1R - 255

REPORTS

DATE:

11/28/2000

Larson & Associates, Inc.
Environmental Consultants

November 28, 2000

Via Facsimile: (505) 827-8177

Mr. William C. Olson
New Mexico Oil Conservation Division
2040 South Pacheco
Santa Fe, New Mexico 87505

Re: 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

Dear Mr. Olson:
This letter was prepared by Larson and Associates, Inc. (LA) on behalf of Texaco Exploration and Production Inc. (Texaco), and presents a comprehensive summary of activities associated with excavation of a former emergency pit at Texaco's J.R. Phillips Tank Battery No. 2 (Site), located approximately 2 miles southwest of Monument, New Mexico. The comprehensive summary was prepared for the New Mexico Oil Conservation Division (NMOCD) as a condition of Texaco's request to close on excavation on October 16, 2000. The request was approved by the NMOCD on October 20, 2000.

Background
The Site is a former emergency pit associated with the J.R. Phillips Tank Battery No. 2, and is located in the southeast quarter (SE/4) of the northwest quarter (NW/4) of Section 6, Township 20 South, Range 37 East, Lea County, New Mexico. The emergency pit was used for temporary containment of produced fluids during upsets at the tank battery. Figure 1 presents a Site location and topographic map. Figure 2 presents a Site drawing.

In December 1999, Texaco retained Environmental Plus, Inc. (EPI) to excavate the emergency pit, and a small burn pit located south-southeast of the emergency pit. Approximately 33,500 cubic yards of hydrocarbon-affected soil was removed from the Site between December 1999 and October 2000. The soil was transported to Texaco's centralized treatment facility (landfarm), located northwest of Jal, New Mexico. The emergency pit (main excavation) was dug to approximately 25 to 30 feet below ground surface (BGS), and the burn pit (satellite excavation) was dug to approximately 12 to 15 feet BGS.

EPI personnel excavated a shallow trench (test trench) in the bottom of the northwest corner of the main excavation, and groundwater was observed approximately 10 feet below the bottom of the excavation, or 35 to 40 feet BGS.

EPI personnel collected soil samples during the early and middle stages of excavation, and LA personnel collected final soil samples from the excavations once it was felt that the majority of hydrocarbon-affected soil had been removed. LA personnel collected soil samples from the test trench on August 17, 2000. Soil samples were collected from the main and satellite excavations on September 15, 2000 and October 3, 2000. The October 3, 2000 samples were collected from the west wall and southwest corner of the main excavation following removal of about 40 cubic

yards of soil to reduce hydrocarbon levels in these areas following receipt of September 15, 2000 analyses. The samples were submitted under chain-of-custody control to Trace Analysis, Inc., located in Lubbock, Texas, and analyzed for total petroleum hydrocarbons (TPH) and chloride. Soil samples that recorded concentrations of total ionizable hydrocarbon above 100 parts per million (ppm) using a photoionization detector (PID) were analyzed for benzene, toluene, ethylbenzene and xylene (collectively referred to as BTEX). The final laboratory results were submitted to the NMOCD in a letter dated October 16, 2000, incorporated here by reference.

Monitoring Wells

EPI personnel installed two (2) monitoring wells (MW-1 and MW-2) north of the Site. The wells were drilled using a trailer mounted hollowstem auger drilling rig. The wells were constructed with 2-inch diameter schedule 40 PVC casing, and screen. Groundwater was observed at approximately 36 feet BGS in well MW-1, and 35.9 feet BGS in well MW-2. EPI prepared geologic logs for each borings. A completion record was only available for well MW-2. Table 1 presents a summary of monitoring well drilling and completion details. Appendix A presents the geologic logs and well completion record. Figure 2 presents the well locations.

Groundwater Samples

On March 15, 2000, EPI personnel collected groundwater samples from a water well located southeast of the Site. On March 17, 2000, EPI personnel collected groundwater samples from a boring (SE boring) drilled near the southeast corner of the Site. A geologic log was not available for the boring. On April 10, 2000, groundwater samples were collected from monitoring wells MW-1 and MW-2.

The water well samples were analyzed for BTEX and chloride. The borehole samples were analyzed for BTEX, TPH (gasoline and diesel ranged hydrocarbons) and chloride. The monitoring wells 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). The analyses were performed by Cardinal Laboratories, Inc., located in Hobbs, New Mexico. Table 2 presents a summary of the laboratory analyses. Appendix B presents the laboratory reports.

Referring to Table 2, BTEX was not reported above the test method detection limits in samples from the water well or monitoring wells. Benzene was reported at 0.011 milligrams per liter (mg/L) in the groundwater sample from the southeast boring, and exceeded the New Mexico Water Quality Control Commission (NMWQCC) human health standard of 0.01 mg/L. Toluene, ethylbenzene and xylene from the borehole sample were below the NMWQCC human health standards.

Chloride was reported at 7,300 mg/L (MW-1), 8,704 mg/L (MW-2), 13,152 mg/L (Water Well) and 41,300 mg/L (SE Borehole). Sulfate was reported at 2,061 mg/L and 2,611 mg/L in samples from wells MW-1 and MW-2, respectively. The NMWQCC standards for chloride and sulfate are 250 mg/L and 600 mg/L, respectively. TDS was reported at 15,816 mg/L and 19,312 mg/L in samples from MW-1 and MW-2, respectively. The NMWQCC standard for TDS is 1,000 mg/L.

Conclusions

Chloride and BTEX were highest in groundwater samples from the SE borehole. Guidelines established by the NMOCD recommend collection of groundwater samples from monitoring wells, unless an alternate method is approved by the NMOCD. The potential exists for cross-contamination between unsaturated zone soils and groundwater when samples are collected from the borehole.

Chloride levels in samples from wells MW-1 and MW-2 may represent background conditions or an impact from an upgradient source. The regional groundwater flow direction, based on published information, is from northwest to southeast, suggests that wells MW-1 and MW-2 are positioned hydraulically upgradient to the Site. Sulfate levels reported in groundwater samples from wells MW-1 and MW-2 indicate that background water quality is generally poor.

It is not possible to determine if chloride reported in the sample from the water well is associated with the Site, since no construction records were available for the well. No other monitoring points exist between the Site and the water well to establish groundwater quality or groundwater flow conditions.

Additional Investigations

Texaco proposes to install three additional monitoring wells south and southeast (downgradient) of the Site, at locations shown on Figure 2. The wells will be drilled to about 60 feet BGS using an air-rotary drilling rig, and soil samples will be collected for visual inspection and field screening using a PID. The soil samples will be collected in accordance with industry and NMOCD accepted practices, and a log will be prepared for each boring. The wells will be constructed with 2-inch diameter schedule 40 PVC casing and screen. Approximately 20 feet of well screen will be placed in each well, with approximately 15 feet of screen extending into groundwater, and five feet above groundwater. The well screen will be surrounded with graded silica sand, placed into the annulus to a depth approximately 2 feet above the screen. A layer of bentonite pellets, approximately 2 feet thick, will be placed over the sand, and hydrated with potable water. The remainder of the annulus will be filled with cement and bentonite grout, to about one (1) foot below ground. Each well will be secured with a locking steel cover anchored in a concrete pad measuring approximately 3 feet by 3 feet. A New Mexico registered professional land surveyor will survey the wells for horizontal location, top-of-casing and ground elevations. The locations of the wells new will be referenced to the existing monitoring wells.

The wells will be developed using an electric submersible pump or bailed. The purged water will be contained in a portable tank, and placed in the tank battery system, or disposed in permitted well. All equipment coming in contact with groundwater (i.e., water level indicator, interface probe, submersible pump, etc.) will be thoroughly cleaned between wells using laboratory grade detergent and rinsed.

Groundwater samples will be collected from all wells, including the monitoring wells and water, and analyzed for BTEX, anions, cations, and TDS. The samples will be collected using dedicated disposable polyethylene bailers after the wells are purged. The wells will be pumped or bailed, and the purged water will be managed as previously stated. Depth-to-groundwater will be measured in all wells prior to purging. Groundwater samples will be carefully transferred from the bailers to laboratory-prepared containers. The containers will be labeled, placed in an ice

chest, chilled, and transferred under chain-of-custody control to the laboratory. Quality Assurance/Quality Control (QA/QC) samples (i.e., duplicate, trip blank, field blank, etc.) will be collected for data validation. Instrument calibration and field observations will be maintained in a bound field notebook.

A review of New Mexico State Engineer records will be performed to determine the construction of the water well located southeast of the Site. The records review will also include water wells within .5 miles of the Site.

Texaco will submit a final report upon completion of the investigation. Field and laboratory data will be presented in tabular form, and the report will contain a discussion of the field sampling techniques and laboratory results. Drawings, including borehole logs, well completion diagrams, a groundwater potentiometric map and isopleth maps of contaminant concentrations will be included in the report.

Please call Mr. Rodney Bailey at (915) 688-2971 or myself at (915) 687-0901 if you have questions.

Sincerely,
LARSON & Associates, Inc.

Mark J. Larson, CPG, CGWP
President

Encl.

cc: Mr. Rodney Bailey - Texaco
Mr. Chris Williams – NMOCD, Hobbs District

TABLES

Table 1: **Summary of Monitor Well Drilling and Completion Details,**
Texaco Exploration and Production Inc., J.R. Phillips Tank Battery No. 2
Lea County, New Mexico

Well Number	Date Drilled	Depth (BGS)	Ground Elevation (AMSL)	Top of Casing Elevation (AMSL)	Screen Interval (BGS)	Water Level (BGS) 10-April-00
MW-1	31-Mar-00	--	3571.61	--	--	36.00
MW-2	31-Mar-00	42	3571.12	--	27 - 42	35.90

Notes: Wells drilled by Environmental Plus, Inc., Eunice, New Mexico, and completed with 2" Schedule 40 PVC screen and casing.

1. BGS: Denotes depth in feet below ground surface
2. AMSL: Denotes elevation in feet above mean sea level
3. --: No data available

Table 2: **Summary of Organic and Inorganic Analyses of Groundwater Samples from Monitor Wells, Water Wells and Boreholes**
Texaco Exploration and Production, Inc., J.R. Phillips Tank Battery No. 2
Lea County, New Mexico

Sample ID	Sample Date	Benzene mg/L	Toluene mg/L	Ethylbenzene mg/L	Xylene mg/L	GRO mg/L	DRO mg/L	Sodium mg/L	Calcium mg/L	Magnesium mg/L
P-1	15-Mar-00	<0.002	<0.002	<0.002	<0.006	--	--	-	-	-
(Water Well)										
SE	17-Mar-00	0.011	0.005	0.032	0.015	<5.0	<5.0	--	--	--
(Borehole)										
MW-1	10-Apr-00	<0.002	<0.002	<0.002	<0.006	--	--	5058	445	175
MW-2	10-Apr-00	<0.002	<0.002	<0.002	<0.006	--	--	5871	569	296
Sample ID	**Sample Date**	**Potassium mg/L**	**Chloride mg/L**	**Sulfate mg/L**	**Carbonate mg/L**	**Bicarbonate mg/L**	**Alkalinity mg/L**	**pH S.U.**	**Sp. Cond. us/cm**	**TDS mg/L**
P-1	15-Mar-00	--	13,152	--	--	--	--	--	--	--
(Water Well)										
SE	17-Mar-00	--	41,300	--	--	--	--	--	--	--
(Borehole)										
MW-1	10-Apr-00	44	7300	2061	0	556	456	7.01	22,550	15,816
MW-2	10-Apr-00	31	8704	2611	0	566	469	6.91	27,860	19,312

Notes:

1. mg/L: Milligrams per liter
2. <: Below detection limit
3. --: No data available

FIGURES

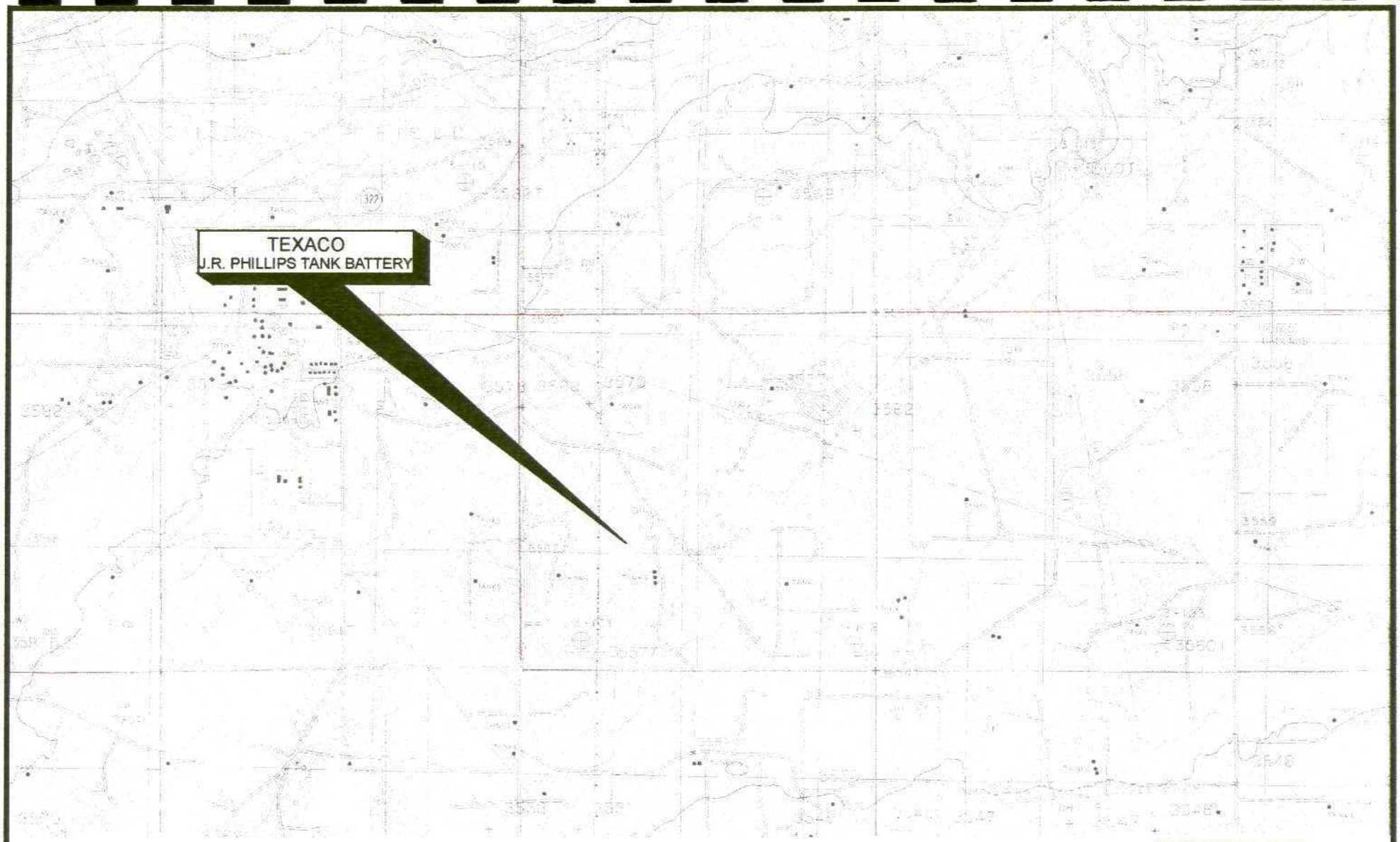


FIGURE #1

LEA COUNTY, NEW MEXICO

TEXACO
EXPLORATION & PRODUCTION INC.
J.R. PHILLIPS TANK BATTERY

TOPOGRAPHIC MAP
SEC.6, T-20-S, R-37-E

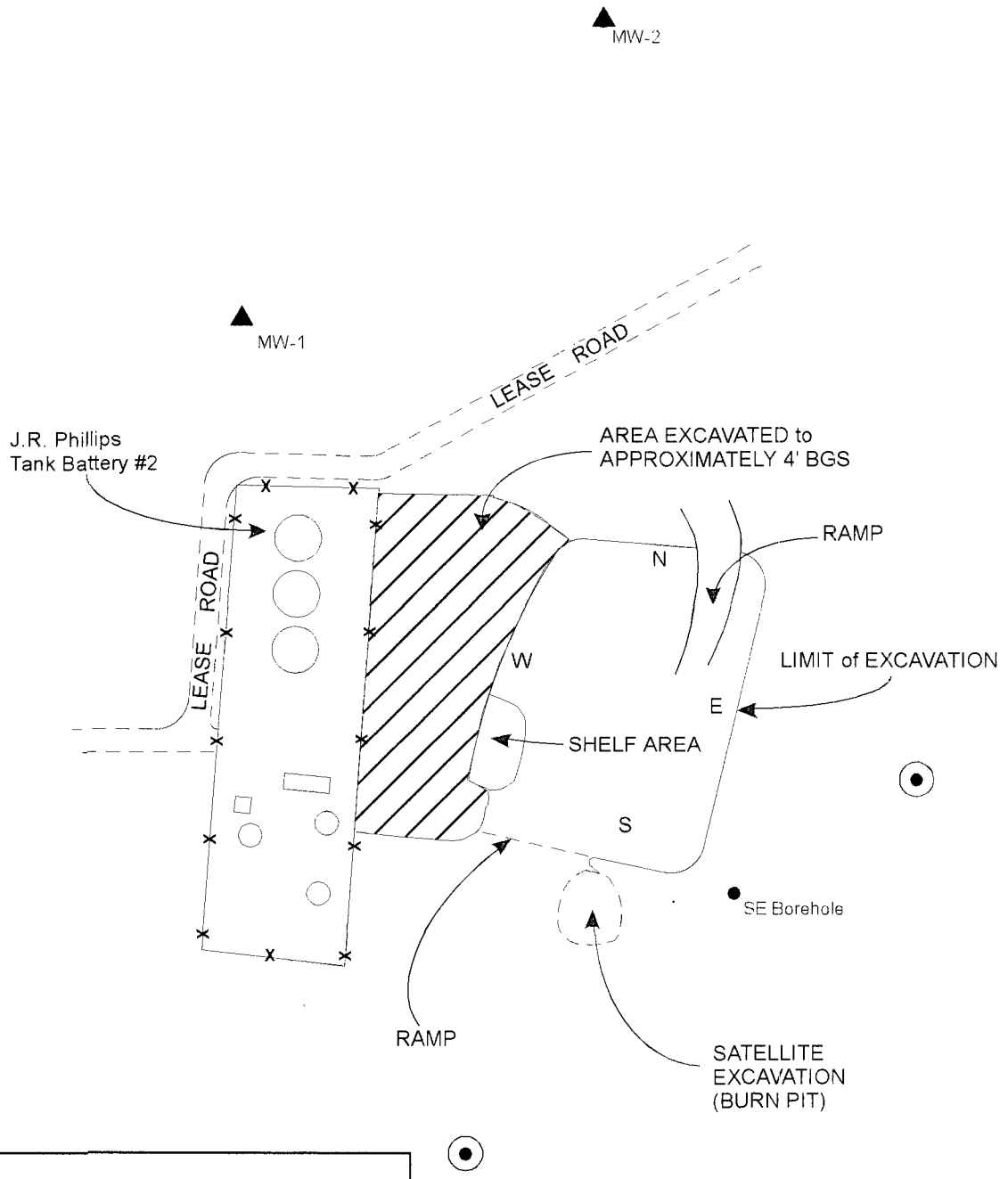
LEGEND

● SAMPLE LOCATION

N-1 COMPOSITE SAMPLE

DATE	10/5/00
NAME:	
FILE:	

Larson & Associates, Inc.
Environmental Consultants



LEGEND

- MW-1 ▲ MONITORING WELL LOCATION
- SE ● SOIL BORING LOCATION
- WW □ WATER WELL LOCATION
- ⊙ PROPOSED MONITORING WELL LOCATION

GRAPHIC SCALE in feet

0 100 200 300

SCALE: 1"=100'

N

WW

FIGURE #2

LEA COUNTY, NEW MEXICO

TEXACO EXPLORATION and PRODUCTION INC.
J.R. PHILLIPS TANK BATTERY #2

SITE DRAWING

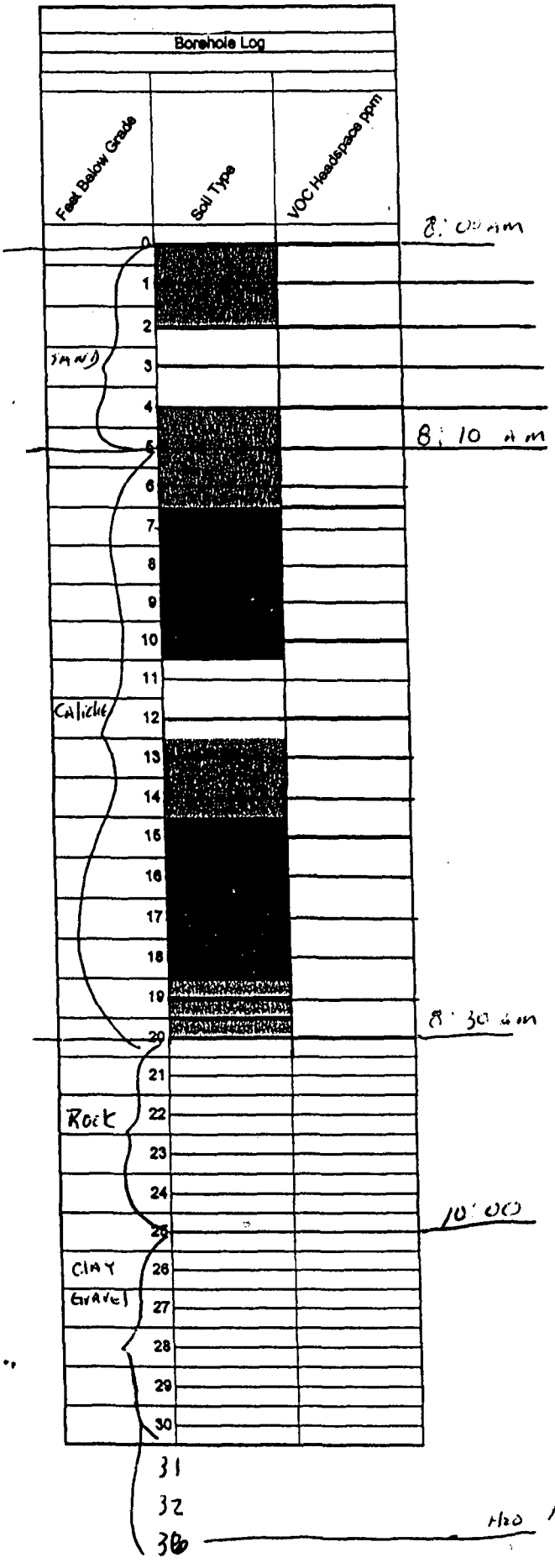
DATE 11/23/00
NAME
FILE 00-0104

Larson & Associates, Inc.
Environmental Consultants

APPENDIX A

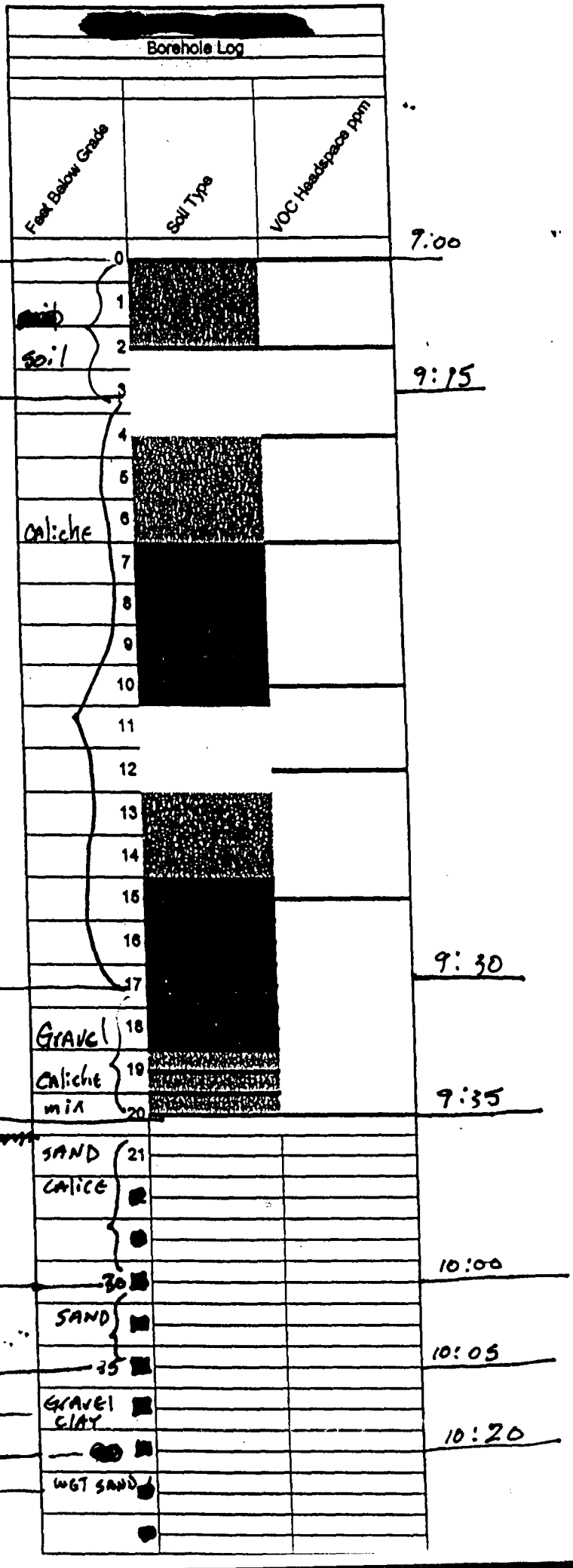
EPI Logs and Well Completion Records

EXACO
R. Phillips
Monitor Well #1

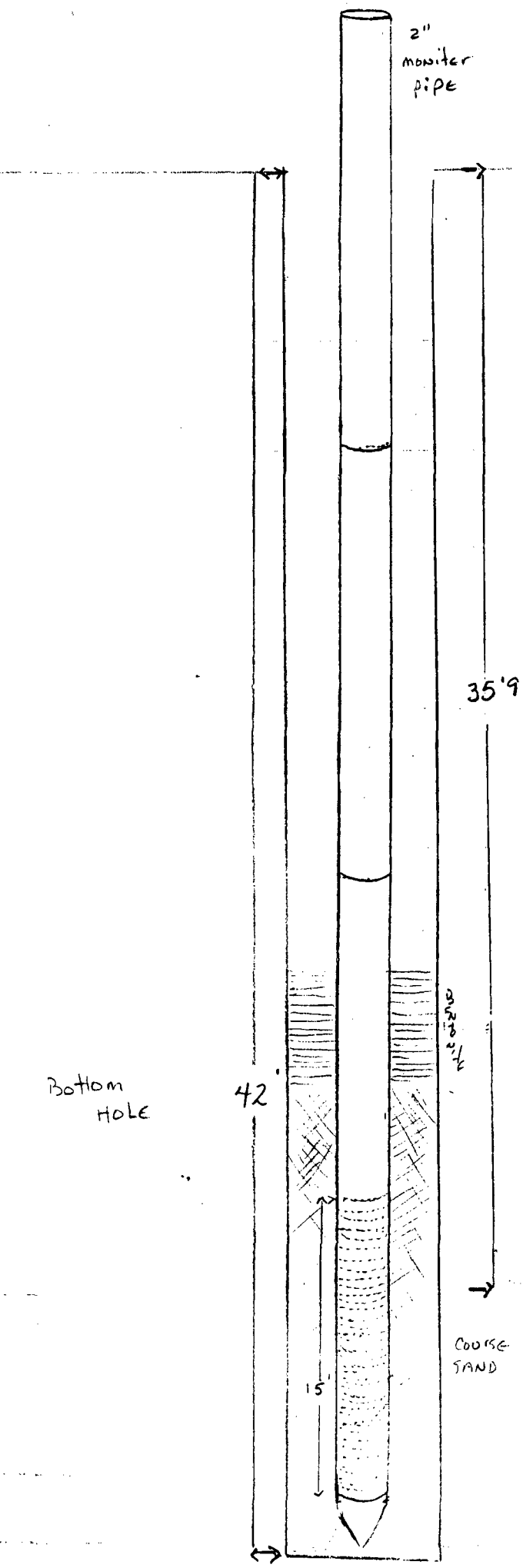


TEXACO E&P INC
JR Phillips
monitor well #2

GW 41000JPMW1



TEXACO E&P Inc
J.R. Phillips
Monitor well #2



APPENDIX B

Cardinal Laboratory Reports

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
TEXACO EXPLORATION & PRODUCTION
ATTN: RODNEY BAILEY
205 E. BENDER
HOBBS, NM 88240
FAX TO:

Receiving Date: 03/15/00
Reporting Date: 03/16/00
Project Number: 103
Project Name: J.R. PHILLIPS
Project Location: SEC 6 T20S R37E

Sampling Date: 03/15/00
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: BC/AH

LAB NO.	SAMPLE ID	Cl^- (mg/L)	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL BENZENE (mg/L)	TOTAL XYLENES (mg/L)
ANALYSIS DATE:		03/16/00	03/15/00	03/15/00	03/15/00	03/15/00
H4718-1	GW31500P1	13152	<0.002	<0.002	<0.002	<0.006
Quality Control		939	0.103	0.103	0.095	0.282
True Value QC		1000	0.100	0.100	0.100	0.300
% Recovery		93.9	103	103	94.5	94.1
Relative Percent Difference		2.0	3.9	3.1	7.6	6.9

METHODS: Cl^- - Std. Methods 4500-Cl^-B, 418.1; BTEX - EPA SW-846 8260

Chemist

3/16/00
Date

H4718.XLS

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

CARDINAL LABORATORIES, INC.

2111 Beechwood, Abilene, TX 79603 (915) 673-7001 Fax (915) 673-7020

101 East Marland, Hobbs, NM 88240 (505) 393-2326 Fax (505) 393-2476

Page____ of ____

Company Name:	Pecos E+P
Project Manager:	Robert Bly
Address:	205 E. Bender
City:	Hobbs State: NM Zip: 88240
Phone #:	397-0422 Fax #: 397-
Project #:	103 Project Owner: Pecos
Project Name:	JR Phillips
Project Location:	Sec C T20S R37E
Sampler Name:	Pat McCasland

BILL TO

P.O. #:	
Company:	
Attn:	
Address:	
City:	
State:	Zip:
Phone #:	
Fax #:	

ANALYSIS REQUEST

FOR LAB USE ONLY Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	CRUDE OIL	SLUDGE	OTHER:	PRESERV.: ACID/BASE:	ICE / COOL	OTHER:	SAMPLING: DATE	TIME	BTEX 8021B	TPH 8015M	Chlorides 4500
114718-1	CW31500 P1	V	3	V							V		3-15-2	1245	V	V	

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. All claims including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Terms and Conditions: Interest will be charged on all accounts more than 30 days past due at the rate of 24% per annum from the original date of invoice, and all costs of collections, including attorney's fees.

Sampler Relinquished:	Date: 3-15-2	Received By:	
	Time: 1450		
Relinquished By:	Date:	Received By: (Lab Staff)	
	Time:		

Delivered By: (Circle One)

Sampler - UPS - Bus - Other:

Sample Condition: Cool	Intact	CHECKED BY: (Initials)
☐ Yes ☐ No	☐ Yes ☐ No	

Phone Result: ☐ Yes ☐ No Add'l Phone #:

Fax Result: ☑ Yes ☐ No Add'l Fax #: 397-

REMARKS: Pat McCasland

† Cardinal cannot accept verbal changes. Please fax written changes to 505-393-2476.

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
TEXACO E&P, INC.
ATTN: RODNEY BAILEY
205 E. BENDER
HOBBS, NM 88240
FAX TO:

Receiving Date: 03/17/00
Reporting Date: 03/21/00
Project Number: 103 (TEXACO)
Project Name: J.R. PHILLIPS
Project Location: SEC6 T20S R37E

Sampling Date: 03/17/00
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: BC

LAB NO.	SAMPLE ID	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL BENZENE (mg/L)	TOTAL XYLENES (mg/L)
ANALYSIS DATE		3/20/00	3/20/00	3/20/00	3/20/00
H4728-1	GW31500JRPSE	0.011	0.005	0.032	0.015
Quality Control		0.100	0.100	0.097	0.291
True Value QC		0.100	0.100	0.100	0.300
% Recovery		99.6	99.6	97.2	96.9
Relative Percent Difference		0.3	<0.1	1.9	2.4

METHOD: EPA SW 846-8021B, 5030, 5021 Gas Chromatography

Chemist

3/21/00
Date

H4728B.XLS

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
TEXACO E&P, INC.
ATTN: RODNEY BAILEY
205 E. BENDER
HOBBS, NM 88240
FAX TO:

Receiving Date: 03/17/00
Reporting Date: 03/21/00
Project Number: 103 (TEXACO)
Project Name: J.R. PHILLIPS
Project Location: SEC6 T20S R37E

Sampling Date: 03/17/00
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: AH
Analyzed By: BC/AH

LAB NUMBER	SAMPLE ID	GRO (C_6-C_{10}) (mg/L)	DRO (>C_{10}-C_{28}) (mg/L)	Cl (mg/L)
ANALYSIS DATE		03/20/00	03/20/00	03/21/00
H4728-1	GW31500JRPSE	<5.0	<5.0	41300
Quality Control		18.9	20.4	986
True Value QC		20.0	20.0	1000
% Recovery		94.6	102	98.6
Relative Percent Difference		3.2	12.3	4.8

Chilled
Bill Olsen
&
Donna Williams
3-27-00

METHODS: TPH GRO & DRO: EPA SW-846 8015 M; Cl^-: Std. Methods 4500-Cl^-B

Chemist

3/21/00
Date

H4728A.XLS

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

CARDINAL LABORATORIES, INC.

2111 Beechwood, Abilene, TX 79603 101 East Marland, Hobbs, NM 88240

(915) 673-7001 Fax (915) 673-7020 (505) 393-2326 Fax (505) 393-2476

Company Name:	Texaco E & P Inc
Project Manager:	Kelly Bailey
Address:	205 E. Bender
City:	Hobbs State: NM Zip: 88240
Phone #:	397-0422 Fax #:
Project #:	103 Project Owner: Texaco
Project Name:	J. R. Phillips
Project Location:	Sec 6 T20S R37E
Sampler Name:	Pat McCasland

BILL TO

P.O. #:	32115
Company:	
Attn:	
Address:	
City:	
State:	Zip:
Phone #:	
Fax #:	

ANALYSIS REQUEST

BTEX 8021B | TPH 8015M | Chlorides

FOR LAB USE ONLY Lab I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	CRUDE OIL	SLUDGE	OTHER:	PRESERV.: ACID/BASE	ICE / COOL	OTHER:	SAMPLING: DATE	TIME	BTEX 8021B	TPH 8015M	Chlorides
H4728 1	CW31500.5RPSE	C	2	x							x		3/7/00	1345	x	x	x

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. All claims including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Terms and Conditions: Interest will be charged on all accounts more than 30 days past due at the rate of 24% per annum from the original date of invoice, and all costs of collections, including attorney's fees.

Sampler Relinquished: Pat McCasland	Date: 3-7-00 Time: 1520	Received By:	
Relinquished By:	Date: 3/7/00 Time: 3:15	Received By: (Lab Staff)	
Delivered By: (Circle One) Sampler - UPS - Bus - Other:	Sample Condition Cool: ☐ Yes ☐ No Intact: ☐ Yes ☐ No	CHECKED BY: (Initials)	

Phone Result: ☐ Yes ☐ No Add'l Phone #:

Fax Result: ☑ Yes ☐ No Add'l Fax #: 364-1464

REMARKS:

† Cardinal cannot accept verbal changes. Please fax written changes to 505-393-2476.

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
TEXACO E&P
ATTN: RODNEY BAILEY
205 E. BENDER
HOBBS, NM 88240
FAX TO: (505) 397-0450

Receiving Date: 04/10/00
Reporting Date: 04/11/00
Project Number: 103
Project Name: J.R.PHILLIPS
Project Location: MONUMENT, NM

Sampling Date: 04/10/00
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: BC
Analyzed By: BC

LAB NO.	SAMPLE ID	BENZENE (mg/L)	TOLUENE (mg/L)	ETHYL BENZENE (mg/L)	TOTAL XYLENES (mg/L)
ANALYSIS DATE		04/10/00	04/10/00	04/10/00	04/10/00
H4778-1	GW41000JPMW1	<0.002	<0.002	<0.002	<0.006
H4778-2	GW41000JPMW2	<0.002	<0.002	<0.002	<0.006
Quality Control		0.098	0.098	0.098	0.300
True Value QC		0.100	0.100	0.100	0.300
% Recovery		98.0	98.4	98.3	100
Relative Percent Difference		7.3	6.7	4.5	5.2

METHOD: EPA SW 846-8021B, 5030, 5021 Gas Chromatography

Chemist

4/11/00
Date

H4778B.XLS

CARDINAL LABORATORIES

PHONE (915) 673-7001 • 2111 BEECHWOOD • ABILENE, TX 79603
PHONE (505) 393-2326 • 101 E. MARLAND • HOBBS, NM 88240

ANALYTICAL RESULTS FOR
TEXACO E&P
ATTN: RODNEY BAILEY
205 E. BENDER
HOBBS, NM 88240
FAX TO: (505) 397-0450

Receiving Date: 04/10/00
Reporting Date: 04/12/00
Project Number: 103
Project Name: J.R.PHILLIPS
Project Location: MONUMENT, NM

Sampling Date: 04/10/00
Sample Type: GROUNDWATER
Sample Condition: COOL & INTACT
Sample Received By: BC
Analyzed By: AH

LAB NUMBER	SAMPLE ID	Na (mg/L)	Ca (mg/L)	Mg (mg/L)	K (mg/L)	Conductivity (u mhos/cm)	T-Alkalinity ($mgCaCO_3/L$)
ANALYSIS DATE:		04/12/00	04/11/00	04/11/00	04/11/00	04/11/00	04/11/00
H4778-1	GW41000JPMW1	5058	445	175	44	22550	456
H4778-2	GW41000JPMW2	5871	569	296	31	27860	464
Quality Control		NR	44	58	5.03	1392	NR
True Value QC		NR	50	50	5.00	1413	NR
% Accuracy		NR	88	116	101	98.5	NR
Relative Percent Difference		NR	1.8	8.6	0.6	0.2	NR
METHODS:			SM3500-Ca-D	3500-Mg E	8049	120.1	310.1

LAB NUMBER	SAMPLE ID	Cl^- (mg/L)	SO_4 (mg/L)	CO_3 (mg/L)	HCO_3 (mg/L)	pH (s.u.)	TDS (mg/L)
ANALYSIS DATE:		04/11/00	04/11/00	04/11/00	04/11/00	04/11/00	04/12/00
H4778-1	GW41000JPMW1	7300	2061	0	556	7.01	15816
H4778-2	GW41000JPMW2	8704	2611	0	566	6.91	19312
Quality Control		992	49.39	NR	971	6.97	NR
True Value QC		1000	50.00	NR	1000	7.00	NR
% Accuracy		99.2	98.8	NR	97.1	99.6	NR
Relative Percent Difference		0.9	3.5	NR	-	0.1	NR
METHODS:		SM4500-Cl-B	375.4	310.1	310.1	150.1	160.1

Gayle A. Potter, Chemist

04/12/2000
Date

CARDINAL LABORATORIES, INC.

2111 Beechwood, Abilene, TX 79603 (915) 673-7001 Fax (915) 673-7020
101 East Marland, Hobbs, NM 88240 (505) 393-2326 Fax (505) 393-2476

CHAIN-OF-CUSTODY AND ANALYSIS REQUEST

Company Name:	Texaco Exp, Inc.
Project Manager:	Rodney Bailey
Address:	205 E. Bender
City:	Hobbs State: NM Zip: 88240
Phone #:	505-397-0422
Fax #:	505-397-0450
Project #:	103 Project Owner: Texaco Exp
Project Name:	J R Phillips
Project Location:	Monument NM

BILL TO PO #:

Company:	SAME
Attn:	
Address:	
City:	
State:	Zip:
Phone #:	
Fax #:	

ANALYSIS REQUEST: BTEX; Anions + Cations

FOR LAB USE ONLY LAB I.D.	Sample I.D.	(G)RAB OR (C)OMP.	# CONTAINERS	MATRIX: GROUNDWATER	WASTEWATER	SOIL	OIL	SLUDGE	OTHER:	PRES.: ACID:	ICE / COOL	OTHER:	SAMPLING: DATE	TIME
H45506-1	GW41000JPMW1	G	3	✓							✓		4-10-00	1445
-2	GW4100JPMW2	G	3	✓							✓		4-10-00	1510

PLEASE NOTE: Liability and Damages. Cardinal's liability and client's exclusive remedy for any claim arising whether based in contract or tort, shall be limited to the amount paid by the client for the analyses. All claims including those for negligence and any other cause whatsoever shall be deemed waived unless made in writing and received by Cardinal within 30 days after completion of the applicable service. In no event shall Cardinal be liable for incidental or consequential damages, including without limitation, business interruptions, loss of use, or loss of profits incurred by client, its subsidiaries, affiliates or successors arising out of or related to the performance of services hereunder by Cardinal, regardless of whether such claim is based upon any of the above stated reasons or otherwise.

Terms and Conditions: Interest will be charged on all accounts more than 30 days past due at the rate of 24% per annum from the original date of invoice and all costs of collections, including attorney's fees.

Sampler Relinquished:	Rogan Boone	Date: 4-10-2000 Time: 1550	Received By:
Relinquished By:		Date: 4-10-00 Time:	Received By: (Lab Staff)
Delivered By: (Circle One) Sampler - UPS - Bus - Other:			Sample Condition: Cool ☒ Yes ☐ No; Intact ☒ Yes ☐ No — CHECKED BY: (Initials)

Phone Result ☐ Yes ☐ No Additional Fax #: 344-2601
Fax Result: ☒ Yes ☐ No
REMARKS: CofC

† Cardinal cannot accept verbal changes. Please fax written changes to 915 673 7020