

NM - 13

INSPECTIONS & DATA



R10320

NEW MEXICO ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

GARY E. JOHNSON

Governor

Jennifer A. Salisbury

Cabinet Secretary

Lori Wrotenbery

Director

Oil Conservation Division

July 31, 2001

Mr. John Coy
2500 Ave "O"
Eunice, New Mexico 88231

RE: WATER WELL SAMPLE ANALYSES

Dear Mr. Coy:

Enclosed you will find a copy of the laboratory analytical results of the water samples that the New Mexico Oil Conservation Division (OCD) obtained from your water well in Eunice, New Mexico on March 20, 2001. The sample analyses did not detect any petroleum hydrocarbon contaminants in your well water. However, chloride was found to be present in the water at a concentration of 310 mg/l which is slightly in excess of the New Mexico Water Quality Control Commission (WQCC) drinking water standard of 250 mg/l. This contaminant may be due to oilfield-related contaminants that the OCD is investigating in the Eunice area. In addition, fluoride was found to be present in the water at a concentration of 3.2 mg/l which is in excess of the WQCC drinking water standard of 1.6 mg/l. Elevated levels of fluoride are naturally present in ground water in areas of southeastern New Mexico. Please contact the New Mexico Environment Department if you have questions regarding fluoride in ground water.

At the time of OCD's sampling, you stated that the water is not used for drinking water. Since these constituents are in excess of WQCC standards, the OCD recommends that you do not use this well as a source of drinking water. The OCD is continuing to work on the investigation of contamination in the Eunice area and will include the chloride contamination of your well in the site investigations.

Thank you for bringing this to our attention. If you have any questions regarding the laboratory analyses of your water or the Eunice investigations, please feel free to call me at (505) 476-3491.

Sincerely,

William C. Olson

Hydrologist

Environmental Bureau

Enclosure

xc w/enclosure:

Chris Williams, OCD Hobbs District Supervisor
Martyne Kieling, OCD Environmental Bureau

John Coy Water Well 3/20/01

2500 Ave D

Enriva, NM 88231

Completed at 1130 hrs.
met with John Coy
water well behind house, SE
of Jimmy Cooper tracking plant
well depth approx 120 ft.

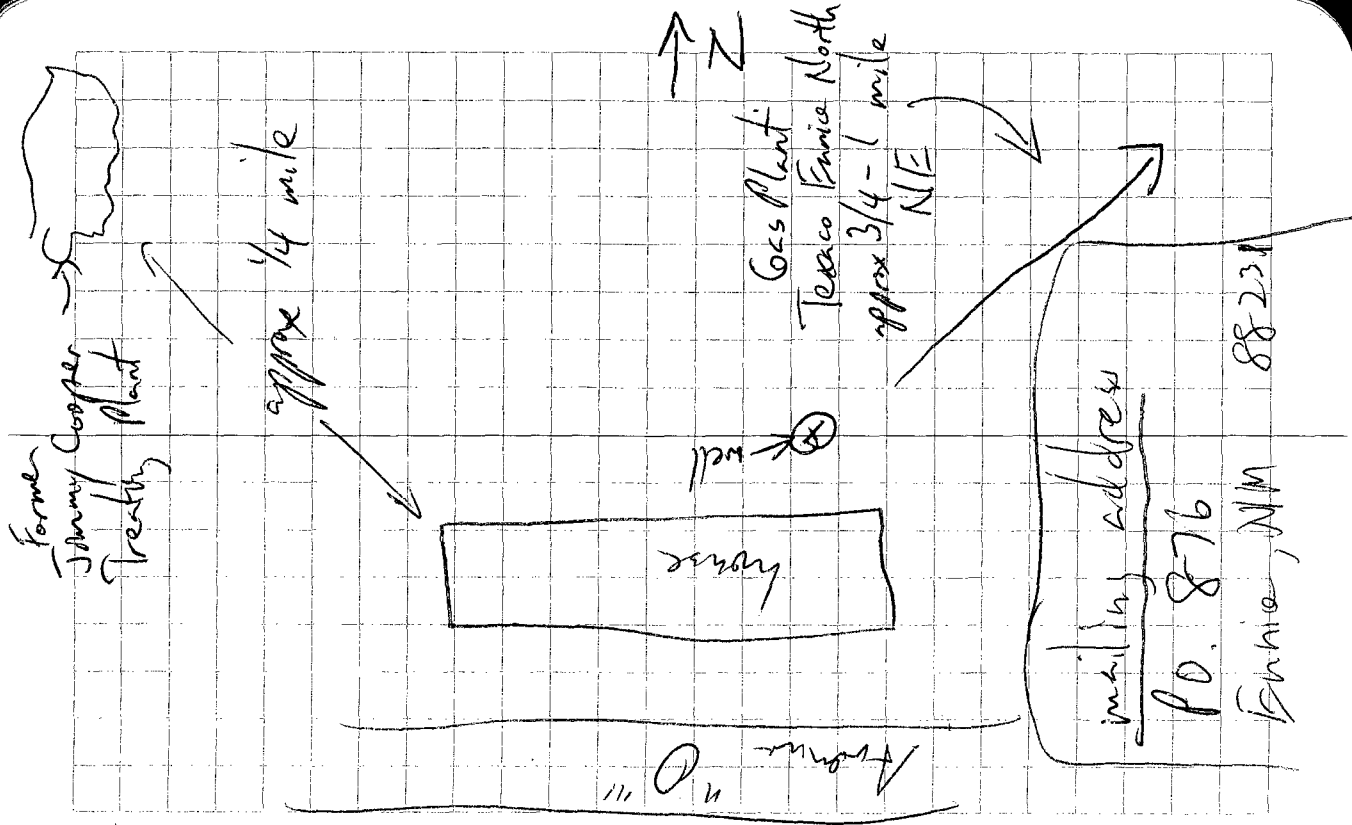
Depth to water approx 30'

Ran well fan 10-15 min
Well running fan 15-20 before
arrived

sample id - 0103201200

samples - 8021
cations/anions
metals

sampled from outdoor tap behind house
water used for household irrigation
not used for drinking



John Coy Water Well 3/20/01

2500 Ave O
Enrnia, NM 88231

Conferred at 1130 hrs.
met with John Coy
water well behind house, SE
of Jimmy Cooper trading plant
well depth approx 120 ft.

Depth to water approx 30'

Ran well for 10-15 min
Well running for 15-20 before
arrived

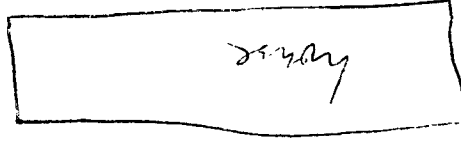
sample id - 0103201200

samples - 8021
cations/anions
metals

sampled from outdoor tap behind house
water used for household irrigation
not used for drinking

Former
Jimmy Cooper
Trading Plant

approx 1/4 mile



well

Approx 1/4 mile

N

Gas Plant
Texas Enrnia North
approx 3/4 - 1 mile
NE

mailing address

P.O. 876

Enrnia, NM 88231

John Coy Water Well 3/20/01

2500 Ave O
Ennise, NM

882231

Arrived at 1130 hrs.
met with John Coy
water well behind house, SE
of Jimmy Cooper trading plant
well depth approx 120 ft.

Depth to water approx 30'

Ran well for 10-15 min
Well running for 15-20 before
arrived

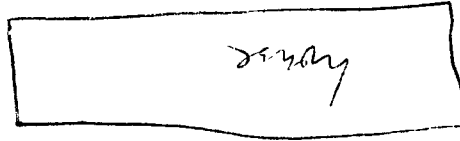
sample 1 & - 010320/200

samples - 8021
cations/anions
metals

sampled from outdoor tap behind house
water used for household irrigation
not used for drinking

Former
Jimmy Cooper
Trading Plant

approx 1/4 mile



well

Arroyo "O"

N

Gas Plant
Texaco Ennise North
approx 3/4 - 1 mile
NE

mailing address

P.O. 876

Ennise, NM

882231

TRACE ANALYSIS, INC.

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E-Mail: lab@traceanalysis.com

Analytical and Quality Control Report

Bill Olson
OCD
1220 S. Saint Francis Dr.
Santa Fe, NM 87504

RECEIVED

APR 24 2001

ENVIRONMENTAL BUREAU
OIL CONSERVATION DIVISION

Report Date: April 17, 2001

Order ID Number: A01032213

Project Number: John Cox
Project Name: N/A
Project Location: Water Well

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
167356	0103201200	Water	3/20/01	12:00	3/22/01

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 15 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: 167356 - 0103201200

Analysis: 8260 Analytical Method: S 8260B QC Batch: QC10004 Date Analyzed: 3/25 01
Analyst: JG Preparation Method: E 5030B Prep Batch: PB08593 Date Prepared: 3/25 01

Param	Flag	Result	Units	Dilution	RDL
Bromochloromethane		<1.00	µg/L	1	1
Dichlorodifluoromethane		<1.00	µg/L	1	1
Chloromethane (methyl chloride)		<1.00	µg/L	1	1
Vinyl Chloride		<1.00	µg/L	1	1
Bromomethane (methyl bromide)		<1.00	µg/L	1	1
Chloroethane		<1.00	µg/L	1	1
Trichlorofluoromethane		<1.00	µg/L	1	1
Acetone		<10.0	µg/L	1	10
Iodomethane (methyl iodide)		<1.00	µg/L	1	1
Carbon Disulfide		<1.00	µg/L	1	1
Acrylonitrile		<1.00	µg/L	1	1
2-Butanone (MEK)		<5.00	µg/L	1	5
4-methyl-2-pentanone (MIBK)		<5.00	µg/L	1	5
2-hexanone		<5.00	µg/L	1	5
trans 1,4-Dichloro-2-butene		<10.0	µg/L	1	10
1,1-Dichloroethene		<1.00	µg/L	1	1
Methylene chloride		<5.00	µg/L	1	5
MTBE		<1.00	µg/L	1	1
trans-1,2-Dichloroethene		<1.00	µg/L	1	1
1,1-Dichloroethane		<1.00	µg/L	1	1
cis-1,2-Dichloroethene		<1.00	µg/L	1	1
2,2-Dichloropropane		<1.00	µg/L	1	1
1,2-Dichloroethane (EDC)		<1.00	µg/L	1	1
Chloroform		<1.00	µg/L	1	1
1,1,1-Trichloroethane		<1.00	µg/L	1	1
1,1-Dichloropropene		<1.00	µg/L	1	1
Benzene		<1.00	µg/L	1	1
Carbon Tetrachloride		<1.00	µg/L	1	1
1,2-Dichloropropane		<1.00	µg/L	1	1
Trichloroethene (TCE)		<1.00	µg/L	1	1
Dibromomethane (methylene bromide)		<1.00	µg/L	1	1
Bromodichloromethane		<1.00	µg/L	1	1
2-Chloroethyl vinyl ether		<5.00	µg/L	1	5
cis-1,3-Dichloropropene		<1.00	µg/L	1	1
trans-1,3-Dichloropropene		<1.00	µg/L	1	1
Toluene		<1.00	µg/L	1	1
1,1,2-Trichloroethane		<1.00	µg/L	1	1
1,3-Dichloropropane		<1.00	µg/L	1	1
Dibromochloromethane		<1.00	µg/L	1	1
1,2-Dibromoethane (EDB)		<1.00	µg/L	1	1
Tetrachloroethene (PCE)		<1.00	µg/L	1	1
Chlorobenzene		<1.00	µg/L	1	1
1,1,1,2-Tetrachloroethane		<1.00	µg/L	1	1
Ethylbenzene		<1.00	µg/L	1	1
m,p-Xylene		<1.00	µg/L	1	1
Bromoform		<1.00	µg/L	1	1
Styrene		<1.00	µg/L	1	1
o-Xylene		<1.00	µg/L	1	1

Continued ...

... Continued Sample: 167356 Analysis: 8260

Param	Flag	Result	Units	Dilution	RDL
1,1,2,2-Tetrachloroethane		<1.00	µg/L	1	1
2-Chlorotoluene		<1.00	µg/L	1	1
1,2,3-Trichloropropane		<1.00	µg/L	1	1
Isopropylbenzene		<1.00	µg/L	1	1
Bromobenzene		<1.00	µg/L	1	1
n-Propylbenzene		<1.00	µg/L	1	1
1,3,5-Trimethylbenzene		<1.00	µg/L	1	1
tert-Butylbenzene		<1.00	µg/L	1	1
1,2,4-Trimethylbenzene		<1.00	µg/L	1	1
1,4-Dichlorobenzene (para)		<1.00	µg/L	1	1
sec-Butylbenzene		<1.00	µg/L	1	1
1,3-Dichlorobenzene		<1.00	µg/L	1	1
p-Isopropyltoluene		<1.00	µg/L	1	1
4-Chlorotoluene		<1.00	µg/L	1	1
1,2-Dichlorobenzene (ortho)		<1.00	µg/L	1	1
n-Butylbenzene		<1.00	µg/L	1	1
1,2-Dibromo-3-chloropropane		<5.00	µg/L	1	5
1,2,3-Trichlorobenzene		<5.00	µg/L	1	5
1,2,4-Trichlorobenzene		<5.00	µg/L	1	5
Naphthalene		<5.00	µg/L	1	5
Hexachlorobutadiene		<5.00	µg/L	1	5

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Dibromofluoromethane		45.94	µg/L	1	50	91	80 - 120
Toluene-d8		50.72	µg/L	1	50	101	80 - 120
4-Bromofluorobenzene		42.94	µg/L	1	50	85	80 - 120

Sample: 167356 - 0103201200

Analysis: Alkalinity Analytical Method: E 310.1 QC Batch: QC10095 Date Analyzed: 3/29/01
Analyst: RS Preparation Method: N/A Prep Batch: PB08682 Date Prepared: 3/29/01

Param	Flag	Result	Units	Dilution	RDL
Hydroxide Alkalinity		<1.0	mg/L as CaCo3	1	1
Carbonate Alkalinity		<1.0	mg/L as CaCo3	1	1
Bicarbonate Alkalinity		166	mg/L as CaCo3	1	1
Total Alkalinity		166	mg/L as CaCo3	1	1

Sample: 167356 - 0103201200

Analysis: Conductivity Analytical Method: SM 2510B QC Batch: QC10021 Date Analyzed: 3/27/01
Analyst: JS Preparation Method: N/A Prep Batch: PB08610 Date Prepared: 3/27/01

Param	Flag	Result	Units	Dilution	RDL
Specific Conductance		1500	µMHOS/cm	1	

Sample: 167356 - 0103201200

Analysis: Hg, Total Analytical Method: E 245.2 QC Batch: QC09995 Date Analyzed: 3/26/01
Analyst: SSC Preparation Method: N/A Prep Batch: PB08585 Date Prepared: 3/22/01

Param	Flag	Result	Units	Dilution	RDL
Total Mercury		<0.0002	mg/L	1	0.0002

Sample: 167356 - 0103201200

Analysis: Ion Chromatography (IC) Analytical Method: E 300.0 QC Batch: QC09959 Date Analyzed: 3/22 01
Analyst: JS Preparation Method: N/A Prep Batch: PB08556 Date Prepared: 3/22 01

Param	Flag	Result	Units	Dilution	RDL
CL		310	mg/L	10	0.50
Fluoride		3.2	mg/L	5	0.20
Nitrate-N	1	2.4	mg/L	5	0.20
Sulfate		160	mg/L	5	0.50

Sample: 167356 - 0103201200

Analysis: Salts Analytical Method: E 200.7 QC Batch: QC10033 Date Analyzed: 3/27 01
Analyst: LDB Preparation Method: E 3005 A Prep Batch: PB08572 Date Prepared: 3/27 01

Param	Flag	Result	Units	Dilution	RDL
Dissolved Calcium		122	mg/L	1	5
Dissolved Magnesium		60.5	mg/L	1	5
Dissolved Potassium		9.94	mg/L	1	5
Dissolved Sodium		111	mg/L	1	5

Sample: 167356 - 0103201200

Analysis: TDS Analytical Method: E 160.1 QC Batch: QC10043 Date Analyzed: 3/27 01
Analyst: JS Preparation Method: N/A Prep Batch: PB08634 Date Prepared: 3/27 01

Param	Flag	Result	Units	Dilution	RDL
Total Dissolved Solids		730	mg/L	2	10

Sample: 167356 - 0103201200

Analysis: Total Metals Analytical Method: 200.7 QC Batch: QC10220 Date Analyzed: 4/4 01
Analyst: RR Preparation Method: E 3010A Prep Batch: PB08598 Date Prepared: 3/27 01

Param	Flag	Result	Units	Dilution	RDL
Total Aluminum		<0.5	mg/L	1	0.50
Total Arsenic		0.0142	mg/L	1	0.01
Total Barium		0.0716	mg/L	1	0.01
Total Boron		<0.5	mg/L	1	0.50
Total Cadmium		<0.002	mg/L	1	0.002
Total Chromium		<0.005	mg/L	1	0.005
Total Cobalt		<0.01	mg/L	1	0.01
Total Copper		<0.01	mg/L	1	0.01
Total Iron		< 0.5	mg/L	1	0.50
Total Lead		<0.01	mg/L	1	0.01
Total Manganese		<0.001	mg/L	1	0.001
Total Molybdenum		0.007	mg/L	1	0.002

Continued ...

¹Sample out of hold time for NO3.

... Continued Sample: 167356 Analysis: Total Metals

Param	Flag	Result	Units	Dilution	RDL
Total Nickel		<0.01	mg/L	1	0.01
Total Selenium		0.0139	mg/L	1	0.01
Total Silver		<0.01	mg/L	1	0.01
Total Zinc		<0.01	mg/L	1	0.01

Sample: 167356 - 0103201200

Analysis: pH Analytical Method: E 150.1 QC Batch: QC10059 Date Analyzed: 3/22/01
Analyst: RS Preparation Method: N/A Prep Batch: PB08643 Date Prepared: 3/22/01

Param	Flag	Result	Units	Dilution	RDL
pH	²	7.7	s.u.	1	1

²Sample run out of holding time

Quality Control Report Method Blank

Method Blank

QCBatch: QC09959

Param	Flag	Results	Units	Reporting Limit
CL		<0.5	mg/L	0.50
Fluoride		<0.2	mg/L	0.20
Nitrate-N		<0.2	mg/L	0.20
Sulfate		<0.5	mg/L	0.50

Method Blank

QCBatch: QC09995

Param	Flag	Results	Units	Reporting Limit
Total Mercury		<0.0002	mg/L	0.0002

Method Blank

QCBatch: QC10004

Param	Flag	Results	Units	Reporting Limit
Bromochloromethane		<1.00	µg/L	1
Dichlorodifluoromethane		<1.00	µg/L	1
Chloromethane (methyl chloride)		<1.00	µg/L	1
Vinyl Chloride		<1.00	µg/L	1
Bromomethane (methyl bromide)		<1.00	µg/L	1
Chloroethane		<1.00	µg/L	1
Trichlorofluoromethane		<1.00	µg/L	1
Acetone		<10.0	µg/L	10
Iodomethane (methyl iodide)		<1.00	µg/L	1
Carbon Disulfide		<1.00	µg/L	1
Acrylonitrile		<1.00	µg/L	1
2-Butanone (MEK)		<5.00	µg/L	5
4-methyl-2-pentanone (MIBK)		<5.00	µg/L	5
2-hexanone		<5.00	µg/L	5
trans-1,1-Dichloro-2-butene		<10.0	µg/L	10
1,1-Dichloroethene		<1.00	µg/L	1
Methylene chloride		<5.00	µg/L	5
MTBE		<1.00	µg/L	1
trans-1,2-Dichloroethene		<1.00	µg/L	1
1,1-Dichloroethane		<1.00	µg/L	1
cis-1,2-Dichloroethene		<1.00	µg/L	1
2,2-Dichloropropane		<1.00	µg/L	1
1,2-Dichloroethane (EDC)		<1.00	µg/L	1
Chloroform		<1.00	µg/L	1
1,1,1-Trichloroethane		<1.00	µg/L	1
1,1-Dichloropropene		<1.00	µg/L	1
Benzene		<1.00	µg/L	1
Carbon Tetrachloride		<1.00	µg/L	1

Continued ...

... Continued

Param	Flag	Results	Units	Reporting Limit
1,2-Dichloropropane		<1.00	µg/L	1
Trichloroethene (TCE)		<1.00	µg/L	1
Dibromomethane (methylene bromide)		<1.00	µg/L	1
Bromodichloromethane		<1.00	µg/L	1
2-Chloroethyl vinyl ether		<5.00	µg/L	5
cis-1,3-Dichloropropene		<1.00	µg/L	1
trans-1,3-Dichloropropene		<1.00	µg/L	1
Toluene		<1.00	µg/L	1
1,1,2-Trichloroethane		<1.00	µg/L	1
1,3-Dichloropropane		<1.00	µg/L	1
Dibromochloromethane		<1.00	µg/L	1
1,2-Dibromoethane (EDB)		<1.00	µg/L	1
Tetrachloroethene (PCE)		<1.00	µg/L	1
Chlorobenzene		<1.00	µg/L	1
1,1,1,2-Tetrachloroethane		<1.00	µg/L	1
Ethylbenzene		<1.00	µg/L	1
m,p-Xylene		<1.00	µg/L	1
Bromoform		<1.00	µg/L	1
Styrene		<1.00	µg/L	1
o-Xylene		<1.00	µg/L	1
1,1,2,2-Tetrachloroethane		<1.00	µg/L	1
2-Chlorotoluene		<1.00	µg/L	1
1,2,3-Trichloropropane		<1.00	µg/L	1
Isopropylbenzene		<1.00	µg/L	1
Bromobenzene		<1.00	µg/L	1
n-Propylbenzene		<1.00	µg/L	1
1,3,5-Trimethylbenzene		<1.00	µg/L	1
tert-Butylbenzene		<1.00	µg/L	1
1,2,4-Trimethylbenzene		<1.00	µg/L	1
1,1-Dichlorobenzene (para)		<1.00	µg/L	1
sec-Butylbenzene		<1.00	µg/L	1
1,3-Dichlorobenzene		<1.00	µg/L	1
p-Isopropyltoluene		<1.00	µg/L	1
1-Chlorotoluene		<1.00	µg/L	1
1,2-Dichlorobenzene (ortho)		<1.00	µg/L	1
n-Butylbenzene		<1.00	µg/L	1
1,2-Dibromo-3-chloropropane		<5.00	µg/L	5
1,2,3-Trichlorobenzene		<5.00	µg/L	5
1,2,4-Trichlorobenzene		<5.00	µg/L	5
Naphthalene		<5.00	µg/L	5
Hexachlorobutadiene		<5.00	µg/L	5

Surrogate	Flag	Result	Units	Dilution	Spike Amount	Percent Recovery	Recovery Limits
Dibromofluoromethane		45.05	µg/L	1	50	90	80 - 120
Toluene-d8		50.25	µg/L	1	50	100	80 - 120
4-Bromofluorobenzene		42.28	µg/L	1	50	84	80 - 120

Method Blank

QC Batch: QC10021

Param	Flag	Results	Units	Reporting Limit
Specific Conductance		7.3	μ MHOS/cm	

Method Blank QCBatch: QC10033

Param	Flag	Results	Units	Reporting Limit
Dissolved Calcium		<5.0	mg/L	5
Dissolved Magnesium		<5.0	mg/L	5
Dissolved Potassium		<5.0	mg/L	5
Dissolved Sodium		<5.0	mg/L	5

Method Blank QCBatch: QC10043

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

Method Blank QCBatch: QC10095

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

Method Blank QCBatch: QC10220

Param	Flag	Results	Units	Reporting Limit
Total Aluminum		<0.5	mg/L	0.50
Total Arsenic		<0.01	mg/L	0.01
Total Barium		<0.01	mg/L	0.01
Total Boron		<0.5	mg/L	0.50
Total Cadmium		<0.002	mg/L	0.002
Total Chromium		<0.005	mg/L	0.005
Total Cobalt		<0.01	mg/L	0.01
Total Copper		<0.01	mg/L	0.01
Total Iron		< 0.5	mg/L	0.50
Total Lead		<0.01	mg/L	0.01
Total Manganese		0.00228	mg/L	0.001
Total Molybdenum		<0.002	mg/L	0.002
Total Nickel		<0.01	mg/L	0.01
Total Selenium		<0.01	mg/L	0.01
Total Silver		<0.01	mg/L	0.01
Total Zinc		<0.01	mg/L	0.01

Quality Control Report Duplicate Samples

Duplicate QCBatch: QC10021

Param	Flag	Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
Specific Conductance		1462	1500	µMHOS/cm	1	2	4.6

Duplicate QCBatch: QC10043

Param	Flag	Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
Total Dissolved Solids		2714	<10	mg/L	1	0	11
Total Dissolved Solids		2714	2700	mg/L	1	0	14

Duplicate QCBatch: QC10059

Param	Flag	Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
pH		7.8	7.8	s.u.	1	0	0.99

Duplicate QCBatch: QC10095

Param	Flag	Duplicate Result	Sample Result	Units	Dilution	RPD	RPD Limit
Hydroxide Alkalinity		<1.0	<1.0	mg/L as CaCo3	1	0	7
Carbonate Alkalinity		<1.0	<1.0	mg/L as CaCo3	1	0	7
Bicarbonate Alkalinity		224	220	mg/L as CaCo3	1	1	7
Total Alkalinity		224	220	mg/L as CaCo3	1	1	7

Quality Control Report Lab Control Spikes and Duplicate Spikes

Laboratory Control Spikes QCBatch: QC09959

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
CL	11.57	11.59	mg/L	1	12.50	<0.5	92	0	90 - 110	20
Sulfate	11.74	11.79	mg/L	1	12.50	<0.5	93	0	90 - 110	20

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

Laboratory Control Spikes QCBatch: QC09995

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Total Mercury	0.00111	0.00105	mg/L	1	0.001	<0.0002	111	5	84 - 125	20

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

Laboratory Control Spikes

QCBatch: QC10004

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
1,1-Dichloroethene	102	109	µg/L	1	100	<1.00	102	6	71 - 132	20
Benzene	101	104	µg/L	1	100	<1.00	101	2	81 - 114	20
Trichloroethene (TCE)	90	92	µg/L	1	100	<1.00	90	2	79 - 111	20
Toluene	99	102	µg/L	1	100	<1.00	99	2	81 - 110	20
Chlorobenzene	96	99	µg/L	1	100	<1.00	96	3	88 - 112	20

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

Surrogate	LCS Result	LCSD Result	Units	Dilution	Spike Amount	LCS % Rec	LCSD % Rec	Recovery Limits
Dibromofluoromethane	46.34	46.45	µg/L	1	50	92	92	80 - 120
Toluene-d8	50.16	50.33	µg/L	1	50	100	100	80 - 120
4-Bromofluorobenzene	44.75	44.37	µg/L	1	50	89	88	80 - 120

Laboratory Control Spikes

QCBatch: QC10033

Param	LCS Result	LCSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Dissolved Calcium	1093	1106	mg/L	1	1000	<5.0	109	1	75 - 125	20
Dissolved Magnesium	1055	1074	mg/L	1	1000	<5.0	105	1	75 - 125	20
Dissolved Potassium	1011	1026	mg/L	1	1000	<5.0	101	1	75 - 125	20
Dissolved Sodium	1067	1084	mg/L	1	1000	<5.0	106	1	75 - 125	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: QC09959

Param	MS Result	MSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
CL	³ 828.65	838.5	mg/L	1	625		94	1	52 - 131	20
CL	⁴ 828.65	838.5	mg/L	1	625	240	94	1	52 - 131	20
Fluoride	131.50	125.33	mg/L	1	125		94	5	80 - 113	20
Nitrate-N	126.42	127.05	mg/L	1	125		89	0	86 - 110	20
Sulfate	2145.62	2158.31	mg/L	1	625		87	2	71 - 121	20
Sulfate	2145.62	2158.31	mg/L	1	625	1600	87	2	71 - 121	20

³I spiked the *50 dilution for 167359, but reported the *10 dilution. The correct %EA = 89.

⁴I spiked the *50 dilution for 167359, but reported the *10 dilution. The correct %EA = 89.

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

Matrix Spikes QCBatch: QC09995

Param	MS Result	MSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Total Mercury	0.00104	0.00098	mg/L	1	0.001	<0.0002	104	5	84 - 127	20

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

Matrix Spikes QCBatch: QC10033

Param	MS Result	MSD Result	Units	Dil.	Spike Amount Added	Matrix Result	% Rec	RPD	% Rec Limit	RPD Limit
Dissolved Calcium	1190	1306	mg/L	1	1000	190	100	10	75 - 125	20
Dissolved Magnesium	1288	1406	mg/L	1	1000	322	96	11	75 - 125	20
Dissolved Potassium	1000	1086	mg/L	1	1000	41.1	95	8	75 - 125	20
Dissolved Sodium	1260	1346	mg/L	1	1000	326	93	8	75 - 125	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: QC09959

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Bromide		mg L	2.50	2.27	90	90 - 110	3/22/01
CL		mg L	12.50	11.69	93	90 - 110	3/22/01
Sulfate		mg L	12.50	11.95	95	90 - 110	3/22/01

ICV (1) QCBatch: QC09959

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Bromide		mg L	2.50	2.33	93	90 - 110	3/22/01
CL		mg L	12.50	11.57	92	90 - 110	3/22/01
Sulfate		mg L	12.50	11.81	94	90 - 110	3/22/01

CCV (1) QCBatch: QC09995

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Mercury		mg/L	0.001	0.00098	98	80 - 120	3/26/01

ICV (1) QCBatch: QC09995

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Mercury		mg/L	0.001	0.00106	106	80 - 120	3/26/01

CCV (1) QCBatch: QC10004

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Vinyl Chloride		µg/L	100	103	103	80 - 120	3/25/01
1,1-Dichloroethene		µg/L	100	114	114	80 - 120	3/25/01
Chloroform		µg/L	100	99	99	80 - 120	3/25/01
1,2-Dichloropropane		µg/L	100	102	102	80 - 120	3/25/01
Toluene		µg/L	100	100	100	80 - 120	3/25/01
Chlorobenzene		µg/L	100	99	99	80 - 120	3/25/01
Ethylbenzene		µg/L	100	98	98	80 - 120	3/25/01
Dibromofluoromethane		µg/L	50	45.99	91	80 - 120	3/25/01
Toluene-d8		µg/L	50	49.96	99	80 - 120	3/25/01
4-Bromofluorobenzene		µg/L	50	48.84	97	80 - 120	3/25/01

CCV (1) QCBatch: QC10021

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Specific Conductance		µMHOS/cm	1413	1370	96	90 - 110	3/27/01

ICV (1) QCBatch: QC10021

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Specific Conductance		µMHOS/cm	1413	1387	98	90 - 110	3/27/01

CCV (1) QCBatch: QC10033

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Calcium		mg/L	25	27.1	108	90 - 110	3/27/01
Dissolved Magnesium		mg/L	25	25.4	101	90 - 110	3/27/01
Dissolved Potassium		mg/L	25	23.4	93	90 - 110	3/27/01
Dissolved Sodium		mg/L	25	25.0	100	90 - 110	3/27/01

ICV (1) QCBatch: QC10033

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Dissolved Calcium		mg/L	25	25.8	103	95 - 105	3/27/01
Dissolved Magnesium		mg/L	25	25.6	102	95 - 105	3/27/01
Dissolved Potassium		mg/L	25	23.8	95	95 - 105	3/27/01
Dissolved Sodium		mg/L	25	24.9	99	95 - 105	3/27/01

CCV (1) QCBatch: QC10043

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Dissolved Solids		mg/L	1000	919	91	90 - 110	3/27/01

ICV (1) QCBatch: QC10043

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Dissolved Solids		mg/L	1000	915	91	90 - 110	3/27/01

CCV (1) QCBatch: QC10059

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
pH		s.u.	7	7.1	101	-0.1 s.u. - -0.1 s.u.	3/22/01

ICV (1) QCBatch: QC10059

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
pH		s.u.	7	7.1	101	-0.1 s.u. - -0.1 s.u.	3/22/01

CCV (1) QCBatch: QC10095

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Hydroxide Alkalinity		mg/L as CaCo3	0	<1.0	0	90 - 110	3/29/01
Carbonate Alkalinity		mg/L as CaCo3	0	228	0	90 - 110	3/29/01
Bicarbonate Alkalinity		mg/L as CaCo3	0	8.0	0	90 - 110	3/29/01
Total Alkalinity		mg/L as CaCo3	250	236	94	90 - 110	3/29/01

ICV (1) QCBatch: QC10095

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Hydroxide Alkalinity		mg/L as CaCo3	0	<1.0	0	90 - 110	3/29/01
Carbonate Alkalinity		mg/L as CaCo3	0	232	0	90 - 110	3/29/01
Bicarbonate Alkalinity		mg/L as CaCo3	0	8.0	0	90 - 110	3/29/01
Total Alkalinity		mg/L as CaCo3	250	240	96	90 - 110	3/29/01

CCV (1) QCBatch: QC10220

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Aluminum		mg/L	0.80	0.806	100	95 - 105	1/1/01
Total Arsenic		mg/L	0.40	0.423	105	95 - 105	1/1/01
Total Barium		mg/L	0.80	0.75	93	95 - 105	1/1/01
Total Boron		mg/L	0.50	<0.5	0	95 - 105	1/1/01
Total Cadmium		mg/L	0.20	0.186	93	95 - 105	1/1/01
Total Chromium		mg/L	0.08	0.0752	94	95 - 105	1/1/01
Total Cobalt		mg/L	0.20	0.19	95	95 - 105	1/1/01
Total Copper		mg/L	0.10	0.247	247	95 - 105	1/1/01
Total Iron		mg/L	0.40	0.372	93	95 - 105	1/1/01
Total Lead		mg/L	0.40	0.375	93	95 - 105	1/1/01
Total Manganese		mg/L	0.20	0.186	93	95 - 105	1/1/01
Total Nickel		mg/L	0.20	0.193	96	95 - 105	1/1/01
Total Selenium		mg/L	0.40	0.384	96	95 - 105	1/1/01
Total Silica		mg/L	5	<0.5	0	95 - 105	1/1/01
Total Silver		mg/L	0.10	0.0957	95	95 - 105	1/1/01
Total Zinc		mg/L	0.20	0.184	92	95 - 105	1/1/01

ICV (1) QCBatch: QC10220

Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Aluminum		mg/L	0.80	0.806	100	95 - 105	1/1/01
Total Arsenic		mg/L	0.40	0.414	103	95 - 105	1/1/01
Total Barium		mg/L	0.80	0.785	98	95 - 105	1/1/01

Continued ...

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Param	Flag	Units	CCVs True Conc.	CCVs Found Conc.	CCVs Percent Recovery	Percent Recovery Limits	Date Analyzed
Total Boron		mg/L	0.50	<0.5	0	95 - 105	4/1/01
Total Cadmium		mg/L	0.20	0.199	99	95 - 105	4/1/01
Total Chromium		mg/L	0.08	0.0797	99	95 - 105	4/1/01
Total Cobalt		mg/L	0.20	0.197	98	95 - 105	4/1/01
Total Copper		mg/L	0.10	0.248	248	95 - 105	4/1/01
Total Iron		mg/L	0.40	0.396	-7	95 - 105	4/1/01
Total Lead		mg/L	0.40	0.392	98	95 - 105	4/1/01
Total Manganese		mg/L	0.20	0.198	97	95 - 105	4/1/01
Total Nickel		mg/L	0.20	0.2	100	95 - 105	4/1/01
Total Selenium		mg/L	0.40	0.399	99	95 - 105	4/1/01
Total Silica		mg/L	5	<0.5	0	95 - 105	4/1/01
Total Silver		mg/L	0.10	0.0987	98	95 - 105	4/1/01
Total Zinc		mg/L	0.20	0.202	101	95 - 105	4/1/01

Summary Report

Bill Olson
OCD
1220 S. Saint Francis Dr.
Santa Fe, NM 87504

Report Date: April 17, 2001

Order ID Number: A01032213

Project Number: John Cox
Project Name: N/A
Project Location: Water Well

Sample	Description	Matrix	Date Taken	Time Taken	Date Received
167356	0103201200	Water	3/20/01	12:00	3/22/01

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: 167356 - 0103201200

Param	Flag	Result	Units
8260			
Bromochloromethane		<1.00	µg/L
Dichlorodifluoromethane		<1.00	µg/L
Chloromethane (methyl chloride)		<1.00	µg/L
Vinyl Chloride		<1.00	µg/L
Bromomethane (methyl bromide)		<1.00	µg/L
Chloroethane		<1.00	µg/L
Trichlorofluoromethane		<1.00	µg/L
Acetone		<10.0	µg/L
Iodomethane (methyl iodide)		<1.00	µg/L
Carbon Disulfide		<1.00	µg/L
Acrylonitrile		<1.00	µg/L
2-Butanone (MEK)		<5.00	µg/L
1-methyl-2-pentanone (MIBK)		<5.00	µg/L
2-hexanone		<5.00	µg/L
trans-1,1-Dichloro-2-butene		<10.0	µg/L
1,1-Dichloroethene		<1.00	µg/L
Methylene chloride		<5.00	µg/L
MTBE		<1.00	µg/L
trans-1,2-Dichloroethene		<1.00	µg/L
1,1-Dichloroethane		<1.00	µg/L
cis-1,2-Dichloroethene		<1.00	µg/L
2,2-Dichloropropane		<1.00	µg/L
1,2-Dichloroethane (EDC)		<1.00	µg/L
Chloroform		<1.00	µg/L
1,1,1-Trichloroethane		<1.00	µg/L
1,1-Dichloropropene		<1.00	µg/L
Benzene		<1.00	µg/L
Carbon Tetrachloride		<1.00	µg/L
1,2-Dichloropropane		<1.00	µg/L
Trichloroethene (TCE)		<1.00	µg/L

Continued on next page ...

This is only a summary. Please, refer to the complete report package for quality control data.

Sample 167356 continued ...

Param	Flag	Result	Units
Dibromomethane (methylene bromide)		<1.00	µg/L
Bromodichloromethane		<1.00	µg/L
2-Chloroethyl vinyl ether		<5.00	µg/L
cis-1,3-Dichloropropene		<1.00	µg/L
trans-1,3-Dichloropropene		<1.00	µg/L
Toluene		<1.00	µg/L
1,1,2-Trichloroethane		<1.00	µg/L
1,3-Dichloropropane		<1.00	µg/L
Dibromochloromethane		<1.00	µg/L
1,2-Dibromoethane (EDB)		<1.00	µg/L
Tetrachloroethene (PCE)		<1.00	µg/L
Chlorobenzene		<1.00	µg/L
1,1,1,2-Tetrachloroethane		<1.00	µg/L
Ethylbenzene		<1.00	µg/L
m,p-Xylene		<1.00	µg/L
Bromoform		<1.00	µg/L
Styrene		<1.00	µg/L
o-Xylene		<1.00	µg/L
1,1,2,2-Tetrachloroethane		<1.00	µg/L
2-Chlorotoluene		<1.00	µg/L
1,2,3-Trichloropropane		<1.00	µg/L
Isopropylbenzene		<1.00	µg/L
Bromobenzene		<1.00	µg/L
n-Propylbenzene		<1.00	µg/L
1,3,5-Trimethylbenzene		<1.00	µg/L
tert-Butylbenzene		<1.00	µg/L
1,2,4-Trimethylbenzene		<1.00	µg/L
1,4-Dichlorobenzene (para)		<1.00	µg/L
sec-Butylbenzene		<1.00	µg/L
1,3-Dichlorobenzene		<1.00	µg/L
p-Isopropyltoluene		<1.00	µg/L
4-Chlorotoluene		<1.00	µg/L
1,2-Dichlorobenzene (ortho)		<1.00	µg/L
n-Butylbenzene		<1.00	µg/L
1,2-Dibromo-3-chloropropane		<5.00	µg/L
1,2,3-Trichlorobenzene		<5.00	µg/L
1,2,4-Trichlorobenzene		<5.00	µg/L
Naphthalene		<5.00	µg/L
Hexachlorobutadiene		<5.00	µg/L
Alkalinity			
Hydroxide Alkalinity		<1.0	mg/L as CaCO ₃
Carbonate Alkalinity		<1.0	mg/L as CaCO ₃
Bicarbonate Alkalinity		166	mg/L as CaCO ₃
Total Alkalinity		166	mg/L as CaCO ₃
Specific Conductance		1500	µMHOS/cm
Total Mercury		<0.0002	mg/L
Ion Chromatography (IC)			
CL		310	mg/L
Fluoride		3.2	mg/L
Nitrate-N	1	2.4	mg/L

Continued on next page ...

¹ Sample out of hold time for NO₃.

Sample 167356 continued ...

Param	Flag	Result	Units
Sulfate		160	mg/L
Salts			
Dissolved Calcium		122	mg/L
Dissolved Magnesium		60.5	mg/L
Dissolved Potassium		9.94	mg/L
Dissolved Sodium		111	mg/L
Total Dissolved Solids		730	mg/L
Total Metals			
Total Aluminum		<0.5	mg/L
Total Arsenic		0.0142	mg/L
Total Barium		0.0716	mg/L
Total Boron		<0.5	mg/L
Total Cadmium		<0.002	mg/L
Total Chromium		<0.005	mg/L
Total Cobalt		<0.01	mg/L
Total Copper		<0.01	mg/L
Total Iron		< 0.5	mg/L
Total Lead		<0.01	mg/L
Total Manganese		<0.001	mg/L
Total Molybdenum		0.007	mg/L
Total Nickel		<0.01	mg/L
Total Selenium		0.0139	mg/L
Total Silver		<0.01	mg/L
Total Zinc		<0.01	mg/L
pH	2	7.7	s.u.

²Sample run out of holding time

Carrier # 702565-514

FINAL GROUNDWATER PLUME DELINEATION REPORT

EUINCE #2 (NORTH) GAS PLANT
EUNICE, NEW MEXICO

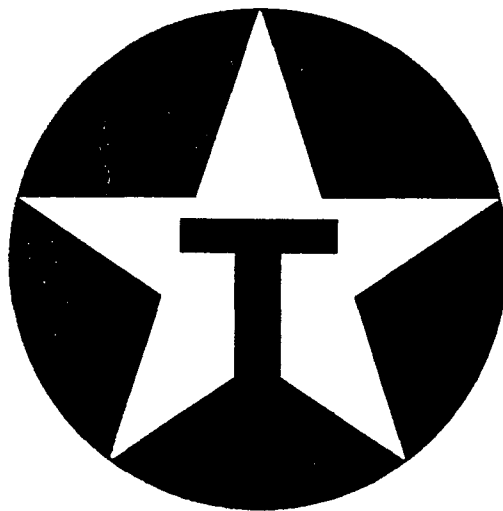
MARCH 2000

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MAR 16 2000

Prepared for

ENVIRONMENTAL BUREAU
OIL CONSERVATION DIVISION



Prepared by

Highlander Environmental Corp.

6W004



Highlander Environmental Corp.

Midland, Texas

March 14, 2000

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

Re: Final Groundwater Plume Delineation Report, Texaco Exploration and Production Inc., Former Eunice #2 (North) Gas Plant, Eunice, New Mexico

Dear Mr. Olson:

Texaco Exploration and Production, Inc. (Texaco) has retained Highlander Environmental Corp. (Highlander) to investigate the lateral and vertical extent of a groundwater contaminant plume in the vicinity of its former Eunice #2 (North) Gas Plant (Site), located near Eunice, New Mexico. The Site is located in the SE/4, NE/4, and NE/4, SE/4, Section 28, Township 21 South, Range 37 East, Lea County, New Mexico (Figure 1). The investigations were conducted between January and November 1999.

1.0 BACKGROUND

During August 1996, the New Mexico Oil Conservation Division (NMOCD), as a condition for renewal of the Site's groundwater Discharge Plan (Number GW-004), required an initial investigation to evaluate the integrity of process area sumps. Dissolved benzene was detected above the New Mexico Water Quality Control Commission (NMWQCC) human health standard of 0.01 milligrams per liter (mg/L), in groundwater from monitoring well MW-1. Dissolved chromium was also observed above the NMWQCC standard of 0.05 mg/L, in groundwater from the Site's water supply well (WW-1). A report titled, "Subsurface Environmental Assessment Report, Texaco Exploration and Production Inc., Eunice # 2 (North) Gas Plant", was prepared by Highlander, and submitted to the NMOCD in September 1996. Additional investigations were conducted from March 31 through May 12, 1997, to evaluate potential sources, and the extent of the dissolved hydrocarbon and chromium. The investigation was detailed in the report titled, "Final Investigation Report, Texaco Exploration and Production Inc., Eunice #2 (North) Gas Plant, Lea County, New Mexico, May 1997", which was submitted to the NMOCD. A subsequent investigation was conducted from August through December 1998, to further characterize the extent of the groundwater impact. A report titled, "Addendum Final Investigation Report, Texaco Exploration and Production Inc., Eunice # 2 (North) Gas Plant, Lea County, New Mexico, January 1998", detailed the investigation results, and was submitted to the NMOCD.

Following its review of the January 1998 report, the NMOCD requested additional information, including copies of aerial photographs, groundwater potentiometric surface maps, and isopleth maps of chloride and total dissolved solids (TDS) for the upper (shallow) and lower (deep) portions of the aquifer. This information

was submitted to the NMOCD on July 14, 1998. On October 9, 1998, the NMOCD requested Texaco to prepare a work plan to complete the delineation of the groundwater contaminant plume.

During a meeting between NMOCD, Texaco and Highlander personnel on December 1, 1998, it was decided that seven (7) additional monitoring wells would be necessary to define the remaining groundwater impact. Highlander was requested to prepare a work plan ("Work Plan for Delineation of Groundwater Contaminant Plume, Texaco Exploration and Production Inc., Former Eunice #2 (North) Gas Plant, Eunice, New Mexico"). The work plan was submitted to the NMOCD on December 17, 1998, and approved on January 13, 1999. The work plan proposed installation of three wells in the lower portion of the aquifer, east, north and northeast of the Site (MW-20A, MW-21A and MW-22A), and four wells in the upper portion of the aquifer, east, northeast, west and south of the Site (MW-11, MW-15, MW-20 and MW-21). The work plan also included collection of groundwater samples for laboratory analyses, from a representative number of wells to evaluate current plume conditions. Texaco also proposed installation of a test (recovery) well near the south-central area of the Site, to assist in future remediation efforts. The NMOCD correspondence is presented in Appendix A.

2.0 GROUNDWATER PLUME DELINEATION ACTIVITIES

The seven additional wells were installed from January 5 through 7, 1999, in accordance with the approved work plan. Groundwater samples were collected from the new wells (7), nineteen (19) existing monitoring wells, and three (3) water wells on January 18 through 22, 1999. Dissolved chromium was reported at concentrations above the NMWQCC human health standard in samples from well MW-22A, which was installed in the lower (deep) portion of the aquifer, and wells MW-11 and MW-15, which were installed in the upper (shallow) portion of the aquifer.

Base on the laboratory analyses, monitoring well (MW-12) was consequently installed in the upper portion of the aquifer near the southwest corner of the Site, adjacent to deep monitoring well MW-12A (February 11, 1999). Three (3) additional shallow monitoring wells (MW-14, MW-18 and MW-25) were also installed south, southeast and southwest of the Site (May 6 and 7, 1999). A shallow well (MW-23) and a deep well (MW-24A) were installed west and north of the Site, respectively (May 16, 1999). Groundwater samples collected for dissolved chromium analyses indicated that additional plume delineation was needed in the upper portion of the aquifer west, south and southwest of the Site. Four (4) shallow wells (MW-26 through MW-29) were installed from October 27, 1999 through November 11, 1999, to complete the plume delineation. The additional wells were installed in accordance with the previously approved work plan, and Highlander (verbal communication) notified the NMOCD prior to installing the wells. Figure 2 presents a drawing for the Site, and well locations. Table 1 presents a summary of well drilling and completion details. Appendix B presents geologic and construction logs for the wells.



3.0 GROUNDWATER PLUME DELINEATION RESULTS

3.1 Depth-to-Groundwater and Flow Conditions

Measurements of depth-to-groundwater and phase-separated hydrocarbon (PSH) were collected from all wells on November 16, 1999. The measurements recorded PSH in monitoring wells MW-5 and MW-6, located adjacent to the sump on the east side of the Site. The apparent PSH thickness was 0.38 feet (MW-5) and 2.75 feet (MW-6). The previous PSH thickness measurements from wells MW-5 and MW-6 were 0.47 and 2.78 feet, respectively (December 18, 1997). The November 16, 1999 depth-to-groundwater and PSH measurements are summarized in Table 1. The measurements were used to prepare depth-to-groundwater and groundwater potentiometric surface maps for the upper (shallow) and lower (deep) portions of the aquifer, which are presented as Figures 3 through 6.

Referring to Figure 3, depth-to-groundwater in the upper portion of the aquifer generally increases from east to west, across the study area. The depth-to-groundwater ranged from 38.30 feet below ground surface (BGS) at well MW-18, to 71.91 feet BGS at well MW-28, on November 16, 1999. The depth-to-groundwater generally coincides with increases in ground elevation. For example, the difference in ground elevation between well MW-28 and MW-18 is 32.63 feet. The difference in depth-to-groundwater between wells MW-28 and MW-18 was 33.61 feet, on November 16, 1999. Figure 4 presents a depth-to-groundwater map for the lower portion of the aquifer, and indicates that depth-to-groundwater is generally controlled by pumping from well WW-1, in the vicinity of the Site. Depth-to-groundwater in the deep portion of the aquifer ranged from 37.70 feet BGS at well MW-18A, to 64.03 feet BGS at well WW-1, on November 16, 1999.

The elevation of the shallow groundwater surface ranged from 3379.09 feet above mean sea level (AMSL) at wells MW-18 and MW-26, to 3374.09 feet AMSL at well MW-21, on November 16, 1999 (Figure 5). Groundwater flow in the upper portion of the aquifer was generally from southwest to northeast. However, groundwater flow southwest of the Site was to the west and southwest, due to an apparent groundwater divide, located south of the Site. The divide was oriented southwest to northeast, and located in the vicinity of wells MW-18 and MW-26, approximately 1,500 to 2,000 feet south of the Site. A trough was also apparent west and southwest of the Site. Groundwater west of the trough appeared to flow to the southeast, and was consistent with the regional groundwater flow direction. The hydrologic features may be associated with pumping from the plant water well (WW-1), located on the north side of the Site.

Groundwater flow in the lower portion of the aquifer was generally towards well WW-1, due to a cone of depression developed from pumping. The elevation of the potentiometric surface ranged from 3379.26 feet AMSL at well MW-17A, to 3364.75 feet AMSL, at well WW-1, on November 16, 1999.



3.2 Groundwater Sample Results

Groundwater samples were collected from the new monitoring wells (MW-11, MW-15, MW-20, MW-20A, MW-21, MW-21A and MW-22A), nineteen (19) existing monitoring wells, and three (3) water wells on January 18 through 22, 1999. Additional groundwater samples were collected on May 19 and 23, 1999, and November 17 through 22, 1999, to complete the delineation of the groundwater contaminant plume. The samples were analyzed for dissolved metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver), BTEX, cations (calcium, magnesium, sodium and potassium), anions (nitrate, chloride, sulfate, fluoride and alkalinity), and TDS, depending on well location. Trace Analysis, Inc., Lubbock, Texas, performed the analyses, and received the samples under preservation and chain-of-custody control. Volatile organic compounds, including BTEX, detected in groundwater samples are presented in Table 2. Table 3 presents a summary of the dissolved metals detected in groundwater samples, and Table 4 presents a summary of the general chemistry parameters, including cations, anions and TDS. The laboratory reports are presented in Appendix C.

Referring to Table 2, BTEX was only detected, above the test method detection limits, in groundwater samples from well MW-1 (January 20, 1999 and November 17, 1999). The detected levels of BTEX were well below the NMWQCC human health standards of 0.01 mg/L (benzene), 0.75 mg/L (toluene), 0.75 mg/L (ethylbenzene) and 0.62 mg/L (xylene).

Dissolved metals detected in the groundwater samples included barium, cadmium, chromium, mercury, selenium and silver. Barium was reported at 0.13 mg/L in groundwater from monitoring well MW-21A (deep), and was below the NMWQCC standard (1.0 mg/L). Cadmium was reported at 0.01 and 0.02 mg/L in groundwater from wells MW-8 (shallow) and MW-8A (deep), respectively. The NMWQCC standard for cadmium is 0.01 mg/L. Mercury was reported in groundwater from MW-18 (shallow) at 0.0067 mg/L, and was above the NMWQCC standard of 0.002 mg/L. The mercury does not appear to be associated with the Site, since mercury was not detected in the remaining groundwater samples. Selenium, reported in groundwater from shallow well MW-15 (0.08 mg/L), deep well MW-8A (0.2 mg/L), and the Lord water well (0.11 mg/L), exceeded the NMWQCC standard of 0.05 mg/L. The selenium does not appear to be associated with the Site, since it was not detected in the remaining samples. Silver was reported at 0.17 and 0.19 mg/L in groundwater from wells MW-8 (shallow) and MW-8A (deep), respectively. The silver concentrations exceed the NMWQCC standard of 0.05 mg/L. Dissolved chromium was detected in shallow groundwater at concentrations from 0.09 mg/L (MW-13) to 6.2 mg/L (MW-11). Chromium was also detected in the deep groundwater at concentrations from 0.05 mg/L (MW-4A) to 2.9 mg/L (MW-8A). The extent of dissolved chromium in the upper (shallow) and lower (deep) portions of the aquifer are depicted on Figure 7 and Figure 8, respectively.

Figure 7 presents the distribution of dissolved chromium in shallow portion of the aquifer, and indicates that the plume extends approximately 1,300 feet southwest of the Site. The distribution of chromium in the shallow portion of the aquifer appears to



coincide with hydrologic features observed on November 16, 1999. Movement of the plume southwest of the Site is likely the result of the groundwater divide, influenced from pumping by wells in the vicinity of the Site. Chromium is concentrated in the southwest area of the Site.

Figure 8 presents the distribution of dissolved chromium in the deep portion of the aquifer, and indicates that the plume is generally confined to the Site, except for a small area southeast of the Site. Pumping from wells southeast of the Site (Lord and Rowland wells) appears to have caused the plume to migrate southeast. The wells are not currently in use. Groundwater samples collected from the Rowland well on September 29, 1997, reported 0.16 mg/L of dissolved chromium. The sample collected on January 19, 1999, did not report chromium above the test method detection limit (0.05 mg/L), indicating that the plume may be retracting toward the Site.

Groundwater quality in the shallow and deep portions of the aquifer was generally variable across the area, based on the cation and anion analyses of groundwater samples. Nitrate was detected in groundwater from wells sampled during January and November 1999. The nitrate concentrations in the shallow portion of the aquifer ranged from 3.6 mg/L in wells MW-21, MW-27 and MW-28, to 24 mg/L in well MW-2 (November 1999). Groundwater from wells MW-2 (background), MW-1 and MW-14 reported nitrate levels above the NMWQCC human health standard (10 mg/L). Nitrate was also reported at the NMWQCC standard in groundwater from wells MW-8 and MW-11. Nitrate in groundwater from the deep portion of the aquifer was generally lower, however, concentrations were reported at or above the NMWQCC standard in samples from wells MW-8A, WW-1 and the Rowland well. Nitrate is typically associated with agricultural practices, fertilizers and domestic sanitation systems.

Groundwater from wells MW-8A and MW-9A (deep) exceeded the NMWQCC domestic water supply standard for sulfate (600 mg/L). Sulfate is typically associated with naturally occurring isotopes of sulfur, which is present in soil. Sulfate concentrations were generally higher in the shallow portion of the aquifer, possibly due to leaching from soil. The sulfate concentrations ranged from 220 mg/L (MW-27) to 1,600 mg/L (MW-8 and MW-11).

Chloride in the shallow portion of the aquifer ranged from 240 mg/L (MW-27) to 3,100 mg/L (MW-15). The NMWQCC standard for chloride in domestic water supplies is 250 mg/L. Chloride concentrations in the shallow portion of the aquifer are depicted on Figure 9, and indicates that the highest concentrations occurred in the vicinity of well MW-15 (3,100 mg/L), located south of the Site. Well MW-15 is located upgradient of the Site, and chloride levels decrease toward the Site (downgradient). Well MW-15 is also located in the vicinity of subsurface pipeline right-of-way, which may be a potential source if leaks have occurred. Groundwater from well MW-1, located near the center of the Site, reported a chloride concentration of 250 mg/L (November 1999). Chloride in the deep portion of the aquifer, depicted on Figure 10, ranged in concentration from 57 mg/L at well MW-13A, to 7,000 mg/L at well MW-21A (January 1999). Well MW-21A is located approximately 700 feet east-northeast of the Site, in an area of active oil and gas production. The chloride level reported in groundwater from well WW-1 (900 mg/L)



may be due, in part, to the cone of depression extending away from the well. Chloride was also observed above the NMWQCC domestic water supply standard in groundwater from well MW-8A, which reported a concentration of 1,000 mg/L. Well MW-8A is located near the south-central area of the Site. Chloride was also reported above the NMWQCC domestic water supply standard in samples from the Lord and Rowland wells, located southeast of the Site. The chloride levels may be due to pumping from the wells, by creating a cone of depression that would allow contaminants to migrate toward the wells.

Groundwater samples from the shallow and deep portions of the aquifer reported TDS concentrations that coincided with the reported chloride values. The NMWQCC domestic water supply standard for TDS is 1,000 mg/L. The distribution of TDS in the shallow and deep portions of the aquifer is presented on Figure 11 and Figure 12, respectively. The highest TDS concentrations in the shallow portion of the aquifer occurred in the vicinity of well MW-15 (5,900 mg/L), which is hydraulically upgradient from the Site. The TDS concentrations decrease toward the Site. The NMWQCC domestic water supply standard was exceeded in samples from background monitoring well MW-2 (1,400 mg/L), located near the northwest corner of the Site. The TDS concentration in groundwater from the deep portion of the aquifer was greatest in the vicinity of MW-21A (9,200 mg/L), located northeast of the Site. The area of elevated TDS and chloride is likely associated with oil and gas production. Concentrations of TDS were also noted above the NMWQCC standard in the deep portion of the aquifer near the south-central area of the Site and southeast of the Site. These results are also consistent with the distribution of chloride.

3.3 Water Well Search

A search of water wells within a 1-mile of the Site was previously through a review of the files of the New Mexico State Engineer, and field reconnaissance. The New Mexico State Engineer's file revealed records for twelve (12) water wells. The nearest well to the Site was identified approximately 500 feet southeast of the Site (Lord Water Well). There were no wells identified south and southwest of the Site, within the area of the shallow chromium plume.

4.0 CONCLUSIONS

1. PSH was only observed in monitoring wells MW-5 and MW-6, at 0.38 and 2.75 feet, respectively, on November 16, 1999. These measurements are consistent with previous measurements.
2. The only samples reporting BTEX above test method detection limits were from well MW-1, on January 20, 1999 and November 17, 1999. The BTEX concentrations were well below the NMWQCC human health standards of 0.01 mg/L (benzene), 0.75 mg/L (toluene), 0.75 mg/L (ethylbenzene) and 0.62 mg/L (xylene).



3. Barium (0.13 mg/L) was only detected in groundwater from monitoring well MW-21A (deep), and was below the NMWQCC standard (1.0 mg/L).
4. Cadmium was reported at 0.01 and 0.02 mg/L in groundwater from wells MW-8 (shallow) and MW-8A (deep), respectively. The NMWQCC standard for cadmium is 0.01 mg/L.
5. Mercury was reported in groundwater from well MW-18 (shallow) at 0.0067 mg/L, and was above the NMWQCC standard of 0.002 mg/L. The mercury does not appear to be associated with the Site.
6. Selenium was reported in groundwater from shallow well MW-15 (0.08 mg/L), deep well MW-8A (0.2 mg/L), and the Lord water well (0.11 mg/L). The NMWQCC standard for selenium (0.05 mg/L) was exceeded, however, it does not appear to be associated with the Site.
7. Silver exceeded the NMWQCC standard (0.05 mg/L) in groundwater from wells MW-8 (shallow) and MW-8A (deep), respectively. The silver concentrations were 0.17 (MW-8) and 0.19 mg/L (MW-8A).
8. Chromium was reported in samples from the upper (shallow) portion of the aquifer, at concentrations from 0.09 mg/L (MW-13) to 6.2 mg/L (MW-11). The vertical and lateral extent of dissolved chromium in the shallow portion of the aquifer was delineated during the investigation. Dissolved chromium in the shallow portion of the aquifer extends approximately 1,300 feet southwest of the Site, and appears coincide with hydrologic features observed on November 16, 1999.
9. Chromium was reported in samples from the lower (deep) portion of the aquifer, at concentrations from 0.05 mg/L (MW-4A) to 2.9 mg/L (MW-8A). The extent of dissolved chromium in the lower (deep) portion of the aquifer was delineated during the investigation. Dissolved chromium in the lower portion of the aquifer is generally confined to the Site, except for a small area that extends southeast of the Site. Pumping from wells southeast of the Site (Lord and Rowland wells) appeared to have allowed the plume to migrate southeast. The wells are not currently in use. Groundwater samples collected from the Rowland well on September 29, 1997, reported 0.16 mg/L of dissolved chromium. The sample collected on January 19, 1999, did not report chromium above the test method detection limit (0.05 mg/L), indicating that the plume may be retracting toward the Site.
10. Nitrate in the shallow portion of the aquifer ranged from 3.6 mg/L (MW-21, MW-27 and MW-28) to 24 mg/L (MW-2). The nitrate levels reported in samples from



wells MW-2 (background), MW-1 and MW-14 were above the NMWQCC human health standard (10 mg/L). Nitrate was reported at the NMWQCC standard in groundwater from wells MW-8 and MW-11. Nitrate in the deep portion of the aquifer was generally lower, however, concentrations were reported at or above the NMWQCC standard in samples from MW-8A, WW-1 and the Rowland well. Nitrate is typically associated with agricultural practices, fertilizers and domestic sanitation systems.

11. Sulfate was reported above the NMWQCC domestic water supply standard (600 mg/L) in groundwater from deep wells MW-8A and MW-9A. Sulfate is typically associated with naturally occurring isotopes of sulfur, which is present in soil. Sulfate concentrations were generally higher in the shallow portion of the aquifer, possibly due to leaching from soil. The sulfate concentrations ranged from 220 mg/L (MW-27) to 1,600 mg/L (MW-8 and MW-11).
12. Chloride reported in groundwater from the upper portion of the aquifer, ranged from 240 mg/L (MW-27) to 3,100 mg/L (MW-15). The NMWQCC standard for domestic water supplies is 250 mg/L. The distribution of chloride indicates that the highest concentration was in the vicinity of well MW-15 (3,100 mg/L), located south of the Site. Well MW-15 is located hydraulically upgradient of the Site, and in the vicinity of a subsurface pipeline right-of-way, which may have contributed to the impact if leaks have occurred.
13. Chloride in the lower portion of the aquifer ranged from 57 mg/L (MW-13A), to 7,000 mg/L (MW-21A). Well MW-21A is located approximately 700 feet east-northeast of the Site, and in an area of active oil and gas production. Chloride reported in groundwater from well WW-1 (900 mg/L) may be due, in part, to the cone of depression extending away from the well. Chloride was reported above the NMWQCC standard in samples from well MW-8A (1,000 mg/L), Lord and Rowland wells. The chloride levels may be due to southeast migration during periods of pumping.
14. Groundwater in the shallow and deep portions of the aquifer reported TDS levels that coincided with chloride concentrations. The highest TDS concentration in the shallow portion of the aquifer occurred in the vicinity of well MW-15 (5,900 mg/L), which is hydraulically upgradient from the Site. The TDS concentrations decrease toward the Site. The NMWQCC domestic water supply standard for TDS (1,000 mg/L) was exceeded in shallow groundwater from background monitoring well MW-2 (1,400 mg/L), located near the northwest corner of the Site. The TDS concentration in groundwater from the deep portion of the aquifer was greatest in the vicinity of MW-21A (9,200 mg/L), located northeast of the Site. The area of elevated TDS and chloride is likely associated with oil and gas



Mr. William C. Olson
March 14, 2000
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production. Concentrations of TDS were also noted above the NMWQCC standard in the deep portion of the aquifer near the south-central area of the Site and southeast of the Site. These results are also consistent with the distribution of chloride.

15. Groundwater quality in the shallow and deep groundwater is generally variable across the area, based on the cation and anion analyses of groundwater samples.
16. No water wells were identified south and southwest of the Site, within the area of the shallow chromium plume.

The extent of groundwater impact has been defined vertically and laterally, therefore, no further investigation is required. Please call if you have any questions.

Sincerely,
Highlander Environmental Corp.



Mark J. Larson
Senior Project Manager

Encl.

cc: Robert Patterson, Texaco Exploration and Production Inc.
Chris Williams, NMOCD – Hobbs District



TABLES

Table 1: Summary of Monitor Well and Water Well Drilling and Completion Details
Texaco Exploration and Production, Inc., Eunice #2 (North) Gas Plant
Lea County, New Mexico

Monitor Well	Date Drilled	Drilled Depth Feet, BGS	Ground Elev. Feet, MSL	TOC Elev. Feet, MSL	Well Diameter Inches	Well Screen Feet/BGS	Depth-to-Ground Water Feet, BGS 11/16/99
MW-14	5/6/99	65.00	3424.31	3424.08	4	45.00-65.00	45.45
MW-14A	10/27/97	109.00	3424.05	3423.90	4	95.15-105.15	45.19
MW-15	1/6/99	55.00	3420.55	3420.4	4	35.00-55.00	41.61
MW-15A	10/28/97	103.00	3420.65	3420.55	4	92.20-102.30	41.43
MW-16A	10/29/97	91.60	3419.99	3419.92	4	81.51-91.60	40.78
MW-17A	10/30/97	106.00	3424.48	3424.38	4	93.50-103.60	45.22
MW-18	5/6/99	55.00	3417.39	3417.15	4	35.00-55.00	38.06
MW-18A	11/3/97	81.55	3417.04	3416.86	4	71.38-81.55	37.70
MW-19A	11/6/97	72.40	3414.95	3414.74	4	62.20-72.40	38.33
MW-20	1/5/99	55.00	3418.50	3420.85	4	35.00-55.00	42.23
MW-20A	1/5/99	81.00	3418.50	3421.14	4	71.00-81.00	42.06
MW-21	1/7/99	55.00	3420.41	3422.72	4	35.00-55.00	45.51
MW-21A	1/6/99	81.00	3420.41	3422.94	4	71.00-81.00	45.88
MW-22A	1/6/99	105.00	3428.50	3431.13	4	95.00-105.00	54.66
MW-23	6/16/99	67.00	3433.99	3436.44	4	46.64-66.04	55.97
MW-24A	6/16/99	105.00	3428.98	3430.77	4	83.72-103.12	52.51
MA-25	5/7/99	65.00	3432.36	3432.69	4	45.00-65.00	53.43
MW-26	10/27/99	67.00	3432.52	3432.04	4	43.13-61.78	53.43
MW-27	10/27/99	71.50	3443.72	3443.33	4	51.39-70.43	65.04
MW-28	11/2/99	85.00	3450.02	3451.63	4	63.29-82.33	71.91
MW-29	11/11/99	80.00	3444.76	3446.89	4	59.89-78.54	66.49

Notes:

1. BGS: Denotes depth in feet below ground surface.
2. MSL: Denotes elevation in feet above mean sea level.
3. *: Denotes depth-to-ground corrected from phase separated hydrocarbons, assuming specific gravity of 0.75.

Table 1: Summary of Monitor Well and Water Well Drilling and Completion Details

Texaco Exploration and Production, Inc., Eunice #2 (North) Gas Plant

4. (0.47') Phase-separated hydrocarbon thickness in feet.

5. - No date available.

Monitor Well	Date Drilled	Drilled Depth Feet, BGS	Ground Elev. Feet, MSL	TOC Elev. Feet, MSL	Well Diameter Inches	Well Screen Feet/BGS	Depth-to-Ground Water Feet, BGS 11/16/99
Lord Water Well	3/7/63	93.00	3419.47	3419.97	6	--	42.17
Rowland Water Well	--	--	3418.47	3419.47	6	--	40.58
WW-1	--	100.00	3428.78	3429.95	6	--	64.03
RW-1	1/13/99	111.00	3425.73	3428.32	6	44.08 - 104.84	47.92

Notes:

1. BGS:

Denotes depth in feet below ground surface.

2. MSL:

Denotes elevation in feet above mean sea level.

3. -

Denotes depth-to-ground corrected from phase separated hydrocarbons, assuming specific gravity of 0.75.

4. (0.47'):

Phase-separated hydrocarbon thickness in feet.

5. -

No date available.

Table 2: Summary of Volatile Organic Parameters Detected in Groundwater Samples from Monitor Wells and Water Wells
Texaco Exploration and Production, Inc., Eunice #2 (North) Gas Plant
Lea County, New Mexico

Well Number	Sample Date	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Xylenes (ug/L)	Dichlorodifluoromethane (ug/L)	Tetrachloroethene (ug/L)
MW-1	8/1/96	9	69	82	169	-	-
	4/23/97	11	33	75	49	98	<1
	1/20/99	6	19	29	29	-	-
	11/17/99	8	18	14	42	-	-
*MW-1	1/20/99	6	17	28	24	-	-
MW-2	4/22/97	<1	<1	<1	<1	<1	<1
MW-3	4/22/97	<1	<1	<1	<1	6	<1
MW-4	4/23/97	<1	<1	<1	<1	8	<1
	1/21/99	<1	<1	<1	<1	-	-
	11/18/99	<1	<1	<1	<1	-	-
*MW-4	1/21/99	<1	<1	<1	<1	-	-
MW-4A	10/23/97	<1	<1	<1	<1	<1	<1
	1/21/99	<1	<1	<1	<1	-	-
MW-5	4/22/97	540	310	93	245	37	<1
MW-6	4/22/97	340	280	110	330	50	<1
MW-7	8/19/97	<1	<1	<1	<1	5	<1
MW-7A	10/22/97	<1	<1	<1	<1	<1	<1
MW-8	8/20/97	<1	<1	<1	<1	12	<1
MW-8A	10/28/97	<1	<1	<1	<1	<1	<1
MW-9	8/20/97	2	<1	<1	<1	<1	<1
MW-9A	10/23/97	<1	<1	<1	<1	<1	<1
MW-10	9/16/97	<1	<1	<1	<1	<1	<1
MW-11A	10/23/97	<1	<1	<1	<1	<1	<1
MW-12A	11/4/97	<1	<1	<1	<1	<1	<1
MW-21	1/18/99	<1	<1	<1	<1	-	-
	11/17/99	<5	<5	<5	<5	-	-
MW-21A	1/18/99	<1	<1	<1	<1	-	-
RW-1	2/17/99	<1	<1	<1	<1	-	-
WW-1	6/14/96	<1	<1	<1	<1	113	<1
	4/23/97	<1	<1	<1	<1	-	-
Trip Blank	1/20/99	<1	<1	<1	<1	-	-

Note: All analysis performed by Trace Analysis, Inc., Lubbock, Texas

1. ug/L: Denotes analyte concentration in milligrams per liter

2. <: Denotes analyte concentration below test method detection limit

3. -: No data available

4. *: Denotes duplicate sample

Table 3: Summary of Dissolved Metals Analysis of Groundwater Samples from Monitor Wells and Water Wells
Texaco Exploration and Production, Inc., Eunice #2 (North) Gas Plant
Lea County, New Mexico

Well No	Sample Date	Arsenic (mg/L)	Barium (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Chromium +6 (mg/L)	Chromium +3 (mg/L)	Lead (mg/L)	Mercury (mg/L)	Selenium (mg/L)	Silver (mg/L)
MW-1	4/23/97	<0.10	<0.20	<0.02	<0.05	-	-	0.1	<0.001	<0.10	<0.01
	1/20/99	<0.10	<1.0	<0.01	<0.05	-	-	<0.05	<0.0002	<0.05	<0.05
	11/17/99	-	-	-	<0.05	-	-	-	-	-	-
*1AW-1	1/20/99	<0.10	<1.0	<0.01	<0.05	-	-	<0.05	<0.0002	<0.05	<0.05
	11/17/99	-	-	-	<0.05	-	-	-	-	-	-
MW-2	4/22/97	<0.10	<0.20	<0.02	<0.05	-	-	<0.10	<0.001	<0.10	<0.01
	1/20/99	<0.10	<1.0	<0.01	<0.05	-	-	<0.05	<0.0002	<0.05	<0.05
	11/17/99	-	-	-	<0.05	-	-	-	-	-	-
MW-3	4/22/97	<0.10	<0.20	<0.02	0.36	-	-	<0.10	<0.001	<0.10	<0.01
	6/11/97	<0.10	<0.10	<0.02	0.22	-	-	<0.10	<0.001	<0.10	<0.05
MW-4	4/23/97	<0.10	<0.20	<0.02	0.08	-	-	0.1	<0.001	<0.10	<0.01
	6/11/97	<0.10	<0.10	<0.02	0.08	-	-	<0.10	<0.001	<0.10	<0.05
	1/21/99	<0.10	<1.0	<0.01	0.09	-	-	<0.05	<0.0002	<0.05	<0.05
	11/18/99	-	-	-	0.42	-	-	-	-	-	-
*MW-4	1/21/99	<0.10	<1.0	<0.01	0.09	-	-	<0.05	<0.0002	<0.05	<0.05
MW-4A	10/23/97	<0.10	<0.20	<0.02	0.05	-	-	<0.10	<0.001	<0.10	<0.01
	1/21/99	<0.10	<1.0	<0.01	0.05	-	-	<0.05	<0.0002	<0.05	<0.05
MW-5	4/22/97	<0.10	<0.20	<0.02	<0.05	-	-	<0.10	<0.001	<0.10	<0.01
MW-6	4/22/97	<0.10	0.3	<0.02	<0.05	-	-	0.1	<0.001	<0.10	<0.01
MW-7	8/19/97	<0.10	<0.20	<0.02	0.35	-	-	<0.10	<0.001	<0.10	<0.05
	8/25/97	-	-	-	0.39	-	-	-	-	-	-
	1/21/99	<0.10	<1.0	<0.01	0.31	-	-	<0.05	<0.0002	<0.05	<0.05
	11/18/99	-	-	-	0.38	-	-	-	-	-	-
MW-7A	10/22/97	<0.10	<0.20	<0.02	0.06	-	-	<0.10	<0.001	<0.10	<0.01
	1/21/99	<0.10	<1.0	<0.01	0.06	-	-	<0.05	<0.0002	<0.05	<0.05
MW-8	8/20/97	<0.10	<0.20	<0.02	5.2	-	-	<0.10	<0.001	0.5	<0.01
	9/16/97	-	-	-	5.4	6.46	0	-	-	0.2	-
	10/28/97	-	-	-	4.6	3.31	0	-	-	-	-
	1/22/99	<0.10	<1.0	0.01	4.4	-	-	<0.05	<0.0002	<0.05	0.17
	11/18/99	-	-	-	6.1	-	-	-	-	-	-
MW-8A	10/28/97	<0.10	<0.20	<0.02	2.3	-	-	<0.10	<0.001	0.1	<0.01
	1/22/99	<0.10	<1.0	0.02	2.9	-	-	<0.05	<0.0002	0.2	0.19

Note: All analysis performed by Trace Analysis, Inc., Lubbock, Texas
1. mg/L: Denotes analyte concentration in milligrams per liter
2. <: Denotes analyte concentration below test method detection limit
3. -: No data available

Table 3: (continued) Summary of Dissolved Metals Analysis of Groundwater Samples from Monitor Wells and Water Wells
Texaco Exploration and Production, Inc., Eunice #2 (North) Gas Plant
Lea County, New Mexico

Well No	Sample Date	Arsenic (mg/L)	Barium (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Chromium +6 (mg/L)	Chromium +3 (mg/L)	Lead (mg/L)	Mercury (mg/L)	Selenium (mg/L)	Silver (mg/L)
MW-9	8/20/97	<0.10	<0.20	<0.02	0.26	-	-	<0.10	<0.001	<0.10	<0.01
	9/16/97	-	-	-	0.16	-	-	-	-	-	-
	1/21/99	<0.10	<1.0	<0.01	0.06	-	-	<0.05	<0.0002	<0.05	<0.05
	11/18/99	-	-	-	0.33	-	-	-	-	-	-
MW-9A	10/23/97	<0.10	<0.20	<0.02	1.5	-	-	<0.10	<0.001	0.1	<0.01
	1/21/99	<0.10	<1.0	<0.01	1.0	-	-	<0.05	<0.0002	<0.05	<0.05
MW-10	9/16/97	<0.10	<0.20	0.03	0.14	-	-	<0.10	<0.001	<0.10	0.13
	1/19/99	<0.10	<1.0	<0.01	0.37	-	-	<0.05	<0.0002	<0.05	<0.05
	11/18/99	-	-	-	0.32	-	-	-	-	-	-
MW-11	1/20/99	<0.10	<1.0	<0.01	4.6	-	-	<0.05	<0.0002	<0.05	<0.05
	11/18/99	-	-	-	6.2	-	-	-	-	-	-
MW-11A	10/23/97	<0.10	<0.20	<0.02	<0.05	-	-	<0.10	<0.001	<0.10	<0.01
	1/20/99	<0.10	<1.0	<0.01	<0.05	-	-	<0.05	<0.0002	<0.05	<0.05
MW-12	2/19/99	-	-	-	3.0	-	-	-	-	-	-
	11/18/99	-	-	-	3.0	-	-	-	-	-	-
MW-12A	11/4/97	<0.10	<0.20	<0.02	<0.05	-	-	<0.10	<0.001	<0.10	<0.01
MW-13	12/4/97	<0.10	<0.20	<0.02	0.16	-	-	<0.10	<0.001	<0.10	<0.01
	1/19/99	<0.10	<1.0	<0.01	0.16	-	-	<0.05	<0.0002	<0.05	<0.05
	11/18/99	-	-	-	0.09	-	-	-	-	-	-
MW-13A	10/28/97	<0.10	<0.20	<0.02	<0.05	-	-	<0.10	<0.001	<0.10	<0.01
	1/20/99	<0.10	<1.0	<0.01	<0.05	-	-	<0.05	<0.0002	<0.05	<0.05
MW-14	5/19/99	<0.10	<0.10	<0.02	1.0	-	-	<0.10	<0.0002	<0.10	<0.05
	11/18/99	-	-	-	0.92	-	-	-	-	-	-
MW-14A	11/4/97	<0.10	<0.20	<0.02	<0.05	-	-	<0.10	<0.001	<0.10	<0.01
MW-15	1/19/99	<0.10	<1.0	<0.01	0.07	-	-	<0.05	<0.0002	0.08	<0.05
	5/19/99	-	-	-	<0.05	-	-	-	-	-	-
	11/17/99	-	-	-	<0.05	-	-	-	-	-	-
MW-15A	11/4/97	<0.10	<0.20	<0.02	<0.05	-	-	<0.10	<0.001	<0.10	<0.01
	1/19/99	<0.10	<1.0	<0.01	<0.05	-	-	<0.05	<0.0002	<0.05	<0.05
MW-16A	11/7/97	<0.10	<0.20	<0.02	<0.05	-	-	<0.10	<0.001	<0.10	<0.01
MW-17A	11/10/97	<0.10	<0.20	<0.02	<0.05	-	-	<0.10	<0.001	<0.10	<0.01

Note: All analysis performed by Trace Analysis, Inc., Lubbock, Texas
1. mg/L: Denotes analyte concentration in milligrams per liter
2. <: Denotes analyte concentration below test method detection limit
3. -: No data available

Table 3: (continued) Summary of Dissolved Metals Analysis of Groundwater Samples from Monitor Wells and Water Wells
Texaco Exploration and Production, Inc., Eunice #2 (North) Gas Plant
Lea County, New Mexico

Well No	Sample Date	Arsenic (mg/L)	Barium (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Chromium +6 (mg/L)	Chromium +3 (mg/L)	Lead (mg/L)	Mercury (mg/L)	Selenium (mg/L)	Silver (mg/L)
MW-18	5/19/99	<0.10	<0.10	<0.02	<0.05	-	-	<0.10	0.0067	<0.10	<0.05
	11/17/99	-	-	-	<0.05	-	-	-	-	-	-
MW-18A	11/17/97	<0.10	<0.20	<0.02	<0.05	-	-	<0.10	<0.001	<0.10	<0.01
	1/19/99	<0.1	<1.0	<0.01	<0.05	-	-	<0.05	<0.0002	<0.05	<0.05
MW-19A	11/10/97	<0.10	<0.20	<0.02	<0.05	-	-	<0.10	<0.001	<0.10	<0.01
	1/19/99	<0.1	<1.0	<0.01	<0.05	-	-	<0.05	<0.0002	<0.05	<0.05
*MW-19A	1/19/99	<0.01	<0.01	<0.01	<0.05	-	-	<0.05	<0.0002	<0.05	<0.05
MW-20	1/19/99	<0.1	<1.0	<0.01	<0.05	-	-	<0.05	<0.0002	<0.05	<0.05
	11/17/99	-	-	-	<0.05	-	-	-	-	-	-
MW-20A	1/19/99	<0.1	<1.0	<0.01	<0.05	-	-	<0.05	<0.0002	<0.05	<0.05
MW-21	1/18/99	<0.10	<0.10	<0.01	<0.05	-	-	<0.05	<0.0002	<0.05	<0.05
	11/17/99	-	-	-	<0.05	-	-	-	-	-	-
MW-21A	1/18/99	<0.10	0.13	<0.01	0.05	-	-	<0.05	<0.0002	<0.05	<0.05
	1/20/99	-	-	-	<0.05	-	-	-	-	-	-
MW-22A	1/21/99	<0.10	<1.0	<0.01	0.13	-	-	<0.05	<0.0002	<0.05	<0.05
MW-23	5/23/99	-	-	-	2.0	-	-	-	-	-	-
	11/18/99	-	-	-	2.56	-	-	-	-	-	-
	1/7/00	-	-	-	2.8	-	-	-	-	-	-
MW-24A	5/23/99	-	-	-	0.03	-	-	-	-	-	-
MW-25	5/19/99	<0.10	<0.10	<0.02	4.5	-	-	<0.10	<0.0002	<0.10	<0.05
	11/18/99	-	-	-	4.4	-	-	-	-	-	-
*MW-25	11/18/99	-	-	-	4.7	-	-	-	-	-	-
MW-26	11/17/99	-	-	-	<0.05	-	-	-	-	-	-
MW-27	11/18/99	-	-	-	<0.05	-	-	-	-	-	-
MW-28	11/18/99	-	-	-	<0.05	-	-	-	-	-	-
MW-29	11/18/99	-	-	-	<0.05	-	-	-	-	-	-
WW-1	6/14/96	<0.10	<0.20	<0.02	0.66	-	-	<0.10	<0.001	<0.1	<0.01
	8/1/96	-	-	-	0.82	-	-	-	-	-	-
	4/23/97	<0.10	<0.20	<0.02	0.52	-	-	<0.10	<0.001	<0.10	<0.01
	1/20/99	<0.10	<1.0	<0.01	0.69	-	-	<0.05	<0.0002	<0.05	<0.05

Note: All analysis performed by Trace Analysis, Inc., Lubbock, Texas
1. mg/L: Denotes analyte concentration in milligrams per liter
2. <: Denotes analyte concentration below test method detection limit
3. -: No data available

Table 3: (continued) Summary of Dissolved Metals Analysis of Groundwater Samples from Monitor Wells and Water Wells
 Texaco Exploration and Production, Inc., Eunice #2 (North) Gas Plant
 Lea County, New Mexico

Well No	Sample Date	Arsenic (mg/L)	Barium (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Chromium +6 (mg/L)	Chromium +3 (mg/L)	Lead (mg/L)	Mercury (mg/L)	Selenium (mg/L)	Silver (mg/L)
Lord Water Well	9/29/97	<0.10	<0.10	<0.02	0.59	-	-	<0.10	<0.001	<0.10	<0.05
	1/19/99	<0.10	<1.0	<0.01	0.52	-	-	<0.05	<0.0002	0.11	<0.05
Roland Water Well	9/29/87	<0.10	<0.10	<0.02	0.16	-	-	<0.10	<0.001	<0.10	<0.05
	1/19/99	<0.1	<1.0	<0.01	<0.05	-	-	<0.05	<0.0002	<0.05	<0.05
RW-1	2/17/99	-	-	-	1.3	-	-	-	-	-	-
	2/18/99	-	-	-	1.4	-	-	-	-	-	-
	2/18/99	-	-	-	1.4	-	-	-	-	-	-

Note:

- All analysis performed by Trace Analysis, Inc., Lubbock, Texas
1. mg/L: Denotes analyte concentration in milligrams per liter
 2. <: Denotes analyte concentration below test method detection limit
 3. -: No data available

Table 4: Summary of General Chemistry Analysis of Groundwater Samples from Monitor Wells and Water Wells, Texaco Exploration and Production, Inc., Eunice #2 (North) Gas Plant, Lea County, New Mexico

Well No.	Sample Date	Potassium (mg/L)	Magnesium (mg/L)	Calcium (mg/L)	Sodium (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Sulfate (mg/L)	Alkalinity (mg/L)	Nitrate (mg/L)	TDS (mg/L)
MW-1	4/23/97	-	-	-	-	200	-	-	-	-	2000
	1/20/99	9.2	74	238	468	370	3.7	860	460	10	2400
	11/17/99	12	72	251	421	250	2.6	850	482	12	2200
*MW-1	1/20/99	7.6	63	265	454	350	3.1	820	510	7.1	2200
	11/17/99	9	68	149	201	350	2.9	300	248	5.1	1270
MW-2	4/22/97	-	-	-	-	350	-	-	-	-	1200
	1/20/99	8.6	61	135	157	350	3.1	230	190	8.2	1100
	11/17/99	9.7	80	170	183	470	2.6	260	200	24	1400
MW-3	4/22/97	-	-	-	-	430	-	-	-	-	2000
MW-4	4/23/97	-	-	-	-	290	-	-	-	-	1600
	1/21/99	12	49	191	357	310	3.5	450	460	1.9	1600
	11/18/99	13	84	296	384	620	2.8	710	366	4.6	2600
*MW-4	1/21/99	12	49	198	362	320	3.2	450	470	1.9	1600
MW-4A	10/23/97	-	-	-	-	170	-	-	-	-	790
	1/21/99	10	40	74	124	240	3.9	180	180	1.7	830
MW-5	4/22/97	-	-	-	-	800	-	-	-	-	2800
MW-6	4/22/97	-	-	-	-	1500	-	-	-	-	3200
MW-7	8/19/97	-	-	-	-	550	-	-	-	-	2600
	1/21/99	13	71	288	530	550	2.8	850	240	4.7	2500
	11/18/99	11	94	309	442	520	2.6	1200	240	6.9	2700
MW-7A	10/22/97	-	-	-	-	260	-	-	-	-	1200
	1/21/99	12	38	84	174	190	3.7	260	180	1.8	920
MW-8	1/22/99	20	111	438	633	960	4.4	1500	160	10	3800
	11/18/99	22	155	626	685	1100	4.0	1600	164	10	4500
MW-8A	10/28/97	-	-	-	-	13	-	-	-	-	3700
	1/22/99	22	215	397	630	1000	3.3	1700	130	11	3200
MW-9	1/21/99	13	81	316	257	410	3.6	700	240	5.5	2000
	11/18/99	13	110	347	353	490	3.2	1200	278	6.8	2700
MW-9A	10/23/97	-	-	-	-	910	-	-	-	-	3600
	1/21/99	21	148	319	542	780	3.0	950	220	7.0	2930
MW-10	9/16/97	-	-	-	-	520	-	-	-	-	2400
	1/19/99	17	167	490	460	1100	2.6	1000	170	7.1	3100
	11/18/99	17	192	528	484	1100	3.0	1200	178	6.6	3800
MW-11	1/20/99	31	105	516	600	990	3.8	1200	300	10	3600
	11/18/99	22	159	689	678	1200	5.4	1600	150	10	4600
MW-11A	10/23/97	-	-	-	-	210	-	-	-	-	940
	1/20/99	10	47	78	139	170	3.5	280	160	4.9	930
MW-12	2/19/99	23	128	465	517	850	5.1	1400	127	9.0	3500
	11/18/99	34	134	496	518	820	4.7	1400	122	8.1	4300
*MW-12	11/18/99	15	142	364	412	760	1.6	970	164	9.6	2900
MW-12A	11/4/97	-	-	-	-	74	-	-	-	-	480
MW-13	12/4/97	-	-	-	-	1100	-	-	-	-	4000
	1/19/99	20	146	513	739	1100	2.7	1400	290	6.5	4000
	11/18/99	17	142	495	678	1200	2.3	1400	372	5.7	4500

Note: All analysis performed by Trace Analysis, Inc., Lubbock, Texas

1. mg/L: Denotes analyte concentration in milligrams per liter
2. <: Denotes analyte concentration below test method detection limit
3. -: No Data Available
4. *: Denotes duplicate sample

Table 4: (continued) Summary of General Chemistry Analysis of Groundwater Samples from Monitor Wells and Water Wells, Texaco Exploration and Production, Inc., Eunice #2 (North) Gas Plant, Lea County, New Mexico

Well No.	Sample Date	Potassium (mg/L)	Magnesium (mg/L)	Calcium (mg/L)	Sodium (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Sulfate (mg/L)	Alkalinity (mg/L)	Nitrate (mg/L)	TDS (mg/L)
MW-13A	10/29/97	-	-	-	-	26	-	-	-	-	520
	1/20/99	5.4	24	43	102	57	4.2	100	210	4.6	530
MW-14	5/19/99	28	125	407	978	1700	-	670	334	9.9	4400
	11/18/99	32	98	321	1179	2000	3.1	760	452	13	4600
MW-14A	11/4/97	-	-	-	-	97	-	-	-	-	510
MW-15	1/19/99	52	81	265	695	1400	2.4	410	180	6.5	3000
	11/17/99	20	201	456	1253	3100	2.6	620	278	6.9	5900
MW-15A	11/4/97	-	-	-	-	230	-	-	-	-	650
	1/19/99	14	26	46	140	140	3.8	97	210	4.6	630
MW-16A	11/7/97	-	-	-	-	210	-	-	-	-	950
MW-17A	11/10/97	-	-	-	-	120	-	-	-	-	570
MW-18	5/19/99	15	60	161	206	420		290	239	5.0	1300
	11/17/99	8.7	62	140	189	370	2.9	300	246	5.1	1300
MW-18A	11/07/97	-	-	-	-	360	-	-	-	-	1500
	1/19/99	12	76	140	196	390	2.9	450	170	6.0	1400
MW-19A	11/10/97	-	-	-	-	480	-	-	-	-	1500
	1/19/99	12	86	156	236	520	3.0	340	200	4.9	1500
*MW-19A	1/19/99	12	89	165	217	500	3.0	330	210	5.0	1500
MW-20	1/19/99	11	70	165	243	570	2.7	270	230	4.5	1680
	11/17/99	12	81	166	282	570	2.6	320	250	3.7	1600
MW-20A	1/19/99	11	55	106	122	250	3.1	260	150	5.1	1000
MW-21	1/18/99	14	58	147	776	740	3.1	660	629	4.4	2700
	11/17/99	16	57	142	876	780	2.7	820	666	3.6	3100
MW-21A	1/18/99	107	292	656	2590	7000	2.0	460	130	4.8	9200
MW-22A	1/21/99	49	52	119	206	350	2.8	270	170	2.0	1200
MW-23	6/23/99	16	133	361	638	910	2.8	1300	222	7.6	3500
	11/18/99	18	168	435	693	1100	3.1	1400	222	8.1	4100
MW-24A	6/23/99	7.1	35	59	95	140	3.7	140	180	3.8	680
MW-25	5/19/99	20	129	342	393	800	-	770	203	6.8	2600
	11/18/99	15	141	358	399	760	1.7	940	210	9.5	2800
MW-26	11/17/99	12	86	242	163	500	2.1	420	174	3.8	1500
MW-27	11/18/99	8.8	44	147	106	240	2.0	220	180	3.6	960
MW-28	11/18/99	14	69	238	559	1200	2.1	230	188	3.6	2400
MW-29	11/18/99	7.9	49	159	158	250	2.4	340	182	7.2	1200
RW-1	2/17/99	18	140	434	644	910	3.2	1400	219	6.9	3600
	2/18/99	13	140	415	602	920	3.3	1400	221	6.9	3700
	2/18/99	13	142	411	598	1000	3.2	1300	214	7.0	3700
WW-1	6/14/96	12.4	142	268	393	782	2.6	-	340	10.4	-
	4/23/97	-	-	-	-	800	-	-	-	-	2600
	1/20/99	15	164	294	436	900	3.7	740	320	11	2800
Lord Water Well	9/29/97	-	-	-	-	480	-	-	-	-	2200
	1/19/99	18	162	390	502	800	2.7	1300	200	8.9	3100

Note:

All analysis performed by Trace Analysis, Inc., Lubbock, Texas

1. mg/L: Denotes analyte concentration in milligrams per liter
2. <: Denotes analyte concentration below test method detection limit
3. -: No Data Available
4. *: Denotes duplicate sample

Table 4: (continued) Summary of General Chemistry Analysis of Groundwater Samples from Monitor Wells and Water Wells, Texaco Exploration and Production, Inc., Eunice #2 (North) Gas Plant, Lea County, New Mexico

Well No.	Sample Date	Potassium (mg/L)	Magnesium (mg/L)	Calcium (mg/L)	Sodium (mg/L)	Chloride (mg/L)	Fluoride (mg/L)	Sulfate (mg/L)	Alkalinity (mg/L)	Nitrate (mg/L)	TDS (mg/L)
Roland Water Well	9/29/97	-	-	-	-	1100	-	-	-	-	2700
	1/19/99	14	97	243	392	920	3.7	460	240	10	2300

Note: All analysis performed by Trace Analysis, Inc., Lubbock, Texas

1. mg/L: Denotes analyte concentration in milligrams per liter
2. <: Denotes analyte concentration below test method detection limit
3. -: No Data Available
4. *: Denotes duplicate sample

FIGURES

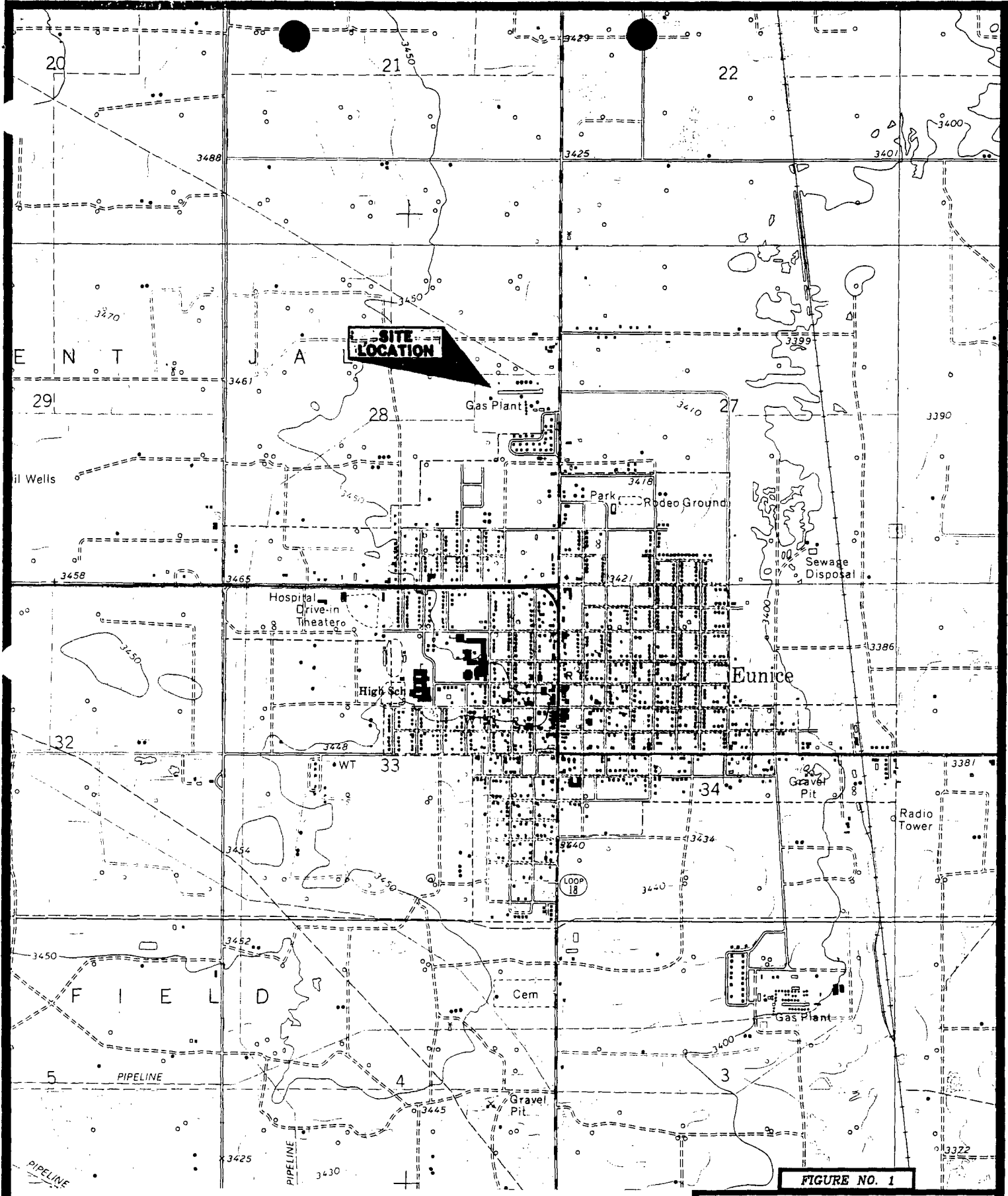


FIGURE NO. 1

LEA COUNTY, NEW MEXICO

TEXACO
EXPLORATION AND PRODUCTION

TOPOGRAPHIC
MAP

HIGHLANDER ENVIRONMENTAL
MIDLAND, TEXAS

TAKEN FROM U.S.G.S.
EUNICE, NEW MEXICO
7.5' QUADRANGLE

SCALE: 1"=2,000'

MW-4A MONITORING WELL LOCATION (DEEP)

BH-1 SOIL BORING LOCATION

WW-1 WATER WELL LOCATION

RW-1 RECOVERY (TEST) WELL LOCATION

339.00 CONTOUR OF GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION, FEET AMSL, 11/16/99

GROUNDWATER FLOW DIRECTION

FIGURE NO. 5

IEA COUNTY, NEW MEXICO

TEXACO

EXPLORATION & PRODUCTION IN

EUNICE #2 (NORTH) GAS PL

GROUNDWATER POTENTIOMETRIC

SURFACE MAP (SHALLOW), 11/16/99

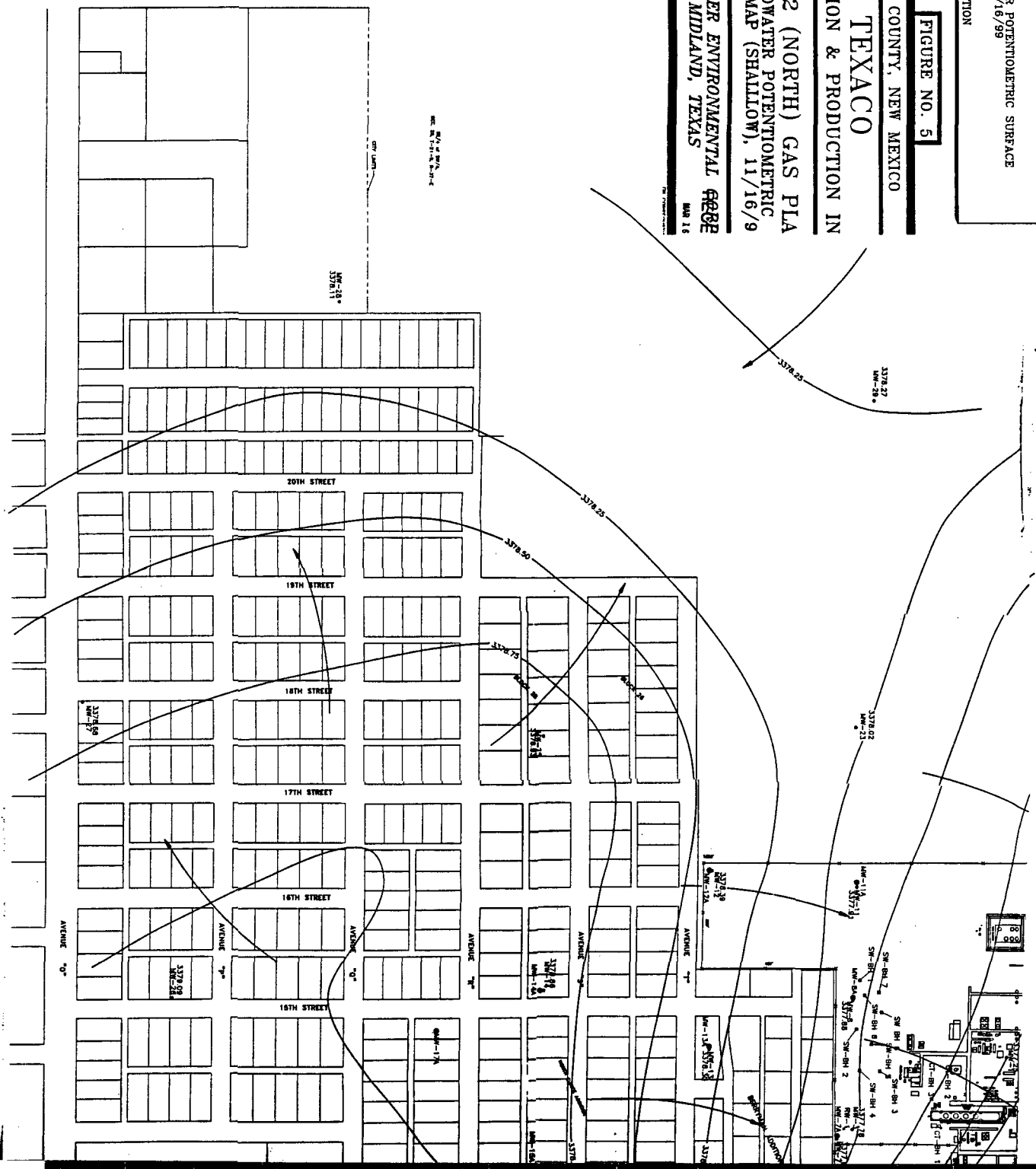
HIGHLANDER ENVIRONMENTAL

MAR 16

NOTE:
CT: COOLING TOWER AREA
SW: SOUTHWEST AREA
* GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION CORRECTED FOR PSR

GRAPHIC SCALE IN FEET
Original Plotting at Scale: 1"=200'

DATE: 01/11/00
DWN. BY: JDA
FILE: C:\87\NORTH\GF5-S-12-99



Project No: 787

Well ID: MW-27

Project: Eunice # 2 (North) Gas Plant

Client: Texaco Exploration and Production Inc.

Enclosure: 1 of 1

Location: Lea County, New Mexico

Engineer: MJL

SUBSURFACE PROFILE				Well Construction	Remarks
Depth	Symbol	Description	Depth/Elev.		
0		Ground Surface	3443.72		
		<i>Silty Sand</i> 5YR 5/6 to 5/8, yellowish red, very fine to fine grained quartz sand, poorly sorted, round	3439.72		Below-Grade Cover and Water-Tight Locking Cap
		<i>Caliche</i> 7.5YR 7/3 to 7/4, pink, indurated to interbedded with fine grained quartz sand, poorly sorted	3436.72		
		<i>Sandstone</i> 7.5YR 7/3 to 7/4, pink, very fine to fine grained quartz sand, moderately well cemented, poorly sorted			
20				4" Sch. 40 PVC Riser (Threaded)	
			3411.72	Cement/Bentonite Grout	
40		<i>Silty-Clayey Sand</i> 7.5YR 6/3 to 6/4, light brown, very fine to fine grained quartz sand, round, poorly to moderately sorted		Bentonite Chips	
60				8-16 Silica Sand	
				4" Sch. 40 PVC Screen, 0.02" Slot	
			3379.72	Depth-to-Water: 65.04 Feet BGS (11/16/99)	
		<i>Sand</i> 5YR 5/6 to 4/6, yellowish red, very fine to fine grained quartz sand, round, poorly sorted, soft	3372.22	4" Sch. 40 PVC Cap (Threaded)	
		TD: 71.5'			
80					

Drilled By: Scarborough Drilling, Inc.

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

Hole Size: 7 7/8"

Drill Method: Rotary (Water)

Datum: Mean Sea Level

Drill Date: 27-Oct-99

Sheet: 1 of 1

Project No: 787

Well ID: MW-28

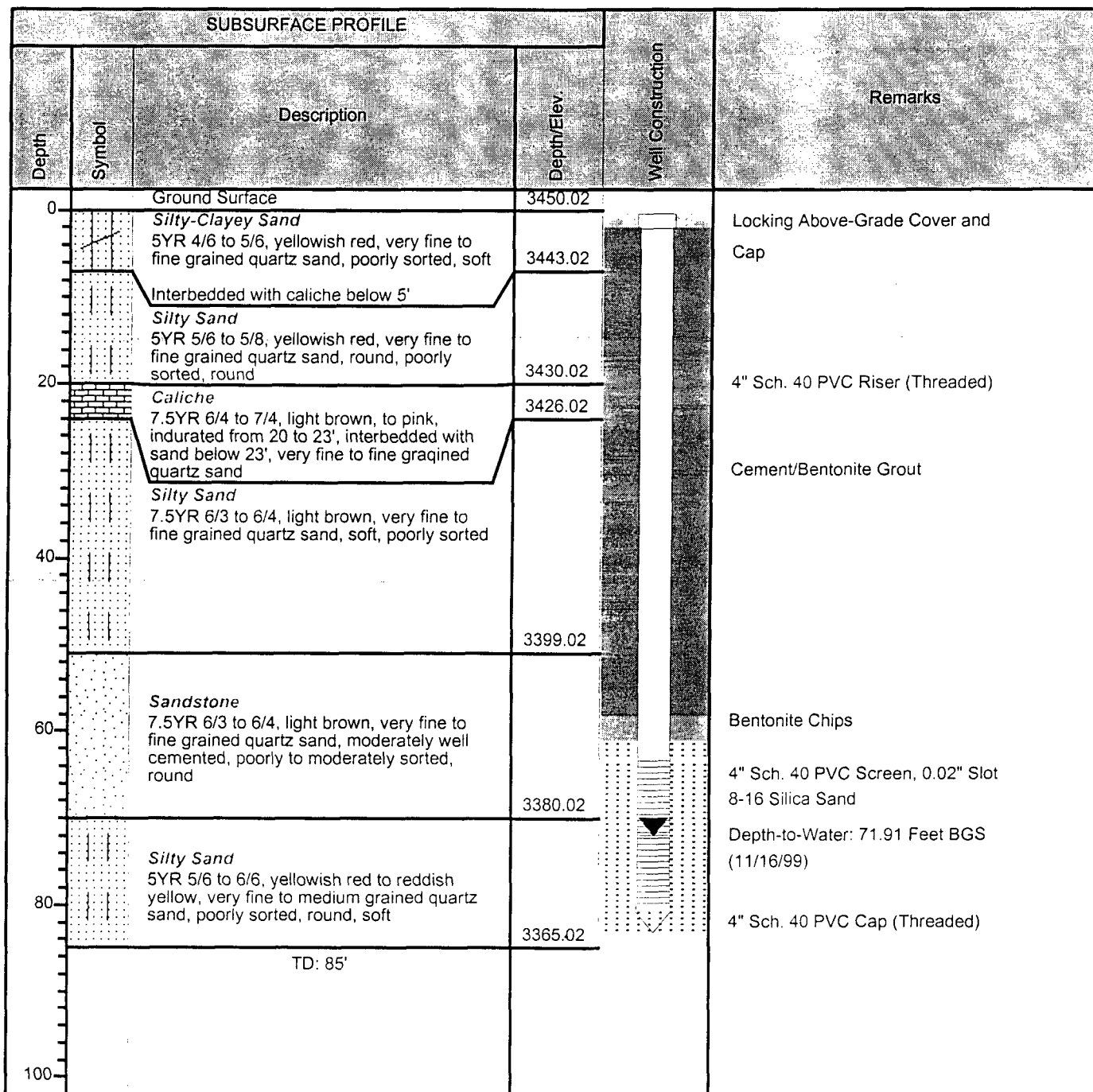
Project: Eunice # 2 (North) Gas Plant

Client: Texaco Exploration and Production Inc.

Enclosure: 1 of 1

Location: Lea County, New Mexico

Engineer: MJL



Drilled By: Scarborough Drilling, Inc.

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

Hole Size: 7 7/8"

Drill Method: Rotary (Water)

Datum: Mean Sea Level

Drill Date: 02-Nov-99

Sheet: 1 of 1

Project No: 787

Well ID: MW-29

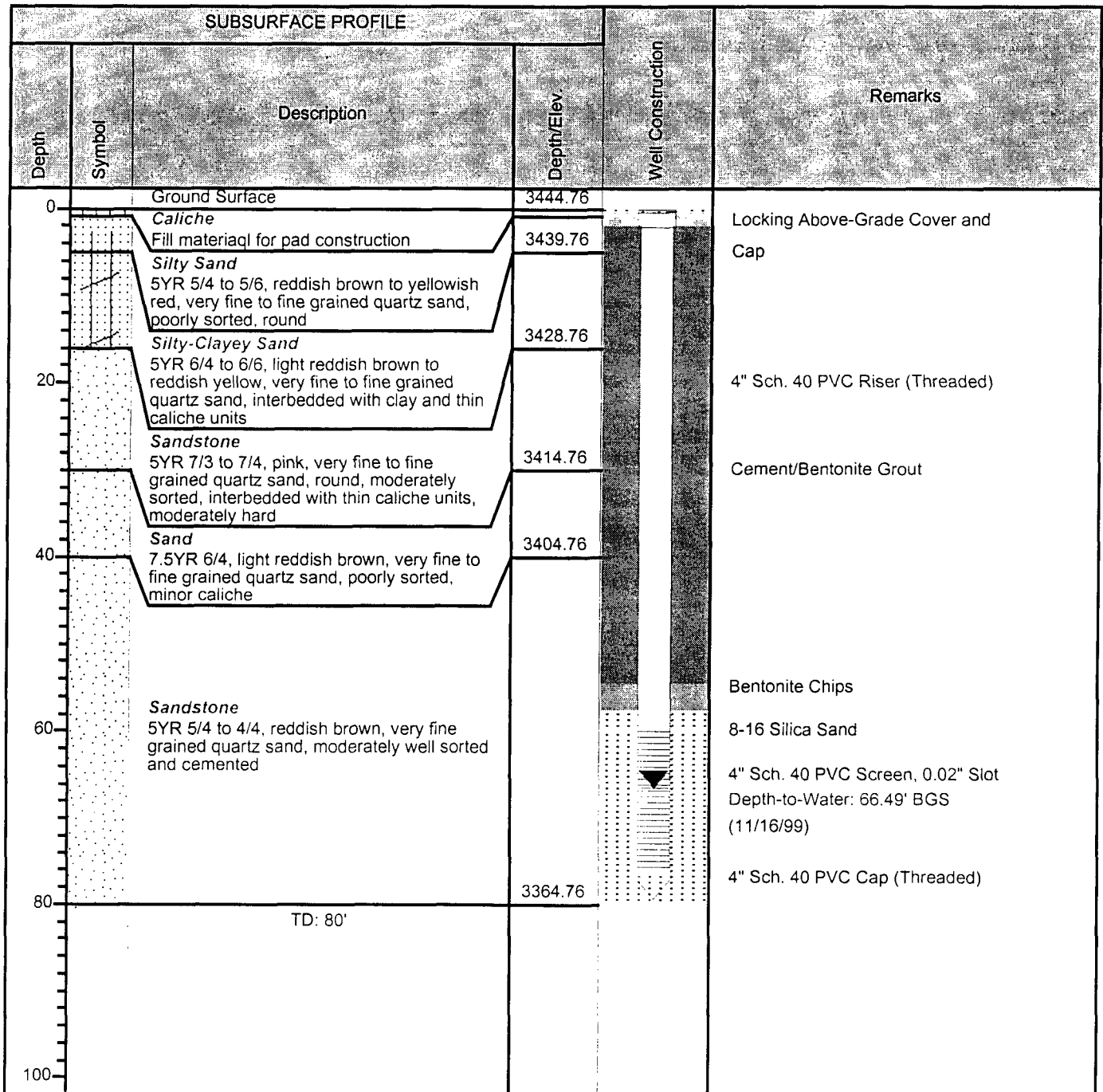
Project: Eunice # 2 (North) Gas Plant

Client: Texaco Exploration and Production Inc.

Enclosure: 1 of 1

Location: Lea County, New Mexico

Engineer: MJL



Drilled By: Scarborough Drilling, Inc.

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

Hole Size: 7 7/8"

Drill Method: Rotary (Water)

Datum: Mean Sea Level

Drill Date: 11-Nov-99

Sheet: 1 of 1

MW-4A MONITORING WELL LOCATION (DEEP)

BH-1 SOIL BORING LOCATION

WW-1 WATER WELL LOCATION

RW-1 RECOVERY (TEST) WELL LOCATION

3379.00 CONTOUR OF GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION, FEET AMSL, 11/16/98

GROUNDWATER FLOW DIRECTION

FIGURE NO. 5

LEA COUNTY, NEW MEXICO

TEXACO

EXPLORATION & PRODUCTION IN

EUNICE #2 (NORTH) GAS PLANT

GROUNDWATER POTENTIOMETRIC SURFACE MAP (SHALLOW), 11/16/98

HIGHLANDER ENVIRONMENTAL SERVICES, INC.

MAP 16

NOTE:
CT. COOLING TOWER AREA
SW. SOUTHWEST AREA
* GROUNDWATER POTENTIOMETRIC SURFACE ELEVATION CORRECTED FOR PSH

GRAPHIC SCALE IN FEET



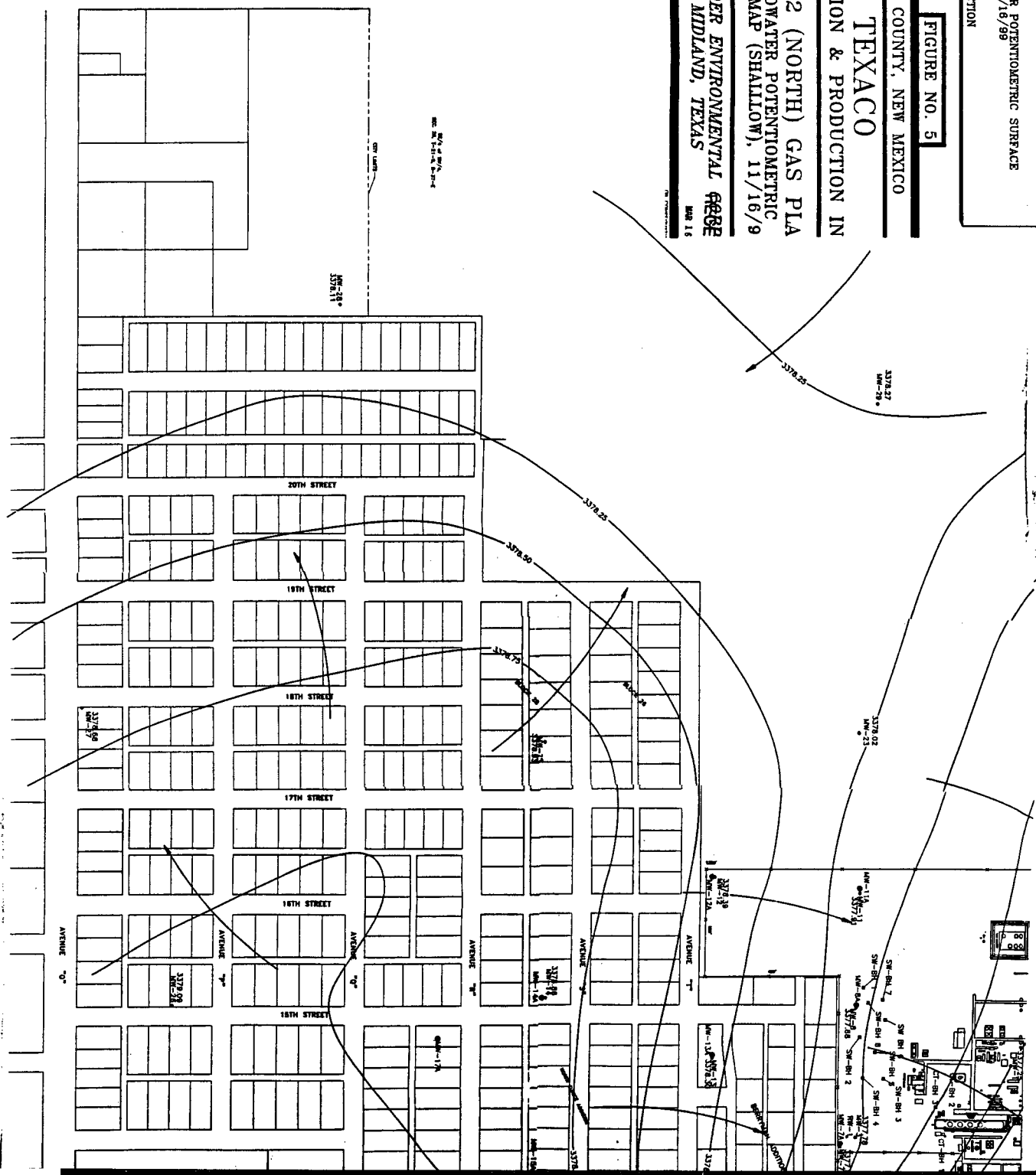
Original Printed at Scale: 1"=200'

DATE: 01/11/00

DRAWN BY: JDA

CHECKED BY: JDA

DATE: 01/11/00



[illegible]

- MW-4A
 ● MONITORING WELL LOCATION (DEEP)
 BH-1
 □ SOIL BORING LOCATION
 WW-1
 △ WATER WELL LOCATION
 RW-1
 ▲ RECOVERY (TEST) WELL LOCATION
 3379.00
 ○ CONTOUR OF GROUNDWATER POTENTIOMETRIC SURFACE
 ELEVATION, FEET AMSL, 11/16/99
 — GROUNDWATER FLOW DIRECTION

FIGURE NO. 5

LEA COUNTY, NEW MEXICO

TEXACO

EXPLORATION & PRODUCTION IN

EUNICE #2 (NORTH) GAS PL

GROUNDWATER POTENTIOMETRIC

SURFACE MAP (SHALLOW), 11/16/99

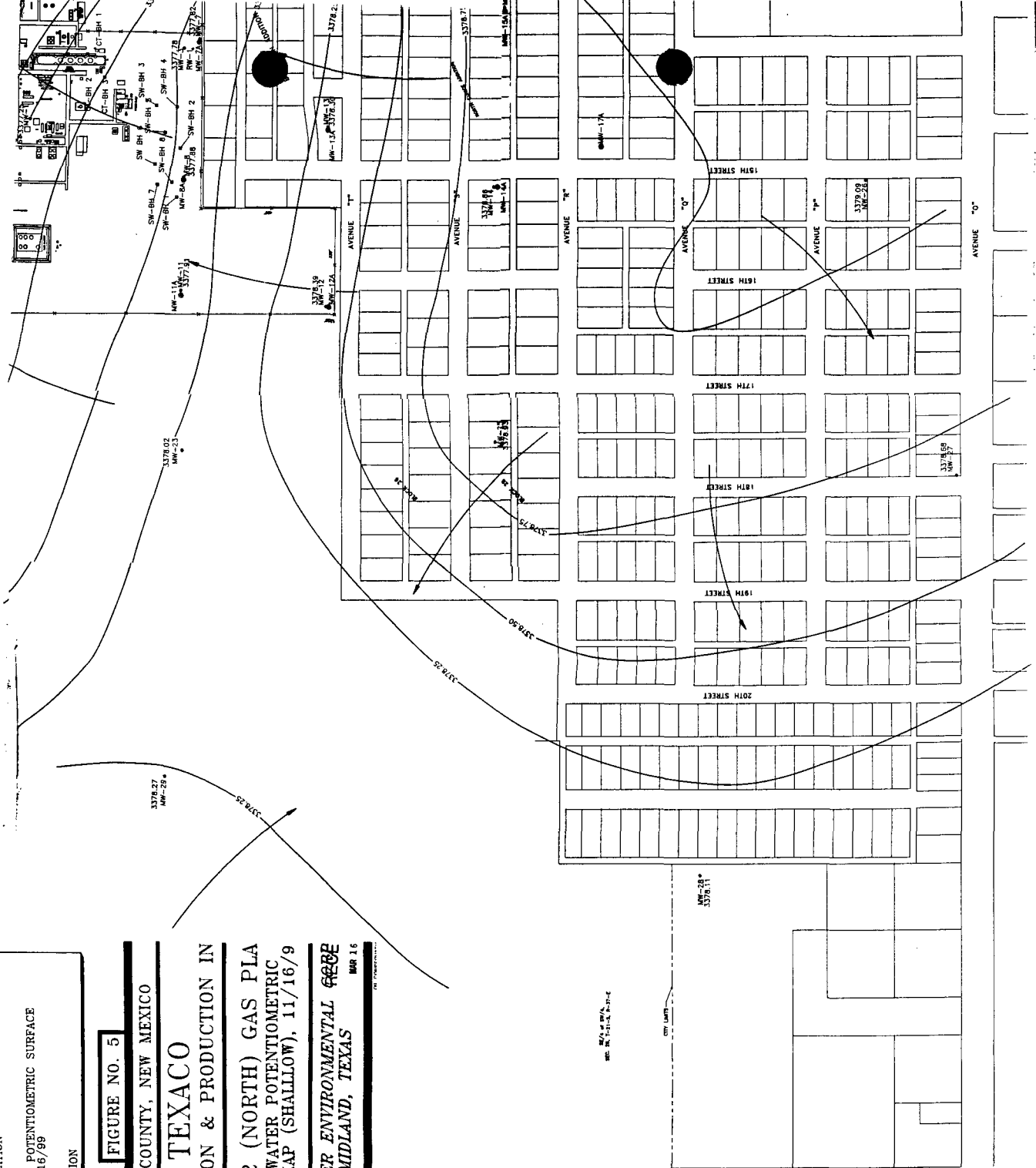
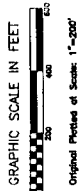
HIGHLANDER ENVIRONMENTAL

MIDLAND, TEXAS

MAR 16

NOTE:
 CT: COOLING TOWER AREA
 SW: SOUTHWEST AREA
 * : GROUNDWATER POTENTIOMETRIC
 SURFACE ELEVATION CORRECTED
 FOR PSR

DATE: 01/11/00
 DWN. BY: JDA
 FILE: C:\97\NORTH\GPS-S-12-99



MW-4A



MONITORING WELL LOCATION (DEEP)

BH-1



SOIL BORING LOCATION

WW-1



WATER WELL LOCATION

RW-1



RECOVERY (TEST) WELL LOCATION

3379.00

CONTOUR OF GROUNDWATER POTENTIOMETRIC SURFACE
ELEVATION, FEET AMSL, 11/16/99



GROUNDWATER FLOW DIRECTION

FIGURE NO. 5

LEA COUNTY, NEW MEXICO

TEXACO

EXPLORATION & PRODUCTION IN

EUNICE #2 (NORTH) GAS PL

GROUNDWATER POTENTIOMETRIC
SURFACE MAP (SHALLOW), 11/16/99

HIGHLANDER ENVIRONMENTAL CORP
MIDLAND, TEXAS

MAR 16

NOTE:

CT: COOLING TOWER AREA

SW: SOUTHWEST AREA

* : GROUNDWATER POTENTIOMETRIC
SURFACE ELEVATION CORRECTED
FOR PSH

GRAPHIC SCALE IN FEET



Original Plotted at Scale: 1"=200'

DATE:

01/11/00

DWN. BY:

JDA

FILE:

C:\787\NORTH\
GPS-S-12-99

3378.27
MW-29

3378.02
MW-23

MW-11A
MW-11
3377.9

SW-BH 7
SW-BH 6
SW-BH 5
SW-BH 4
SW-BH 3
SW-BH 2
SW-BH 1
CT-BH 3
CT-BH 2
CT-BH 1
3377.78
MW-8
RW-1
MW-7A
MW-7
3377.82
3378.22

3378.39
MW-12
MW-12A

MW-13A
MW-13
3378.30

AVENUE "T"

AVENUE "S"

AVENUE "R"

AVENUE "Q"

AVENUE "P"

AVENUE "O"

SE 1/4 of SW 1/4,
SEC. 26, T-21-S, R-37-E

CITY LIMITS

MW-28
3378.11

20TH STREET

19TH STREET

18TH STREET

17TH STREET

16TH STREET

15TH STREET

3378.68
MW-27

3379.09
MW-26

MW-17A

MW-15A
MW-15

BERRYMAN ADDITION

NORTH QUINCE ADDITION

3378.25

3378.25

3378.50

3378.75

3378.71

3379.00