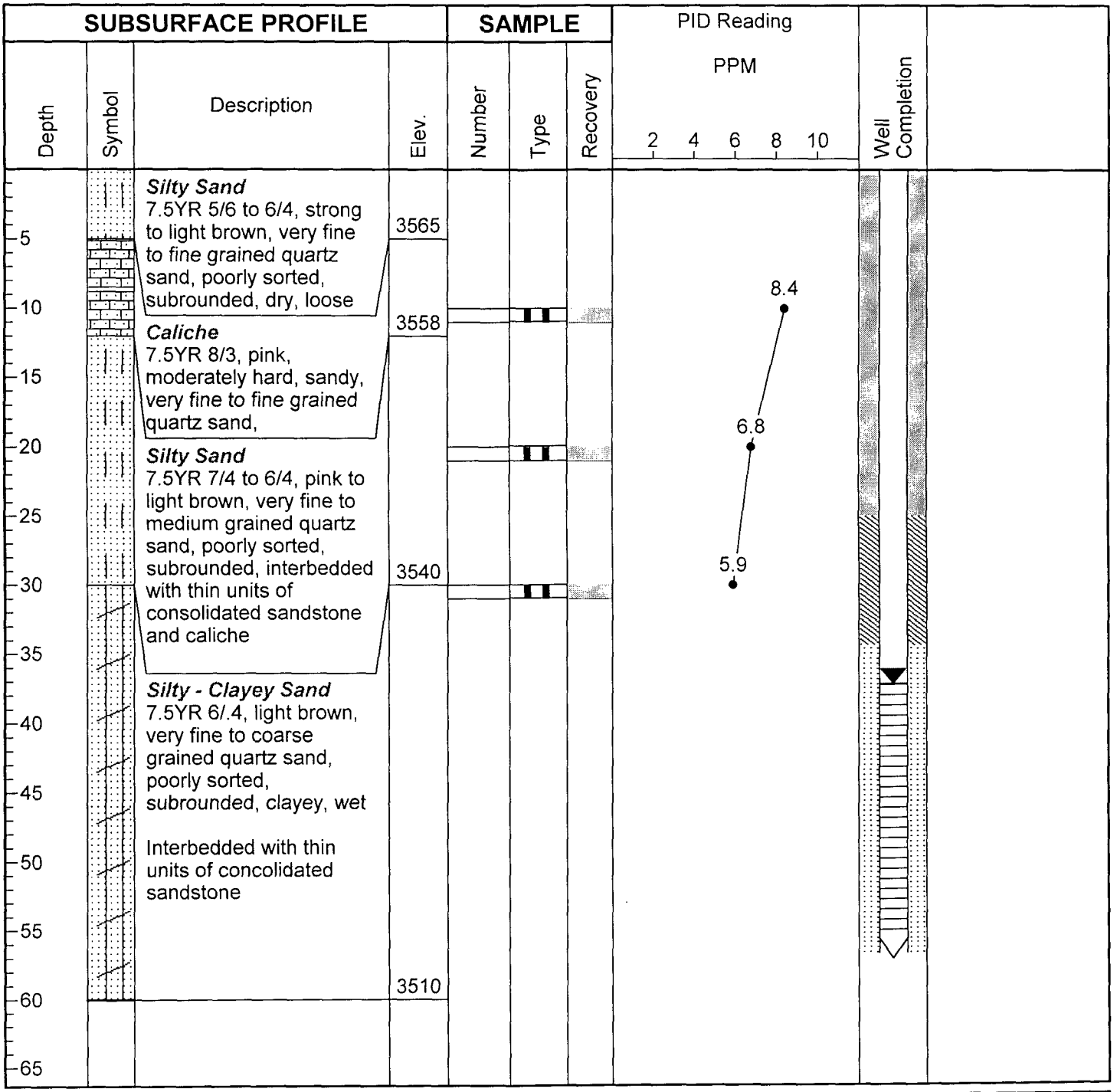
Project No: # 00-0104

Location: Lea County, New Mexcio

Log: MW-7

Geologist: M. J. Larson

Page: 1 of 1



Drilling Method: Rotary (air)

Drill Date: 16 - Apr - 01

Hole Diameter: 4.75"

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

Datum: MSL

Checked by: MJL

Drilled by: Scarborough

Client: Texaco Exploration and Production Inc.

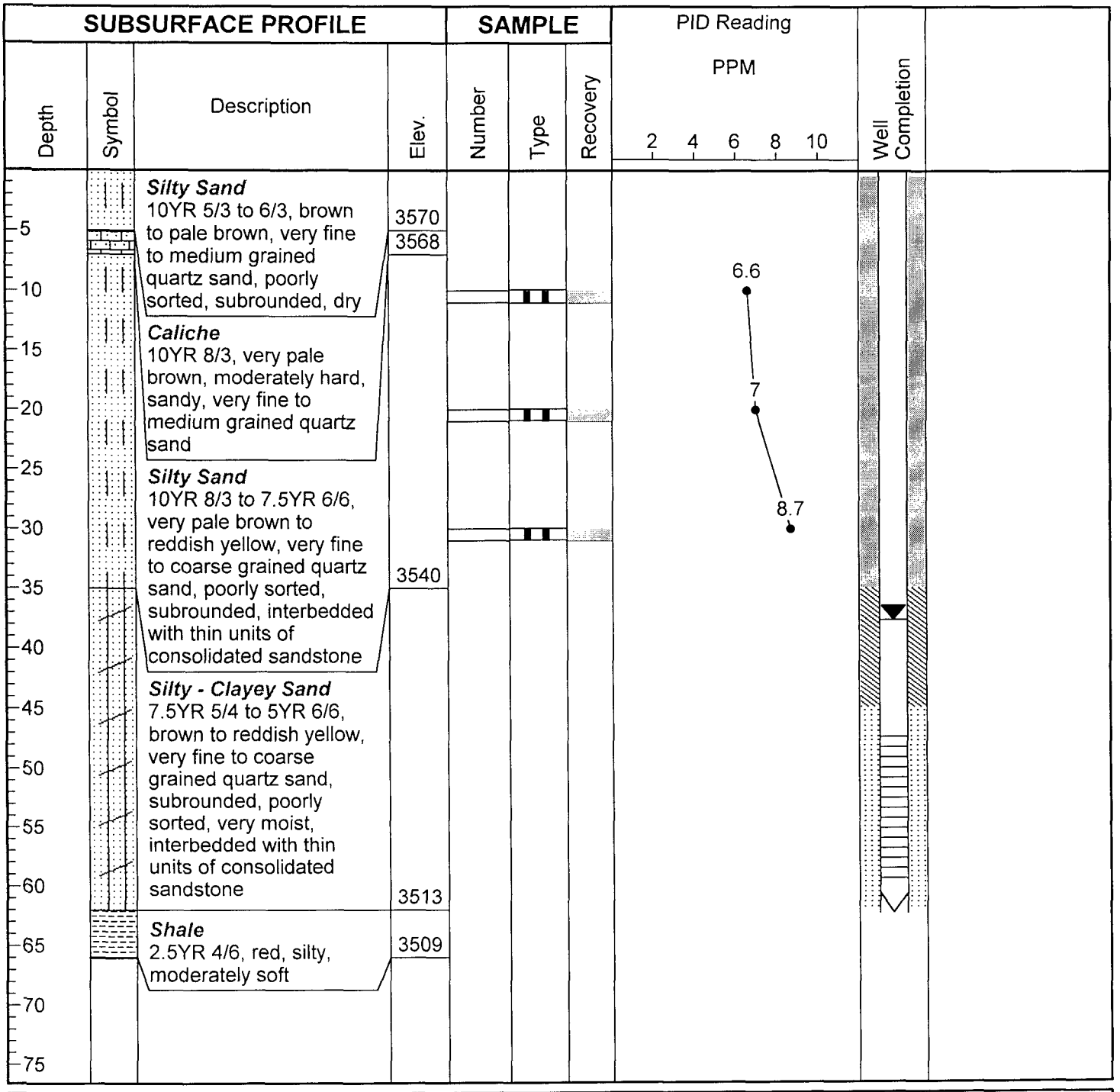
Project: J. R. Phillips

Project No: # 00-0104

Location: Lea County, New Mexico

Log: MW-8

Geologist: M. J. Larson



Drilling Method: Rotary (air)

Drill Date: 16 - Apr - 01

Hole Diameter: 4.75"

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

Datum: MSL

Checked by: MJL

Drilled by: Scarborough

APPENDIX D

Environmental Lab of Texas, Inc. Report

ENVIRONMENTAL LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

LARSON & ASSOCIATES, INC.
ATTN: MR. MARK LARSON
P.O. BOX 50685
MIDLAND, TEXAS 79710-0685
FAX: 915-687-0456

Sample Type: Water
Sample Condition: Intact/ Iced/ 7 deg. C
Project #: 00-0104
Project Name: JR Phillips
Project Location: Lea County, NM

Sampling Date: 05/02/01
Receiving Date: 05/03/01
Analysis Date: See Below

ELT#	FIELD CODE	pH s.u.	TDS mg/L	Chloride mg/L	Sulfate mg/L	Carbonate mg/L	Bicarbonate mg/L
39992	MW-8	6.67	16325	7445	1213	<2	426
39993	MW-7	6.70	18578	8154	2430	<2	436
	REPORTING LIMIT	*	10	5	0.5	2	2
	QUALITY CONTROL	7.01	*	5140	50.6	*	*
	TRUE VALUE	7.00	*	5000	50.0	*	*
	% IA	100	*	103	101	*	*
	BLANK	*	<10	<5	<0.5	<2	<2
	ANALYSIS DATE	05/04/01	05/07/01	5/04/01	5/04/01	05/07/01	05/07/01

METHODS: EPA 150.1, 375.4, 160.1, 310.0, SW846-9253

Celey Keene
Celey Keene

05/15/01
Date

ENVIRONMENTAL LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

LARSON & ASSOCIATES, INC.
ATTN: MR. MARK LARSON
P.O. BOX 50685
MIDLAND, TEXAS 79710-0685
FAX: 915-687-0456

Sample Type: Water
Sample Condition: Intact/ Iced/ 7 deg. C
Project #: 00-0104
Project Name: JR Phillips
Project Location: Lea County, NM

Sampling Date: 05/03/01
Receiving Date: 05/03/01
Analysis Date: See Below

ELT#	FIELD CODE	pH s.u.	TDS mg/L	Chloride mg/L	Sulfate mg/L	Carbonate mg/L	Bicarbonate mg/L
39994	WW-1	4.38	22571	12053	629	<2	<2
39995	MW-3	6.50	24135	11078	3525	<2	458
39996	MW-4	6.51	20118	9572	2755	<2	618
39997	MW-5	6.60	18846	8685	3045	<2	416
39998	MW-2	6.77	16857	7799	2670	<2	516
39999	MW-1	6.77	14501	6913	2020	<2	500
40000	DUP	4.25	21192	12053	688	<2	<2
40001	MW-6	6.41	25288	11876	4380	<2	460
	REPORTING LIMIT	*	10	5	0.5	2	2
	QUALITY CONTROL	7.01	*	5140	50.6	*	*
	TRUE VALUE	7.00	*	5000	50.0	*	*
	% IA	100	*	103	101	*	*
	BLANK	*	<10	<5	<0.5	<2	<2
	ANALYSIS DATE	05/04/01	05/07/01	5/04/01	5/04/01	05/07/01	05/07/01

METHODS: EPA 150.1, 375.4, 160.1, 310.0, SW846-9253

Celey Keene
Celey Keene

05/15/01
Date

ENVIRONMENTAL LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

LARSON & ASSOCIATES, INC.
ATTN: MR. MARK LARSON
P.O. BOX 50685
MIDLAND, TEXAS 79710-0685
FAX: 915-687-0456

Sample Type: Water
Sample Condition: Intact/ Iced/ HCl/ 7 deg. C
Project #: 00-0104
Project Name: JR Phillips
Project Location: Lea County, NM

Sampling Date: See Below
Receiving Date: 05/03/01
Analysis Date: 05/07/01

ELT#	FIELD CODE	BENZENE mg/l	TOLUENE mg/l	ETHYLBENZENE mg/l	m,p-XYLENE mg/l	o-XYLENE mg/l	Sample Date
39992	MW-8	<0.001	0.002	<0.001	<0.001	<0.001	05/02/01
39993	MW-7	<0.001	<0.001	<0.001	<0.001	<0.001	05/02/01
39994	WW-1	<0.001	<0.001	<0.001	<0.001	<0.001	05/03/01
39995	MW-3	<0.001	<0.001	<0.001	<0.001	<0.001	05/03/01
39996	MW-4	0.005	<0.001	<0.001	<0.001	<0.001	05/03/01
39997	MW-5	<0.001	<0.001	<0.001	<0.001	<0.001	05/03/01
39998	MW-2	<0.001	<0.001	<0.001	<0.001	<0.001	05/03/01
39999	MW-1	<0.001	<0.001	<0.001	<0.001	<0.001	05/03/01
40000	DUP	<0.001	<0.001	<0.001	<0.001	<0.001	05/03/01
40001	MW-6	<0.001	<0.001	<0.001	<0.001	<0.001	05/03/01
	%IA	102	106	111	110	110	
	%EA	96	100	101	99	102	
	BLANK	<0.001	<0.001	<0.001	<0.001	<0.001	

METHODS: EPA SW 846-8021B ,5030

Celey Keene

Celey Keene

05/15/01

Date

ENVIRONMENTAL LAB OF , INC.

"Don't Treat Your Soil Like Dirt!"

LARSON & ASSOCIATES, INC.
ATTN: MR. MARK LARSON
P.O. BOX 50685
MIDLAND, TEXAS 79710-0685
FAX: 915-687-0456

Sample Type: Water
Sample Condition: Intact/ Iced/ 7 deg. C
Project #: 00-0104
Project Name: JR Phillips
Project Location: Lea County, NM

Sampling Date: See Below
Receiving Date: 05/03/01
Analysis Date: 05/11/01

ELT#	FIELD CODE	Calcium mg/l	Potassium mg/l	Magnesium mg/l	Sodium mg/l	Sample Date
39992	MW-8	766.7	52.68	295.7	2999	05/02/01
39993	MW-7	599.5	34.57	289.8	4578	05/02/01
39994	WW-1	1419	38.95	387.3	1486	05/03/01
39995	MW-3	984.0	38.89	431.9	6114	05/03/01
39996	MW-4	467.7	49.25	299.8	5435	05/03/01
39997	MW-5	430.9	44.36	237.1	4651	05/03/01
39998	MW-2	412.4	30.31	221.7	4424	05/03/01
39999	MW-1	323.4	52.11	172.5	3756	05/03/01
40000	DUP	1337	42.68	323.9	1376	05/03/01
40001	MW-6	1004	52.27	429.9	6281	05/03/01
REPORTING LIMIT		0.01	0.05	0.001	0.01	
%IA		99	102	100	102	
%EA		104	81	102	84	
RPD		1.9	6.4	0	1.2	
BLANK		<0.01	<0.05	<0.001	<0.01	

METHODS: EPA SW 846-6010B

Celey Keene
Celey Keene

05/15/01
Date

Environmental Lab of Texas, Inc.

12600 West I-20 East
Odessa, Texas 79763
Phone: 915-563-1800
Fax: 915-563-1713

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST

Project Manager: Mark Larson
Company Name: Larson and Associates, Inc
Company Address: P.O. Box 50685
City/State/Zip: Midland, TX 79710 - 0685
Telephone No: (915) 687-0901 Fax No: (915) 687-0456
Sampler Signature:

Project Name: JR Phillips
Project #: 00-0104
Project Loc: Lea County, NM
PO #:

LAB # (lab use only)	FIELD CODE	Date Sampled	Time Sampled	No. of Containers	Preservative: Ice	HNO3	HCl	NaOH	H2SO4	None	Other (Specify)	Matrix: Water	Sludge	Soil	Other (specify)	Analyze For: TDS / CL / SAR / EC	TPH 418.1	TPH TX 1005/1006	TPH 8015M GRO/DRO	Metals: As Ag Ba Cd Cr Pb Hg Se	Volatiles	Semivolatiles	BTEX 8021B/5030	Cations	Cations	TDS	pH			RUSH TAT (Pre-Schedule)	Standard TAT
39992	MW-8	5-2-01	1300	3	✓		✓					✓										✓	✓	✓	✓	✓					
39993	MW-7	5-2-01	1400	3	✓		✓															✓	✓	✓	✓	✓					
39994	MW-1	5-3-01	0830	3	✓		✓															✓	✓	✓	✓	✓					
39995	MW-3	"	1015	3	✓		✓															✓	✓	✓	✓	✓					
39996	MW-4	"	1100	3	✓		✓															✓	✓	✓	✓	/					
39997	MW-5	"	1215	3	✓		✓															✓	✓	✓	✓	✓					
39998	MW-2	"	1250	3	✓		✓															✓	✓	✓	✓	✓					
39999	MW-1	"	1325	3	✓		✓															✓	✓	✓	✓	✓					
40000	Dup.	"	-	3	✓		✓															✓	✓	✓	✓	✓					
40001	MW-6	"	0930	3	✓		✓					✓										✓	✓	✓	✓	✓					

Special Instructions:

Sample Containers Intact? Y N
Temperature Upon Receipt:
Laboratory Comments:
Rec- 7°C.

Relinquished by:	Date	Time	Received by:	Date	Time
	5/3/01	17:05			
Relinquished by:	Date	Time	Received by ELOT:	Date	Time
				5/3/01	1705

APPENDIX E

Water Well Records

Form WR-23 STATE ENGINEER OFFICE Llips #12

WELL RECORD

INSTRUCTIONS: This form should be executed in triplicate, preferably typewritten, and submitted to the nearest district office of the State Engineer. All sections, except Section 5, shall be answered as completely and accurately as possible when any well is drilled, repaired or deepened. When this form is used as a plugging record, only Section 1A and Section 5 need be completed.

Section 1

(Plat of 640 acres)

(A) Owner of well MAKIN DRILLING CO.
Street and Number Box 1628
City Hobbs State New Mexico
Well was drilled under Permit No. and is located in the
¼ SE ¼ NW ¼ of Section 6 Twp. 20 S Rge. 37 E
(B) Drilling Contractor Ed. Burke License No. WD 111
Street and Number Box 306
City Hobbs State New Mexico
Drilling was commenced March 9 19 58
Drilling was completed March 9 19 58

Elevation at top of casing in feet above sea level Total depth of well 86
State whether well is shallow or artesian shallow Depth to water upon completion 27

Section 2 PRINCIPAL WATER-BEARING STRATA

No.	Depth in Feet From	Depth in Feet To	Thickness in Feet	Description of Water-Bearing Formation
1	40	68	28	Water sand
2				
3				
4				
5				

Section 3 RECORD OF CASING

Dia in.	Pounds ft.	Threads in	Depth Top	Depth Bottom	Feet	Type Shoe	Perforations From	Perforations To
7	17	10	0	82	82	none	42	82

Section 4 RECORD OF MUDDING AND CEMENTING

Depth in Feet From	Depth in Feet To	Diameter Hole in in.	Tons Clay	No. Sacks of Cement	Methods Used

Section 5 PLUGGING RECORD

Name of Plugging Contractor License No.
Street and Number City State
Tons of Clay used Tons of Roughage used Type of roughage
Plugging method used Date Plugged 19
Plugging approved by:
Basin Supervisor

Cement Plugs were placed as follows:

No.	Depth of Plug From	Depth of Plug To	No. of Sacks Used

FOR USE OF STATE ENGINEER ONLY

Date Received MAR 19 1958

STATE ENGINEER OFFICE
GROUND WATER SUPERVISOR
ROSWELL, NEW MEXICO

File No. L-3410 Use O. & G. Location No. 20.37.6.4432

L S Elev 3565

~~Depth to K~~ ~~Trc~~ LB

Elev of K Trc 3497

~~Loc. No.~~ 20.37.6, 14432

~~Hydro Survey~~ ~~Field Check~~ X

SOURCE OF ALTITUDE GIVEN

Interpolated from Topo Sheet X

Determined by Inst. Leveling

Other

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 well.

Richard A Brady

Well Driller