AP - 017

STAGE 1 & 2 REPORTS

DATE: March 9, 1999

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OIL CONSERVATION DIVISION

SUBSURFACE INVESTIGATION REPORT

MONITORING WELLS MW-1 THROUGH MW-3 AND SOIL BORING SB-1

TEXAS - NEW MEXICO PIPE LINE COMPANY
TNM-97-17
UNIT L, SECTION 21, TOWNSHIP 20 SOUTH, RANGE 37 EAST
LEA COUNTY, NEW MEXICO

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TEXAS - NEW MEXICO PIPE LINE COMPANY
TNM-97-17
UNIT L, SECTION 21, TOWNSHIP 20 SOUTH, RANGE 37 EAST
LEA COUNTY, NEW MEXICO

PREPARED FOR:

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Monica Slentz
Project Manager

Theresa Nix
Project Manager

KEI Job No. 810051-1

March 9, 1999

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PURPOSE AND SCOPE

The Texas - New Mexico Pipe Line Company (TNMPL) release TNM-97-17 occurred on August 13, 1997, from a 16-inch crude oil pipeline. The purpose of the subsurface investigation was to determine the horizontal and vertical extent of hydrocarbon impact within the stained area. The scope consisted of installing 3 monitoring wells and 1 soil boring at selected locations. The release site is located in Unit L, Section 21, Township 20 South, Range 37 East in Lea County, New Mexico. A site location map is provided as FIG. 1.

SITE CONDITIONS

Prior to the start of the investigation, minor excavation of impacted soils along the TNMPL 16-inch crude oil pipeline had taken place to facilitate pipeline repairs at the apparent release point. The site consisted of 2 open excavations with several areas of stockpiled soil. Approximate excavation details are presented below.

EXCAVATION DIMENSIONS (length, width, depth)	VOLUME OF EXCAVATED SOIL (with 30% expansion factor)
165 feet long, 12 feet wide, 9 feet deep	858 yd^3
58 feet long, 12 feet wide, 9 feet deep	302 yd^3
Total:	1160 yd^3

SOIL INVESTIGATION

During the subsurface investigation, 3 monitoring wells (designated MW-1 through MW-3) and 1 soil boring (designated SB-1) were installed utilizing air rotary drilling. Soil samples were collected at selected intervals from the ground surface to the bottom of each boring. The soils were classified in the field, soil samples were field screened, and selected samples were prepared and shipped to the laboratory for analysis.

Upon advancement to total depth and collection of soil samples, a monitoring well consisting of 2-inch slotted PVC and blank riser was placed in the open hole of each monitoring well. The soil boring and monitoring well locations were surveyed by a Professional Land Surveyor registered in the State of New Mexico and are presented on FIG. 2. Upon completion of sampling activities, the soil boring was backfilled to the ground surface with cement/bentonite grout.

SOIL DESCRIPTION

The subsurface soil profile was classified in general accordance with the Unified Soil Classification System by visually observing the soil samples obtained during the assessment. In general, 3 soil types were encountered. A general description of the soil, approximate thickness, and head-space sample results for each soil type are as follows:

Soil Type I
This soil type consisted of tan sand encountered in soil boring SB-1 and at all monitoring well locations. The sand was fine to medium grained, loose, and moist. The observed thickness of this soil type varied from 2 to 28 feet. Head-space readings from samples of this soil type ranged from below instrument detection limits (ND) to 385 ppm.

Soil Type II
This soil type consisted of grey sand and was encountered in soil boring SB-1 and monitoring wells MW-2 and MW-3. The sand was fine to medium grained, silty to clayey, medium dense to dense, and wet. The observed thickness of this soil type varied from approximately 0.5 to 12 feet. Head-space readings from samples of this soil type ranged from ND to 385 ppm.

Soil Type III
This soil type consisted of light tan sand encountered in monitoring wells MW-1 and MW-2. The sand was silty, very calcareous, medium dense, and dry, with an observed thickness of approximately 1.5 feet. Head-space readings from samples of this soil type were ND.

Logs indicating the typical subsurface soil profile, depths at which soil samples were obtained, head-space results, laboratory results, and generalized geologic profiles are presented on FIGs. 3 through 6.

SOIL SAMPLING AND ANALYTICAL RESULTS

Samples were selected from each soil boring based on the following criteria:

- the sample with the highest PID reading
- the sample directly above the groundwater level measured at the time of drilling

Soil samples selected for analytical testing consisted of the following:

- Six soil samples from the monitoring wells and 2 from the soil boring were tested for benzene, toluene, ethylbenzene, and xylenes (BTEX) and total petroleum hydrocarbons diesel range organics (TPH-DRO)
- One soil sample from monitoring well MW-1 exhibiting the highest concentration of TPH was tested for SPLP volatile organic compounds (VOC), SPLP semi-volatile organic compounds (SVOC), and SPLP TPH
- Laboratory results for the selected samples indicated the following concentration ranges:

CONSTITUENT	CONCENTRATION RANGE
BENZENE	ND to 6.28 mg/kg
BTEX	ND to 72.02 mg/kg
TPH	ND to 6,900 ppm
SPLP SVOC	ND to 0.005 mg/l
SPLP VOC	ND to 0.037 mg/l
SPLP TPH	14.6 ppm

Soil laboratory results are summarized in TABLES I and II. Soil analytical laboratory reports and chain-of-custody documentation are presented in APPENDIX A.

GROUND WATER SAMPLING AND ANALYTICAL RESULTS

Upon completion of drilling, each well was gauged to determine the depth to ground water and checked for the presence of phase-separate hydrocarbon (PSH). The depth to ground water measured in the monitoring wells on January 7, 1999, ranged from 18.19 to 20.10 feet below ground surface. Ground water elevations indicate an approximate gradient of 0.004 ft/ft towards the southeast. Ground water contours are presented on FIG. 7. PSH was not observed on ground water in any of the monitoring wells. Ground water measurements are summarized in TABLE III.

Monitoring wells MW-1 through MW-3 were sampled on November 17, 1998. Each monitoring well was purged of approximately 3 well volumes of water and ground water samples were collected from each monitoring well. Purged water collected during the event was stored in steel drums pending disposal.

Ground water samples were tested for BTEX, polycyclic aromatic hydrocarbon (PAH), ICP heavy metals, major cations/anions, and total dissolved solids (TDS). Laboratory results indicated the following concentration ranges:

CONSTITUENT	CONCENTRATION RANGE (mg/l)
BENZENE	ND
BTEX	ND
PAH	ND
METALS	ND to 3,180
BICARBONATE	328 to 543
SULFATE	1,610 to 2,530
CHLORIDE	3,690 to 4,300
TDS	8,790 to 11,800

Ground water laboratory results are summarized in TABLES IV and V. BTEX results are graphically presented on FIG. 7. Water analytical laboratory reports and chain-of-custody documentation are presented in APPENDIX B.

CLOSURE STANDARDS

SOIL

The New Mexico OCD Guidelines for Remediation of Leaks, Spills, and Releases contains the standard criteria for remediation activities. A ranking analysis for the site was performed to determine appropriate soil remediation levels. The ranking analysis is as follows:

Depth to Ground Water	Less Than 50 Feet	20 Points
	Greater Than 1000 Feet to Water Source	
Well Head Protection	Greater Than 200 Feet to Private Water Source	0 Points
Surface Water Body	Greater Than 1000 Feet	0 Points
	Total Ranking Score	**20 Points**

Based on the total ranking score, the closure objectives for this site for concentrations of benzene, BTEX, and TPH in soil are summarized as follows:

CONSTITUENT	CONCENTRATION RANGE	CLOSURE CONCENTRATIONS (mg/kg)
BENZENE	ND to 6.28 mg/kg	10
BTEX	ND to 72.02 mg/kg	50
TPH	ND to 6,900 ppm	100 + Background

GROUND WATER

The OCD requires remediation of impacted ground water to within the New Mexico Water Quality Control Commission (WQCC) Ground Water Standards for natural background water quality. This site exceeds the WQCC standards for several metals as well as chloride, sulfate and TDS as listed below:

CONSTITUENT	CONCENTRATION RANGE (mg/l)	CLOSURE CONCENTRATIONS (mg/l)
ARSENIC	0.226 to 0.343	0.1
SELENIUM	0.057 to 0.215	0.05
CHLORIDE	3,690 to 4,300	250
IRON	0.94 to 2.11	1.0
MANGANESE	0.351 to 0.537	0.2
SULFATE	1,610 to 2,530	600
TDS	8,790 to 11,800	1,000
BORON	3.70 to 5.10	0.75

SUMMARY AND RECOMMENDATIONS

Data obtained during the investigation can be summarized by the following observations:

- Hydrocarbon impact to soils exceeding OCD closure concentrations appears to extend from the surface to approximately 22 feet below ground surface at soil boring SB-1 in the source area.
- Hydrocarbon impact to soils exceeding OCD closure concentrations was encountered in well MW-3 (well down gradient to the southeast) approximately 20 to 22 feet below ground surface.

- Apparent hydrocarbon impact to soils was delineated to the northwest, southwest, and southeast of the stained area.
- The potential for impact to ground water in the source area exists due to the presence of BTEX and TPH concentrations in soil above and below the ground water depth in boring SB-1.
- The results of the BTEX and PAH analyses for wells MW-1, MW-2 and MW-3 were ND indicating potential ground water impact has not migrated from the source area in the direction of the monitoring wells.
- The metal and anion concentrations in ground water exceeding the WQCC closure concentrations are apparently not related to the crude oil release as hydrocarbon concentrations were ND in ground water.

Recommendations include the following:

- Install 1 monitoring well in the source area
- Monthly gauging of all monitoring wells
- Quarterly ground water sampling for determination of BTEX concentrations
- Conducting a risk assessment to further determine closure standards and the need for corrective action

MONUMENT SOUTH QUADRANGLE

NEW MEXICO - LEA CO.

PRINTED 1985

SCALE 1:24000

1 1/2 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

CONTOUR INTERVAL 5 FEET

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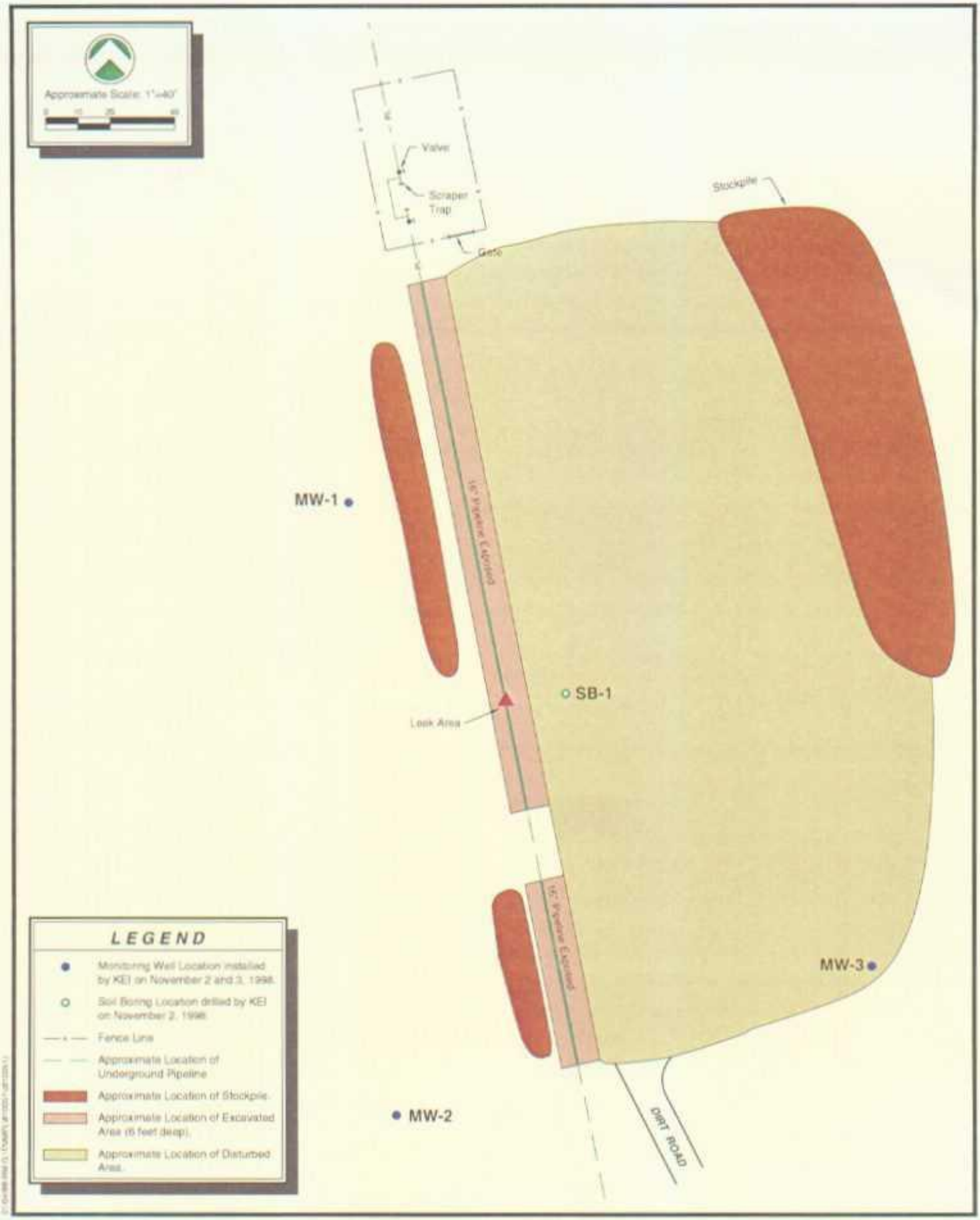
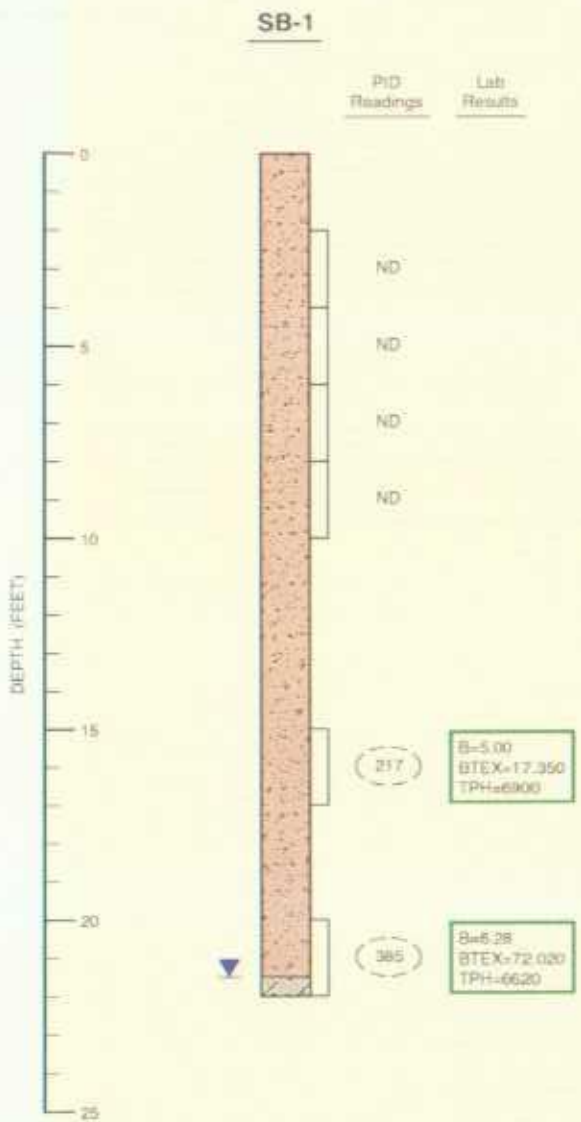
SITE LOCATION MAP			810051-1-0
TEXAS-NEW MEXICO PIPE LINE	TNM-97-17	LEA COUNTY, NEW MEXICO	FIG 1



k·e·i	SITE PLAN	810051-1-0
	TEXAS-NEW MEXICO PIPE LINE TNM-97-17 LEA COUNTY, NEW MEXICO	FIG 2



LEGEND

Sand (SP), fine to medium grained, loose, tan, moist.

Sand (SC), fine to medium grained, silty to clayey, medium dense to dense, grey, wet.

Indicates the depth interval from which a soil sample was selected and prepared for field head-space and/or laboratory analysis.

Indicates the ground water level measured during drilling.

PID — Head-space readings in ppm obtained with a photo-ionization detector.

B = Benzene Concentration (mg/kg)

BTEX = Total Benzene, Toluene, Ethylbenzene, and Xylenes Concentration (mg/kg)

TPH = Total Petroleum Hydrocarbons Concentration (mg/kg)

ND = Indicates the constituent was not detected.

NOTES

1. The soil boring was drilled on November 2, 1998, using air rotary techniques.
2. The lines between material types shown on the profile log represent approximate boundaries. Actual transitions may be gradual.
3. The depths indicated are referenced from the ground surface.
4. The soil boring was grouted to the ground surface with a cement and bentonite grout.

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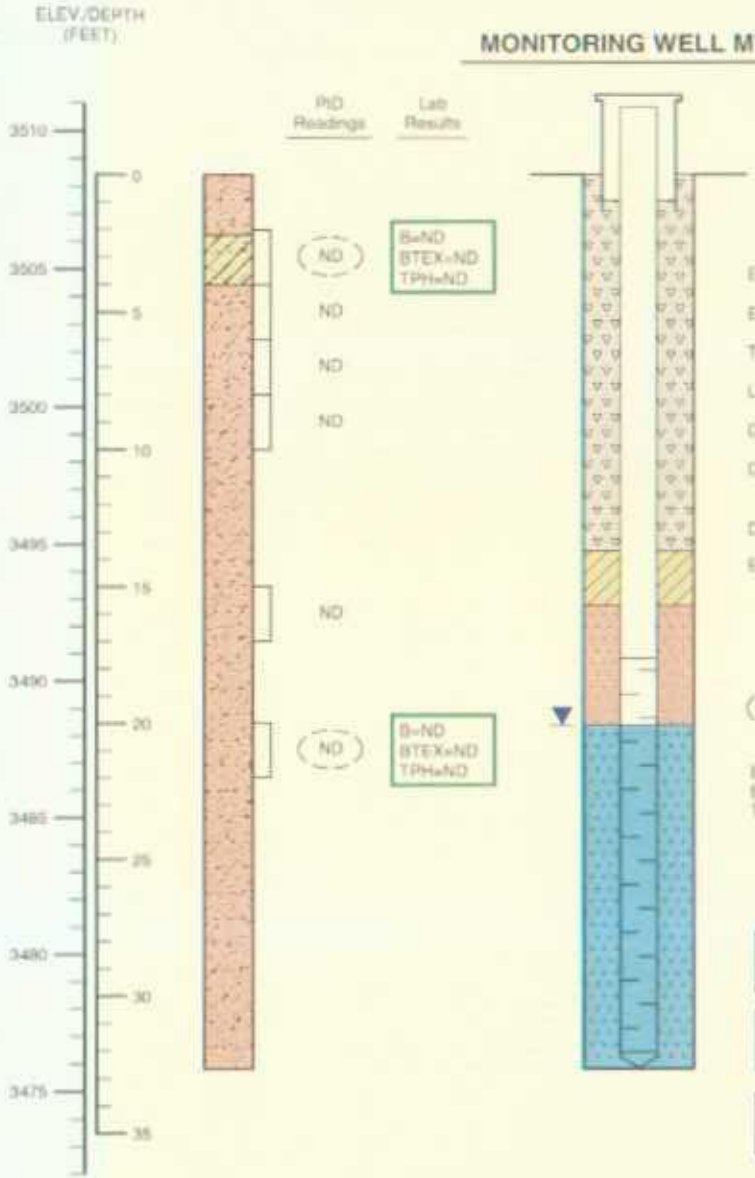
LOG AND DETAILS OF SOIL BORING SB-1

TEXAS-NEW MEXICO PIPE LINE | TNM-97-17 | LEA COUNTY, NEW MEXICO

810051-1-0

FIG 3

MONITORING WELL MW-1



Monitoring Well Details (MW-1)

Elev of Ground Surface	3508.46 ft
Elev Top of PVC Well	3510.90 ft
Thickness of Bentonite Seal	2.0 ft
Length of PVC Well Screen	15.0 ft
Depth of PVC Well	32.65 ft
Depth of Exploratory Hole	32.7 ft
Depth to Ground Water	20.10 ft
Elev of Ground Water	3488.36 ft

Indicates sample selected for laboratory analysis.

B = Benzene Concentration (mg/kg)
BTEX = Total BTEX Concentration (mg/kg)
TPH = Total Petroleum Hydrocarbon Concentration (mg/kg)

Concrete Surface Seal

Bentonite Pellet Seal

Sand Pack

LEGEND

Sand (SP), fine to medium grained, loose, tan, moist.

Sand (SM), silty, very calcareous, medium dense, light tan, dry.

Indicates the depth interval from which a soil sample was selected and prepared for field head-space and/or laboratory analysis.

Indicates the ground water level measured on January 7, 1999.

PID — Head-space readings in ppm obtained with a photo-ionization detector.

ND — Indicates the constituent was not detected.

NOTES

1. The monitoring well was installed on November 2, 1998 using air rotary drilling techniques.
2. The well was constructed with 2 inch ID, 0.010 inch factory slotted, threaded joint, Schedule 40 PVC pipe.
3. The well is protected with a locked stick up steel cover and a compression cap.
4. The lines between material types shown on the profile log represent approximate boundaries. Actual transitions may be gradual.
5. The depths indicated are referenced from the ground surface.

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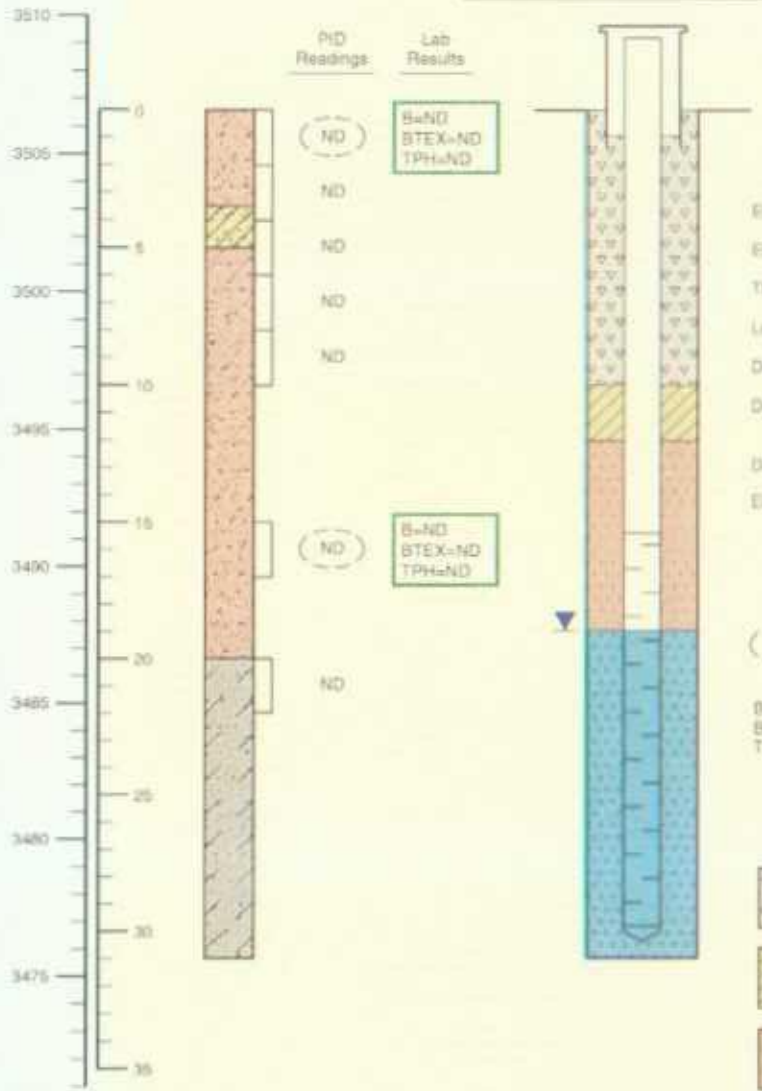
LOG AND DETAILS OF MONITORING WELL MW-1

TEXAS-NEW MEXICO PIPE LINE | TNM-97-17 | LEA COUNTY, NEW MEXICO

810051-1-0

FIG 4

MONITORING WELL MW-2



Monitoring Well Details (MW-2)

Elev of Ground Surface	3506.62 ft
Elev Top of PVC Well	3509.23 ft
Thickness of Bentonite Seal	2.0 ft
Length of PVC Well Screen	15.0 ft
Depth of PVC Well	30.39 ft
Depth of Exploratory Hole	31.0 ft
Depth to Ground Water	18.95 ft
Elev of Ground Water	3487.67 ft

(ND) Indicates sample selected for laboratory analysis.

B = Benzene Concentration (mg/kg)
BTEX = Total BTEX Concentration (mg/kg)
TPH = Total Petroleum Hydrocarbon Concentration (mg/kg)

Concrete Surface Seal

Bentonite Pellet Seal

Sand Pack

LEGEND

Sand (SP), fine to medium grained, loose, tan, moist.

Sand (SM), silty, very calcareous, medium dense, light tan, dry.

Sand (SC), fine to medium grained, silty to clayey, medium dense to dense, gray, wet.

Indicates the depth interval from which a soil sample was selected and prepared for field head-space and/or laboratory analysis.

▼ Indicates the ground water level measured on January 7, 1999.

PID Head-space readings in ppm obtained with a photo-ionization detector.

ND Indicates the constituent was not detected.

NOTES

1. The monitoring well was installed on November 3, 1998 using air rotary drilling techniques.
2. The well was constructed with 2 inch ID, 0.010 inch factory slotted, threaded joint, Schedule 40 PVC pipe.
3. The well is protected with a locked stick up steel cover and a compression cap.
4. The lines between material types shown on the profile log represent approximate boundaries. Actual transitions may be gradual.
5. The depths indicated are referenced from the ground surface.

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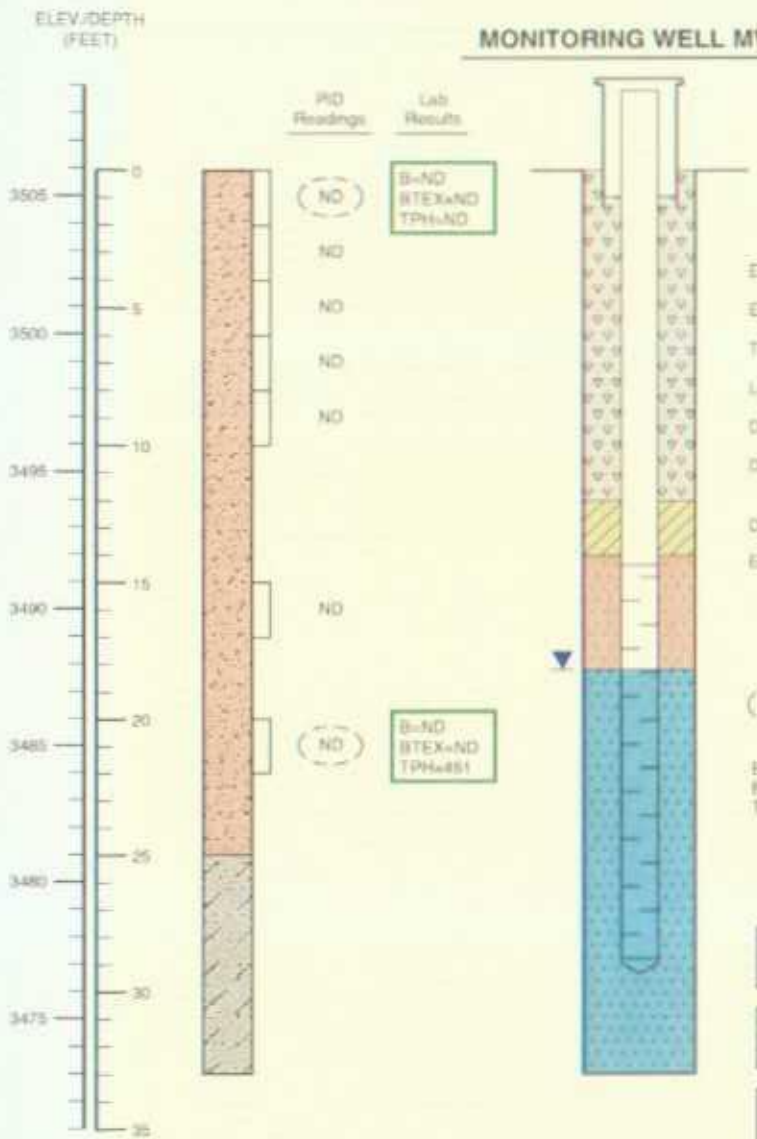
LOG AND DETAILS OF MONITORING WELL MW-2			810051-1-0
TEXAS-NEW MEXICO PIPE LINE	TNM-97-17	LEA COUNTY, NEW MEXICO	FIG 5

MONITORING WELL MW-3



Monitoring Well Details (MW-3)

Elev of Ground Surface	3505.93 ft
Elev Top of PVC Well	3508.82 ft
Thickness of Bentonite Seal	2.0 ft
Length of PVC Well Screen	15.0 ft
Depth of PVC Well	29.36 ft
Depth of Exploratory Hole	33.0 ft
Depth to Ground Water	18.19 ft
Elev of Ground Water	3487.74 ft

Indicates sample selected for laboratory analysis

B = Benzene Concentration (mg/kg)
BTEX = Total BTEX Concentration (mg/kg)
TPH = Total Petroleum Hydrocarbon Concentration (mg/kg)

Concrete Surface Seal

Bentonite Pellet Seal

Sand Pack

LEGEND

Sand (SP), fine to medium grained, loose, tan, moist.

Sand (SC), fine to medium grained, silty to clayey, medium dense to dense, grey, wet.

Indicates the depth interval from which a soil sample was selected and prepared for field head-space and/or laboratory analysis.

Indicates the ground water level measured on January 7, 1999.

PID Head-space readings in ppm obtained with a photo-ionization detector.

ND Indicates the constituent was not detected.

NOTES

1. The monitoring well was installed on November 3, 1998 using air rotary drilling techniques.
2. The well was constructed with 2 inch ID, 0.010 inch factory slotted, threaded joint, Schedule 40 PVC pipe.
3. The well is protected with a locked stick up steel cover and a compression cap.
4. The lines between material types shown on the profile log represent approximate boundaries. Actual transitions may be gradual.
5. The depths indicated are referenced from the ground surface.

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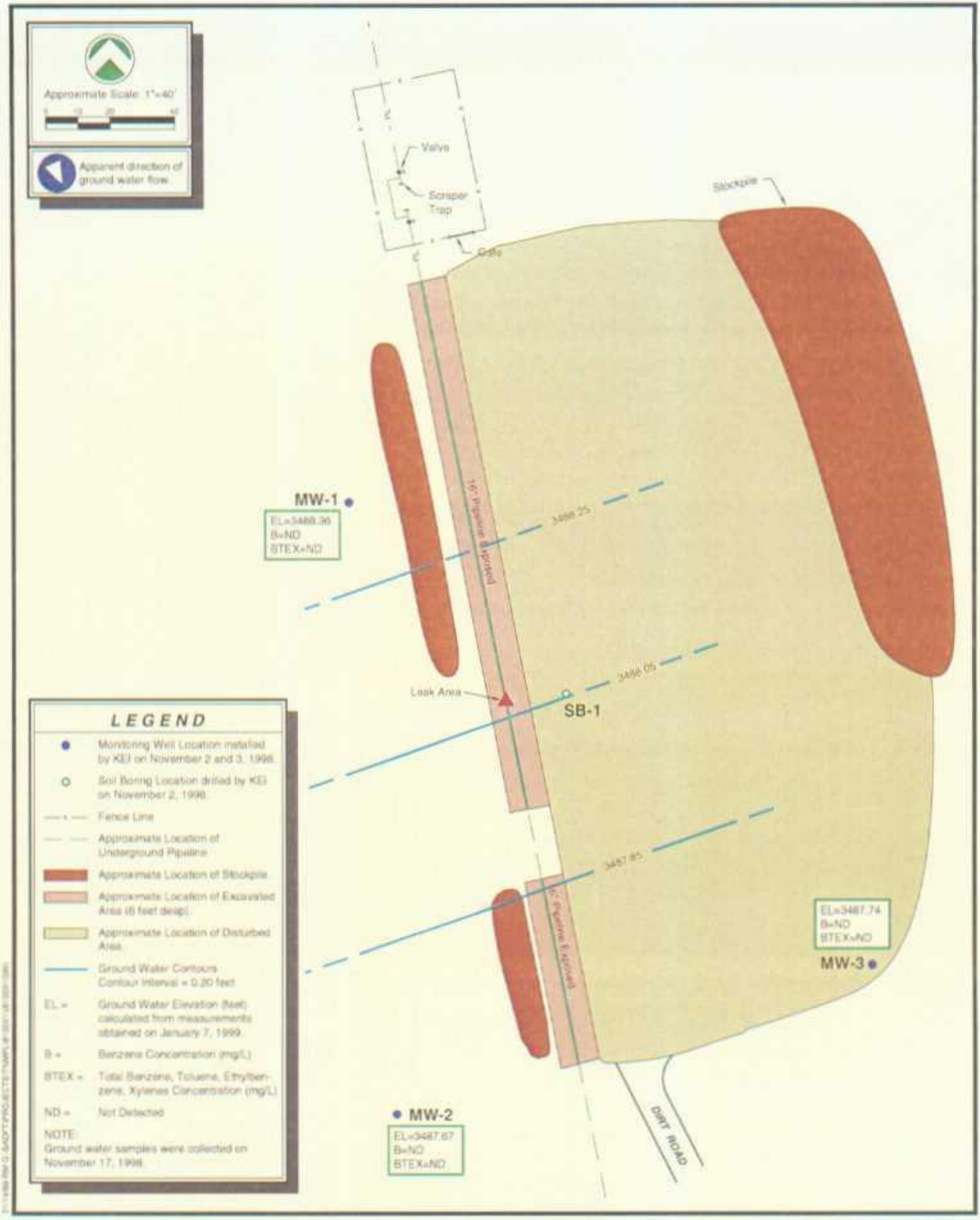
LOG AND DETAILS OF MONITORING WELL MW-3		810051-1-0
TEXAS-NEW MEXICO PIPE LINE	TNM-97-17	LEA COUNTY, NEW MEXICO	FIG 6



k·e·i	GROUND WATER CONTOUR / CONCENTRATION MAP	810051-1-0
	TEXAS-NEW MEXICO PIPE LINE TNM-97-17 LEA COUNTY, NEW MEXICO	FIG 7

GENERAL NOTES

ND - Indicates constituent was not detected above the method detection or reporting limit.

--- - Indicates PSH was not detected (TABLE III).

Depth to water is referenced from ground surface unless otherwise indicated.

Method detection or reporting limits:

Soil:	BTEX	- 0.020 to 0.20 mg/kg
	TPH	- 10.0 to 500 ppm
	SPLP VOC	- 0.025 to 0.050 mg/l
	SPLP SVOC	- 0.005 to 0.013 mg/l
	SPLP TPH	- 0.7 ppm
Water:	BTEX	- 0.001 to 0.002 mg/l
	Metals	- 0.002 to 5.6 mg/l
	PAH	- 0.002 mg/l
	Cations	- 4 mg/l
	Anions	- 40 mg/l
	TDS	- 25 mg/l

Laboratory test methods:

	BTEX	- EPA Method SW846-8021B
	TPH	- Modified EPA Method 8015 Diesel Range Organics
	SPLP VOC	- EPA Method 1312/8260
	SPLP SVOC	- EPA Method 1312/8270
	SPLP TPH	- EPA Method 1312/418.1
	Metals	- EPA ICP Method 6010
	PAH	- EPA Method 8270
	Cations	- SM4500CO2D
	Anions	- EPA Method 300.0
	TDS	- EPA Method 160.1

TABLE I

SUMMARY OF SOIL RESULTS - BTEX AND TPH
TEXAS - NEW MEXICO PIPE LINE COMPANY
TNM-97-17
LEA COUNTY, NEW MEXICO

SAMPLE LOCATION	SAMPLE DATE	DEPTH (feet)	BENZENE (mg/kg)	TOLUENE (mg/kg)	ETHYL-BENZENE (mg/kg)	XYLENES (mg/kg)	TOTAL BTEX (mg/kg)	TPH (mg/kg)
SB-1	11/2/98	15 - 17'	5	0.72	6.72	4.91	17.35	6,900
	11/2/98	20 - 22'	6.28	13.2	21.5	31.04	72.02	6,620
MW-1	11/2/98	2 - 4'	ND	ND	ND	ND	ND	ND
	11/2/98	20 - 22'	ND	ND	ND	ND	ND	ND
MW-2	11/3/98	0 - 2'	ND	ND	ND	ND	ND	ND
	11/3/98	15 - 17'	ND	ND	ND	ND	ND	ND
MW-3	11/3/98	0 - 2'	ND	ND	ND	ND	ND	ND
	11/3/98	20 - 22'	ND	ND	ND	ND	ND	451

TABLE II

SUMMARY OF SOIL RESULTS - SPLP
TEXAS - NEW MEXICO PIPE LINE COMPANY
TNM-97-17
LEA COUNTY, NEW MEXICO

PARAMETER	CONCENTRATION (mg/l)
SVOC	
2-Methylnaphthalene	0.005
Naphthalene	0.005
VOC	
Ethylbenzene	0.037
TPH	14.6 ppm

NOTES:

1. Sample was collected from soil boring SB-1 from 0 to 2 feet on November 2, 1998.
2. Those constituents not listed above were ND.

TABLE III

SUMMARY OF GROUND WATER MEASUREMENTS
TEXAS - NEW MEXICO PIPE LINE COMPANY
TNM-97-17
LEA COUNTY, NEW MEXICO

MONITORING WELL ID	DATE MEASURED	GROUND SURFACE ELEVATION (feet)	DEPTH TO WATER (feet)	GROUND WATER ELEVATION		PSH THICKNESS (feet)
				Actual	Corrected	
MW-1	11/17/98	3,508.46	20.37	3,488.09	---	---
	01/07/99	3,508.46	20.10	3,488.36	---	---
MW-2	11/17/98	3,506.62	19.16	3,487.46	---	---
	01/07/99	3,506.62	18.95	3,487.67	---	---
MW-3	11/17/98	3,505.93	18.51	3,487.42	---	---
	01/07/99	3,505.93	18.19	3,487.74	---	---

NOTE:
Depth to water is referenced from the top of the ground surface.

TABLE IV

SUMMARY OF GROUND WATER RESULTS - BTEX
TEXAS-NEW MEXICO PIPE LINE COMPANY
TNM-97-17
LEA COUNTY, NEW MEXICO

MONITORING WELL	DATE SAMPLED	BENZENE (mg/l)	TOLUENE (mg/l)	ETHYL-BENZENE (mg/l)	XYLENES (mg/l)	BTEX (mg/l)
MW-1	11/17/98	ND	ND	ND	ND	ND
MW-2	11/17/98	ND	ND	ND	ND	ND
MW-3	11/17/98	ND	ND	ND	ND	ND

TABLE V

SUMMARY OF GROUND WATER RESULTS - MISCELLANEOUS
TEXAS - NEW MEXICO PIPE LINE COMPANY
TNM-97-17
LEA COUNTY, NEW MEXICO

SAMPLE LOCATION	MW-1	MW-2	MW-3
SAMPLE DATE	11/17/98	11/17/98	11/17/98
CONSTITUENT	CONCENTRATION (mg/l)		
PAH			
All constituents	ND	ND	ND
METALS			
Aluminum	2.1	1.26	4.85
Arsenic	0.32	0.343	0.226
Barium	0.122	0.165	0.228
Boron	5.1	4.37	3.7
Calcium	642	958	570
Iron	1.22	0.94	2.11
Lead	0.015	ND	0.024
Magnesium	386	333	319
Manganese	0.387	0.351	0.537
Potassium	81.4	76.4	60.8
Selenium	0.215	0.062	0.057
Silicon	52.5	44.9	56.3
Sodium	3,180	2,740	2,500
Strontium	21.5	22.1	21.9
Tin	ND	ND	0.41
Vanadium	0.843	0.621	0.688
Zinc	0.131	ND	0.112
CATIONS			
Bicarbonate	410	328	543
Carbonate	ND	ND	ND
ANIONS			
Chloride	4,050	3,690	4,300
Sulfate	2,140	2,530	1,610
TDS	11,800	10,900	8,790

NOTE:
Those constituents not listed above were ND.

ANALYTICAL REPORT 1-84273

for

K.E.I. Consultants, Inc.

Project Manager: Theresa Nix

Project Name: TNMPL TNM-97-17

Project Id: 810051-1-0

November 25, 1998

HOUSTON - DALLAS - SAN ANTONIO

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November 25, 1998

Project Manager: Theresa Nix
K.E.I. Consultants, Inc.
5309 Wurzbach Rd. Suite 100
San Antonio, TX 78238

Reference: **XENCO Report No.: 1-84273**
Project Name: TNMPL TNM-97-17
Project ID: 810051-1-0
Project Address: Lea County, NM.

Dear Theresa Nix:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with XENCO Chain of Custody Number 1-84273. All results being reported to you apply only to the samples analyzed, properly identified with a Laboratory ID number. This letter documents the official transmission of the contents of the report and validates the information contained within.

All the results for the quality control samples passed thorough examination. Also, all parameters for data reduction and validation checked satisfactorily. In view of this, we are able to release the analytical data for this report within acceptance criteria for accuracy, precision, completeness or properly flagged.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by XENCO Laboratories. This report will be filed for at least 3 years in our archives and after that time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in COC No. 1-84273 will be filed for 60 days, and after that time they will be properly disposed of without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

XENCO operates under the A2LA guidelines. Our Quality System meets ISO/IEC Guide 25 requirements which is strictly implemented and enforced through our standard QA/QC procedures.

We thank you for selecting XENCO Laboratories to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Sincerely,

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

ANALYTICAL CHAIN OF CUSTODY REPORT
CHRONOLOGY OF SAMPLES

K.E.I. Consultants, Inc.

Project ID: 810051-1-0
Project Manager: Theresa Nix
Project Location: Lea County, NM.

Project Name: TNMPL TNM-97-17

XENCO COC#: 1-84273
Date Received in Lab: Nov 5, 1998 10:10 by JO
XENCO contact : Carlos Castro/Karen Olson

	Field ID	Lab. ID	Method Name	Method ID	Units	Turn Around	Date and Time: Sample Collected	Addition Requested	Extraction	Analysis
1	SB-1 (15-17')	184273-001	BTEX	SW-846	ppm	10 days	Nov 2, 1998		Nov 10, 1998 by HL	Nov 10, 1998 22:31 by HL
2			TPH8015M-D	SW-846 8015 M	mg/kg	10 days	Nov 2, 1998		Nov 9, 1998 by JM	Nov 14, 1998 17:29 by AM
3			SPLP TPH	EPA	ppm	7 days	Nov 2, 1998	Nov16,1998 13:00	Nov 19, 1998 by EZ	Nov 19, 1998 17:30 by EZ
4			VOA (8260)	EPA1312/8260	mg/kg	7 days	Nov 2, 1998	Nov16,1998 13:00	Nov 23, 1998 by CCE	Nov 23, 1998 20:14 by CCE
5			SPLP-SV(TCL)	SW846-1312/82	ug/L	7 days	Nov 2, 1998	Nov16,1998 13:00	Nov 17, 1998 by RK	Nov 18, 1998 16:25 by LC
6	SB-1 (20-22')	184273-002	BTEX	SW-846	ppm	10 days	Nov 2, 1998		Nov 10, 1998 by HL	Nov 10, 1998 22:49 by HL
7			TPH8015M-D	SW-846 8015 M	mg/kg	10 days	Nov 2, 1998		Nov 9, 1998 by JM	Nov 14, 1998 19:06 by AM
8	MW-1 (2-4')	184273-003	BTEX	SW-846	ppm	10 days	Nov 2, 1998		Nov 10, 1998 by HL	Nov 10, 1998 19:24 by HL
9			TPH8015M-D	SW-846 8015 M	mg/kg	10 days	Nov 2, 1998		Nov 9, 1998 by JM	Nov 14, 1998 10:57 by AM
10	MW-1(20-22')	184273-004	BTEX	SW-846	ppm	10 days	Nov 2, 1998		Nov 10, 1998 by HL	Nov 10, 1998 21:35 by HL
11			TPH8015M-D	SW-846 8015 M	mg/kg	10 days	Nov 2, 1998		Nov 9, 1998 by JM	Nov 14, 1998 11:29 by AM
12	MW-2(0-2')	184273-005	BTEX	SW-846	ppm	10 days	Nov 3, 1998		Nov 10, 1998 by HL	Nov 10, 1998 21:53 by HL
13			TPH8015M-D	SW-846 8015 M	mg/kg	10 days	Nov 3, 1998		Nov 9, 1998 by JM	Nov 14, 1998 12:01 by AM
14	MW-2 (15-17')	184273-006	BTEX	SW-846	ppm	10 days	Nov 3, 1998		Nov 10, 1998 by HL	Nov 10, 1998 22:12 by HL
15			TPH8015M-D	SW-846 8015 M	mg/kg	10 days	Nov 3, 1998		Nov 9, 1998 by JM	Nov 14, 1998 12:37 by AM
16	MW-3 (0-2')	184273-007	BTEX	SW-846	ppm	10 days	Nov 3, 1998		Nov 10, 1998 by HL	Nov 10, 1998 23:26 by HL
17			TPH8015M-D	SW-846 8015 M	mg/kg	10 days	Nov 3, 1998		Nov 9, 1998 by JM	Nov 14, 1998 13:09 by AM
18	MW-3 (20-22')	184273-008	BTEX	SW-846	ppm	10 days	Nov 3, 1998		Nov 10, 1998 by HL	Nov 10, 1998 23:45 by HL
19			TPH8015M-D	SW-846 8015 M	mg/kg	10 days	Nov 3, 1998		Nov 9, 1998 by JM	Nov 14, 1998 15:19 by AM

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Analysis Requested		Lab ID:	184273 001		184273 002		184273 003		184273 004		184273 005		184273 006	
		Field ID:	SB-1		SB-1		MW-1		MW-1		MW-2		MW-2	
		Depth:	15-17'		20-22'		2-4'		20-22'		0-2'		15-17'	
		Matrix:	Solid		Solid		Solid		Solid		Solid		Solid	
		Sampled:	11/02/98		11/02/98		11/02/98		11/02/98		11/03/98		11/03/98	
TPH-DRO (Diesel) EPA 8015 M	Analyzed:		11/14/98	R.L.	11/14/98	R.L.	11/14/98	R.L.	11/14/98	R.L.	11/14/98	R.L.	11/14/98	R.L.
	Units:		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg		mg/kg	
Total Petroleum Hydrocarbons			6900	(500)	6620	(500)	< 10.0	(10.0)	< 10.0	(10.0)	< 10.0	(10.0)	< 10.0	(10.0)
BTEX EPA 8021B	Analyzed:		11/10/98	R.L.	11/10/98	R.L.	11/10/98	R.L.	11/10/98	R.L.	11/10/98	R.L.	11/10/98	R.L.
	Units:		ppm		ppm		ppm		ppm		ppm		ppm	
Benzene			5.00	(0.10)	6.28	(0.10)	< 0.020	(0.020)	< 0.050	(0.050)	< 0.050	(0.050)	< 0.050	(0.050)
Toluene			0.72	(0.10)	13.20	(0.10)	< 0.020	(0.020)	< 0.050	(0.050)	< 0.050	(0.050)	< 0.050	(0.050)
Ethylbenzene			6.72	(0.10)	21.50	(0.10)	< 0.020	(0.020)	< 0.050	(0.050)	< 0.050	(0.050)	< 0.050	(0.050)
m,p-Xylene			3.20	(0.20)	23.10	(0.20)	< 0.040	(0.040)	< 0.100	(0.100)	< 0.100	(0.100)	< 0.100	(0.100)
o-Xylene			1.71	(0.10)	7.94	(0.10)	< 0.020	(0.020)	< 0.050	(0.050)	< 0.050	(0.050)	< 0.050	(0.050)
Total BTEX			17.350		72.020		N.D.		N.D.		N.D.		N.D.	
SPLP-Semivolatiles EPA1312/8270	Analyzed:		11/18/98	R.L.										
	Units:		mg/L											
Acenaphthene			< 0.005	(0.005)										
Acenaphthylene			< 0.005	(0.005)										
Anthracene			< 0.005	(0.005)										
Benz(a)anthracene			< 0.005	(0.005)										
Benzo(a)pyrene			< 0.005	(0.005)										
Benzo(b)fluoranthene			< 0.005	(0.005)										
Benzo(g,h,i)perylene			< 0.005	(0.005)										
Benzo(k)fluoranthene			< 0.005	(0.005)										
4-Bromophenyl-phenylether			< 0.005	(0.005)										
Butyl benzyl phthalate			< 0.005	(0.005)										
Carbazole			< 0.005	(0.005)										
4-Chloro-3-methylphenol			< 0.005	(0.005)										

Eddie L. Clemons, II
QA/QC Manager

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Analysis Requested	Lab ID:	184273 001	184273 002	184273 003	184273 004	184273 005	184273 006
	Field ID:	SB-1	SB-1	MW-1	MW-1	MW-2	MW-2
	Depth:	15-17'	20-22'	2-4'	20-22'	0-2'	15-17'
	Matrix:	Solid	Solid	Solid	Solid	Solid	Solid
	Sampled:	11/02/98	11/02/98	11/02/98	11/02/98	11/03/98	11/03/98
SPLP-Semivolatiles EPA1312/8270	Analyzed:	11/18/98					
	Units:	mg/L R.L.					
4-Chloroaniline		< 0.005 (0.005)					
2-Chloronaphthalene		< 0.005 (0.005)					
2-Chlorophenol		< 0.005 (0.005)					
4-Chlorophenyl-phenyl ether		< 0.005 (0.005)					
Chrysene		< 0.005 (0.005)					
Di-n-butyl phthalate		< 0.005 (0.005)					
Di-n-octylphthalate		< 0.005 (0.005)					
Dibenz(a,h)anthracene		< 0.005 (0.005)					
Dibenzofuran		< 0.005 (0.005)					
1,2-Dichlorobenzene		< 0.005 (0.005)					
1,3-Dichlorobenzene		< 0.005 (0.005)					
1,4-Dichlorobenzene		< 0.005 (0.005)					
3,3'-Dichlorobenzidine		< 0.005 (0.005)					
2,4-Dichlorophenol		< 0.005 (0.005)					
Diethyl phthalate		< 0.005 (0.005)					
2,4-Dimethylphenol		< 0.005 (0.005)					
Dimethyl phthalate		< 0.005 (0.005)					
4,6-Dinitro-2-methylphenol		< 0.013 (0.013)					
2,4-Dinitrophenol		< 0.013 (0.013)					
2,4-Dinitrotoluene		< 0.005 (0.005)					
2,6-Dinitrotoluene		< 0.005 (0.005)					
Fluoranthene		< 0.005 (0.005)					
Fluorene		< 0.005 (0.005)					
Hexachlorobenzene		< 0.005 (0.005)					

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		Field ID:	SB-1	SB-1	MW-1	MW-1	MW-2	MW-2
		Depth:	15-17'	20-22'	2-4'	20-22'	0-2'	15-17'
		Matrix:	Solid	Solid	Solid	Solid	Solid	Solid
		Sampled:	11/02/98	11/02/98	11/02/98	11/02/98	11/03/98	11/03/98
SPLP-Semivolatiles EPA1312/8270		Analyzed:	11/18/98					
		Units:	mg/L					
			R.L.					
Hexachlorobutadiene			< 0.005 (0.005)					
Hexachlorocyclopentadiene			< 0.005 (0.005)					
Hexachloroethane			< 0.005 (0.005)					
Indeno(1,2,3-cd)pyrene			< 0.005 (0.005)					
Isophorone			< 0.005 (0.005)					
2-Methylnaphthalene			0.005 (0.005)					
2-Methylphenol			< 0.005 (0.005)					
4-Methylphenol			< 0.005 (0.005)					
N-Nitrosodi-n-propylamine			< 0.005 (0.005)					
N-Nitrosodiphenylamine			< 0.005 (0.005)					
Naphthalene			0.005 (0.005)					
2-Nitroaniline			< 0.013 (0.013)					
3-Nitroaniline			< 0.013 (0.013)					
4-Nitroaniline			< 0.013 (0.013)					
Nitrobenzene			< 0.005 (0.005)					
2-Nitrophenol			< 0.005 (0.005)					
4-Nitrophenol			< 0.005 (0.005)					
Pentachlorophenol			< 0.013 (0.013)					
Phenanthrene			< 0.005 (0.005)					
Phenol			< 0.005 (0.005)					
Pyrene			< 0.005 (0.005)					
1,2,4-Trichlorobenzene			< 0.005 (0.005)					
2,4,5-Trichlorophenol			< 0.013 (0.013)					
2,4,6-Trichlorophenol			< 0.005 (0.005)					

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	Field ID:	SB-1	SB-1	MW-1	MW-1	MW-2	MW-2
	Depth:	15-17'	20-22'	2-4'	20-22'	0-2'	15-17'
	Matrix:	Solid	Solid	Solid	Solid	Solid	Solid
	Sampled:	11/02/98	11/02/98	11/02/98	11/02/98	11/03/98	11/03/98
SPLP-Semivolatiles EPA1312/8270	Analyzed:	11/18/98					
	Units:	mg/L R.L.					
bis(2-Chloroethoxy) methane		< 0.005 (0.005)					
bis(2-Chloroethyl) ether		< 0.005 (0.005)					
bis(2-Chloroisopropyl) ether		< 0.005 (0.005)					
bis(2-Ethylhexyl) phthalate		< 0.005 (0.005)					
SPLP Volatiles EPA 8260	Analyzed:	11/23/98					
	Units:	mg/kg R.L.					
Benzene		< 0.025 (0.025)					
Bromobenzene		< 0.025 (0.025)					
Bromochloromethane		< 0.025 (0.025)					
Bromodichloromethane		< 0.025 (0.025)					
Bromoform		< 0.025 (0.025)					
Bromomethane		< 0.025 (0.025)					
Carbon tetrachloride		< 0.025 (0.025)					
Chlorobenzene		< 0.025 (0.025)					
Chlorodibromomethane		< 0.025 (0.025)					
Chloroethane		< 0.050 (0.050)					
Chloroform		< 0.025 (0.025)					
Chloromethane		< 0.050 (0.050)					
2-Chlorotoluene		< 0.025 (0.025)					
4-Chlorotoluene		< 0.025 (0.025)					
1,2-Dibromo-3-chloropropane		< 0.025 (0.025)					
1,2-Dibromoethane		< 0.025 (0.025)					

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	Field ID:	SB-1	SB-1	MW-1	MW-1	MW-2	MW-2
	Depth:	15-17'	20-22'	2-4'	20-22'	0-2'	15-17'
	Matrix:	Solid	Solid	Solid	Solid	Solid	Solid
	Sampled:	11/02/98	11/02/98	11/02/98	11/02/98	11/03/98	11/03/98
SPLP Volatiles EPA 8260	Analyzed:	11/23/98					
	Units:	mg/kg R.L.					
Dibromomethane		< 0.025 (0.025)					
1,2-Dichlorobenzene		< 0.025 (0.025)					
1,3-Dichlorobenzene		< 0.025 (0.025)					
1,4-Dichlorobenzene		< 0.025 (0.025)					
Dichlorodifluoromethane		< 0.025 (0.025)					
1,1-Dichloroethane		< 0.025 (0.025)					
1,2-Dichloroethane		< 0.025 (0.025)					
1,1-Dichloroethene		< 0.025 (0.025)					
1,2-Dichloropropane		< 0.025 (0.025)					
1,3-Dichloropropane		< 0.025 (0.025)					
2,2-Dichloropropane		< 0.025 (0.025)					
1,1-Dichloropropene		< 0.025 (0.025)					
Ethylbenzene		0.037 (0.025)					
Hexachlorobutadiene		< 0.025 (0.025)					
Isopropylbenzene (Cumene)		< 0.025 (0.025)					
MTBE		< 0.050 (0.050)					
Methylene chloride		< 0.050 (0.050)					
Naphthalene		< 0.025 (0.025)					
Styrene		< 0.025 (0.025)					
1,1,1,2-Tetrachloroethane		< 0.025 (0.025)					
1,1,2,2-Tetrachloroethane		< 0.025 (0.025)					
Tetrachloroethene		< 0.025 (0.025)					
Toluene		< 0.025 (0.025)					
1,2,3-Trichlorobenzene		< 0.025 (0.025)					

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	Field ID:	SB-1	SB-1	MW-1	MW-1	MW-2	MW-2
	Depth:	15-17'	20-22'	2-4'	20-22'	0-2'	15-17'
	Matrix:	Solid	Solid	Solid	Solid	Solid	Solid
	Sampled:	11/02/98	11/02/98	11/02/98	11/02/98	11/03/98	11/03/98
SPLP Volatiles	*Analyzed:*	11/23/98					
EPA 8260	*Units:*	mg/kg R.L.					
1,2,4-Trichlorobenzene		< 0.025 (0.025)					
1,1,1-Trichloroethane		< 0.025 (0.025)					
1,1,2-Trichloroethane		< 0.025 (0.025)					
Trichloroethene		< 0.025 (0.025)					
Trichlorofluoromethane		< 0.025 (0.025)					
1,2,3-Trichloropropane		< 0.025 (0.025)					
1,2,4-Trimethylbenzene		< 0.025 (0.025)					
1,3,5-Trimethylbenzene		< 0.025 (0.025)					
Vinyl chloride		< 0.025 (0.025)					
cis-1,2-Dichloroethene		< 0.025 (0.025)					
cis-1,3-Dichloropropene		< 0.025 (0.025)					
m,p-Xylene		< 0.025 (0.025)					
n-Butylbenzene		< 0.025 (0.025)					
n-Propylbenzene		< 0.025 (0.025)					
o-Xylene		< 0.025 (0.025)					
p-Isopropyltoluene (p-Cymene)		< 0.025 (0.025)					
sec-Butylbenzene		< 0.025 (0.025)					
tert-Butylbenzene		< 0.025 (0.025)					
trans-1,2-Dichloroethene		< 0.025 (0.025)					
trans-1,3-Dichloropropene		< 0.025 (0.025)					
SPLP TPH	*Analyzed:*	11/19/98					
1312/418.1	*Units:*	ppm R.L.					

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		Field ID:	SB-1	SB-1	MW-1	MW-1	MW-2	MW-2
		Depth:	15-17'	20-22'	2-4'	20-22'	0-2'	15-17'
		Matrix:	Solid	Solid	Solid	Solid	Solid	Solid
		Sampled:	11/02/98	11/02/98	11/02/98	11/02/98	11/03/98	11/03/98
SPLP TPH 1312/418.1		Analyzed:	11/19/98					
		Units:	ppm R.L.					
Total Petroleum Hydrocarbons			14.6 (0.7)					

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Analysis Requested	*Lab ID:*	184273 007	184273 008				
	Field ID:	MW-3	MW-3				
	Depth:	0-2'	20-22'				
	Matrix:	Solid	Solid				
	Sampled:	11/03/98	11/03/98				
TPH-DRO (Diesel) **EPA 8015 M**	*Analyzed:*	11/14/98	11/14/98				
	Units:	mg/kg R.L.	mg/kg R.L.				
Total Petroleum Hydrocarbons		< 10.0 (10.0)	451 (10.0)				
BTEX **EPA 8021B**	*Analyzed:*	11/10/98	11/10/98				
	Units:	ppm R.L.	ppm R.L.				
Benzene		< 0.050 (0.050)	< 0.050 (0.050)				
Toluene		< 0.050 (0.050)	< 0.050 (0.050)				
Ethylbenzene		< 0.050 (0.050)	< 0.050 (0.050)				
m,p-Xylene		< 0.100 (0.100)	< 0.100 (0.100)				
o-Xylene		< 0.050 (0.050)	< 0.050 (0.050)				
Total BTEX		N.D.	N.D.				

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Certificate Of Quality Control for Batch : 18A40H67

SW- 846 8015 M TPH- DRO (Diesel)

Date Validated: Nov 16, 1998 11:50
Date Analyzed: Nov 14, 1998 06:06

Analyst: AM
Matrix: Solid

	BLANK SPIKE ANALYSIS						
Parameter	[A] Blank Result	[B] Blank Spike Result	[C] Blank Spike Amount	[D] Detection Limit	[E] QC LIMITS Blank Spike Recovery	[F] QC LIMITS Recovery Range	[G] Qualifier
	mg/kg	mg/kg	mg/kg	mg/kg	%	%	
Total Petroleum Hydrocarbons	< 10.00	162	200	10.00	81.0	65-135	

Blank Spike Recovery [E] = 100*(B-A)/(C)
N.C. = Not calculated, data below detection limit
N.D = Below detection limit
All results are based on MDL and validated for QC purposes only

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Certificate Of Quality Control for Batch : 18A40H67

SW- 846 8015 M TPH- DRO (Diesel)

Date Validated: Nov 16, 1998 11:50
Date Analyzed: Nov 14, 1998 07:10

Analyst: AM
Matrix: Solid

MATRIX SPIKE / MATRIX SPIKE DUPLICATE AND RECOVERY

Q.C. Sample ID 18219- 001 / Parameter	[A] Sample Result mg/kg	[B] Matrix Spike Result mg/kg	[C] Matrix Spike Duplicate Result mg/kg	[D] Matrix Spike Amount mg/kg	[E] Detection Limit mg/kg	Matrix Limit Relative Difference %	[F] QC Spike Relative Difference %	[G] QC Matrix Spike Recovery %	[H] QC M.S.D. Recovery %	[I] Matrix Spike Recovery Range %	[J] Qualifier
Total Petroleum Hydrocarbons	< 10.00	241	168	200	10.00	30.0	35.7	120.5	84.0	65-135	

Spike Relative Difference [F] = 200*(B-C)/(B+C)
Matrix Spike Recovery [G] = 100*(B-A)/[D]
M.S.D. = Matrix Spike Duplicate
M.S.D. Recovery [H] = 100*(C-A)/[D]
N.D. = Below detection limit or not detected
All results are based on MDL and validated for QC purposes

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 18A25D96

SW- 846 5030/8021B BTEX

Date Validated: Nov 11, 1998 09:00
Date Analyzed: Nov 10, 1998 18:47

Analyst: HL
Matrix: Solid

BLANK SPIKE ANALYSIS

Parameter	[A] Blank Result ppm	[B] Blank Spike Result ppm	[C] Blank Spike Amount ppm	[D] Detection Limit ppm	[E] QC Blank Spike Recovery %	[F] LIMITS Recovery Range %	[G] Qualifier
Benzene	< 0.0010	0.1130	0.1000	0.0010	113.0	65-135	
Toluene	*< 0.0010*	*0.1120*	*0.1000*	*0.0010*	*112.0*	65-135	
Ethylbenzene	< 0.0010	0.1110	0.1000	0.0010	111.0	65-135	
m,p-Xylene	< 0.0020	0.2240	0.2000	0.0020	112.0	65-135	
o-Xylene	< 0.0010	0.1100	0.1000	0.0010	110.0	65-135	

Blank Spike Recovery [E] = 100*(B-A)/(C)
N.C. = Not calculated, data below detection limit
N.D. = Below detection limit
All results are based on MDL and validated for QC purposes only

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 18A25D96

SW- 846 5030/8021B BTEX

Date Validated: Nov 11, 1998 09:00
Date Analyzed: Nov 10, 1998 19:24

Analyst: HL
Matrix: Solid

	MATRIX SPIKE / MATRIX SPIKE DUPLICATE AND RECOVERY										
Q.C. Sample ID 184273- 003	[A] Sample Result	[B] Matrix Spike Result	[C] Matrix Spike Duplicate Result	[D] Matrix Spike Amount	[E] Detection Limit	Matrix Limit Relative Difference	[F] QC Spike Relative Difference	[G] QC Matrix Spike Recovery	[H] QC M.S.D. Recovery	[I] Matrix Spike Recovery Range	[J] Qualifier
Parameter	ppm	ppm	ppm	ppm	ppm	%	%	%	%	%	
Benzene	< 0.020	2.040	2.020	2.000	0.020	25.0	1.0	102.0	101.0	65-135	
Toluene	< 0.020	2.040	1.996	2.000	0.020	25.0	2.2	102.0	99.8	65-135	
Ethylbenzene	< 0.020	2.060	2.020	2.000	0.020	25.0	2.0	103.0	101.0	65-135	
m,p-Xylene	< 0.040	4.120	4.040	4.000	0.040	25.0	2.0	103.0	101.0	65-135	
o-Xylene	< 0.020	2.040	2.000	2.000	0.020	25.0	2.0	102.0	100.0	65-135	

Spike Relative Difference [F] = 200*(B-C)/(B+C)
Matrix Spike Recovery [G] = 100*(B-A)/[D]
M.S.D. = Matrix Spike Duplicate
M.S.D. Recovery [H] = 100*(C-A)/[D]
N.D. = Below detection limit or not detected
All results are based on MDL and validated for QC purposes

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 18A23E61

EPA1312/8260 SPLP Volatiles

Date Validated: Nov 25, 1998 10:00
Date Analyzed: Nov 23, 1998 17:32

Analyst: CCE
Matrix: Solid

	BLANK SPIKE / BLANK SPIKE DUPLICATE AND RECOVERY										
Parameter	[A] Blank Result mg/kg	[B] Blank Spike Result mg/kg	[C] Blank Spike Duplicate Result mg/kg	[D] Blank Spike Amount mg/kg	[E] Detection Limit mg/kg	Blank Limit Relative Difference %	[F] QC Spike Relative Difference %	[G] QC Blank Spike Recovery %	[H] QC B.S.D. Recovery %	[I] Blank Spike Recovery Range %	[J] Qualifier
Benzene	< 0.0010	0.0447	0.0418	0.0500	0.0010	20.0	6.7	89.4	83.6	66-142	
Chlorobenzene	< 0.0010	0.0452	0.0428	0.0500	0.0010	20.0	5.5	90.4	85.6	60-133	
1,1-Dichloroethene	< 0.0040	0.0426	0.0379	0.0500	0.0040	25.0	11.7	85.2	75.8	59-172	
Toluene	< 0.0010	0.0444	0.0415	0.0500	0.0010	20.0	6.8	88.8	83.0	59-139	
Trichloroethene	< 0.0030	0.0416	0.0381	0.0500	0.0030	20.0	8.8	83.2	76.2	62-137	

Spike Relative Difference [F] = 200*(B-C)/(B+C)
Blank Spike Recovery [G] = 100*(B-A)/[D]
B.S.D. = Blank Spike Duplicate
B.S.D. Recovery [H] = 100*(C-A)/[D]
N.D. = Below detection limit or not detected
All results are based on MDL and validated for QC purposes

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 18A34E94

SW846-1312/8270 SPLP PAHs by GC-MS (610 List)

Date Validated: Nov 18, 1998 16:30
Date Analyzed: Nov 18, 1998 13:29

Analyst: LC
Matrix: Solid

	BLANK SPIKE / BLANK SPIKE DUPLICATE AND RECOVERY										
Parameter	[A] Blank Result mg/L	[B] Blank Spike Result mg/L	[C] Blank Spike Duplicate Result mg/L	[D] Blank Spike Amount mg/L	[E] Detection Limit mg/L	Blank Limit Relative Difference %	[F] QC Spike Relative Difference %	[G] QC Blank Spike Recovery %	[H] QC B.S.D. Recovery %	[I] Blank Spike Recovery Range %	[J] Qualifier
Acenaphthene	< 0.0020	0.0441	0.0440	0.0500	0.0020	19.0	0.2	88.2	88.0	31-137	
4-Chloro-3-methylphenol	< 0.0038	0.0356	0.0347	0.0500	0.0038	33.0	2.6	71.2	69.4	26-103	
2-Chlorophenol	< 0.0050	0.0354	0.0307	0.0500	0.0050	28.7	14.2	70.8	61.4	25-102	
1,4-Dichlorobenzene	< 0.0042	0.0374	0.0335	0.0500	0.0042	32.1	11.0	74.8	67.0	28-104	
2,4-Dinitrotoluene	< 0.0050	0.0398	0.0380	0.0500	0.0050	21.8	4.6	79.6	76.0	28-89	
N-Nitrosodi-n-propylamine	< 0.0040	0.0397	0.0399	0.0500	0.0040	55.4	0.5	79.4	79.8	41-126	
4-Nitrophenol	< 0.0040	0.0128	0.0080	0.0500	0.0040	47.2	46.2	25.6	16.0	11-114	
Pentachlorophenol	< 0.0086	0.0270	0.0244	0.0500	0.0086	48.9	10.1	54.0	48.8	17-109	
Phenol	< 0.0037	0.0121	0.0106	0.0500	0.0037	22.6	13.2	24.2	21.2	26-90	A
Pyrene	< 0.0020	0.0523	0.0548	0.0500	0.0020	25.2	4.7	104.6	109.6	35-142	
1,2,4-Trichlorobenzene	< 0.0054	0.0366	0.0334	0.0500	0.0054	23.0	9.1	73.2	66.8	38-107	

(A) Spike recovery is less than laboratory acceptance criteria. Client samples are ND.
Spike Relative Difference [F] = 200*(B-C)/(B+C)
Blank Spike Recovery [G] = 100*(B-A)/[D]
B.S.D. = Blank Spike Duplicate
B.S.D. Recovery [H] = 100*(C-A)/[D]
N.D. = Below detection limit or not detected
All results are based on MDL and validated for QC purposes

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 18A07E25

EPA 1312/418.1 SPLP TPH

Date Validated: Nov 20, 1998 10:05
Date Analyzed: Nov 19, 1998 17:05

Analyst: EZ
Matrix: Solid

	BLANK SPIKE / BLANK SPIKE DUPLICATE AND RECOVERY										
Parameter	[A] Blank Result ppm	[B] Blank Spike Result ppm	[C] Blank Spike Duplicate Result ppm	[D] Blank Spike Amount ppm	[E] Detection Limit ppm	Blank Limit Relative Difference %	[F] QC Spike Relative Difference %	[G] QC Blank Spike Recovery %	[H] QC B.S.D. Recovery %	[I] Blank Spike Recovery Range %	[J] Qualifier
Total Petroleum Hydrocarbons	< 0.50	4.65	4.54	4.18	0.50	20.0	2.4	111.2	108.6	65-135	

Spike Relative Difference [F] = 200*(B-C)/(B+C)
Blank Spike Recovery [G] = 100*(B-A)/[D]
B.S.D. = Blank Spike Duplicate
B.S.D. Recovery [H] = 100*(C-A)/[D]
N.D. = Below detection limit or not detected
All results are based on MDL and validated for QC purposes

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

☐ 11381 Meadowglen, Suite L, Houston TX 77082 281-589-0692
☐ 5309 Wurzbach Road, Suite 104, San Antonio, TX 78238 210-509-3334
☐ 11078 Morrison Road, Suite D, Dallas, TX 75229 972-481-9999

ANALYSIS REQUEST & CHAIN OF CUSTODY RECORD

On-LINE Help & Technical Services at XENCO.com

10513

Company COC No: 192 Work Order No: Page 1 of 1

Company: KEI Consultants Phone: (210) 680-3767

Lab Only: 184273-SA

Project Name: ☐ Previously done at XENCO — TNMPL TNM-97-17 Project ID: 810051-1-0

TAT: 5h 12h 20h 24h 48h 3d 5d 7d 14d 21d Standard TAT is 10 Working Days unless otherwise agreed in writing. But often reported in 5-7 Working Days

Location: Lea Co, NM

Project Manager (PM): Theresa Nix Project Director (PD): Mike Hawthorne

Fax Results to ☒ PM and / or Fax (512) 364-3556

Invoice to ☐ Accounting ☐ Include Invoice with Final Report Attn PM ☒ Invoice must have a P.O Bill to:

Quote No. P.O No 810051-1-0 ☐ Call for a P.O.

Special DLs (RR I RR II DW QAPP See Lab PM Call Proj. PM)

Specifications: FAX RESULTS TO NUMBER LISTED ABOVE

Sampler Name: Monica Slent Signature: [signature]

Analyses: BTEX by (8020) 8021 8260 602 624 Other; BTEX-MTBE by 8020 8021 8260 602 624 Other; TPH by TX1005 418.1 8015GRO (8015DRO) 8015JetF; PAHs by 8270 8100 8310; METALS by 6010 8RCRA Tot Pb TCLP8 13PP 23TAL See List; VOAs by 8260 624 BTEX MTBE PPs TCL See List Call PM; SVOAs by 8270 625 PAHs BN&A TCL PPs See List Call PM; Highest TPH from each sample ID also analysed for: SPLP TPH (1312/418.1), SPLP VOCs (1312/8260), SPLP SVOCs (1312/8270); TAT 5h 12h 20h 24h 48h 3d 5d 7d 10d 14d 21d; Addn: PAH above mg/L W, mg/Kg S Highest Hit; Hold Analysis

Remarks: SPLP Analyses on highest TPH sample for each sample ID only

#	Sample ID	Sampling Date	Time	Depth (ft)	Matrix	Composite	Grab	# Containers	Container Size	Type	Preservatives	BTEX 8020	BTEX-MTBE	TPH 8015DRO	PAHs	METALS	VOAs	SVOAs	SPLP TPH	SPLP VOCs	SPLP SVOCs	TAT	Addn: PAH	Hold Analysis
1	SB-1	11/2/98		15-17	S		X	1	8oz	G	Ice	X		X					X	X	X			
2	SB-1	11/2/98		20-22	S		X	1	8oz	G	Ice	X		X					X	X	X			
3	MW-1	11/2/98		2-4	S		X	1	8oz	G	Ice	X		X					X	X	X			
4	MW-1	11/2/98		20-22	S		X	1	8oz	G	Ice	X		X					X	X	X			
5	MW-2	11/3/98		0-2	S		X	1	8oz	G	Ice	X		X					X	X	X			
6	MW-2	11/3/98		15-17	S		X	1	8oz	G	Ice	X		X					X	X	X			
7	MW-3	11/3/98		0-2	S		X	1	8oz	G	Ice	X		X					X	X	X			
8	MW-3	11/3/98		20-22	S		X	1	8oz	G	Ice	X		X					X	X	X			
9																								
10																								

Lab Only Additions: From: / Rcv by: / Date (×3)

EXPORT 1 — N240 1475 89 0

#	Relinquished by (Initials and Signature)	Relinquished to (Initials and Signature)	Date & Time	
1	[signature]		11/4/98 1600	Total Containers per COC: 8
2			Via U.P.S	Rush TATs Fax Due: Final Fax Due:
3		Lab: Johnny Ohm [signature]	11/5/98 10:10	Final Report Data Package Due Date:
				Rush Charges are Pre-Approved upon Requesting them. All Terms Apply

Preservatives - Various (V), HCl pH<2 (H), H2SO4 pH<2 (S), HNO4 pH<2 (N), NaOH+Asbc Acid (NAA), ZnAc+NaOH (ZA), (Cool,<4C) (C4), None (N), See Label (SL), Other (O)

SIZE: 4oz (4), 8oz (8), 32oz (32), 40ml VOA (V), 1L (1), 500ml (.5), Tedlar Bag (B), Wipe (W), Other ____ **TYPE** Glass Amb (GA), Glass Clear (GC), Plastic (P), Other (O)

ANALYTICAL REPORT 1-84450

for

K.E.I. Consultants, Inc.

Project Manager: Stan Grover

Project Name: 810051-1-0

Project Id: 810051-1-0

December 3, 1998

XENCO Laboratories

HOUSTON - DALLAS - SAN ANTONIO

11381 Meadowglen Lane Suite L * Houston, Texas 77082-2647
Phone (281) 589-0692 Fax (281) 589-0695

XENCO Laboratories

11381 Meadowglen Suite L
Houston, Texas 77082-2647
(281) 589-0692 Fax: (281) 589-0695
Houston - Dallas - San Antonio - Latin America

December 3, 1998

Project Manager: Stan Grover
K.E.I. Consultants, Inc.
5309 Wurzbach Rd. Suite 100
San Antonio, TX 78238

Reference: **XENCO Report No.: 1-84450**
Project Name: 810051-1-0
Project ID: 810051-1-0
Project Address: Lea County, NM.

Dear Stan Grover:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with XENCO Chain of Custody Number 1-84450. All results being reported to you apply only to the samples analyzed, properly identified with a Laboratory ID number. This letter documents the official transmission of the contents of the report and validates the information contained within.

All the results for the quality control samples passed thorough examination. Also, all parameters for data reduction and validation checked satisfactorily. In view of this, we are able to release the analytical data for this report within acceptance criteria for accuracy, precision, completeness or properly flagged.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by XENCO Laboratories. This report will be filed for at least 3 years in our archives and after that time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in COC No. 1-84450 will be filed for 60 days, and after that time they will be properly disposed of without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

XENCO operates under the A2LA guidelines. Our Quality System meets ISO/IEC Guide 25 requirements which is strictly implemented and enforced through our standard QA/QC procedures.

We thank you for selecting XENCO Laboratories to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Sincerely,

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

ANALYTICAL CHAIN OF CUSTODY REPORT
CHRONOLOGY OF SAMPLES

K.E.I. Consultants, Inc.

Project ID: 810051-1-0
Project Manager: Stan Grover
Project Location: Lea County, NM.

Project Name: 810051-1-0

XENCO COC#: 1-84450
Date Received in Lab: Nov 18, 1998 12:20 by JO
XENCO contact : Carlos Castro/Karen Olson

	Field ID	Lab. ID	Method Name	Method ID	Units	Turn Around	Date and Time: Sample Collected	Date and Time: Addition Requested	Date and Time: Extraction	Date and Time: Analysis
1	MW-1	184450-001	BTEX	SW-846	ppm	10 days	Nov 17, 1998 12:45		Nov 18, 1998 by HL	Nov 18, 1998 16:35 by HL
2			PAHs	SW846-8270	mg/L	10 days	Nov 17, 1998 12:45		Nov 19, 1998 by SS	Nov 20, 1998 16:09 by MM
3			Tot. Metals	EPA	mg/L	10 days	Nov 17, 1998 12:45		Nov 24, 1998 by ALO	Nov 24, 1998 15:29 by MAB
4			TDS	EPA 160.1	mg/L	10 days	Nov 17, 1998 12:45		Nov 19, 1998 by JO	Nov 20, 1998 15:10 by JO
5			Anions	EPA 300.0	mg/L	10 days	Nov 17, 1998 12:45		Nov 20, 1998 by OR	Nov 20, 1998 23:35 by OR
6			Total Metals	EPA 6010	mg/L	10 days	Nov 17, 1998 12:45		Nov 24, 1998 by AO	Dec 1, 1998 15:14 by CG
7			Carbonate	SM4500CO2D	mg/L	Standard	Nov 17, 1998 12:45		Nov 23, 1998 by IF	Nov 23, 1998 10:20 by IF
8			Bicarbonate	SM 4500CO2D	mg/L	10 days	Nov 17, 1998 12:45		Nov 23, 1998 by IF	Nov 23, 1998 10:20 by IF
9	MW-2	184450-002	BTEX	SW-846	ppm	10 days	Nov 17, 1998 12:00		Nov 18, 1998 by HL	Nov 18, 1998 16:53 by HL
10			PAHs	SW846-8270	mg/L	10 days	Nov 17, 1998 12:00		Nov 19, 1998 by SS	Nov 20, 1998 16:54 by MM
11			Tot. Metals	EPA	mg/L	10 days	Nov 17, 1998 12:00		Nov 24, 1998 by ALO	Nov 24, 1998 15:36 by MAB
12			TDS	EPA 160.1	mg/L	10 days	Nov 17, 1998 12:00		Nov 19, 1998 by JO	Nov 20, 1998 15:15 by JO
13			Anions	EPA 300.0	mg/L	10 days	Nov 17, 1998 12:00		Nov 20, 1998 by OR	Nov 20, 1998 23:44 by OR
14			Total Metals	EPA 6010	mg/L	10 days	Nov 17, 1998 12:00		Nov 24, 1998 by AO	Dec 1, 1998 15:28 by CG
15			Carbonate	SM4500CO2D	mg/L	Standard	Nov 17, 1998 12:00		Nov 23, 1998 by IF	Nov 23, 1998 10:30 by IF
16			Bicarbonate	SM 4500CO2D	mg/L	10 days	Nov 17, 1998 12:00		Nov 23, 1998 by IF	Nov 23, 1998 10:30 by IF
17	MW-3	184450-003	BTEX	SW-846	ppm	10 days	Nov 17, 1998 12:30		Nov 18, 1998 by HL	Nov 18, 1998 17:12 by HL
18			PAHs	SW846-8270	mg/L	10 days	Nov 17, 1998 12:30		Nov 19, 1998 by SS	Dec 1, 1998 00:06 by MM
19			Tot. Metals	EPA	mg/L	10 days	Nov 17, 1998 12:30		Nov 24, 1998 by ALO	Nov 24, 1998 16:02 by MAB
20			TDS	EPA 160.1	mg/L	10 days	Nov 17, 1998 12:30		Nov 19, 1998 by JO	Nov 20, 1998 15:25 by JO
21			Anions	EPA 300.0	mg/L	10 days	Nov 17, 1998 12:30		Nov 20, 1998 by OR	Nov 20, 1998 23:55 by OR
22			Total Metals	EPA 6010	mg/L	10 days	Nov 17, 1998 12:30		Nov 24, 1998 by AO	Dec 1, 1998 15:34 by CG
23			Carbonate	SM4500CO2D	mg/L	Standard	Nov 17, 1998 12:30		Nov 23, 1998 by IF	Nov 23, 1998 10:40 by IF
24			Bicarbonate	SM 4500CO2D	mg/L	10 days	Nov 17, 1998 12:30		Nov 23, 1998 by IF	Nov 23, 1998 10:40 by IF

XENCO Laboratories

CERTIFICATE OF ANALYSIS SUMMARY 1-84450

K.E.I. Consultants, Inc.

Project Name: 810051-1-0

Project ID: 810051-1-0
Project Manager: Stan Grover
Project Location: Lea County, NM.

Date Received in Lab : Nov 18, 1998 12:20
Date Report Faxed: Dec 3, 1998
XENCO contact : Carlos Castro/Karen Olson

Analysis Requested	*Lab ID:* / *Field ID:* / *Depth:* / *Matrix:* / *Sampled:*	184450 001 MW-1 Liquid 11/17/98 12:45		184450 002 MW-2 Liquid 11/17/98 12:00		184450 003 MW-3 Liquid 11/17/98 12:30	
Total Metals (ICP) EPA 6010	*Analyzed:* / *Units:*	12/01/98 mg/L	R.L.	12/01/98 mg/L	R.L.	12/01/98 mg/L	R.L.
Boron		5.10	(0.11)	4.37	(0.11)	3.70	(0.11)
Molybdenum		< 0.22	(0.22)	< 0.22	(0.22)	< 0.22	(0.22)
Silicon		52.5	(0.6)	44.9	(0.6)	56.3	(0.6)
Sodium		3180	(5.6)	2740	(5.6)	2500	(5.6)
Strontium		21.5	(0.2)	22.1	(0.2)	21.9	(0.2)
Tin		< 0.22	(0.22)	< 0.22	(0.22)	0.41	(0.22)
BTEX EPA 8021B	*Analyzed:* / *Units:*	11/18/98 ppm	R.L.	11/18/98 ppm	R.L.	11/18/98 ppm	R.L.
Benzene		< 0.001	(0.001)	< 0.001	(0.001)	< 0.001	(0.001)
Toluene		< 0.001	(0.001)	< 0.001	(0.001)	< 0.001	(0.001)
Ethylbenzene		< 0.001	(0.001)	< 0.001	(0.001)	< 0.001	(0.001)
m,p-Xylene		< 0.002	(0.002)	< 0.002	(0.002)	< 0.002	(0.002)
o-Xylene		< 0.001	(0.001)	< 0.001	(0.001)	< 0.001	(0.001)
Total BTEX			N.D.		N.D.		N.D.
PAHs by GC-MS EPA 8270	*Analyzed:* / *Units:*	11/20/98 mg/L	R.L.	11/20/98 mg/L	R.L.	12/01/98 mg/L	R.L.
Acenaphthene		< 0.002	(0.002)	< 0.002	(0.002)	< 0.002	(0.002)
Acenaphthylene		< 0.002	(0.002)	< 0.002	(0.002)	< 0.002	(0.002)
Anthracene		< 0.002	(0.002)	< 0.002	(0.002)	< 0.002	(0.002)
Benz(a)anthracene		< 0.002	(0.002)	< 0.002	(0.002)	< 0.002	(0.002)
Benzo(a)pyrene		< 0.002	(0.002)	< 0.002	(0.002)	< 0.002	(0.002)
Benzo(b)fluoranthene		< 0.002	(0.002)	< 0.002	(0.002)	< 0.002	(0.002)
Benzo(g,h,i)perylene		< 0.002	(0.002)	< 0.002	(0.002)	< 0.002	(0.002)
Benzo(k)fluoranthene		< 0.002	(0.002)	< 0.002	(0.002)	< 0.002	(0.002)
Chrysene		< 0.002	(0.002)	< 0.002	(0.002)	< 0.002	(0.002)
Dibenz(a,h)anthracene		< 0.002	(0.002)	< 0.002	(0.002)	< 0.002	(0.002)
Fluoranthene		< 0.002	(0.002)	< 0.002	(0.002)	< 0.002	(0.002)
Fluorene		< 0.002	(0.002)	< 0.002	(0.002)	< 0.002	(0.002)
Indeno(1,2,3-cd)pyrene		< 0.002	(0.002)	< 0.002	(0.002)	< 0.002	(0.002)
Naphthalene		< 0.002	(0.002)	< 0.002	(0.002)	< 0.002	(0.002)
Phenanthrene		< 0.002	(0.002)	< 0.002	(0.002)	< 0.002	(0.002)
Pyrene		< 0.002	(0.002)	< 0.002	(0.002)	< 0.002	(0.002)

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

CERTIFICATE OF ANALYSIS SUMMARY 1-84450

K.E.I. Consultants, Inc.

Project Name: 810051-1-0

Project ID: 810051-1-0
Project Manager: Stan Grover
Project Location: Lea County, NM.

Date Received in Lab : Nov 18, 1998 12:20
Date Report Faxed: Dec 3, 1998
XENCO contact : Carlos Castro/Karen Olson

Analysis Requested	*Lab ID:* / *Field ID:* / *Depth:* / *Matrix:* / *Sampled:*	184450 001 MW-1 Liquid 11/17/98 12:45		184450 002 MW-2 Liquid 11/17/98 12:00		184450 003 MW-3 Liquid 11/17/98 12:30	
Bicarbonate	*Analyzed:*	11/23/98		11/23/98		11/23/98	
SM 4500CO2D	*Units:*	mg/L	R.L.	mg/L	R.L.	mg/L	R.L.
Bicarbonate		410	(4.0)	328	(4.0)	543	(4.0)
Carbonate	*Analyzed:*	11/23/98		11/23/98		11/23/98	
SM4500CO2D	*Units:*	mg/L	R.L.	mg/L	R.L.	mg/L	R.L.
Carbonate		< 4.0	(4.0)	< 4.0	(4.0)	< 4.0	(4.0)
Total Dissolved Solids	*Analyzed:*	11/20/98		11/20/98		11/20/98	
EPA 160.1	*Units:*	mg/L	R.L.	mg/L	R.L.	mg/L	R.L.
Total Dissolved Solids		11800	(25.0)	10900	(25.0)	8790	(25.0)
Total Metals by ICP-MS	*Analyzed:*	11/24/98		11/24/98		11/24/98	
ICP-MS Metal	*Units:*	mg/L	R.L.	mg/L	R.L.	mg/L	R.L.
Aluminum		2.10	(1.11)	1.26	(1.11)	4.85	(1.11)
Arsenic		0.320	(0.056)	0.343	(0.056)	0.226	(0.056)
Barium		0.122	(0.028)	0.165	(0.028)	0.228	(0.028)
Beryllium		< 0.006	(0.006)	< 0.006	(0.006)	< 0.006	(0.006)
Cadmium		< 0.006	(0.006)	< 0.006	(0.006)	< 0.006	(0.006)
Calcium		642	(1.1)	958	(1.1)	570	(1.1)
Chromium		< 0.028	(0.028)	< 0.028	(0.028)	< 0.028	(0.028)
Cobalt		< 0.028	(0.028)	< 0.028	(0.028)	< 0.028	(0.028)
Copper		< 0.028	(0.028)	< 0.028	(0.028)	< 0.028	(0.028)
Iron		1.22	(0.56)	0.94	(0.56)	2.11	(0.56)
Lead		0.015	(0.011)	< 0.011	(0.011)	0.024	(0.011)
Magnesium		386	(1.1)	333	(1.1)	319	(1.1)
Manganese		0.387	(0.056)	0.351	(0.056)	0.537	(0.056)
Mercury		< 0.002	(0.002)	< 0.002	(0.002)	< 0.002	(0.002)
Nickel		< 0.028	(0.028)	< 0.056	(0.056)	< 0.056	(0.056)
Potassium		81.4	(2.8)	76.4	(2.8)	60.8	(2.8)
Selenium		0.215	(0.005)	0.062	(0.050)	0.057	(0.005)
Silver		< 0.028	(0.028)	< 0.028	(0.028)	< 0.028	(0.028)
Vanadium		0.843	(0.028)	0.621	(0.028)	0.688	(0.028)
Zinc		0.131	(0.028)	< 0.028	(0.028)	0.112	(0.028)
Anions by Ion Chromatography	*Analyzed:*	11/20/98		11/20/98		11/20/98	
EPA 300.0	*Units:*	mg/L	R.L.	mg/L	R.L.	mg/L	R.L.
Chloride		4050	(40)	3690	(40)	4300	(40)
Sulfate		2140	(40)	2530	(40)	1610	(40)

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch 8A46A77

EPA 6010 Total Metals (ICP)

Date Validated: Dec 2, 1998 16:33
Date Analyzed: Dec 1, 1998 14:39

Analyst: CG
Matrix: Liquid

BLANK SPIKE ANALYSIS

Parameter	[A] Blank Result mg/L	[B] Blank Spike Result mg/L	[C] Blank Spike Amount mg/L	[D] Detection Limit mg/L	[E] QC LIMITS Blank Spike Recovery %	[F] QC LIMITS Recovery Range %	[G] Qualifier
Boron	< 0.111	2.019	2.220	0.111	90.9	70-125	
Molybdenum	< 0.333	0.996	1.110	0.333	89.7	70-125	
Silicon	< 0.556	4.432	4.440	0.556	99.8	70-125	
Sodium	< 1.11	13.43	13.33	1.11	100.8	70-125	
Strontium	< 0.222	1.932	2.220	0.222	87.0	70-125	
Tin	< 0.222	2.399	2.220	0.222	108.1	70-125	

Blank Spike Recovery [E] = 100*(B-A)/(C)
N.C. = Not calculated, data below detection limit
N.D. = Below detection limit
All results are based on MDL and validated for QC purposes only

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch = 18A46A77

EPA 6010 Total Metals (ICP)

Date Validated: Dec 2, 1998 16:33
Date Analyzed: Dec 1, 1998 14:54

Analyst: CG
Matrix: Liquid

	MATRIX DUPLICATE ANALYSIS					
Q.C. Sample ID 184449- 001	[A] Sample Result	[B] Duplicate Result	[C]	[D] QC	[E] LIMITS	[F]
Parameter			Detection Limit	Relative Difference	Relative Difference	Qualifier
	mg/L	mg/L	mg/L	%	%	
Boron	5.06	5.12	0.11	1.2	25.0	
Molybdenum	0.630	0.631	0.333	0.2	25.0	
Silicon	26.76	26.38	0.56	1.4	25.0	
Sodium	2270	2320	1.11	2.2	25.0	*
Strontium	11.86	11.58	0.22	2.4	25.0	
Tin	< 0.222	< 0.222	0.222	N.C	25.0	

Relative Difference [D] = 200*(B-A)/(B+A)
N.C. = Not calculated, data below detection limit
N.D. = Below detection limit
All results are based on MDL and validated for QC purposes only

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 18A48A33

EPA 200.8 Total Metals by ICP- MS

Date Validated: Nov 25, 1998 09:24
Date Analyzed: Nov 24, 1998 14:44

Analyst: MAB
Matrix: Liquid

BLANK SPIKE ANALYSIS

Parameter	[A] Blank Result mg/L	[B] Blank Spike Result mg/L	[C] Blank Spike Amount mg/L	[D] Detection Limit mg/L	[E] QC LIMITS Blank Spike Recovery %	[F] QC LIMITS Recovery Range %	[G] Qualifier
Aluminum	< 0.56	2.10	2.22	0.56	94.6	70-125	
Arsenic	< 0.0278	1.9344	2.2200	0.0278	87.1	70-125	
Barium	< 0.0278	0.9761	1.1100	0.0278	87.9	70-125	
Beryllium	< 0.0056	0.3983	0.4440	0.0056	89.7	70-125	
Cadmium	< 0.0056	0.4061	0.4440	0.0056	91.5	75-125	
Calcium	< 0.56	1.56	2.22	0.56	70.3	70-125	
Chromium	< 0.0111	0.9878	1.1000	0.0111	89.8	70-125	
Cobalt	< 0.0278	0.9917	1.1100	0.0278	89.3	70-125	
Copper	< 0.0278	1.0128	1.1100	0.0278	91.2	70-125	
Iron	< 0.556	2.389	2.220	0.556	107.6	70-125	
Lead	< 0.0111	1.8856	2.2200	0.0111	84.9	70-125	
Magnesium	< 0.56	4.39	4.44	0.56	98.9	70-125	
Manganese	< 0.0556	2.0461	2.2200	0.0556	92.2	70-125	
Mercury	< 0.0028	0.0056	0.0056	0.0028	100.0	75-125	
Nickel	< 0.0278	0.9861	1.1100	0.0278	88.8	70-125	
Potassium	< 2.778	4.111	4.440	2.778	92.6	70-125	
Selenium	< 0.0556	1.9850	2.2000	0.0556	90.2	70-125	
Silver	< 0.0278	0.5689	0.5560	0.0278	102.3	70-125	
Vanadium	< 0.0278	0.9517	1.1100	0.0278	85.7	70-125	
Zinc	< 0.0278	0.9650	1.1100	0.0278	86.9	70-125	

Blank Spike Recovery [E] = 100*(B-A)/(C)
N.C. = Not calculated, data below detection limit
N.D. = Below detection limit
All results are based on MDL and validated for QC purposes only

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 18A48A33

EPA 200.8 Total Metals by ICP- MS

Date Validated: Nov 25, 1998 09:24
Date Analyzed: Nov 24, 1998 15:03

Analyst: MAB
Matrix: Liquid

Q.C. Sample ID 184449- 001	MATRIX DUPLICATE ANALYSIS					MATRIX SPIKE ANALYSIS				
	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[G]
				QC	LIMITS			QC	LIMITS	
Parameter	Sample Result	Duplicate Result	Detection Limit	Relative Difference	Relative Difference	Matrix Spike Result	Matrix Spike Amount	Matrix Spike Recovery	Recovery Range	Qualifier
	mg/L	mg/L	mg/L	%	%	mg/L	mg/L	%	%	
Aluminum	1.267	1.182	0.556	6.9	25.0	3.556	2.20	104.0	70-125	
Arsenic	1.624	1.622	0.028	0.1	25.0	3.246	2.20	73.7	70-125	
Barium	0.0994	0.0978	0.0278	1.6	25.0	1.0944	1.100	90.5	70-125	
Beryllium	< 0.0056	< 0.0056	0.0056	N.C	25.0	0.3117	0.444	70.2	70-125	
Cadmium	< 0.0056	< 0.0056	0.0056	N.C	20.0	*0.3400*	*0.444*	76.6	75-125	
Calcium	639	636	0.56	0.5	25.0	563	4.4	1727	70-125	A,B
Chromium	< 0.0111	< 0.0111	0.0111	N.C	25.0	0.9261	1.100	84.2	70-125	
Cobalt	< 0.0278	< 0.0278	0.0278	N.C	25.0	0.9056	1.100	82.3	70-125	
Copper	< 0.0278	< 0.0278	0.0278	N.C	25.0	0.8856	1.100	80.5	70-125	
Iron	0.556	< 0.556	0.556	N.C	25.0	2.944	2.22	107.6	70-125	
Lead	< 0.0111	< 0.0111	0.0111	N.C	25.0	2.0061	2.220	90.4	70-125	
Magnesium	289	282	0.56	2.5	25.0	249	4.4	900.9	70-125	A,B
Manganese	0.4133	0.4106	0.0556	0.7	25.0	2.2350	2.220	82.1	70-125	

(A) High analyte concentration affects spike recovery.
(B) LCS within acceptance limits.
Relative Difference [D] = 200*(B-A)/(B+A)
Matrix Spike Recovery [H] = 100*(F-A)/[G]
N.C. = Not calculated, data below detection limit
N.D. = Below detection limit
All results are based on MDL and validated for QC purposes only

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 18A48A33

EPA 200.8 Total Metals by ICP- MS

Date Validated: Nov 25, 1998 09:24
Date Analyzed: Nov 24, 1998 15:03

Analyst: MAB
Matrix: Liquid

	MATRIX DUPLICATE ANALYSIS					MATRIX SPIKE ANALYSIS				
Q.C. Sample ID 184449- 001	[A]	[B]	[C]	[D]	[E]	[F]	[G]	[H]	[I]	[G]
	Sample	Duplicate		QC	LIMITS	Matrix Spike	Matrix	QC	LIMITS	
Parameter	Result	Result	Detection Limit	Relative Difference	Relative Difference	Result	Spike Amount	Matrix Spike Recovery	Recovery Range	Qualifier
	mg/L	mg/L	mg/L	%	%	mg/L	mg/L	%	%	
Mercury	< 0.0028	< 0.0028	0.0028	N.C	20.0	0.0033	0.006	58.9	75-125	B
Nickel	< 0.0278	< 0.0278	0.0278	N.C	25.0	0.8617	1.100	78.3	70-125	
Potassium	116	114	2.7778	1.7	25.0	104	4.400	272.7	70-125	A,B
Selenium	0.6061	0.6167	0.0556	1.7	25.0	2.2644	2.200	75.4	70-125	
Silver	< 0.0278	< 0.0278	0.0278	N.C	25.0	0.4811	0.556	86.5	70-125	
Vanadium	0.4189	0.4156	0.0278	0.8	25.0	1.3300	1.100	82.8	70-125	
Zinc	0.0294	< 0.0278	0.0278	N.C	25.0	0.7472	1.100	65.3	70-125	B

(A) High analyte concentration affects spike recovery.
(B) LCS within acceptance limits.
Relative Difference [D] = 200*(B-A)/(B+A)
Matrix Spike Recovery [H] = 100*(F-A)/[G]
N.C. = Not calculated, data below detection limit
N.D. = Below detection limit
All results are based on MDL and validated for QC purposes only

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 18A25E10

SW- 846 5030/8021B BTEX

Date Validated: Nov 19, 1998 13:15
Date Analyzed: Nov 18, 1998 14:24

Analyst: HL
Matrix: Liquid

	BLANK SPIKE ANALYSIS						
Parameter	[A] Blank Result ppm	[B] Blank Spike Result ppm	[C] Blank Spike Amount ppm	[D] Detection Limit ppm	[E] QC Blank Spike Recovery %	[F] LIMITS Recovery Range %	[G] Qualifier
Benzene	< 0.0010	0.1060	0.1000	0.0010	106.0	65-135	
Toluene	< 0.0010	0.1060	0.1000	0.0010	106.0	65-135	
Ethylbenzene	< 0.0010	0.1040	0.1000	0.0010	104.0	65-135	
m,p-Xylene	< 0.0020	0.2100	0.2000	0.0020	105.0	65-135	
o-Xylene	< 0.0010	0.1050	0.1000	0.0010	105.0	65-135	

Blank Spike Recovery [E] = 100*(B-A)/(C)
N.C. = Not calculated, data below detection limit
N.D. = Below detection limit
All results are based on MDL and validated for QC purposes only

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 18A25E10

SW- 846 5030/8021B BTEX

Date Validated: Nov 19, 1998 13:15
Date Analyzed: Nov 18, 1998 15:02

Analyst: HL
Matrix: Liquid

	MATRIX SPIKE / MATRIX SPIKE DUPLICATE AND RECOVERY										
Q.C. Sample ID 184445- 002	[A] Sample Result	[B] Matrix Spike Result	[C] Matrix Spike Duplicate Result	[D] Matrix Spike Amount	[E] Detection Limit	Matrix Limit Relative Difference	[F] QC Spike Relative Difference	[G] QC Matrix Spike Recovery	[H] QC M.S.D. Recovery	[I] Matrix Spike Recovery Range	[J] Qualifier
Parameter	ppm	ppm	ppm	ppm	ppm	%	%	%	%	%	
Benzene	< 0.0010	0.1030	0.1030	0.1000	0.0010	20.0	0.0	103.0	103.0	65-135	
Toluene	< 0.0010	0.1030	0.1020	0.1000	0.0010	20.0	1.0	103.0	102.0	65-135	
Ethylbenzene	< 0.0010	0.1010	0.1000	0.1000	0.0010	20.0	1.0	101.0	100.0	65-135	
m,p-Xylene	< 0.0020	0.2080	0.2040	0.2000	0.0020	20.0	1.0	103.0	102.0	65-135	
o-Xylene	< 0.0010	0.1040	0.1030	0.1000	0.0010	20.0	1.0	104.0	103.0	65-135	

Spike Relative Difference [F] = 200*(B-C)/(B+C)
Matrix Spike Recovery [G] = 100*(B-A)/[D]
M.S.D. = Matrix Spike Duplicate
M.S.D. Recovery [H] = 100*(C-A)/[D]
N.D. = Below detection limit or not detected
All results are based on MDL and validated for QC purposes

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 18A20C17

SM 4500CO2D Bicarbonate

Date Validated: Nov 23, 1998 16:04
Date Analyzed: Nov 23, 1998 09:10

Analyst: IF
Matrix: Liquid

BLANK SPIKE ANALYSIS

Parameter	[A] Blank Result mg/L	[B] Blank Spike Result mg/L	[C] Blank Spike Amount mg/L	[D] Detection Limit mg/L	[E] QC Blank Spike Recovery %	[F] LIMITS Recovery Range %	[G] Qualifier
Bicarbonate	< 4.00	250	250	4.00	100.0	70-125	

Blank Spike Recovery [E] = 100(B-A)/(C)*
N.C. = Not calculated, data below detection limit
N.D. = Below detection limit
All results are based on MDL and validated for QC purposes only

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch = 18A20C17

SM 4500CO2D Bicarbonate

Date Validated: Nov 23, 1998 16:04
Date Analyzed: Nov 23, 1998 09:40

Analyst: IF
Matrix: Liquid

	MATRIX DUPLICATE ANALYSIS					
Q.C. Sample ID 184449- 001	[A] Sample Result	[B] Duplicate Result	[C]	[D] QC	[E] LIMITS	[F]
Parameter			Detection Limit	Relative Difference	Relative Difference	Qualifier
	mg/L	mg/L	mg/L	%	%	
Bicarbonate	318	320	4.00	0.6	25.0	

Relative Difference [D] = 200*(B-A)/(B+A)
N.C. = Not calculated, data below detection limit
N.D. = Below detection limit
All results are based on MDL and validated for QC purposes only

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch - 184449C18

SM4500CO2D Carbonate

Date Validated: Nov 23, 1998 16:04
Date Analyzed: Nov 23, 1998 09:40

Analyst: IF
Matrix: Liquid

	MATRIX DUPLICATE ANALYSIS					
Q.C. Sample ID 184449- 001	[A] Sample Result	[B] Duplicate Result	[C]	[D] QC	[E] LIMITS	[F]
Parameter			Detection Limit	Relative Difference	Relative Difference	Qualifier
	mg/L	mg/L	mg/L	%	%	
Carbonate	< 4.00	< 4.00	4.00	N.C	25.0	

Relative Difference [D] = 200*(B-A)/(B+A)
N.C. = Not calculated, data below detection limit
N.D. = Below detection limit
All results are based on MDL and validated for QC purposes only

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch 184470A07

EPA 160.1 Total Dissolved Solids

Date Validated: Nov 20, 1998 17:00
Date Analyzed: Nov 20, 1998 15:15

Analyst: JO
Matrix: Liquid

	MATRIX DUPLICATE ANALYSIS					
Q.C. Sample ID 184450- 002	[A] Sample Result	[B] Duplicate Result	[C]	[D] QC	[E] LIMITS	[F]
Parameter			Detection Limit	Relative Difference	Relative Difference	Qualifier
	mg/L	mg/L	mg/L	%	%	
Total Dissolved Solids	10900	10900	25.00	0.0	25.0	

Relative Difference [D] = 200*(B-A)/(B+A)
N.C. = Not calculated, data below detection limit
N.D. = Below detection limit
All results are based on MDL and validated for QC purposes only

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 18A10C80

EPA 300.0 Anions by Ion Chromatography

Date Validated: Nov 25, 1998 00:41
Date Analyzed: Nov 20, 1998 21:28

Analyst: OR
Matrix: Liquid

	BLANK SPIKE / BLANK SPIKE DUPLICATE AND RECOVERY										
Parameter	[A] Blank Result mg/L	[B] Blank Spike Result mg/L	[C] Blank Spike Duplicate Result mg/L	[D] Blank Spike Amount mg/L	[E] Detection Limit mg/L	Blank Limit Relative Difference %	[F] QC Spike Relative Difference %	[G] QC Blank Spike Recovery %	[H] QC B.S.D. Recovery %	[I] Blank Spike Recovery Range %	[J] Qualifier
Chloride	< 0.20	5.23	5.06	5.00	0.20	20.0	3.3	104.6	101.2	70-125	
Fluoride	< 0.10	5.22	5.16	5.00	0.10	20.0	1.2	104.4	103.2	70-125	
Sulfate	< 0.20	5.44	5.25	5.00	0.20	20.0	3.6	108.8	105.0	70-125	

Spike Relative Difference [F] = 200*(B-C)/(B+C)
Blank Spike Recovery [G] = 100*(B-A)/[D]
B.S.D. = Blank Spike Duplicate
B.S.D. Recovery [H] = 100*(C-A)/[D]
N.D. = Below detection limit or not detected
All results are based on MDL and validated for QC purposes

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch 184450

EPA 300.0 Anions by Ion Chromatography

Date Validated: Nov 25, 1998 00:41
Date Analyzed: Nov 20, 1998 23:55

Analyst: OR
Matrix: Liquid

	MATRIX DUPLICATE ANALYSIS					
Q.C. Sample ID 184450- 003	[A] Sample Result	[B] Duplicate Result	[C]	[D] QC	[E] LIMITS	[F]
Parameter			Detection Limit	Relative Difference	Relative Difference	Qualifier
	mg/L	mg/L	mg/L	%	%	
Chloride	4300	4350	40	1.2	20.0	
Sulfate	1610	1610	40	0.0	20.0	

Relative Difference [D] = 200*(B-A)/(B+A)
N.C. = Not calculated, data below detection limit
N.D. = Below detection limit
All results are based on MDL and validated for QC purposes only

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch: 18A34F05

SW846- 8270 Semivolatiles (SVOCs TCL)

Date Validated: Nov 25, 1998 17:00
Date Analyzed: Nov 20, 1998 10:04

Analyst: MM
Matrix: Liquid

BLANK SPIKE / BLANK SPIKE DUPLICATE AND RECOVERY

Parameter	[A] Blank Result mg/L	[B] Blank Spike Result mg/L	[C] Blank Spike Duplicate Result mg/L	[D] Blank Spike Amount mg/L	[E] Detection Limit mg/L	Blank Limit Relative Difference %	[F] QC Spike Relative Difference %	[G] QC Blank Spike Recovery %	[H] QC B.S.D. Recovery %	[I] Blank Spike Recovery Range %	[J] Qualifier
Acenaphthene	< 0.0025	0.0442	0.0471	0.0500	0.0025	31.0	6.4	88.4	94.2	46-118	
4-Chloro-3-methylphenol	< 0.0038	0.0368	0.0404	0.0500	0.0038	42.0	9.3	73.6	80.8	23-97	
2-Chlorophenol	< 0.0050	0.0357	0.0385	0.0500	0.0050	40.0	7.5	71.4	77.0	27-123	
1,4-Dichlorobenzene	< 0.0042	0.0388	0.0414	0.0500	0.0042	28.0	6.5	77.6	82.8	36-97	
2,4-Dinitrotoluene	< 0.0050	0.0397	0.0425	0.0500	0.0050	38.0	6.8	79.4	85.0	24-96	
N-Nitrosodi-n-propylamine	< 0.0040	0.0390	0.0426	0.0500	0.0040	38.0	8.8	78.0	85.2	41-116	
4-Nitrophenol	< 0.0040	0.0163	0.0181	0.0500	0.0040	50.0	10.5	32.6	36.2	10-80	
Pentachlorophenol	< 0.0086	0.0255	0.0285	0.0500	0.0086	50.0	11.1	51.0	57.0	9-103	
Phenol	< 0.0037	0.0113	0.0129	0.0500	0.0037	42.0	13.2	22.6	25.8	12-89	
Pyrene	< 0.0020	0.0499	0.0527	0.0500	0.0020	31.0	5.5	99.8	105.4	26-127	
1,2,4-Trichlorobenzene	< 0.0054	0.0380	0.0405	0.0500	0.0054	28.0	6.4	76.0	81.0	39-98	

Spike Relative Difference [F] = 200*(B-C)/(B+C)
Blank Spike Recovery [G] = 100*(B-A)/[D]
B.S.D. = Blank Spike Duplicate
B.S.D. Recovery [H] = 100*(C-A)/[D]
N.D. = Below detection limit or not detected

Eddie L. Clemons, II
QA/QC Manager

XENCO Laboratories

- ☐ 11381 Meadowglen, Suite L, Houston TX 77082 281-589-0692
- ☒ 5309 Wurzbach Road, Suite 104, San Antonio, TX 78238 210-509-3334
- ☐ 11078 Morrison Road, Suite D, Dallas, TX 75229 972-481-9999

ANALYSIS REQUEST & CHAIN OF CUSTODY RECORD

On-LINE Help & Technical Services at XENCO.com

10444

Company COC No: 214 Work Order No: 810051-1-0 Page 1 of 1

Company: KEI Phone:

Project Name: 8100 51-1-Ø ☐ Previously done at XENCO Project ID:

Location: LEA COUNTY NM

Project Manager (PM): S. GROVER Project Director (PD): M. HAWTHORNE

Fax Results to ☒ PM and / or Fax: (210) 680-3763

Invoice to ☐ Accounting ☐ Include Invoice with Final Report Attn PM ☐ Invoice must have a P.O Bill to:

Quote No. P.O No 810051-1-0 ☐ Call for a P.O.

Special DLs (RR I RR II DW QAPP See Lab PM Call Proj. PM)

Specifications

Sampler Name: Ken Dutton Signature: [signature]

Lab Only: 18450-SA

TAT: 5h 12h 20h 24h 48h 3d 5d 7d 14d 21d (Standard) TAT is 10 Working Days unless otherwise agreed in writing. But often reported in 5-7 Working Days

	Sample ID	Sampling Date	Time	Depth ft' in" m	Matrix A P S W	Composite	Grab	# Containers	Container Size	Type	Preservatives	BTEX by 8020 8021 8260 602 624 Other	BTEX-MTBE by 8020 8021 8260 602 624 Other	TPH by TX1005 418.1 8015GRO 8015DRO 8015Jetf	PAHs by 8270 8100 8310	METALS by 6010 8RCRA Tot Pb TCLP8 13PP 23TAL See List	VOAs by 8260 624 BTEX MTBE PPs TCL See List Call PM	SVOAs by 8270 625 PAHs BN&A TCL PPs See List Call PM	CATIONS (6010) / ANIONS (300.0)	TDS - 160.1	TAT 5h 12h 20h 24h 48h 3d 5d 7d 10d 14d 21d	Addn: PAH above mg/L W. mg/Kg S Highest Hit	Hold Analysis	Remarks
1	MW-1	17NOV98	1245				X	6	✓,(1)	GA P	H, C4 HNO3	X			X	X			X	X				CONTACT S. GROVER FOR QUESTIONS @ (210) 680-3767
2	MW-2	↓	1200				↓	↓	↓	↓	↓	↓			↓	↓			↓	↓				
3	MW-3	↓	1230				↓	↓	↓	↓	↓	↓			↓	↓			↓	↓				A321 8590 334
4																								UPS. A:5:11
5																								
6																								
7																								
8																								
9																								
10																								

Lab Only Additions: From: / Rcv by: / Date (×3)

	Relinquished by (Initials and Signature)	Relinquished to (Initials and Signature)	Date & Time	
1	KD Ken Dutton		17Nov98/1530	Total Containers per COC: 18
2			Via UPS.	Rush TATs Fax Due: Final Fax Due:
3		Lab: Johnny [signature]	11/18/98 12:20	Final Report Data Package Due Date:
				Rush Charges are Pre-Approved upon Requesting them. All Terms Apply

Preservatives - Various (V), HCl pH<2 (H), H2SO4 pH<2 (S), HNO4 pH<2 (N), NaOH+Asbc Acid (NAA), ZnAc+NaOH (ZA), (Cool,<4C) (C4), None (N), See Label (SL), Other (O)

SIZE: 4oz (4), 8oz (8), 32oz (32), 40ml VOA (V), 1L (1), 500ml (.5), Tedlar Bag (B), Wipe (W), Other ______ **TYPE** Glass Amb (GA), Glass Clear (GC), Plastic (P), Other (O)

QA/QC PROCEDURES

DECONTAMINATION OF EQUIPMENT

Cleaning of drilling equipment was the responsibility of the drilling company. In general, the cleaning procedures consisted of using high pressure steam to wash the drilling and sampling equipment prior to drilling and prior to starting each hole. Prior to use, the sampling equipment was cleaned with Liqui-Nox detergent and rinsed with distilled water.

SOIL SAMPLING

Samples of the subsurface soils were obtained utilizing an air rotary drilling rig with split spoon samples at discrete intervals. Representative soil samples were divided into 2 separate portions using clean, disposable gloves and clean sampling tools. One portion of the soil sample was placed in a disposable sample bag. The bag was labeled and sealed for head-space analysis using a photo-ionization detector (PID) calibrated to a 100 ppm isobutylene standard. Each sample was allowed to volatilize for approximately 30 minutes at ambient temperature prior to conducting the analysis.

The other portion of the soil sample was placed in a sterile glass container equipped with a Teflon-lined lid furnished by the analytical laboratory. The container was filled to capacity to limit the amount of head-space present. Each container was labeled and placed on ice in an insulated cooler. Upon selection of samples for analysis, the cooler was sealed for shipment to the laboratory. Proper chain-of-custody documentation was maintained throughout the sampling process.

Soil samples were express mailed to Xenco Laboratories of San Antonio, Texas for BTEX, TPH-DRO, SPLP SVOC, SPLP VOC, and SPLP TPH analyses using the methods described below. Soil samples were prepared for analysis by the analytical laboratory for BTEX, TPH, and SPLP concentrations within 14 days following the collection date.

The soil samples were analyzed in accordance with the methods as follows:

- BTEX concentrations in accordance with EPA Method SW846-8021B
- TPH concentrations in accordance with modified EPA Method 8015-DRO
- SPLP TPH concentrations in accordance with EPA Method 1312/418.1
- SPLP VOC concentrations in accordance with EPA Method SW846-1312/8260
- SPLP SVOC concentrations in accordance with EPA Method SW846-1312/8270

GROUND WATER SAMPLING

Monitoring wells were developed and purged with a clean PVC bailer. The bailer was cleaned prior to each use with Liqui-Nox detergent and rinsed with distilled water. Monitoring wells with sufficient recharge were purged by removing a minimum of 3 well volumes. Monitoring wells that did not recharge sufficiently were purged until no additional ground water could be obtained.

After purging the wells, ground water samples were collected with a disposable Teflon sampler and polyethylene line by personnel wearing clean, disposable gloves. Ground water sample containers were filled in the order of decreasing volatilization sensitivity (i.e., BTEX containers were filled first and PAH containers second).

Ground water samples collected for BTEX analysis were placed in 40 ml glass VOA vials equipped with Teflon-lined caps. The containers provided were pre-preserved with HCl by the analytical laboratory. The vials were filled to a positive meniscus, sealed, and visually checked to ensure the absence of air bubbles.

Ground water samples collected for PAH and Cations/Anions analyses were filled to capacity in sterile, 1 liter glass containers equipped with Teflon-lined caps. Ground water samples collected for metals analysis were filled to capacity in 1 liter plastic containers pre-preserved with HNO_3 and equipped with Teflon-lined caps. The containers were provided by the analytical laboratory.

The filled containers were labeled and placed on ice in an insulated cooler. The cooler was sealed for transportation to the analytical laboratory. Proper chain-of-custody documentation was maintained throughout the sampling process.

The ground water samples were analyzed in accordance with the methods as follows:

- BTEX concentrations in accordance with EPA Method SW846-8021B
- Metals concentrations in accordance with EPA ICP Method 6010
- PAH concentrations in accordance with EPA Method 8270
- Anion concentrations in accordance with EPA Method 300
- Cation concentrations in accordance with SM Method 4500CO2D
- TDS concentrations in accordance with EPA Method 160.1

LABORATORY PROTOCOL

The laboratory was responsible for proper QA/QC procedures. These procedures are either transmitted with the laboratory reports or are on file at the laboratory.