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REPORTS

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COMPREHENSIVE ASSESSMENT REPORT

TEXAS - NEW MEXICO PIPELINE COMPANY
MONUMENT SITE NO. 18
LEA COUNTY, NEW MEXICO

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COMPREHENSIVE ASSESSMENT REPORT

MONUMENT SITE NO. 18
LEA COUNTY, NEW MEXICO

PREPARED FOR:

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September 9, 1997

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EXECUTIVE SUMMARY

This report summarizes the results of subsurface assessment activities conducted at Monument Site No. 18, located in Lea County, New Mexico. Activities were performed in general accordance with the work plan submitted with the Phase I - Preliminary Site Characterization Report prepared for the site and approved by the State of New Mexico Oil Conservation Division.

Field activities associated with the subsurface assessment consisted of advancing six soil borings and installing three monitoring wells for the collection of soil and ground water samples for laboratory analysis. A sensitive receptor survey/migration pathway evaluation was also conducted.

Results of the assessment included the following:

- Soil analytical results indicated the presence of volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) at concentrations noted within the report.
- Identified ground water impact consisted of dissolved or phase-separated hydrocarbons (PSH) within all on-site monitoring wells.
- Laboratory analysis of ground water samples obtained from monitoring wells not impacted with PSH indicated benzene, toluene, ethylbenzene and xylenes (BTEX) at concentrations noted within the report. Analysis of polycyclic aromatic hydrocarbons (PAH) indicated ND concentrations for all constituents.
- Observed impact to soils from petroleum hydrocarbons extended from the ground surface to the apparent ground water table at approximately 30 feet below ground surface.

Recommended additional assessment and remediation activities to be conducted pursuant to final site closure include:

- Excavation of soil impacted above New Mexico Oil Conservation Division regulatory levels for treatment at an off-site land farming facility.
- Delineation of the PSH.
- Characterization of background ground water conditions.
- Monitoring well slug/bail down testing.
- Quarterly monitoring and sampling of all on-site monitoring wells.
- Weekly initial abatement consisting of hand-bailing PSH from impacted monitoring wells.

INTRODUCTION

This report summarizes the results of the subsurface assessment activities conducted in response to suspected crude oil impact at Monument Site No. 18, located in Lea County, New Mexico. Site No. 18 consisted of an area of surficial hydrocarbon impact approximately 15 feet in diameter. A site location map is presented as FIG. 1.

A scope of work for the subsurface assessment was prepared based upon field observations obtained during a preliminary investigation of surface site conditions. The proposed work plan was presented in the Phase I - Preliminary Site Characterization report dated June 21, 1996, and was approved by the State of New Mexico Oil Conservation Division in a letter dated August 16, 1996. The general scope of work for the subsurface investigation included:

- A sensitive receptor survey, migration pathway evaluation, and registered water well search.
- Soil borings within and in the periphery of the surficial hydrocarbon impact.
- Monitoring wells surrounding the suspected source area.

SUBSURFACE INVESTIGATION

SENSITIVE RECEPTOR SURVEY/MIGRATION PATHWAY EVALUATION

Receptor Survey

A sensitive receptor survey/migration pathway evaluation was conducted at the site. No potential receptors were identified within a 500-foot radius of the site. Adjacent properties consisted of active and inactive crude oil gathering and storage facilities to the south and southwest and vacant rangeland to the north, east and west.

A search of State of New Mexico water well registrations indicated two water wells potentially within a 1/2-mile radius of the site. The location of one of the wells could not be determined from the well registration coordinates. The approximate location of the well positively identified as within a 1/2 mile radius is presented on FIG. 1. A copy of the well registration data is presented in APPENDIX A.

Migration Pathway Analysis

Potential manmade migration pathways identified during the survey included a buried water line extending along the eastern edge of the site from north to south and two crude oil pipelines extending through the center of the site from the north to the south. Approximate locations of the manmade potential migration pathways are presented on FIG. 2.

Ground water at the site may also act as a migration pathway. The calculated ground water gradient at the site indicated a direction of flow to the east. Surface drainage at the site is to the southeast.

FIELD ACTIVITIES

Soil Borings

On March 9 and 14, 1997, Soil Borings B18-1 through B18-4 were advanced utilizing a direct-push hydraulic sampling system. Each of the soil borings was advanced to sampler refusal at depths ranging from 27 to 35 feet below ground surface (bgs). Field observations obtained during the soil boring advancement included the following:

- Phase-separate hydrocarbon (PSH) was not observed in any soil boring.
- Hydrocarbon impact extends from the ground surface to the depth of ground water in the suspected source area. Impact in the periphery of the source area may be associated with ground water transport of dissolved-phase hydrocarbons and PSH.
- Hydrocarbon impact to vadose zone soils appears to have been delineated.

Upon completion of sampling activities, each soil boring not completed as a monitoring well was backfilled to the ground surface with a cement/bentonite grout. Approximate locations of the soil borings are presented on FIG. 2.

Monitoring Wells

Following evaluation of field and analytical data obtained during soil boring advancement, monitoring wells were installed to complete a triangulation of ground water monitoring points surrounding the suspected source area. The monitoring wells were installed to depths of approximately 40 feet bgs. The well materials consisted of threaded connection 2-inch ID, Schedule 40 PVC solid pipe, and 0.010 inch slotted PVC well screen. A graded, clean silica sand was placed in the annulus of the screened interval for each well. A 3-foot bentonite seal was placed above the sand packing and a stick-up, steel protective cover was then concreted in place. Each well was protected with a locked cap.

The monitoring wells were installed by a well driller licensed in the State of New Mexico.

Elevations of the monitoring well PVC riser, top of cover, surface pad, and ground surface were determined by a level survey conducted by Basin Surveys of Hobbs, New Mexico. The monitoring well elevations were referenced from mean sea level.

SOIL ASSESSMENT

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

Soil Type 1

This soil type consisted of light brown to brown sand encountered at the surface of all soil boring locations. This moist sand was fine grained, slightly silty and contained gravel. Observed thicknesses of this soil type varied from approximately 2 to 9 feet. The head-space readings from samples of this soil type ranged from below instrument detection levels (ND) to 1308 ppm.

Soil Type 2

This soil type consisted of a light brown to gray sand encountered beneath the upper sand at all soil boring locations except for B18-1. This moist sand was very silty with gravel (caliche). Observed thicknesses of this soil type varied from approximately 9 to 18 feet. The head-space readings from samples of this soil type ranged from ND to 5 ppm.

Soil Type 3

This soil type consisted of a tan to grey gravel encountered beneath the upper sands at all soil boring locations. This moist sand was fine grained, and silty. This soil type was encountered at depths ranging from 9 to 23 feet bgs to the maximum depth investigated in all soil borings. The head-space readings from samples of this soil type ranged from ND to 1145 ppm.

Graphic logs indicating the subsurface soil profile, depths at which soil samples were obtained, head-space results, laboratory results, and the monitoring well/soil boring details are presented on FIGS. 3 through 7.

GROUND WATER MONITORING

A ground water monitoring event was conducted at the site on April 30, 1997. The event consisted of gauging the water level in Monitoring Wells MW18-1 through MW18-3, checking for the presence of phase-separate hydrocarbon (PSH), and purging and sampling all wells not containing PSH.

Ground water measurements obtained during the event indicated a general direction of flow to the east, with a calculated gradient of approximately 0.012 ft/ft. PSH with a thickness of 0.70 and 0.22 feet was observed in Monitoring Wells MW18-1 and MW18-3, respectively. PSH observed within Monitoring Well MW-18-3 was not present during well gauging and purging, but appeared while the well was being sampled. A summary of ground water gauging and elevation data is presented on TABLE IV.

LABORATORY ANALYSES

Soil

Soil samples were selected for laboratory analysis from sample intervals that, at a minimum, represented the high field screening result and the bottom of the hole of each soil boring. The selected soil samples were express mailed to Xenco Laboratories in San Antonio, Texas for determination of TPH concentrations by EPA METHOD 418.1 and BTEX concentrations by EPA Method SW846-8020. Additional analyses of SPLP Volatiles by EPA Method SW846-1312/8260, SPLP Semi-Volatiles by EPA Method SW846-1312/8270 and SPLP TPH by EPA Method 1312/418.1 were conducted on the soil boring sample with the highest TPH concentration. A determination of fraction organic carbon and moisture content was conducted on an unimpacted sample collected from Soil Boring B18-2.

Analytical results indicated the following range of constituent concentrations for the soil boring samples:

CONSTITUENT	RANGE OF CONCENTRATIONS
TPH	ND to 31,500 mg/kg
BTEX	ND to 19.97 mg/kg
Benzene	ND to 2.15 mg/kg
SPLP VOC	
1,2,4-Trimethylbenzene	0.086 mg/l
1,3,5-Trimethylbenzene	0.043 mg/l
m,p-Xylene	0.029 mg/l
SPLP SVOC	
Di-n-butylphthalate	0.033 mg/l
SPLP TPH	1.9 mg/l
Fraction Organic Carbon	0.9%
Moisture Content	3.5%

All SPLP VOC and SPLP SVOC constituent concentrations not listed above were ND.

A complete summary of analytical results for soil samples is presented in TABLES I through III. Copies of the certified laboratory reports and chain-of-custody documentation for soils are presented in APPENDIX B.

Ground Water

Ground water samples were express mailed to Xenco Laboratories in San Antonio, Texas for a determination of BTEX, Total Metals (ICP) by EPA Method EPA 6010, total Mercury by EPA Method 7470, polycyclic aromatic hydrocarbons (PAH) by EPA Method 8100, bicarbonate by SM4500CO2D, carbonate by SM4500CO2D, TDS by EPA Method 160.1, Anions by EPA Method 300.0, and total inorganic carbon by Modified EPA Method 415.1.

Results for ground water samples indicated the following range of concentrations:

CONSTITUENT	RANGE	NMWQCC LIMIT
BTEX	0.006 to 0.092 mg/l	0.001 to 0.75 mg/l
		l
PAH	ND	0.03 mg/l
ICP METALS		
Aluminum	2.67 to 48.6 mg/l	5.0 mg/l
Barium	0.30 to 3.33 mg/l	1.0 mg/l
Calcium	1,000 to 3,600 mg/l	N/A
Iron	0.88 to 26.7 mg/l	1.0 mg/l
Magnesium	627 to 1,070 mg/l	N/A
Manganese	ND to 0.91 mg/l	0.2 mg/l
Potassium	36.3 to 63.4 mg/l	N/A
Sodium	2,150 to 2,390 mg/l	N/A
Tin	0.25 to 10.2 mg/l	N/A
Vanadium	ND to 0.35 mg/l	N/A
Boron	0.57 to 0.70 mg/l	0.75 mg/l
Silicon	8.2 to 26.0 mg/l	N/A
Strontium	16.0 mg/l	N/A
Mercury	ND	0.002 mg/l
Bicarbonate	271 and 279 mg/l	N/A
Carbonate	ND	N/A
ANIONS		
Sulfate	356 and 368 mg/l	600.0 mg/l
Chloride	757 and 7,680 mg/l	250.0 mg/l
Total Dissolved Solids	16,300 and 17,200 mg/l	1000.0 mg/l
Total Inorganic Carbon	44.8 and 46.7 mg/l	N/A

All ICP Metals concentrations not listed above were ND. N/A indicates a New Mexico Water Quality Control Commission (NMWQCC) standard was not available.

Analytical results for ground water samples collected from monitoring wells MW18-2 and MW18-3 indicated dissolved-phase hydrocarbon impact. Therefore, non-hydrocarbon analyte concentrations listed above cannot be assumed to represent background ground water quality conditions at the site.

A complete summary of analytical results for ground water samples is presented in TABLE V. Copies of the certified laboratory results for ground water are presented in APPENDIX C.

WASTE MANAGEMENT AND DISPOSITION

Auger cuttings generated during the installation of Monitoring Wells MW18-1 through MW18-3 were spread over surficial hydrocarbon-stained soil at the site. Water collected during monitoring well development and purging was stored on site in sealed drums pending appropriate disposal.

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 a direct-push continuous sampling device and air rotary coring methods. Representative soil samples were divided into two 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.

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 three 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 bailer 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 sterile, 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 analysis were filled to capacity in sterile, 1 liter glass containers 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.

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.

CONCLUSIONS

The following conclusions are presented based on the field observations, drilling activities, and soil laboratory results:

SOIL

- Soil impact extends from the ground surface to approximately 28 feet below the ground surface based on laboratory results and field PID readings.

- Standard New Mexico Oil Conservation Division (OCD) regulatory site closure concentrations for soils were exceeded by TPH concentrations in samples collected from Soil Boring B18-1 in soils from the vadose zone and at the ground water/air interface. Soil Borings B18-2 and B18-3 exhibited TPH concentrations in soil above standard OCD cleanup levels only at the ground water/air interface.

- Vadose zone soil in soil borings B18-2 through B18-4 does not appear to be impacted above standard OCD cleanup levels.

GROUND WATER

- PSH with a thickness of 0.70 and 0.22 feet was measured within Monitoring Wells MW18-1 and MW18-3, respectively.

- Dissolved-phase hydrocarbon impact was indicated by laboratory analysis of samples collected from Monitoring Wells MW18-2 and MW18-3.

- Analysis of ground water samples collected from an unimpacted area of the site will be necessary to determine background ground water conditions. If the TDS concentrations observed (16,300 and 17,200 mgl) are confirmed to represent background ground water conditions, then ground water remediation may not be required.

RECOMMENDATIONS

SOIL

Recommendations for remediation of impacted soil at the site consist of excavation and off-site landfarming.

GROUND WATER

Additional characterization of ground water conditions at the site should be conducted prior to preparation of a Ground Water Remedial Alternatives Plan. Pending collection and evaluation of the additional ground water data, an interim method of PSH recovery should be implemented at the site. Recommended assessment and PSH abatement activities to be conducted include:

- Preparation of a closure plan presenting target closure concentrations for impacted media at the site.

- Characterization of background ground water conditions at the site by installation and sampling of a monitoring well located in an unimpacted portion of the site.

- Delineation of the PSH by installing additional monitoring wells. If field observations obtained indicate the presence of PSH at either or both of the proposed locations, an additional well or wells should be installed as necessary to delineate the PSH plume.

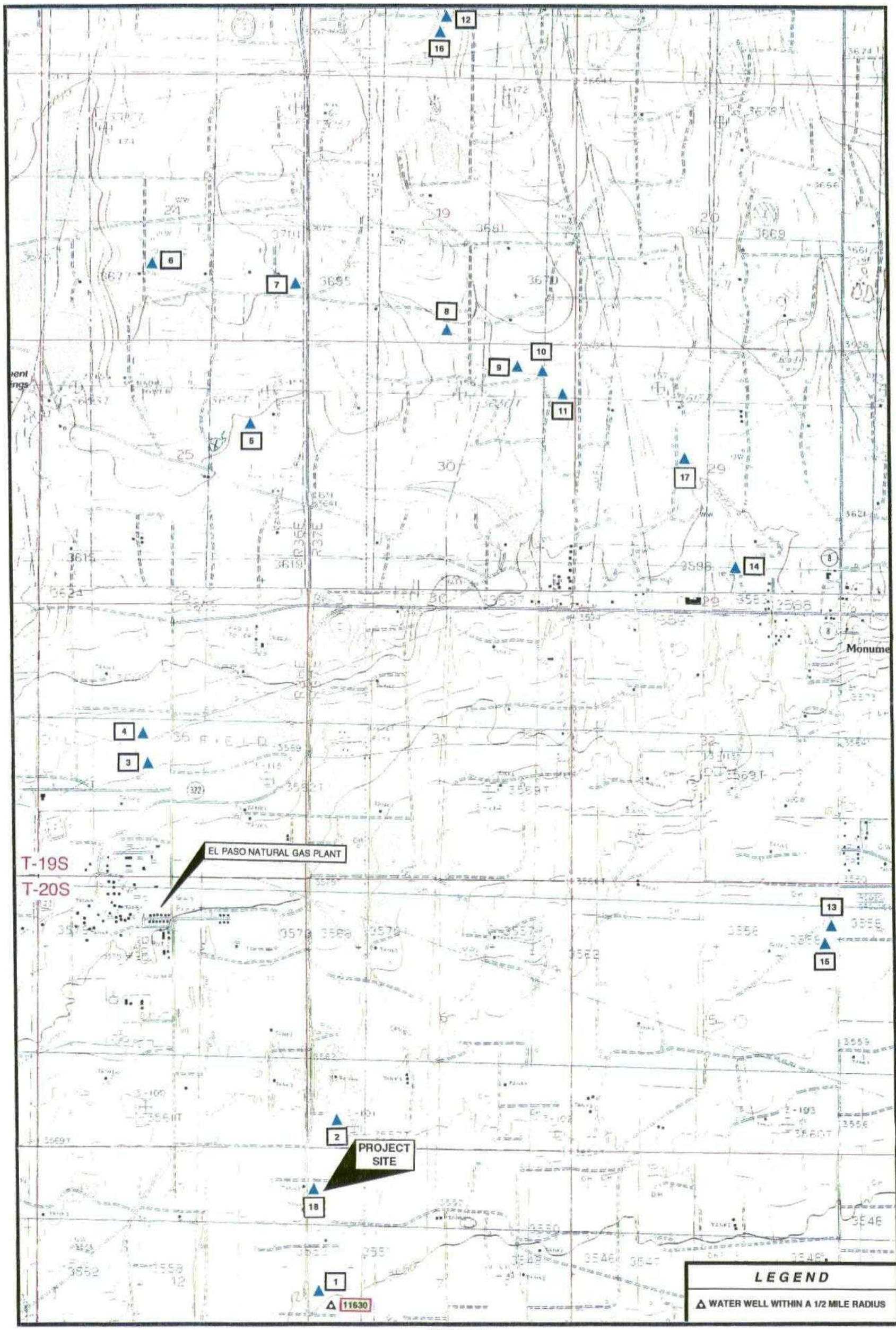
- Quarterly monitoring and sampling of all on-site monitoring wells to verify dissolved-phase concentrations and direction of ground water flow.

- Monitoring well slug/bail down testing (if it is determined that remediation is required).

- Weekly initial PSH abatement consisting of hand-bailing crude oil from all impacted monitoring wells.

MONUMENT NORTH QUADRANGLE
NEW MEXICO - LEA COUNTY
PRINTED 1985

MONUMENT SOUTH QUADRANGLE
NEW MEXICO - LEA COUNTY
PRINTED 1985



SCALE 1:24000

1 1/2 0 1 MILE

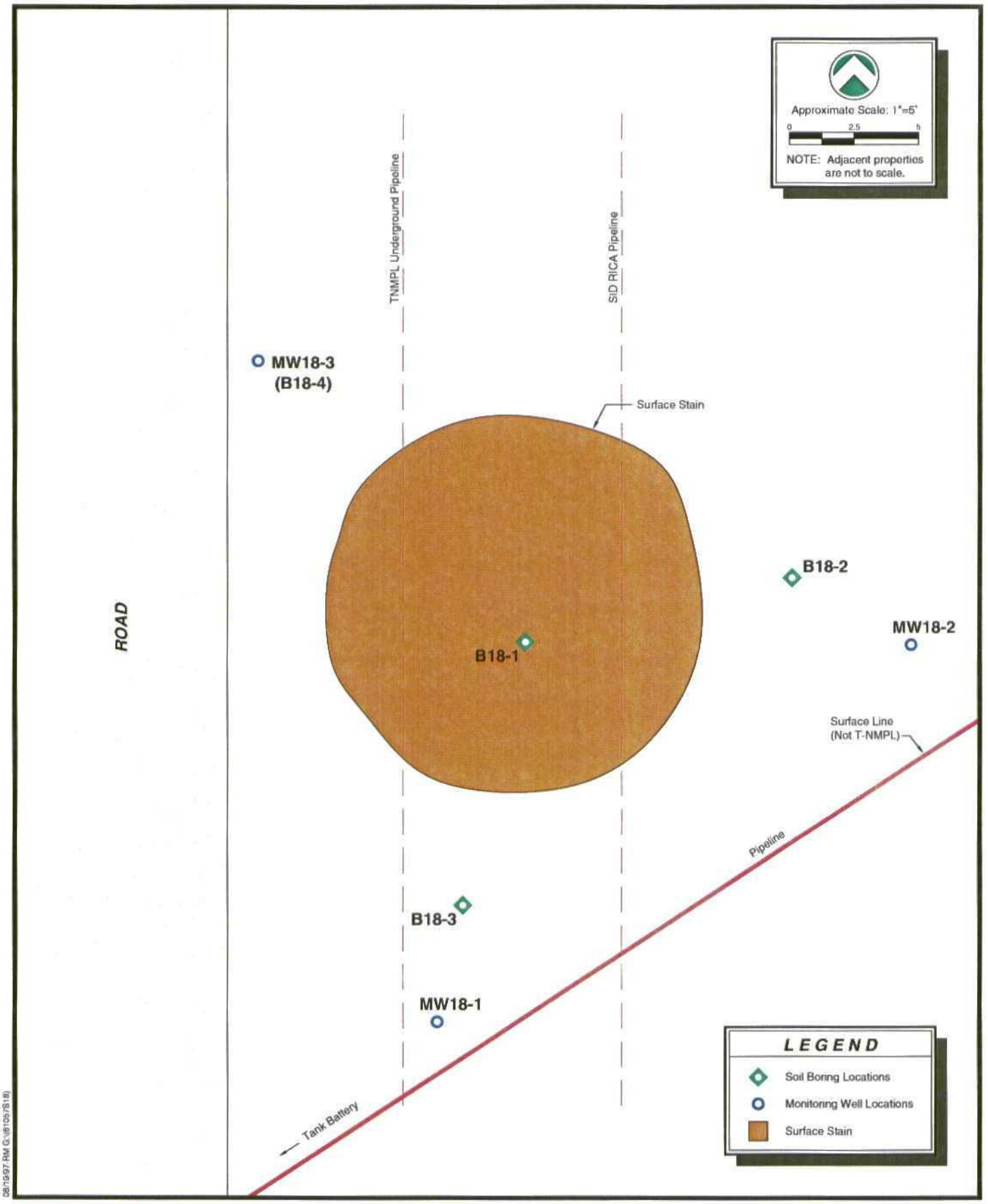
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETRE

CONTOUR INTERVAL 5 FEET

05/21/98--JB (610057SL)

k·e·i	*SITE LOCATION MAP*	610057
	TEXAS - NEW MEXICO PIPE LINE CO. MONUMENT SITE NO. 18 LEA COUNTY, NEW MEXICO	FIG 1



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SITE DETAILS			610057
TEXAS - NEW MEXICO PIPE LINE CO.	MONUMENT SITE NO. 18	LEA COUNTY, NEW MEXICO	FIG 2

LEGEND

Sand (SP), fine grained, slightly silty, moist, brown to light brown.

Sand (SM), silty with occassional gravels, moist, light brown to grey.

Gravel (GM), gravel-sand-silt mixture, caliche, moist to wet, tan to grey.

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

Indicates sample selected for laboratory analysis.

Indicates direct push refusal.

B = benzene concentration (mg/kg)
BTEX = total BTEX concentration (mg/kg)
TPH = total petroleum hydrocarbon concentration (mg/kg)
PID = Head-space readings in ppm obtained with a photoionization detector.
ND = Indicates the concentration was below laboratory detection limits.

NOTES:

1. The soil borings were advanced utilizing direct-push sampling methods on March 9 and 14, 1997.
2. Ground water was not encountered during advancement of Soil Borings B18-1 through B18-4.
3. The lines between material types shown on the profile log represent approximate boundaries. Actual transitions may be gradual.
4. The depths indicated are referenced from the ground surface.
5. The soil borings not completed as monitoring wells were grouted to the ground surface with cement grout containing 5 percent bentonite.

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LEGEND AND NOTES FOR SOIL BORINGS			610057
TEXAS - NEW MEXICO PIPE LINE CO.	MONUMENT SITE NO. 18	LEA COUNTY, NEW MEXICO	FIG 3

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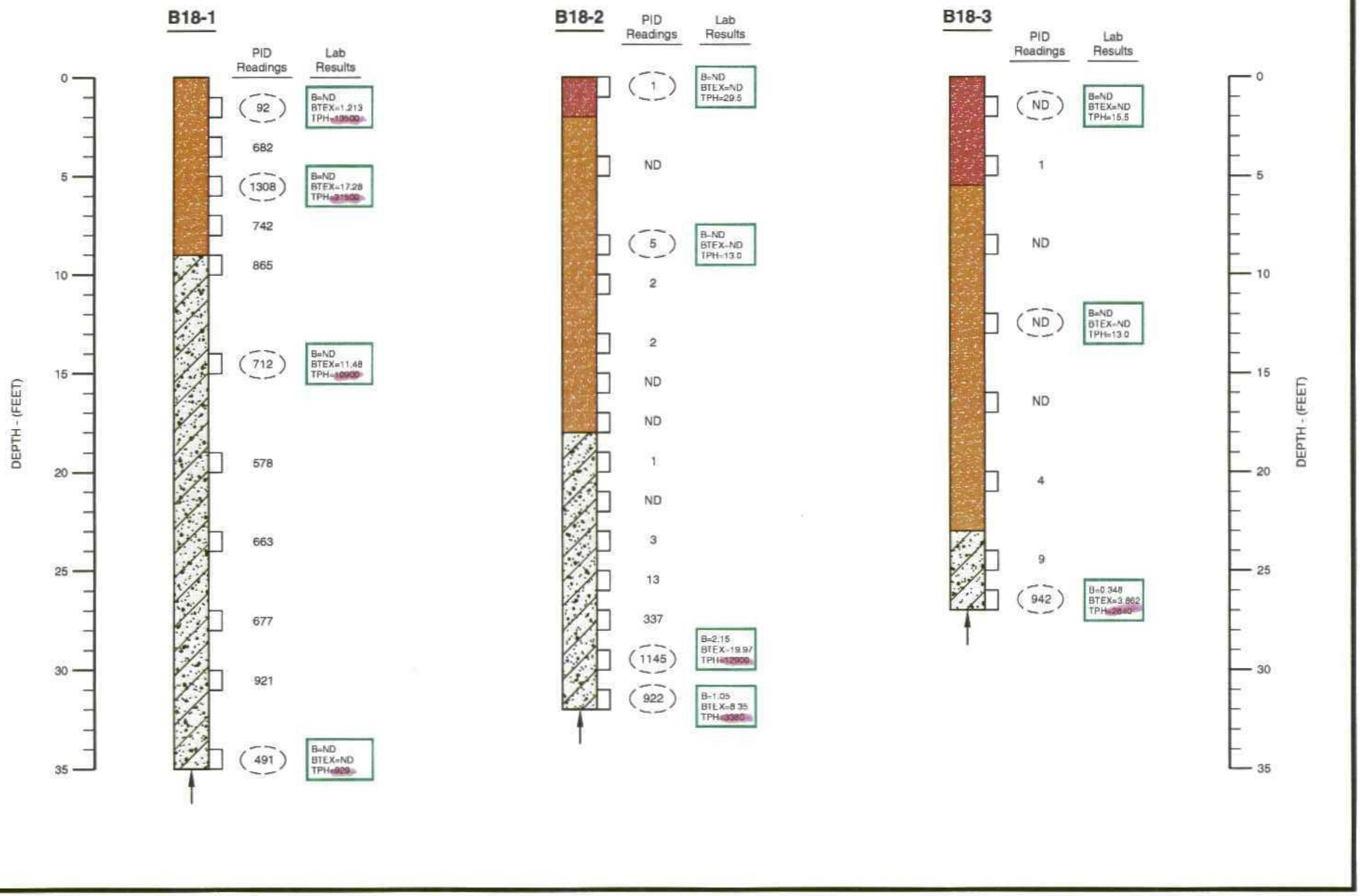

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LOG AND DETAILS OF SOIL BORINGS

TEXAS - NEW MEXICO PIPE LINE CO. MONUMENT SITE NO. 18 LEA COUNTY, NEW MEXICO

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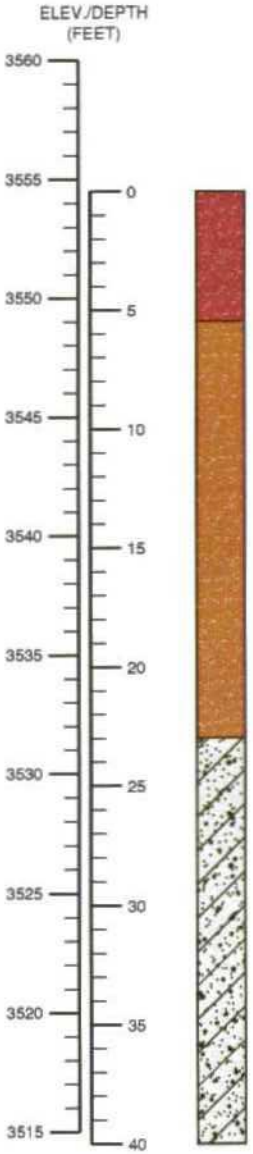
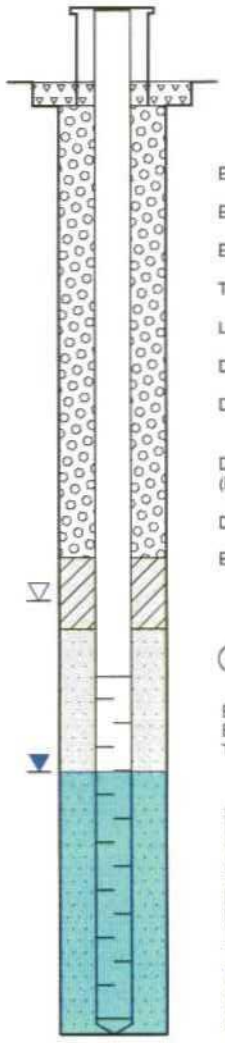
FIG 4

09/03/97-RM (610057W1)

MONITORING WELL MW18-1





Monitoring Well Details (MW18-1)

Elev Top of Steel Sleeve	3557.52 ft
Elev of Ground Surface	3554.51 ft
Elev Top of PVC Well	3557.59 ft
Thickness of Bentonite Seal	3.0 ft
Length of PVC Well Screen	15.0 ft
Depth of PVC Well	40.0 ft
Depth of Exploratory Hole	40.0 ft
Depth to Ground Water (During drilling)	21.80 ft
Depth to Ground Water	28.99 ft
Elev of Ground Water	3525.52 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)

2' x 2' Concrete Pad

Cement / Bentonite Grout

Bentonite Pellet Seal

Sand Pack

LEGEND

Sand (SP), fine grained, slightly silty, moist, brown to light brown.

Sand (SM), silty with occassional gravels, moist, light brown to grey.

Gravel (GM), gravel-sand-silt mixture, caliche, moist to wet, tan to grey.

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.

Indicates the ground water level measured on April 30, 1997.

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

ND Indicates the constituent was not detected.

NOTES

1. Monitoring well MW18-1 was offset 5 feet to the south of boring B18-3. Monitoring well MW18-1 was installed on April 8, 1997 utilizing an air rotary rig. The lithology of MW18-1 is assumed to be as same as boring B18-3.
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 stick up steel cover and a locked 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 MW18-1

TEXAS - NEW MEXICO PIPE LINE CO. MONUMENT SITE NO. 18 LEA COUNTY, NEW MEXICO

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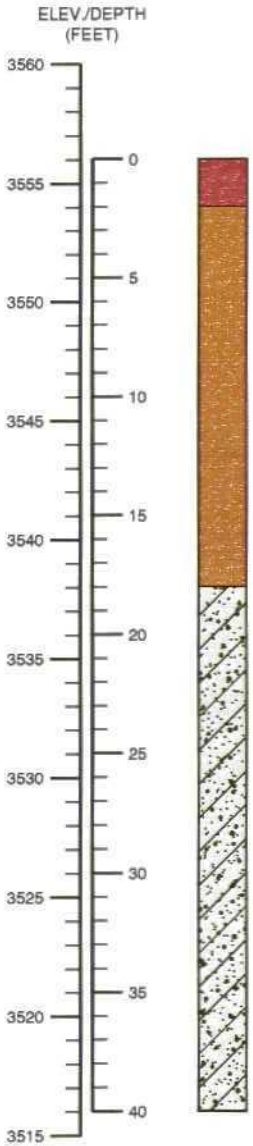
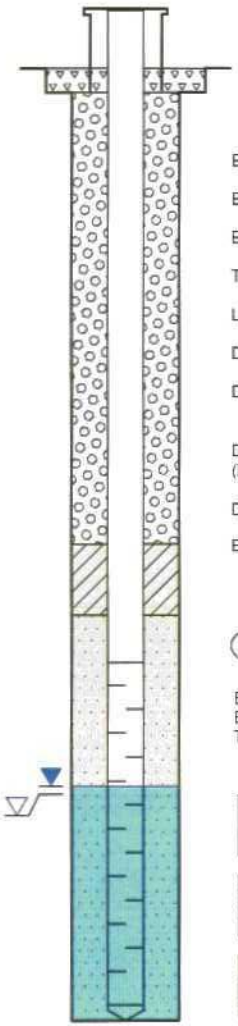
FIG 5

MONITORING WELL MW18-2





Monitoring Well Details (MW18-2)

Elev Top of Steel Sleeve	3558.48 ft
Elev of Ground Surface	3556.05 ft
Elev Top of PVC Well	3558.54 ft
Thickness of Bentonite Seal	2.5 ft
Length of PVC Well Screen	15.0 ft
Depth of PVC Well	40.0 ft
Depth of Exploratory Hole	40.0 ft
Depth to Ground Water (During drilling)	30.5 ft
Depth to Ground Water	30.18 ft
Elev of Ground Water	3525.87 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)

2' x 2' Concrete Pad

Cement / Bentonite Grout

Bentonite Pellet Seal

Sand Pack

LEGEND

Sand (SP), fine grained, slightly silty, moist, brown to light brown.

Sand (SM), silty with occassional gravels, moist, light brown to grey.

Gravel (GM), gravel-sand-silt mixture, caliche, moist to wet, tan to grey.

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.

Indicates the ground water level measured on April 30, 1997.

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

ND Indicates the constituent was not detected.

NOTES

1. Monitoring well MW18-2 was offset 5 feet to the southeast of boring B18-2. Monitoring well MW18-2 was installed on April 8, 1997 utilizing an air rotary rig. The lithology of MW18-2 is assumed to be as same as boring B18-2.
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 stick up steel cover and a locked 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 MW18-2

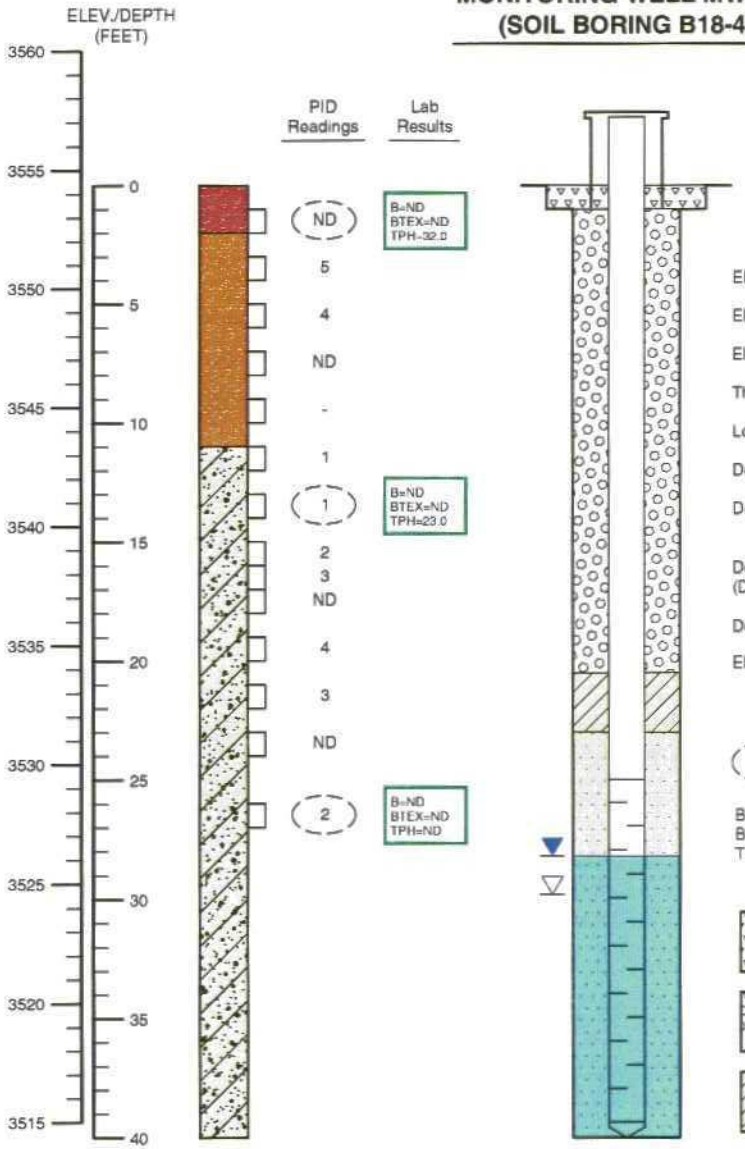
TEXAS - NEW MEXICO PIPE LINE CO. MONUMENT SITE NO. 18 LEA COUNTY, NEW MEXICO

610057

FIG 6

09/04/97-RM (610057W3)

MONITORING WELL MW18-3
(SOIL BORING B18-4)



Monitoring Well Details (MW18-3)

Elev Top of Steel Sleeve	3557.26 ft
Elev of Ground Surface	3554.38 ft
Elev Top of PVC Well	3557.43 ft
Thickness of Bentonite Seal	2.5 ft
Length of PVC Well Screen	15.0 ft
Depth of PVC Well	40.0 ft
Depth of Exploratory Hole	40.0 ft
Depth to Ground Water (During drilling)	29.8 ft
Depth to Ground Water	28.21 ft
Elev of Ground Water	3526.17 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)

2' x 2' Concrete Pad

Cement / Bentonite Grout

Bentonite Pellet Seal

Sand Pack

LEGEND

Sand (SP), fine grained, slightly silty, moist, brown to light brown.

Sand (SM), silty with occassional gravels, moist, light brown to grey.

Gravel (GM), gravel-sand-silt mixture, caliche, moist to wet, tan to grey.

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.

Indicates the ground water level measured on April 30, 1997.

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

ND Indicates the constituent was not detected.

NOTES

1. Boring B18-4 was advanced utilizing a direct-push continuous sampler to a depth of 27 feet on March 14, 1997. Monitoring well MW18-3 was offset 5 feet to the southeast of boring B18-4. Monitoring well MW18-3 was installed on April 7, 1997 utilizing an air rotary rig. The lithology of MW18-3 is assumed to be as same as boring B18-4.
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 stick up steel cover and a locked 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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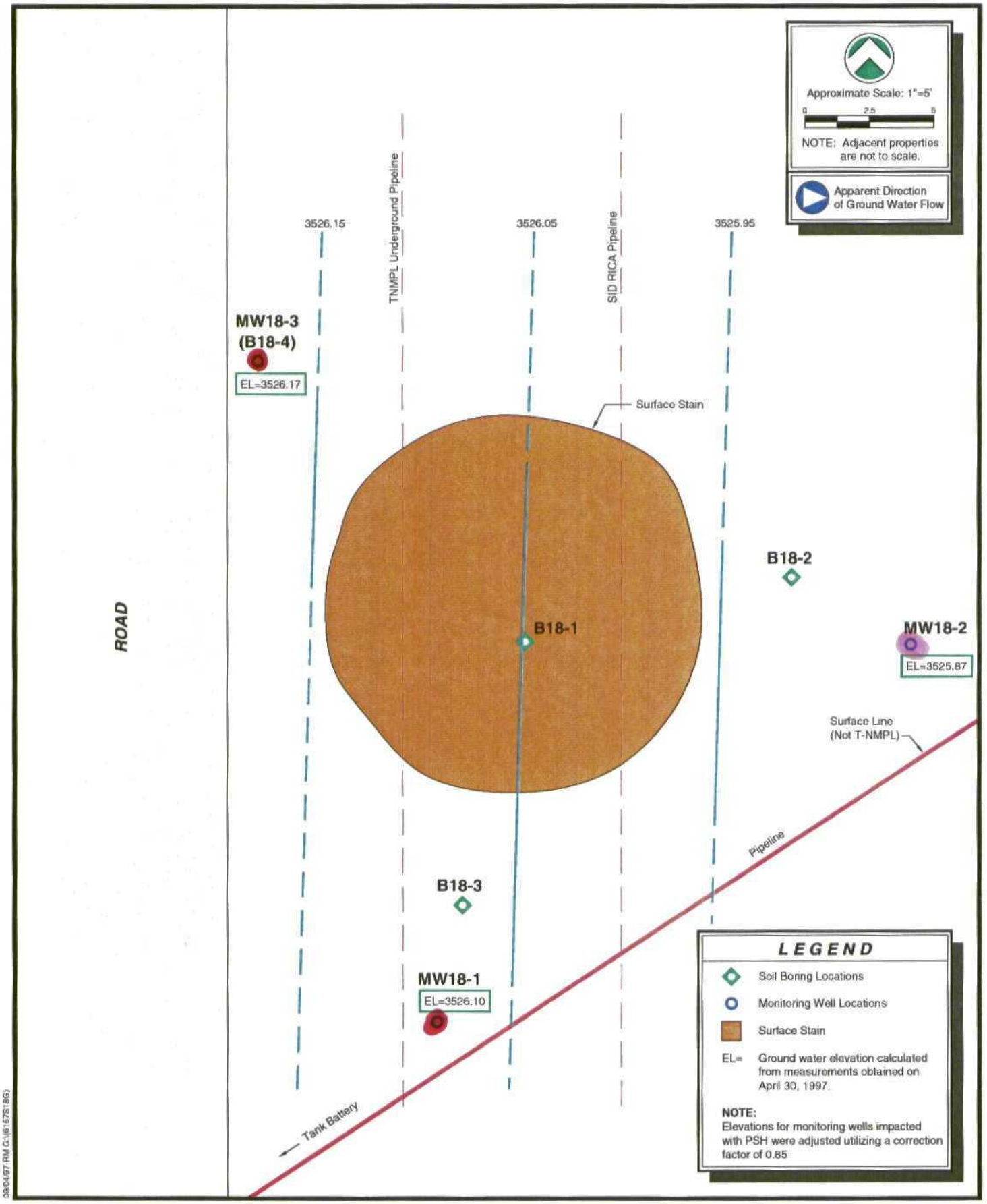
LOG AND DETAILS OF MONITORING WELL MW18-3 (SOIL BORING B18-4)

TEXAS - NEW MEXICO PIPE LINE CO. MONUMENT SITE NO. 18 LEA COUNTY, NEW MEXICO

610057

FIG 7



08/04/97 RM G:\610157S18G\

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GROUND WATER CONTOURS - APRIL 1997	610057
TEXAS - NEW MEXICO PIPE LINE CO. MONUMENT SITE NO. 18 LEA COUNTY, NEW MEXICO	FIG 8

GENERAL NOTES

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

NT - Indicates sample was not tested for constituent indicated.

Depth is referenced from the top of casing unless otherwise specified.

Method detection limit:

Soil:	Benzene	-	0.020 mg/kg
	Toluene	-	0.020 mg/kg
	Ethylbenzene	-	0.020 mg/kg
	Xylene	-	0.020 to 0.040 mg/kg
	BTEX	-	0.120 mg/kg
	TPH	-	10.0 mg/kg
Ground Water:	Benzene	-	0.001 mg/l
	Toluene	-	0.001 mg/l
	Ethylbenzene	-	0.001 mg/l
	Xylenes	-	0.002 mg/l
	BTEX	-	0.006 mg/l
	PAH	-	0.002 mg/l

Laboratory testing method:

BTEX	-	EPA Method SW846-8020
TPH	-	EPA Method 418.1
Metals	-	EPA Method 6010
PAH	-	EPA Method 8100
Bicarbonate	-	SM 4500CO2D
Carbonate	-	SM 4500CO2D
TDS	-	EPA Method 160.1
Anions	-	EPA Method 300.0
TIC	-	EPA Method 415.1

TABLE I

SUMMARY OF LABORATORY BTEX/TPH RESULTS - SOIL
TEXAS - NEW MEXICO PIPE LINE COMPANY
MONUMENT SITE NO. 18
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)
B18-1	03/09/97	1 - 2	ND	0.348	0.865	ND	1.213	13,500
B18-1	03/09/97	5 - 6	ND	4.82	ND	12.46	17.28	31,500
B18-1	03/09/97	14 - 15	ND	1.92	0.92	8.64	11.48	10,900
B18-1	03/09/97	34 - 35	ND	ND	ND	ND	ND	929
B18-2	03/14/97	0 - 1	ND	ND	ND	ND	ND	30
B18-2	03/14/97	8 - 9	ND	ND	ND	ND	ND	13.0
B18-2	03/14/97	29 - 30	2.15	2.74	8.33	6.75	19.97	12,900
B18-2	03/14/97	31 - 32	1.05	1.48	3.03	2.79	8.35	3,380
B18-3	03/14/97	1 - 2	ND	ND	ND	ND	ND	15.5
B18-3	03/14/97	12 - 13	ND	ND	ND	ND	ND	13.0
B18-3	03/14/97	26 - 27	0.348	0.880	0.660	1.974	3.862	28400
B18-4	03/14/97	1 - 2	ND	ND	ND	ND	ND	32.0
B18-4	03/14/97	13 - 14	ND	ND	ND	ND	ND	23.0
B18-4	03/14/97	26 - 27	ND	ND	ND	ND	ND	ND

TABLE II

SUMMARY OF LABORATORY SPLP RESULTS - SOIL
TEXAS - NEW MEXICO PIPE LINE COMPANY
MONUMENT SITE NO. 18
LEA COUNTY, NEW MEXICO

CONSTITUENT	SAMPLE LOCATION	DEPTH INTERVAL	DATE SAMPLED	CONCENTRATION (mg/l)
VOCs				
1,2,4-Trimethylbenzene	B18-1	5 - 6	03/09/97	0.086
1,3,5-Trimethylbenzene	B18-1	5 - 6	03/09/97	0.043
m,p-Xylene	B18-1	5 - 6	03/09/97	0.029
SVOCs				
Di-n-butylphthalate	B18-1	5 - 6	03/09/97	0.033
TPH	B18-1	5 - 6	03/09/97	1.9

Note:

1. Sample B18-1 (5 to 6 feet) was sampled on 03/09/97 and analyzed for SPLP of volatiles, semi-volatiles and TPH concentrations. Those constituents not listed were ND.

TABLE III

SUMMARY OF GEOTECHNICAL PARAMETER RESULTS
TEXAS - NEW MEXICO PIPE LINE COMPANY
MONUMENT SITE NO. 18
LEA COUNTY, NEW MEXICO

PARAMETER	SAMPLE LOCATION	SAMPLE DATE	DEPTH (feet)	RESULT
Fraction Organic Carbon (%)	B18-2	03/14/97	8 - 9	0.9
Water Content (%) by total mass	B18-2	03/14/97	8 - 9	3.5

TABLE IV

SUMMARY OF GROUND WATER GAUGING DATA
TEXAS - NEW MEXICO PIPE LINE COMPANY
MONUMENT SITE NO. 18
LEA COUNTY, NEW MEXICO

MONITORING WELL	DATE MEASURED	PVC ELEVATION (feet)	DEPTH TO WATER (feet)	GROUND WATER ELEVATION		PSH THICKNESS (feet)
				Actual	Corrected	
MW18-1	04/30/97	3,557.59	32.07	3525.52	3526.10	0.68
MW18-2	04/30/97	3,558.54	32.67	3525.87	---	---
MW18-3	04/30/97	3,557.43	31.26	3526.17	3526.36	0.22

TABLE V

SUMMARY OF LABORATORY RESULTS (05/02/97) - WATER
MONUMENT SITE NO. 18
LEA COUNTY, NEW MEXICO

CONSTITUENT	NMWQCC LIMIT (mg/l)	MW18-2 (mg/l)	MW18-3 (mg/l)
BTEX			
Benzene	0.01	0.010	0.006
Toluene	0.75	ND	ND
Ethylbenzene	0.75	0.060	ND
Xylenes	0.62	0.022	ND
PAH	0.002	ND	NT
ICP METALS			
Aluminum	5.0	2.67	48.6
Arsenic	0.1	ND	ND
Barium	1.0	0.30	3.33
Beryllium	N/A	ND	ND
Cadmium	0.01	ND	ND
Calcium	N/A	1,000	3,600
Chromium	0.05	ND	ND
Cobalt	0.05	ND	ND
Iron	1.0	0.88	26.7
Lead	0.05	ND	ND
Magnesium	N/A	627	1,070
Manganese	0.20	ND	0.91
Molybdenum	1.0	ND	ND
Potassium	N/A	36.3	63.4
Silver	0.05	ND	ND
Sodium	N/A	2,150	2,390
Tin	N/A	0.25	10.2
Vanadium	N/A	ND	0.35

TABLE V
(continued)

SUMMARY OF LABORATORY RESULTS (05/02/97) - WATER
MONUMENT SITE NO. 18
LEA COUNTY, NEW MEXICO

CONSTITUENT	NMWQCC LIMIT (mg/l)	MW18-2 (mg/l)	MW18-3 (mg/l)
ICP METALS (continued)			
Zinc	10.0	ND	ND
Nickel	0.2	ND	ND
Copper	1.0	ND	ND
Boron	0.75	0.57	0.70
Silicon	N/A	26.0	8.2
Strontium	N/A	16.0	16.0
Mercury	0.002	ND	ND
BICARBONATE	N/A	271	279
CARBONATE	N/A	ND	ND
ANIONS			
Sulfate	600.0	368	356
Chloride	250.0	757	7,680
TDS	1,000.0	16,300	17,200
TIC	N/A	46.7	44.8

Notes:

1. All metals concentrations not listed above were ND. A complete list of ICP Metals analytes and results is presented on the certified laboratory report (see Appendix B).

2. Values presented as NMWQCC Limits were obtained from New Mexico Water Quality Control Commission Ground Water Standards. Maximum allowable concentration values were not available for constituents listed as N/A.

11592	L	05766		L	05766	X9	10	01	1965	CAN	NOT	20S	36E	02	122	21S	36E	00	0672	68		WELCH THOMAS F	0.00	0.00	0	
12759	L	10246							1931	DCL	DOM SHA	20S	36E	03	311	20S	36E	03	0492	68		KLEIN FAYE L	0.00	3.00	0	USED FOR STOCK ALSO
11593	L	09344					09	21	1983	WDN	IRR	20S	36E	04	1	20S	36E	04	0983	68		KLEIN FAYE L	0.00	0.00	0	
11594	L	09344	S2	L	09344		09	21	1983	WDN	IRR	20S	36E	04	1	19S	36E	35	0983	68		KLEIN FAYE L	0.00	0.00	0	
11595	L	09344	S	L	09344		09	21	1983	WDN	IRR	20S	36E	04	1	20S	36E	04	0983	68		KLEIN FAYE L	0.00	0.00	0	
11596	L	07724					07	13	1977	WDN	NOT	20S	36E	04	330	20S	36E	04	0884	68		KLEIN RANCH	0.00	0.00	0	
12760	L	10247							1931	DCL	DOM SHA	20S	36E	05	13	20S	36E	05	0492	68		KLEIN FAYE L	0.00	3.00	0	USED FOR STOCK USE ALSO
11597	L	01522					08	19	1952	PMT	STK	20S	36E	08	111	20S	36E	08	0664	68		HUGHES B E	0.00	3.00	0	
12761	L	10248							1931	DCL	DOM SHA	20S	36E	09	13	20S	36E	09	0492	68		KLEIN FAYE L	0.00	3.00	0	USE FOR STOCK USE ALSO
11598	L	02707					11	28	1954	PMT	OWD	20S	36E	09	222	20S	36E	09	0764	68		CONTINENTAL OIL CO	0.00	0.00	0	
12762	L	10249							1931	DCL	DOM SHA	20S	36E	10	23	20S	36E	10	0492	68		KLEIN FAYE L	0.00	3.00	0	USED FOR STOCK USE ALSO
12763	L	10250							1931	DCL	DOM SHA	20S	36E	10	43	20S	36E	10	0492	68		KLEIN FAYE L	0.00	3.00	0	USED FOR STOCK USE ALSO
12764	L	10251							1931	DCL	DOM SHA	20S	36E	11	44	20S	36E	11	0492	68		KLEIN FAYE L	0.00	3.00	0	USED FOR STOCK USE ALSO
12628	L	10160	S	L	10160		02	20	1991	PMT	COM SHA	20S	36E	12	124	20S	36E	12	0291	68	M	BYRD J R	0.00	0.00	0	
12629	L	10160	S2	L	10160		02	20	1991	PMT	COM SHA	20S	36E	12	124	20S	36E	12	0291	68	M	BYRD J R	0.00	0.00	0	
12627	L	10160					01	23	1991	PMT	COM SHA	20S	36E	12	N 1/2	20S	36E	12	0191	68	M	BYRD J R	0.00	8.00	8	
11599	L	01254					10	18	1951	PMT	NOT	20S	36E	13	232	20S	36E	13	0564	68		GULF OIL CORP	0.00	0.00	0	
11600	L	01275					10	18	1951	PMT	NOT	20S	36E	13	332	20S	36E	13	0564	68		GULF OIL CORP	0.00	0.00	0	
11601	L	01249					10	18	1951	PMT	NOT	20S	36E	13	432	20S	36E	13	0564	68		GULF OIL CORP	0.00	0.00	0	
11602	L	04507					08	18	1960	PMT	OWD	20S	36E	14	230	20S	36E	14	1064	68		CONTINENTAL OIL CO	0.00	0.00	0	
12559	L	10135					06	21	1990	PMT	STK SHA	20S	36E	14	24	20S	36E	14	0690	68		COOPER JIM	0.00	3.00	0	
11603	L	04506					08	18	1960	PMT	OWD	20S	36E	14	330	20S	36E	14	1064	68		CONTINENTAL OIL CO	0.00	0.00	0	
11604	L	06667		L			04	29	1970	PMT	STK	20S	36E	14	411	20S	36E	14	0771	68		COOPER BROS	0.00	3.00	0	
12765	L	10252							1931	DCL	DOM SHA	20S	36E	15	24	20S	36E	15	0492	68		KLEIN FAYE L	0.00	3.00	0	USED FOR STOCK USE ALSO
11605	L	06986					06	28	1972	PMT	DOM	20S	36E	15	422	20S	36E	15	0672	68		KLEIN EDWARD R	0.00	3.00	0	
11606	L	06432		L	06432	E	11	27	1968	DEN	NOT	20S	36E	18	111	20S	36E	18	0776	68		LEA CO WATER ASSOC	0.00	0.00	0	
11607	L	02584					07	09	1954	PMT	OWD	20S	36E	26	144	20S	36E	26	0764	68		AMERADA PETRO CORP	0.00	0.00	0	
11608	L	02582					05	14	1954	PMT	OWD	20S	36E	34	240	20S	36E	34	0764	68		LEE R J	0.00	0.00	0	
11609	L	02540					05	10	1954	WDN	NOT	20S	36E	34	243	20S	36E	34	0764	68		AMERADA PETRO CORP	0.00	0.00	0	
11610	L	08066					00	00	1945	DCL	STK	20S	37E	01	200	20S	37E	01	0884	69		S & W CATTLE CO	0.00	3.00	0	
12491	L	10069					04	10	1989	PMT	STK	20S	37E	04	11	20S	37E	04	0489			COOPER JIMMIE	0.00	3.00	0	
[illegible]	L	[illegible]					[illegible]	[illegible]	[illegible]	DCL	[illegible]	20S	37E	[illegible]	[illegible]	20S	37E	[illegible]	[illegible]	69		REEVES ELSIE M ET AL	0.00	3.00	0	

11609	L	02540				05	10	1954	ADN	NOT	20S	36E	34	240	20S	36E	34	0764	69	AMERADA PETRO CORP	0.00	0.00	0
11610	L	08066				00	00	1945	DCL	STK	20S	37E	01	200	20S	37E	01	0894	69	B & W CATTLE CO	0.00	3.00	0
12451	L	10069				04	10	1989	PMT	STK	20S	37E	04	11	20S	37E	04	0459		COOPER JIMMIE	0.00	3.00	0
11612	L	05980				00	00	1948	DCL	DOM SHA	20S	37E	04	341	20S	37E	04	0693	69	REEVES ELSIE M ET AL	0.00	3.00	0
11613	L	01450				05	27	1952	PMT	OWD	20S	37E	05	130	20S	37E	05	0564	69	MARATHON OIL CO	0.00	0.00	0
12096	L	09779				01	08	1986	PMT	DOM	20S	37E	05	222	20S	37E	05	0186	69	DAVIS DOLORES NASH	0.00	3.00	0
11614	L	02488				02	11	1954	PMT	OWD	20S	37E	05	230	20S	37E	05	0764	69	TEXAS COMPANY THE	0.00	0.00	0
11615	L	05447		L	05447	08	06	1964	CAN	NOT	20S	37E	05	230	20S	37E	05	0776	69	COOPER BROS	0.00	0.00	0
11616	L	01572				09	19	1952	PMT	OWD	20S	37E	05	331	20S	37E	05	0664	69	EXPLORATION DRG CO	0.00	0.00	0
11617	L	02497				03	10	1954	PMT	OWD	20S	37E	05	333	20S	37E	05	0764	69	AMERADA PETRO CORP	0.00	0.00	0
11618	L	02501				03	13	1954	PMT	OWD	20S	37E	05	333	20S	37E	05	0764	69	AMERADA PETRO CORP	0.00	0.00	0
11619	L	02102				03	23	1953	PMT	OWD	20S	37E	05	340	20S	37E	05	0764	69	MORAN OIL PROD & D	0.00	0.00	0
11620	L	02278				07	09	1953	PMT	DOM SHA	20S	37E	05	430	20S	37E	05	0693	69	REEVES ELSIE M ET AL	0.00	3.00	0
11621	L	03810				03	12	1958	PMT	OWD	20S	37E	06	140	20S	37E	06	0764	69	THE TEXAS CO	0.00	0.00	0
11622	L	02801				03	07	1955	PMT	OWD	20S	37E	06	233	20S	37E	06	0764	69	AMERADA PETRO CORP	0.00	0.00	0
11623	L	02420				11	27	1953	PMT	OWD	20S	37E	06	3423	20S	37E	06	0776	69	MORAN DRILLING CO	0.00	0.00	0
11624	L	01145				06	20	1951	PMT	OWD	20S	37E	06	414	20S	37E	06	0564	69	GULF OIL CORP	0.00	0.00	0
11625	L	01487				07	14	1952	PMT	NOT	20S	37E	06	414	20S	37E	06	0664	69	GULF OIL CORP	0.00	0.00	0
11626	L	04619				03	31	1961	PMT	OWD	20S	37E	06	423	20S	37E	06	1064	69	GULF OIL CORP	0.00	0.00	0
11627	L	02553				05	14	1954	PMT	OWD	20S	37E	06	434	20S	37E	06	0764	69	AMERADA PETRO CORP	0.00	0.00	0
11628	L	02460				01	15	1954	PMT	OWD	20S	37E	07	210	20S	37E	07	0764	69	MORAN OIL PROD	0.00	0.00	0
11629	L	02533				04	21	1954	PMT	OWD	20S	37E	07	230	20S	37E	07	0764	69	MORAN OIL PROD	0.00	0.00	0
11630	L	04670				08	07	1961	CAN	NOT	20S	37E	07	310	20S	37E	07	1064	69	COOPER MRS TOMMIE	0.00	0.00	0
11631	L	02274				07	09	1953	PMT	OWD	20S	37E	08	130	20S	37E	08	0764	69	SINCLAIR OIL & GAS	0.00	0.00	0
11632	L	02483				02	17	1954	PMT	OWD	20S	37E	08	144	20S	37E	08	0764	69	MORAN OIL PROD DRG	0.00	0.00	0
11633	L	02139				04	03	1953	PMT	OWD	20S	37E	08	222	20S	37E	08	0764	69	GACKLE DRG CO INC	0.00	0.00	0
11634	L	07619	S4	L	07619	10	08	1976	PMT	IRR	20S	37E	08	230	20S	37E	08	1279	69	COOPER JIMMY	0.00	0.00	0
11635	L	01253				07	29	1953	PMT	OWD	20S	37E	08	231	20S	37E	08	0564	69	GULF OIL CORP	0.00	0.00	0
11636	L	07619	S3	L	07619	10	08	1976	PMT	IRR	20S	37E	08	240	20S	37E	08	1279	69	COOPER JIMMY	0.00	0.00	0
11637	L	07620		L		10	08	1976	PBU	COM	20S	37E	08	2441	20S	37E	08	0894	69	COOPER JIMMY	0.00	10.00	10
11638	L	07620	ES	L	07620	05	17	1978	PBU	COM	20S	37E	08	2441	20S	37E	08	0834	69	COOPER JIMMY	0.00	8.82	9

XENCO Laboratories

CERTIFICATE OF ANALYSIS SUMMARY 1-70588

K.E.I. Consultants, Inc.

Project Name: TNMPL Monument

Project ID: 610057-02-18
Project Manager: Ann Baker
Project Location: Site 18

Date Received in Lab: Mar 11, 1997 10:30 by RT
Date Report Faxed: Mar 27, 1997
XENCO contact: Carlos Castro/Edward Yonemoto

Analysis Requested	*Lab ID:*	170588-001	170588-002	170588-003	170588-004		
	Field ID:	B18-1	B18-1	B18-1	B18-1		
	Depth:	1-2'	5-6'	14-15'	34-35'		
BTEX Analyzed by EPA 8020		Date Analyzed - Analytical Results					**ppm (mg/L - mg/Kg)**
		Mar 12, 1997	Mar 12, 1997	Mar 13, 1997	Mar 12, 1997		
Benzene		< 0.050	< 0.20	< 0.20	< 0.050		
Toluene		0.348	4.82	1.92	< 0.050		
Ethylbenzene		0.865	< 0.20	0.92	< 0.050		
m,p-Xylenes		< 0.100	12.46	8.64	< 0.100		
o-Xylene		< 0.050	< 0.20	< 0.20	< 0.050		
Total BTEX		1.213	17.28	11.48	< 0.300		
SPLP Volatiles by 1312/8260		Date Analyzed - Analytical Results					**ppm (mg/L - mg/Kg)**
			Mar 24, 1997				
Benzene			< 0.025				
Bromobenzene			< 0.025				
Bromodichloromethane			< 0.025				
Bromoform			< 0.025				
Bromomethane			< 0.025				
n-Butylbenzene			< 0.025				
sec-Butylbenzene			< 0.025				
tert-Butylbenzene			< 0.025				
Carbon Tetrachloride			< 0.025				
Chloroethane			< 0.050				
Chloroform			< 0.025				
Chloromethane			< 0.050				
2-Chlorotoluene			< 0.025				
4-Chlorotoluene			< 0.025				
1,2-Dibromo-3-chloropropane			< 0.025				
Dibromochloromethane			< 0.025				
1,2-Dibromoethane			< 0.025				

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

CERTIFICATE OF ANALYSIS SUMMARY 1-70588

K.E.I. Consultants, Inc.

Project Name: TNMPL Monument

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Analysis Requested	Lab ID:	170588-001	170588-002	170588-003	170588-004		
	Field ID:	B18-1	B18-1	B18-1	B18-1		
	Depth:	1-2'	5-6'	14-15'	34-35'		
Dibromomethane			< 0.025				
1,2-Dichlorobenzene			< 0.025				
1,3-Dichlorobenzene			< 0.025				
1,4-Dichlorobenzene			< 0.025				
Dichlorodifluoromethane			< 0.025				
1,1-Dichloroethane			< 0.025				
1,2-Dichloroethane			< 0.025				
1,1-Dichloroethene			< 0.025				
cis-1,2-Dichloroethene			< 0.025				
trans-1,2-Dichloroethene			< 0.025				
1,2-Dichloropropane			< 0.025				
1,3-Dichloropropane			< 0.025				
2,2-Dichloropropane			< 0.025				
1,1-Dichloropropene			< 0.025				
Ethylbenzene			< 0.025				
Hexachlorobutadiene			< 0.025				
Isopropylbenzene			< 0.025				
p-Isopropyltoluene			< 0.025				
Methylene chloride			< 0.025				
Naphthalene			< 0.025				
n-Propylbenzene			< 0.025				
Styrene			< 0.025				
1,1,1,2-Tetrachloroethane			< 0.025				
1,1,2,2-Tetrachloroethane			< 0.025				
Tetrachloroethene			< 0.025				
Toluene			< 0.025				
1,2,3-Trichlorobenzene			< 0.025				
1,2,4-Trichlorobenzene			< 0.025				

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

CERTIFICATE OF ANALYSIS SUMMARY 1-70588

K.E.I. Consultants, Inc.

Project Name: TNMPL Monument

Project ID: 610057-02-18
Project Manager: Ann Baker
Project Location: Site 18

Date Received in Lab: Mar 11, 1997 10:30 by RT
Date Report Faxed: Mar 27, 1997
XENCO contact: Carlos Castro/Edward Yonemoto

Analysis Requested	*Lab ID:*	170588-001	170588-002	170588-003	170588-004		
	Field ID:	B18-1	B18-1	B18-1	B18-1		
	Depth:	1-2'	5-6'	14-15'	34-35'		
1,1,1-Trichloroethane			< 0.025				
1,1,2-Trichloroethane			< 0.025				
Trichloroethene			< 0.025				
Trichlorofluoromethane			< 0.025				
1,2,3-Trichloropropane			< 0.025				
1,2,4-Trimethylbenzene			0.086				
1,3,5-Trimethylbenzene			0.043				
Vinyl chloride			< 0.025				
o-Xylene			< 0.025				
m,p-Xylenes			0.029				
Bromochloromethane			< 0.025				
Chlorobenzene			< 0.025				
MTBE			< 0.050				
SPLP Semivolatiles by 1312/8270		Date Analyzed	- Analytical Results			**ppm (mg/L - mg/Kg)**	
			Mar 21, 1997				
Acenaphthene			< 0.028				
Acenaphthylene			< 0.028				
Anthracene			< 0.028				
Benzo[a]anthracene			< 0.028				
Benzo[a]pyrene			< 0.028				
Benzo[b]fluoranthene			< 0.028				
Benzo[ghi]perylene			< 0.028				
Benzo[k]fluoranthene			< 0.028				
Butyl benzyl phthalate			< 0.028				
Carbazole			< 0.028				
4-Chloroaniline			< 0.028				

Edward K. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

CERTIFICATE OF ANALYSIS SUMMARY 1-70588

K.E.I. Consultants, Inc.

Project Name: TNMPL Monument

Project ID: 610057-02-18
Project Manager: Ann Baker
Project Location: Site 18

Date Received in Lab: Mar 11, 1997 10:30 by RT
Date Report Faxed: Mar 27, 1997
XENCO contact: Carlos Castro/Edward Yonemoto

Analysis Requested	*Lab ID:*	170588-001	170588-002	170588-003	170588-004		
	Field ID:	B18-1	B18-1	B18-1	B18-1		
	Depth:	1-2'	5-6'	14-15'	34-35'		
bis [2-Chloroethoxy] methane			< 0.028				
bis [2-Chloroethyl] ether			< 0.028				
bis [2-Chloroisopropyl] ether			< 0.028				
2-Chloronaphthalene			< 0.028				
2-Chlorophenol			< 0.028				
4-Chlorophenyl-phenyl ether			< 0.028				
Chrysene			< 0.028				
Dibenzofuran			< 0.028				
Dibenzo[a,h]anthracene			< 0.028				
1,2-Dichlorobenzene			< 0.028				
1,3-Dichlorobenzene			< 0.028				
1,4-Dichlorobenzene			< 0.028				
3,3'-Dichlorobenzidine			< 0.028				
2,4-Dichlorophenol			< 0.028				
Diethyl phthalate			< 0.028				
2,4-Dimethylphenol			< 0.028				
Dimethyl phthalate			< 0.028				
4,6-Dinitro-2-methylphenol			< 0.069				
2,4-Dinitrophenol			< 0.069				
2,4-Dinitrotoluene			< 0.028				
2,6-Dinitrotoluene			< 0.028				
Di-n-octyl phthalate			< 0.028				
bis [2-Ethylhexyl] phthalate			< 0.028				
Fluoranthene			< 0.028				
Fluorene			< 0.028				
Hexachlorobenzene			< 0.028				
Hexachlorobutadiene			< 0.028				
Hexachlorocyclopentadiene			< 0.028				

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

CERTIFICATE OF ANALYSIS SUMMARY 1-70588

K.E.I. Consultants, Inc.

Project Name: TNMPL Monument

Project ID: 610057-02-18
Project Manager: Ann Baker
Project Location: Site 18

Date Received in Lab: Mar 11, 1997 10:30 by RT
Date Report Faxed: Mar 27, 1997
XENCO contact: Carlos Castro/Edward Yonemoto

Analysis Requested	*Lab ID:*	170588-001	170588-002	170588-003	170588-004		
	Field ID:	B18-1	B18-1	B18-1	B18-1		
	Depth:	1-2'	5-6'	14-15'	34-35'		
Hexachloroethane			< 0.028				
Indeno[1,2,3-cd]pyrene			< 0.028				
Isophorone			< 0.028				
2-Methylnaphthalene			< 0.028				
2-Methylphenol			< 0.028				
4-Methylphenol			< 0.028				
Naphthalene			< 0.028				
2-Nitroaniline			< 0.069				
3-Nitroaniline			< 0.069				
4-Nitroaniline			< 0.069				
Nitrobenzene			< 0.028				
2-Nitrophenol			< 0.028				
4-Nitrophenol			< 0.028				
N-Nitroso-di-n-propylamine			< 0.028				
N-Nitrosodiphenylamine			< 0.028				
Pentachlorophenol			< 0.069				
Phenanthrene			< 0.028				
Phenol			< 0.028				
Pyrene			< 0.028				
Pyridine			< 0.028				
1,2,4-Trichlorobenzene			< 0.028				
2,4,5-Trichlorophenol			< 0.069				
2,4,6-Trichlorophenol			< 0.028				
4-Bromophenyl-phenylether			< 0.028				
4-Chloro-3-Methylphenol			< 0.028				
Di-n-butyl phthalate			0.033				

Edward T. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

CERTIFICATE OF ANALYSIS SUMMARY 1-70588

K.E.I. Consultants, Inc.

Project Name: TNMPL Monument

Project ID: 610057-02-18
Project Manager: Ann Baker
Project Location: Site 18

Date Received in Lab: Mar 11, 1997 10:30 by RT
Date Report Faxed: Mar 27, 1997
XENCO contact: Carlos Castro/Edward Yonemoto

Analysis Requested	*Lab ID:*	170588-001	170588-002	170588-003	170588-004		
	Field ID:	B18-1	B18-1	B18-1	B18-1		
	Depth:	1-2'	5-6'	14-15'	34-35'		
TPH Analyzed by EPA 418.1		Date Analyzed - Analytical Results					**ppm (mg/L - mg/Kg)**
		Mar 13, 1997	Mar 13, 1997	Mar 13, 1997	Mar 13, 1997		
Total Petroleum Hydrocarbons		13500	31500	10900	929		
SPLP TPH by 1312/418.1		Date Analyzed - Analytical Results					**ppm (mg/L - mg/Kg)**
			Mar 25, 1997				
Total Petroleum Hydrocarbons			1.9				

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 17A29A79

SW- 846 5030/8020 BTEX

Date Validated: Mar 13, 1997 15:30
Date Analyzed: Mar 12, 1997 09:55
QA/QC Manager: Edward H. Yonemoto, Ph.D.

Analyst: IF
Matrix: Solid

	BLANK SPIKE ANALYSIS						
Parameter	[A] Blank Result ppm	[B] Blank Spike Result ppm	[C] Blank Spike Amount ppm	[D] Method Detection Limit ppm	[E] QC LIMITS Blank Spike Recovery %	[F] Recovery Range %	[G] Qualifier
Benzene	< 0.0010	0.0808	0.1000	0.0010	80.8	65-135	
Toluene	< 0.0010	0.0866	0.1000	0.0010	86.6	65-135	
Ethylbenzene	< 0.0010	0.0806	0.1000	0.0010	80.6	65-135	
m,p-Xylenes	< 0.0020	0.1730	0.2000	0.0020	86.5	65-135	
o-Xylene	< 0.0010	0.0886	0.1000	0.0010	88.6	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

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 17A29A79

SW- 846 5030/8020 BTEX

Date Validated: Mar 13, 1997 15:30
Date Analyzed: Mar 12, 1997 14:36
QA/QC Manager: Edward H. Yonemoto, Ph.D.

Analyst: IF
Matrix: Solid

	MATRIX SPIKE / MATRIX SPIKE DUPLICATE AND RECOVERY										
Q.C. Sample ID 170587- 002	[A]	[B]	[C]	[D]	[E]	Matrix	[F]	[G]	[H]	[I]	[J]
							QC	QC	QC	Matrix Spike	
Parameter	Sample Result	Matrix Spike Result	Matrix Spike Duplicate Result	Matrix Spike Amount	Method Detection Limit	Limit Relative Difference	Spike Relative Difference	Matrix Spike Recovery	M.S.D. Recovery	Recovery Range	Qualifier
	ppm	ppm	ppm	ppm	ppm	%	%	%	%	%	
Benzene	< 0.050	2.025	1.895	2.000	0.050	25.0	6.6	101.3	94.8	65-135	
Toluene	< 0.050	2.180	2.110	2.000	0.050	25.0	3.3	109.0	105.5	65-135	
Ethylbenzene	< 0.050	1.925	1.880	2.000	0.050	25.0	2.4	96.3	94.0	65-135	
m,p-Xylenes	< 0.100	4.330	4.210	4.000	0.100	25.0	2.8	108.3	105.3	65-135	
o-Xylene	< 0.050	2.130	2.085	2.000	0.050	25.0	2.1	106.5	104.3	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

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 17A29A80

SW- 846 5030/8020 BTEX

Date Validated: Mar 13, 1997 16:25
Date Analyzed: Mar 13, 1997 10:27
QA/QC Manager: Edward H. Yonemoto, Ph.D.

Analyst: IF
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] Method 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
Benzene	< 0.0010	0.1000	0.0966	0.1000	0.0010	25.0	3.5	100.0	96.6	65-135	
Toluene	< 0.0010	0.1110	0.1020	0.1000	0.0010	25.0	8.5	111.0	102.0	65-135	
Ethylbenzene	< 0.0010	0.1070	0.1040	0.1000	0.0010	25.0	2.8	107.0	104.0	65-135	
m,p-Xylenes	< 0.0020	0.2110	0.2030	0.2000	0.0020	25.0	3.9	105.5	101.5	65-135	
o-Xylene	< 0.0010	0.1110	0.0999	0.1000	0.0010	25.0	10.5	111.0	99.9	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

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 17A23A33

1312/8260 Volatile Organic Analysis

Date Validated: Mar 25, 1997 18:15
Date Analyzed: Mar 24, 1997 17:41
QA/QC Manager: Edward H. Yonemoto, Ph.D.

Analyst: CE
Matrix: Solid

	MATRIX SPIKE / MATRIX SPIKE DUPLICATE AND RECOVERY										
Q.C. Sample ID 170588- 002	[A] Sample Result	[B] Matrix Spike Result	[C] Matrix Spike Duplicate Result	[D] Matrix Spike Amount	[E] Method 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	mg/L	mg/L	mg/L	mg/L	mg/L	%	%	%	%	%	
Benzene	< 0.0050	0.2200	0.2180	0.2500	0.0050	21.0	0.9	88.0	87.2	66-142	
Chlorobenzene	< 0.0050	0.2425	0.2400	0.2500	0.0050	21.0	1.0	97.0	96.0	60-133	
1,1-Dichloroethene	< 0.0200	0.2145	0.2010	0.2500	0.0200	22.0	6.5	85.8	80.4	59-172	
Toluene	< 0.0050	0.2240	0.2225	0.2500	0.0050	21.0	0.7	89.6	89.0	59-139	
Trichloroethene	< 0.0150	0.2170	0.2170	0.2500	0.0150	24.0	0.0	86.8	86.8	62-137	

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

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO laboratories

Certificate Of Quality Control for Batch : 17A34A53

1312/8270 Semivolatiles (SPLP)

Date Validated: Mar 24, 1997 11:45
Date Analyzed: Mar 21, 1997 16:53
QA/QC Manager: Edward H. Yonemoto, Ph.D.

Analyst: MM
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] Method 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	< 0.0030	0.0477	0.0451	0.0500	0.0030	19.0	5.6	95.4	90.2	46-118	
4-Chloro-3-Methylphenol	< 0.0040	0.0141	0.0176	0.0500	0.0040	33.0	22.1	28.2	35.2	23-97	
2-Chlorophenol	< 0.0050	0.0362	0.0418	0.0500	0.0050	50.0	14.4	72.4	83.6	27-123	
1,4-Dichlorobenzene	< 0.0040	0.0479	0.0471	0.0500	0.0040	27.0	1.7	95.8	94.2	36-97	
2,4-Dinitrotoluene	< 0.0050	0.0429	0.0410	0.0500	0.0050	47.0	4.5	85.8	82.0	24-96	
N-Nitroso-di-n-propylamine	< 0.0040	0.0471	0.0461	0.0500	0.0040	38.0	2.1	94.2	92.2	41-116	
4-Nitrophenol	< 0.0040	0.0102	0.0089	0.0500	0.0040	50.0	13.6	20.4	17.8	10-80	
Pentachlorophenol	< 0.0090	0.0449	0.0471	0.0500	0.0090	47.0	4.8	89.8	94.2	9-103	
Phenol	< 0.0040	0.0110	0.0130	0.0500	0.0040	35.0	16.7	22.0	26.0	12-89	
Pyrene	< 0.0020	0.0512	0.0492	0.0500	0.0020	36.0	4.0	102.4	98.4	26-127	
1,2,4-Trichlorobenzene	< 0.0050	0.0439	0.0438	0.0500	0.0050	23.0	0.2	87.8	87.6	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
All results are based on MDL and validated for QC purposes

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 17A07B76

EPA 418.1 Total Petroleum Hydrocarbons

Date Validated: Mar 14, 1997 10:15
Date Analyzed: Mar 13, 1997 17:26
QA/QC Manager: Edward H. Yonemoto, Ph.D.

Analyst: CG
Matrix: Solid

	MATRIX DUPLICATE ANALYSIS					
Q.C. Sample ID 170583- 001	[A] Sample Result	[B] Duplicate Result	[C] Method Detection Limit	[D] QC Relative Difference	[E] LIMITS Relative Difference	[F] Qualifier
Parameter	ppm	ppm	ppm	%	%	
Total Petroleum Hydrocarbons	< 7.50	< 7.50	7.50	N.C	30.0	

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

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 17A07B76

EPA 418.1 Total Petroleum Hydrocarbons

Date Validated: Mar 14, 1997 10:15
Date Analyzed: Mar 13, 1997 17:28
QA/QC Manager: Edward H. Yonemoto, Ph.D.

Analyst: CG
Matrix: Solid

	BLANK SPIKE ANALYSIS						
Parameter	[A] Blank Result ppm	[B] Blank Spike Result ppm	[C] Blank Spike Amount ppm	[D] Method Detection Limit ppm	[E] QC LIMITS Blank Spike Recovery %	[F] Recovery Range %	[G] Qualifier
Total Petroleum Hydrocarbons	< 7.50	201	202	7.50	99.5	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

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 17A07C11

EPA 1312/418.1 SPLP TPH

Date Validated: Mar 26, 1997 10:00
Date Analyzed: Mar 25, 1997 15:15
QA/QC Manager: Edward H. Yonemoto, Ph.D.

Analyst: OG
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] Method 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	< 0.73	4.03	3.93	4.04	0.73	25.0	2.5	99.8	97.3	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

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

11381 Meadowglen Suite L Houston, Texas 77082
(713) 589-0692 Fax (713) 589-0695

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM

Lab. Batch # 170588-H

Contractor: KEI | Phone: (210) 680-3767

Address: 5304 WURZBACH STE 100 San Antonio TX 78238

Project Name: TNMPL-MONUMENT | Project Director: PAUL HARTNETT

Project Location: STE 18 | Project Manager: ANN BAKER

Sampler Signature: [signature] | Project No.: 61057-18-02-18

No. coolers this shipment: 2 | Contractor COC #: 0002

Carrier: | Quote #:

Airbill No. | P.O. No.: 7205

Turn-around: * ASAP * 24 hrs 48 hrs (Standard)

LAB ONLY ID #

	Field ID	Date	Time	Depth	Soil	Water	Comp	Grab	Container Size	Container Type P, G	Preservative: Ice	Preservative: Other	Sample Description	No of Containers Total	BTEX (5030/8020-602)	TPH (418.1)	Please Hold	Remarks	LAB ONLY ID #
1	B18-1 1-2'	3/4/97	1130	1-2'	X			X	4,8	G	X		B18-1, 1-2	2	X	X		Hold 8oz	1
2	B18-1 5-6'	"	1135	5-6'	"			"	"	"	"		B18-1, 5-6	"	"	"		"	2
3	B18-1 14-15'	"	1145	14-15	"			"	"	"	"		B18-1, 14-15	"	"	"		"	3
4	B18-1 34-35	"	1230	34-35	"			"	"	"	"		B18-1, 34-35'	"	"	"		"	4
5																			5
6																			6
7																			7
8																			8
9																			9
10																			10

Unl Dies Ker Unknown
Waste Oil
PIT No: Tank No:

Relinquished by: (Signature)	DATE	TIME	Received by: (Signature)	DATE	TIME
[signature]	3/4/97	1730	Gerald J Carrillo	3-10-97	0730
			Received For Laboratory by: [signature]	3-11-97	1030

Remarks: Hold 8oz. Pending TPH results

Pink (Contractor), Yellow & White (Lab).

* Pre-scheduling is recommended

Precision Analytical Services

XENCO Laboratories

11381 Meadowglen Suite L Houston, Texas 77082
(713) 589-0692 Fax (713) 589-0695

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM

Page 1 of 1

Lab. Batch # 170588-H

Contractor: KEJ | Phone: (210) 6803767 | No. coolers this shipment: 2 | Contractor COC #: 0002

Address: 5309 WURZBACH STE 100 San Antonio TX 78238 | Carrier: | Quote #: | Airbill No. | P.O. No.: 7205

Project Name: TNMPL-MONUMENT | Project Director: PAUL HARTNETT

Project Location: STE 18 | Project Manager: Ann BAKER

Sampler Signature: | Project No.: 610057-18-02-18 DOC

SAMPLE CHARACTERIZATION

Preservative: Ice | Other

Unl Dies Ker Unknown | Waste Oil | PIT No: | Tank No:

	Field ID	Date	Time	DEPTH	SOIL	WATER	COMP	GRAB	Container Size	Container Type P, G	Ice	Other	Sample Description	No of CONTAINERS Total	BTEX (8020/8020-602)	TPH (418.1)	SPLP VOLATILES *	SPLP SEMIVOLATILES *	SPLP TPH *	Please Hold	Turn-around: ASAP / 24 hrs / 48 hrs / Standard	LAB ONLY ID #	Remarks
1	B18-1 1-2'	3/9/97	1130	1-2'	X			X	4,8	G	Y		B18-1, 1-2	2	X	X						1	Hold 8oz 402378
2	B18-1, 5-6'		1135	5-6'									B18-1, 5-6				X	X	X			2	
3	B18-1 14-15'		1145	14-15									B18-1, 14-15									3	
4	B18-1 34-35		1230	34-35									B18-1, 34-35'									4	
5																						5	
6																						6	
7																						7	
8																						8	
9																						9	
10																						10	

Relinquished by: (Signature)	DATE	TIME	Received by: (Signature)	DATE	TIME
	3/9/97	1730	Gerald J Carville	3-10-97	0730
			Received For Laboratory by	3-11-97	1030

Remarks: Hold 8oz. Pending TPH results

* Requested by Ann Baker 3/20/97 10:30

Pink (Contractor), Yellow & White (Lab)

* Pre-scheduling is recommended

Precision Analytical Services

XENCO Laboratories

CERTIFICATE OF ANALYSIS SUMMARY 1-70661

K.E.I. Consultants, Inc.

Project ID: 610057-2-18
Project Manager: Ann Baker
Project Location: Site 18

Project Name: TNMPL Monument

Date Received in Lab : Mar 20, 1997 11:30 by CC
Date Report Faxed: Apr 7, 1997
XENCO contact : Carlos Castro/Edward Yonemoto

Analysis Requested	*Lab ID:*	170661-001	170661-002	170661-003	170661-004	170661-005	170661-006	170661-007	170661-008	170661-009
	Field ID:	B18-2	B18-2	B18-2	B18-2	B18-3	B18-3	B18-3	B18-4	B18-4
	Depth:	0-1'	8-9'	29-30'	31-32'	1-2'	12-13'	26-27'	1-2'	13-14'
BTEX by EPA 8020		Date Analyzed - Analytical Results								**ppm (mg/L - mg/Kg)**
		Mar 20, 1997	Mar 20, 1997	Mar 20, 1997	Mar 20, 1997	Mar 20, 1997	Mar 20, 1997	Mar 20, 1997	Mar 20, 1997	Mar 20, 1997
Benzene		< 0.020	< 0.020	2.15	1.05	< 0.020	< 0.020	0.348	< 0.020	< 0.020
Toluene		< 0.020	< 0.020	2.74	1.48	< 0.020	< 0.020	0.880	< 0.020	< 0.020
Ethylbenzene		< 0.020	< 0.020	8.33	3.03	< 0.020	< 0.020	0.660	< 0.020	< 0.020
m,p-Xylenes		< 0.040	< 0.040	6.13	2.48	< 0.040	< 0.040	1.550	< 0.040	< 0.040
o-Xylene		< 0.020	< 0.020	0.62	0.31	< 0.020	< 0.020	0.424	< 0.020	< 0.020
Total BTEX		< 0.120	< 0.120	19.97	8.35	< 0.120	< 0.120	3.862	< 0.120	< 0.120
Total Petroleum Hydrocarbons by EPA 418.1		Date Analyzed - Analytical Results								**ppm (mg/L - mg/Kg)**
		Mar 20, 1997	Mar 20, 1997	Mar 20, 1997	Mar 20, 1997	Mar 20, 1997	Mar 20, 1997	Mar 20, 1997	Mar 20, 1997	Mar 20, 1997
Total Petroleum Hydrocarbons		29.5	13.0	12900	3380	15.5	13.0	2840	32.0	23.0

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

CERTIFICATE OF ANALYSIS SUMMARY 1-70661

K.E.I. Consultants, Inc.

Project ID: 610057-2-18
Project Name: *TNMPL Monument*
Project Manager: Ann Baker
Project Location: Site 18

Date Received in Lab : Mar 20, 1997 11:30 by CC
Date Report Faxed: Apr 7, 1997
XENCO contact : Carlos Castro/Edward Yonemoto

Analysis Requested	*Lab ID:*	170661-010
	Field ID:	B18-4
	Depth:	26-27'
BTEX by EPA 8020	Date Analyzed - Analytical Results	**ppm (mg/L - mg/Kg)**
	Mar 20, 1997	
Benzene		< 0.020
Toluene		< 0.020
Ethylbenzene		< 0.020
m,p-Xylenes		< 0.040
o-Xylene		< 0.020
Total BTEX		< 0.120
Total Petroleum Hydrocarbons by EPA 418.1	Date Analyzed - Analytical Results	**ppm (mg/L - mg/Kg)**
	Mar 20, 1997	
Total Petroleum Hydrocarbons		< 10.0

Edward K. Yonemoto, Ph.D.
QA/QC Manager

AGRA EARTH & ENVIRONMENTAL, INC.

12758 Cimarron Path, Suite 128
San Antonio, Texas 78249

Tele: 210-699-6595
Fax: 210-699-6597

REPORT OF ORGANIC CONTENT

CLIENT: Xenco Laboratories
5309 Wurzbach, Suite 104
San Antonio, TX 78238
Attn: Carlos A. Castro, Ph.D

PROJECT NO: 6-729-0257
REPORT NO: T-0991
AUTHORIZATION: Client
REPORT DATE: 4/01/97

PROJECT: Xenco Miscellaneous Testing

SERVICES: Tested for Organic content.

PROJECT DATA

CONTRACTOR: N/A
TEST FOR: N/A
MATERIAL: See Below
METHOD OF TEST: ASTM D2974

DATE SAMPLED: N/A
SAMPLED BY: Client
SAMPLE LOCATION: See Below

REPORT OF TESTS

DESCRIPTION	LOCATION	MOISTURE PERCENT	ORGANIC CONTENT PERCENT
Brown Sand	B18-2, 8-9'	3.5	0.9

Michael Jennings, S.E.T.

XENCO Laboratories

Certificate Of Quality Control for Batch : 17A25A93

SW- 846 5030/8020 BTEX

Date Validated: Mar 21, 1997 09:00
Date Analyzed: Mar 20, 1997 20:16
QA/QC Manager: Edward H. Yonemoto, Ph.D.

Analyst: CB
Matrix: Solid

	BLANK SPIKE ANALYSIS						
Parameter	[A] Blank Result ppm	[B] Blank Spike Result ppm	[C] Blank Spike Amount ppm	[D] Method 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	0.1110	0.1000	0.0010	111.0	65-135	
Ethylbenzene	< 0.0010	0.1100	0.1000	0.0010	110.0	65-135	
m,p-Xylenes	< 0.0020	0.2270	0.2000	0.0020	113.5	65-135	
o-Xylene	< 0.0010	0.1090	0.1000	0.0010	109.0	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

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 17A25A93

SW- 846 5030/8020 BTEX

Date Validated: Mar 21, 1997 09:00
Date Analyzed: Mar 20, 1997 20:34
QA/QC Manager: Edward H. Yonemoto, Ph.D.

Analyst: CB
Matrix: Solid

	MATRIX SPIKE / MATRIX SPIKE DUPLICATE AND RECOVERY										
Q.C. Sample ID 170661- 001	[A] Sample Result	[B] Matrix Spike Result	[C] Matrix Spike Duplicate Result	[D] Matrix Spike Amount	[E] Method 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	2.640	2.480	2.000	0.020	25.0	6.3	132.0	124.0	65-135	
Toluene	< 0.020	2.560	2.420	2.000	0.020	25.0	5.6	128.0	121.0	65-135	
Ethylbenzene	< 0.020	2.600	2.440	2.000	0.020	25.0	6.3	130.0	122.0	65-135	
m,p-Xylenes	< 0.040	5.280	5.000	4.000	0.040	25.0	5.4	132.0	125.0	65-135	
o-Xylene	< 0.020	2.540	2.420	2.000	0.020	25.0	4.8	127.0	121.0	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

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 17A30B02

EPA 418.1 Total Petroleum Hydrocarbons

Date Validated: Mar 21, 1997 12:00
Date Analyzed: Mar 20, 1997 15:50
QA/QC Manager: Edward H. Yonemoto, Ph.D.

Analyst: HL
Matrix: Solid

MATRIX SPIKE / MATRIX SPIKE DUPLICATE AND RECOVERY

Q.C. Sample ID 170661- 001 / Parameter	[A] Sample Result ppm	[B] Matrix Spike Result ppm	[C] Matrix Spike Duplicate Result ppm	[D] Matrix Spike Amount ppm	[E] Method Detection Limit ppm	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	29.50	226	219	198	7.50	30.0	3.1	99.4	95.9	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

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 17A30B02

EPA 418.1 Total Petroleum Hydrocarbons

Date Validated: Mar 21, 1997 12:00
Date Analyzed: Mar 20, 1997 15:41
QA/QC Manager: Edward H. Yonemoto, Ph.D.

Analyst: HL
Matrix: Solid

	BLANK SPIKE ANALYSIS						
Parameter	[A] Blank Result ppm	[B] Blank Spike Result ppm	[C] Blank Spike Amount ppm	[D] Method Detection Limit ppm	[E] QC Blank Spike Recovery %	[F] LIMITS Recovery Range %	[G] Qualifier
Total Petroleum Hydrocarbons	< 7.50	189	198	7.50	95.6	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

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

ANALYTICAL CHAIN OF CUSTODY REPORT
CHRONOLOGY OF SAMPLES

K.E.I. Consultants, Inc.

Project ID: 610057-2-18
Project Manager: Ann Baker
Project Location: Site 18

Project Name: TNMPL Monument

XENCO COC#: 1-70661
Date Received in Lab: Mar 20, 1997 11:30 by CC
XENCO contact : Carlos Castro/Edward Yonemoto

							Date and Time			
	Field ID	Lab. ID	Method Name	Method ID	Units	Turn Around	Sample Collected	Addition Requested	Extraction	Analysis
1	B18-2 (0-1')	170661-001	BTEX	SW-846	ppm	Standard	Mar 14, 1997 09:10		Mar 20, 1997 by CB	Mar 20, 1997 20:34 by CB
2			TPH	EPA 418.1	ppm	Standard	Mar 14, 1997 09:10		Mar 20, 1997 by HL	Mar 20, 1997 15:50 by HL
3	B18-2 (8-9')	170661-002	BTEX	SW-846	ppm	Standard	Mar 14, 1997 09:16		Mar 20, 1997 by CB	Mar 20, 1997 21:26 by CB
4			TPH	EPA 418.1	ppm	Standard	Mar 14, 1997 09:16		Mar 20, 1997 by HL	Mar 20, 1997 15:53 by HL
5			Org. Content	ASTM D2974	ppm	Standard	Mar 14, 1997 09:16	Mar26,1997 14:00		
6	B18-2 (29-30')	170661-003	BTEX	SW-846	ppm	Standard	Mar 14, 1997 10:20		Mar 20, 1997 by CB	Mar 20, 1997 21:43 by CB
7			TPH	EPA 418.1	ppm	Standard	Mar 14, 1997 10:20		Mar 20, 1997 by HL	Mar 20, 1997 15:56 by HL
8	B18-2 (31-32')	170661-004	BTEX	SW-846	ppm	Standard	Mar 14, 1997 10:22		Mar 20, 1997 by CB	Mar 20, 1997 22:01 by CB
9			TPH	EPA 418.1	ppm	Standard	Mar 14, 1997 10:22		Mar 20, 1997 by HL	Mar 20, 1997 15:59 by HL
10	B18-3 (1-2')	170661-005	BTEX	SW-846	ppm	Standard	Mar 14, 1997 10:35		Mar 20, 1997 by CB	Mar 20, 1997 22:18 by CB
11			TPH	EPA 418.1	ppm	Standard	Mar 14, 1997 10:35		Mar 20, 1997 by HL	Mar 20, 1997 16:02 by HL
12	B18-3 (12-13')	170661-006	BTEX	SW-846	ppm	Standard	Mar 14, 1997 10:58		Mar 20, 1997 by CB	Mar 20, 1997 22:35 by CB
13			TPH	EPA 418.1	ppm	Standard	Mar 14, 1997 10:58		Mar 20, 1997 by HL	Mar 20, 1997 16:05 by HL
14	B18-3 (26-27')	170661-007	BTEX	SW-846	ppm	Standard	Mar 14, 1997 11:36		Mar 20, 1997 by CB	Mar 20, 1997 22:53 by CB
15			TPH	EPA 418.1	ppm	Standard	Mar 14, 1997 11:36		Mar 20, 1997 by HL	Mar 20, 1997 16:08 by HL
16	B18-4 (1-2')	170661-008	BTEX	SW-846	ppm	Standard	Mar 14, 1997 11:40		Mar 20, 1997 by CB	Mar 20, 1997 23:10 by CB
17			TPH	EPA 418.1	ppm	Standard	Mar 14, 1997 11:40		Mar 20, 1997 by HL	Mar 20, 1997 16:11 by HL
18	B18-4 (13-14')	170661-009	BTEX	SW-846	ppm	Standard	Mar 14, 1997 12:02		Mar 20, 1997 by CB	Mar 20, 1997 23:27 by CB
19			TPH	EPA 418.1	ppm	Standard	Mar 14, 1997 12:02		Mar 20, 1997 by HL	Mar 20, 1997 16:14 by HL
20	B18-4 (26-27')	170661-010	BTEX	SW-846	ppm	Standard	Mar 14, 1997 12:42		Mar 20, 1997 by CB	Mar 20, 1997 23:45 by CB
21			TPH	EPA 418.1	ppm	Standard	Mar 14, 1997 12:42		Mar 20, 1997 by HL	Mar 20, 1997 16:17 by HL

XENCO Laboratories

11381 Meadowglen Suite L Houston, Texas 77082
(713) 589-0692 Fax (713) 589-0695

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM

Lab. Batch # 170661-SA

Contractor: KEI Phone (210) 6803767
Address: 5309 WURZBACH STE 100 San Antonio TX 78238
Project Name: TNMPL/ Monument Project Director: PAUL HARTNETT
Project Location: SITE 18 Project Manager: Ann Baker
Sampler Signature: [signature] Project No. 610057-2-18

No. coolers this shipment:
Carrier:
Airbill No.
Contractor COC # 0012
Quote #:
P.O. No: 7205

Turn-around: * ASAP, * 24 hrs, 48 hrs, Standard (circled)

Sample description types: Unl Dies Ker Unknown, Waste Oil, PIT No:, Tank No:

	Field ID	Date	Time	Depth	Soil	Water	Comp	Grab	Container Size	Container Type P, G	Preservative Ice	Preservative Other	Sample Description	No of Containers Total	BTEX (5030/8020-602)	TPH (418.1)	Please Hold	Remarks	LAB ONLY ID #
1	BIA-2 0-1	3/14/97	0910	0-1	X			X	4.8	G	X		BIA-2, 0-1	2	X	X		Hold 8oz.	1
2	BIA-2 8-9	↓	0916	8-9	↓			↓	↓	↓	↓		BIA-2, 8-9'	↓	↓	↓		↓	2
3	BIA-2 29-30	↓	1020	29-30	↓			↓	↓	↓	↓		BIA-2, 29-30'	↓	↓	↓		↓	3
4	BIA-2 31-32	↓	1022	31-32	↓			↓	↓	↓	↓		BIA-2, 31-32'	↓	↓	↓		↓	4
5	BIA-3 1-2'	↓	1035	1-2	↓			↓	↓	↓	↓		BIA-3, 1-2'	↓	↓	↓		↓	5
6	BIA-3 12-13'	↓	1058	12-13	↓			↓	↓	↓	↓		BIA-3, 12-13'	↓	↓	↓		↓	6
7	BIA-3 26-27'	↓	1136	26-27	↓			↓	↓	↓	↓		BIA-3, 26-27'	↓	↓	↓		↓	7
8	BIA-4 1-2	↓	1140	1-2	↓			↓	↓	↓	↓		BIA-4, 1-2'	↓	↓	↓		↓	8
9	BIA-4 13-14	↓	1202	13-14	↓			↓	↓	↓	↓		BIA-4, 13-14'	↓	↓	↓		↓	9
10	BIA-4 26-27	↓	1242	26-27	↓			↓	↓	↓	↓		BIA-4, 26-27	↓	↓	↓		↓	10

Relinquished by: (Signature)	DATE	TIME	Received by: (Signature)	DATE	TIME
[signature]	3/17/97	1541	Gerald Carroll	3-18-97	1200
Gerald Carroll	3/18/97				
			Received For Laboratory by: [signature]	3-20-97	11:30

Remarks: Hold 8oz Pending TPH
→ Via UPS

* Pre-scheduling is recommended

XENCO Laboratories

CERTIFICATE OF ANALYSIS SUMMARY 1-71050

K.E.I. Consultants, Inc.

Project Name: Monument

Project ID: 610057 Site #18
Project Manager: Ann Baker
Project Location: Site #18

Date Received in Lab: May 6, 1997 10:00 by RT
Date Report Faxed: May 22, 1997
XENCO contact: Carlos Castro/Edward Yonemoto

Analysis Requested	*Lab ID:*	171050-001	171050-002				
	Field ID:	MW-2	MW-3				
	Depth:						
Metals (ICP) Analyzed by EPA 6010		Date Analyzed - Analytical Results ppm (mg/L - mg/Kg)					
		May 13, 1997	May 13, 1997				
Aluminum		2.67	48.6				
Arsenic		< 0.05	< 0.05				
Barium		0.30	3.33				
Beryllium		< 0.005	< 0.005				
Cadmium		< 0.01	< 0.01				
Calcium		1000	3600				
Chromium		< 0.05	< 0.05				
Cobalt		< 0.10	< 0.10				
Iron		0.88	26.7				
Lead		< 0.05	< 0.05				
Magnesium		627	1070				
Manganese		< 0.20	0.91				
Molybdenum		< 0.20	< 0.20				
Potassium		36.3	63.4				
Silver		< 0.02	< 0.02				
Sodium		2150	2390				
Tin		0.25	10.2				
Vanadium		< 0.05	0.35				
Zinc		< 0.25	< 0.25				
Nickel		< 0.10	< 0.10				
Copper		< 0.25	< 0.25				
Boron		0.57	0.70				
Silicon		26.0	8.24				
Strontium		16.0	16.0				

Edward T. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

CERTIFICATE OF ANALYSIS SUMMARY 1-71050

K.E.I. Consultants, Inc.

Project Name: Monument

Project ID: 610057 Site #18
Project Manager: Ann Baker
Project Location: Site #18

Date Received in Lab: May 6, 1997 10:00 by RT
Date Report Faxed: May 22, 1997
XENCO contact: Carlos Castro/Edward Yonemoto

Analysis Requested	*Lab ID:*	171050-001	171050-002				
	Field ID:	MW-2	MW-3				
	Depth:						
Mercury, Tot Analyzed by EPA 7470		Date Analyzed - Analytical Results					ppm (mg/L - mg/Kg)
		May 12, 1997	May 12, 1997				
Mercury		< 0.0010	< 0.0010				
BTEX Analyzed by EPA 8020		Date Analyzed - Analytical Results					ppm (mg/L - mg/Kg)
		May 9, 1997	May 9, 1997				
Benzene		0.010	0.006				
Toluene		< 0.001	< 0.001				
Ethylbenzene		0.060	< 0.001				
m,p-Xylenes		0.022	< 0.002				
o-Xylene		< 0.001	< 0.001				
Total BTEX		0.092	0.006				
PAH Analyzed by EPA 8100		Date Analyzed - Analytical Results					ppm (mg/L - mg/Kg)
		May 15, 1997					
Acenaphthene		< 0.002					
Acenaphthylene		< 0.002					
Anthracene		< 0.002					
Benzo(a)anthracene		< 0.002					
Benzo(a)pyrene		< 0.002					
Benzo(b)fluoranthene		< 0.002					
Benzo(g,h,i)perylene		< 0.002					
Benzo(k)fluoranthene		< 0.002					
Chrysene		< 0.002					
Dibenzo(a,e)pyrene		< 0.002					
Dibenzo(a,h)anthracene		< 0.002					
Dibenz(a,j)acridine		< 0.002					
Fluoranthene		< 0.002					
Fluorene		< 0.002					

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

CERTIFICATE OF ANALYSIS SUMMARY 1-71050

K.E.I. Consultants, Inc.

Project Name: Monument

Project ID: 610057 Site #18
Project Manager: Ann Baker
Project Location: Site #18

Date Received in Lab: May 6, 1997 10:00 by RT
Date Report Faxed: May 22, 1997
XENCO contact: Carlos Castro/Edward Yonemoto

Analysis Requested	*Lab ID:*	171050-001	171050-002				
	Field ID:	MW-2	MW-3				
	Depth:						
Indeno(1,2,3-cd)pyrene		< 0.002					
3-Methylcholanthrene		< 0.002					
Naphthalene		< 0.002					
Phenanthrene		< 0.002					
Pyrene		< 0.002					
Dibenz(a,h)acridine		< 0.002					
Benzo(j)fluoranthene		< 0.002					
7H-Dibenzo(c,g)carbazole		< 0.002					
Dibenzo(a,h)pyrene		< 0.002					
Dibenzo(a,i)pyrene		< 0.002					
Bicarbonate Analyzed by SM 4500CO2D		Date Analyzed - Analytical Results					ppm (mg/L - mg/Kg)
		May 10, 1997	May 10, 1997				
Bicarbonate		271	279				
Carbonate Analyzed by SM4500CO2D		Date Analyzed - Analytical Results					ppm (mg/L - mg/Kg)
		May 10, 1997	May 10, 1997				
Carbonate		< 1.0	< 1.0				
TDS Analyzed by EPA 160.1		Date Analyzed - Analytical Results					ppm (mg/L - mg/Kg)
		May 9, 1997	May 9, 1997				
Total Dissolved Solids		16300	17200				
Anions Analyzed by EPA 300.0		Date Analyzed - Analytical Results					ppm (mg/L - mg/Kg)
		May 8, 1997	May 8, 1997				
Sulfate		368	356				
Chloride		757	7680				
TIC Mod. Analyzed by Mod. 415.1		Date Analyzed - Analytical Results					ppm (mg/L - mg/Kg)
		May 14, 1997	May 14, 1997				

Edward S. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

CERTIFICATE OF ANALYSIS SUMMARY 1-71050

K.E.I. Consultants, Inc.

Project Name: Monument

Project ID: 610057 Site #18
Project Manager: Ann Baker
Project Location: Site #18

Date Received in Lab: May 6, 1997 10:00 by RT
Date Report Faxed: May 22, 1997
XENCO contact: Carlos Castro/Edward Yonemoto

Analysis Requested	*Lab ID:* / *Field ID:* / *Depth:*	171050-001 MW-2	171050-002 MW-3				
Total Inorganic Carbon		46.7	44.8				

Edward T. Yonemoto, Ph.D.
QA/QC Manager

SCENCO Laboratories

Certificate Of Quality Control for Batch : 17A18C05

EPA 6010 Metals by ICP

Date Validated: May 15, 1997 09:00
Date Analyzed: May 13, 1997 11:30
QA/QC Manager: Edward H. Yonemoto, Ph.D.

Analyst: SA
Matrix: Liquid

	BLANK SPIKE ANALYSIS						
Parameter	[A] Blank Result mg/L	[B] Blank Spike Result mg/L	[C] Blank Spike Amount mg/L	[D] Method Detection Limit mg/L	[E] QC Blank Spike Recovery %	[F] LIMITS Recovery Range %	[G] Qualifier
Aluminum	< 0.01	0.72	1.00	0.01	72.0	70-125	
Arsenic	< 0.050	0.869	1.000	0.050	86.9	70-125	
Barium	< 0.002	0.429	0.500	0.002	85.8	70-125	
Beryllium	< 0.0050	0.1808	0.2000	0.0050	90.4	70-125	
Boron	< 0.03	1.20	1.56	0.03	76.9	70-125	
Cadmium	< 0.010	0.162	0.200	0.010	81.0	70-125	
Calcium	< 0.01	1.82	2.00	0.01	91.0	70-125	
Chromium	< 0.013	0.433	0.500	0.013	86.6	70-125	
Cobalt	< 0.003	0.423	0.500	0.003	84.6	70-125	
Copper	< 0.008	0.443	0.500	0.008	88.6	70-125	
Iron	< 0.006	0.814	1.000	0.006	81.4	70-125	
Lead	< 0.03	0.85	1.00	0.03	85.0	70-125	
Magnesium	< 0.01	1.79	2.00	0.01	89.5	70-125	
Nickel	< 0.03	0.46	0.50	0.03	92.0	70-125	
Potassium	< 0.0250	2.1275	2.0000	0.0250	106.4	70-125	
Silver	< 0.010	0.334	0.400	0.010	83.5	70-125	
Sodium	< 0.0250	1.8363	2.0000	0.0250	91.8	70-125	
Strontium	< 0.025	1.171	1.560	0.025	75.1	70-125	
Vanadium	< 0.00	0.44	0.50	0.00	88.0	70-125	
Zinc	< 0.008	0.431	0.500	0.008	86.2	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

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 17A18C05

EPA 6010 Metals by ICP

Date Validated: May 15, 1997 09:00
Date Analyzed: May 13, 1997 19:46
QA/QC Manager: Edward H. Yonemoto, Ph.D.

Analyst: SA
Matrix: Liquid

	MATRIX DUPLICATE ANALYSIS					
Q.C. Sample ID 171051- 001	[A] Sample Result	[B] Duplicate Result	[C] Method Detection Limit	[D] QC LIMITS Relative Difference	[E] LIMITS Relative Difference	[F] Qualifier
Parameter	mg/L	mg/L	mg/L	%	%	
Aluminum	21.16	16.94	0.01	22.2	25.0	
Arsenic	< 0.050	< 0.050	0.050	N.C	25.0	
Barium	0.746	0.766	0.002	2.6	25.0	
Beryllium	< 0.0050	< 0.0050	0.0050	N.C	25.0	
Boron	0.148	0.139	0.025	6.3	25.0	
Cadmium	< 0.010	< 0.010	0.010	N.C	25.0	
Calcium	1170	1110	0.01	5.3	25.0	
Chromium	0.039	0.039	0.013	0.0	25.0	
Cobalt	0.011	0.013	0.003	16.7	25.0	
Copper	0.014	0.014	0.008	0.0	25.0	
Iron	13.43	13.26	0.01	1.3	25.0	
Lead	< 0.025	< 0.025	0.025	N.C	25.0	
Magnesium	39.95	37.77	0.01	5.6	25.0	
Manganese	0.291	0.300	0.006	3.0	25.0	
Molybdenum	< 0.025	< 0.025	0.025	N.C	25.0	
Nickel	< 0.025	0.157	0.025	N.C	25.0	
Potassium	7.841	7.730	0.025	1.4	25.0	
Silicon	24.49	16.18	0.03	40.9	25.0	A
Silver	< 0.010	< 0.010	0.010	N.C	25.0	

(A) Variability in duplicate measurement attributed to sample non-homogeneity.
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

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 17A18C05

EPA 6010 Metals by ICP

Date Validated: May 15, 1997 09:00
Date Analyzed: May 13, 1997 19:46
QA/QC Manager: Edward H. Yonemoto, Ph.D.

Analyst: SA
Matrix: Liquid

MATRIX DUPLICATE ANALYSIS

Q.C. Sample ID 171051- 001 / Parameter	[A] Sample Result mg/L	[B] Duplicate Result mg/L	[C] Method Detection Limit mg/L	[D] QC Relative Difference %	[E] LIMITS Relative Difference %	[F] Qualifier
Sodium	80.69	76.85	0.03	4.9	25.0	
Strontium	2.164	2.036	0.025	6.1	25.0	
Tin	5.533	5.160	0.025	7.0	25.0	
Vanadium	0.054	0.058	0.003	7.1	25.0	
Zinc	0.090	0.087	0.008	3.4	25.0	

(A) Variability in duplicate measurement attributed to sample non-homogeneity.
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

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 17A18C05

EPA 6010 Metals by ICP

Date Validated: May 15, 1997 09:00
Date Analyzed: May 13, 1997 11:30
QA/QC Manager: Edward H. Yonemoto, Ph.D.

Analyst: SA
Matrix: Liquid

Q.C. Sample ID 171046-001	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	Method 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	30.68	30.75	0.01	0.2	25.0	40.7	12.5	79.8	70-125	
Arsenic	< 0.050	< 0.050	0.050	N.C	25.0	0.89	1.00	88.7	70-125	
Barium	1.031	1.233	0.002	17.8	25.0	1.25	0.50	44.6	70-125	B
Beryllium	< 0.0050	< 0.0050	0.0050	N.C	25.0	0.179	0.200	89.3	70-125	
Boron	0.173	0.178	0.025	2.8	25.0	2.51	3.13	74.8	70-125	
Cadmium	< 0.010	< 0.010	0.010	N.C	25.0	0.16	0.20	79.5	70-125	
Calcium	114	134	0.01	16.1	25.0	133	12.5	152.0	70-125	A,B
Chromium	0.031	0.030	0.013	3.3	25.0	0.44	0.50	81.0	70-125	
Cobalt	0.037	0.032	0.003	14.5	25.0	0.39	0.50	69.8	70-125	B
Copper	0.026	0.030	0.008	14.3	25.0	0.46	0.50	86.8	70-125	
Iron	38.92	37.58	0.01	3.5	25.0	45.1	12.5	49.5	70-125	A,B
Lead	< 0.025	< 0.025	0.025	N.C	25.0	0.80	1.00	80.2	70-125	
Magnesium	21.29	23.91	0.01	11.6	25.0	31.9	12.5	85.0	70-125	

(A) High analyte concentration affects spike recovery.
(B) Post-digestion spike 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

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 17A18C05

EPA 6010 Metals by ICP

Date Validated: May 15, 1997 09:00
Date Analyzed: May 13, 1997 11:30
QA/QC Manager: Edward H. Yonemoto, Ph.D.

Analyst: SA
Matrix: Liquid

	MATRIX DUPLICATE ANALYSIS					MATRIX SPIKE ANALYSIS				
Q.C. Sample ID 171046- 001	[A] Sample Result	[B] Duplicate Result	[C] Method Detection Limit	[D] QC LIMITS Relative Difference	[E] LIMITS Relative Difference	[F] Matrix Spike Result	[G] Matrix Spike Amount	[H] QC Matrix Spike Recovery	[I] LIMITS Recovery Range	[G] Qualifier
Parameter	mg/L	mg/L	mg/L	%	%	mg/L	mg/L	%	%	
Manganese	1.263	1.503	0.006	17.4	25.0	12.16	12.50	87.2	70-125	
Molybdenum	< 0.025	< 0.025	0.025	N.C	25.0	0.55	0.63	88.6	70-125	
Nickel	< 0.025	< 0.025	0.025	N.C	25.0	0.40	0.50	80.2	70-125	
Potassium	7.715	8.064	0.025	4.4	25.0	19.08	12.50	90.9	70-125	
Silver	< 0.010	< 0.010	0.010	N.C	25.0	0.33	0.40	81.3	70-125	
Sodium	56.80	67.17	0.03	16.7	25.0	72.3	12.5	123.7	70-125	
Strontium	0.921	1.095	0.025	17.3	25.0	3.05	3.13	68.1	70-125	B
Vanadium	0.128	0.142	0.003	10.4	25.0	0.51	0.50	77.2	70-125	
Zinc	0.180	0.201	0.008	11.0	25.0	0.57	0.50	78.6	70-125	

(A) High analyte concentration affects spike recovery.
(B) Post-digestion spike 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

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 17A05B25

SW846- 7470 Total Mercury

Date Validated: May 15, 1997 14:15
Date Analyzed: May 12, 1997 13:22
QA/QC Manager: Edward H. Yonemoto, Ph.D.

Analyst: EZ
Matrix: Liquid

	MATRIX DUPLICATE ANALYSIS					MATRIX SPIKE ANALYSIS				
Q.C. Sample ID 171051- 002	[A] Sample Result	[B] Duplicate Result	[C] Method Detection Limit	[D] QC LIMITS Relative Difference	[E] LIMITS Relative Difference	[F] Matrix Spike Result	[G] Matrix Spike Amount	[H] QC LIMITS Matrix Spike Recovery	[I] LIMITS Recovery Range	[G] Qualifier
Parameter	mg/L	mg/L	mg/L	%	%	mg/L	mg/L	%	%	
Mercury	< 0.0010	< 0.0010	0.0010	N.C	25.0	0.0025	0.0025	100.0	70-125	

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

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 17A05B25

SW846- 7470 Total Mercury

Date Validated: May 15, 1997 14:15
Date Analyzed: May 12, 1997 12:58
QA/QC Manager: Edward H. Yonemoto, Ph.D.

Analyst: EZ
Matrix: Liquid

	MATRIX DUPLICATE ANALYSIS					MATRIX SPIKE ANALYSIS				
Q.C. Sample ID 171047- 001	[A] Sample Result	[B] Duplicate Result	[C] Method Detection Limit	[D] QC LIMITS Relative Difference	[E] QC LIMITS Relative Difference	[F] Matrix Spike Result	[G] Matrix Spike Amount	[H] QC LIMITS Matrix Spike Recovery	[I] QC LIMITS Recovery Range	[G] Qualifier
Parameter	mg/L	mg/L	mg/L	%	%	mg/L	mg/L	%	%	
Mercury	< 0.0010	< 0.0010	0.0010	N.C	25.0	0.0026	0.0025	104.0	70-125	

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

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 17A05B25

SW846- 7470 Total Mercury

Date Validated: May 15, 1997 14:15
Date Analyzed: May 12, 1997 12:55
QA/QC Manager: Edward H. Yonemoto, Ph.D.

Analyst: EZ
Matrix: Liquid

	BLANK SPIKE ANALYSIS						
Parameter	[A] Blank Result mg/L	[B] Blank Spike Result mg/L	[C] Blank Spike Amount mg/L	[D] Method Detection Limit mg/L	[E] QC LIMITS Blank Spike Recovery %	[F] Recovery Range %	[G] Qualifier
Mercury	< 0.0010	0.0022	0.0025	0.0010	88.0	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

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 17A04B61

SW- 846 5030/8020 BTEX

Date Validated: May 12, 1997 14:50
Date Analyzed: May 9, 1997 10:17
QA/QC Manager: Edward H. Yonemoto, Ph.D.

Analyst: IF
Matrix: Liquid

BLANK SPIKE ANALYSIS

Parameter	[A] Blank Result ppm	[B] Blank Spike Result ppm	[C] Blank Spike Amount ppm	[D] Method 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	0.1160	0.1000	0.0010	116.0	65-135	
Ethylbenzene	< 0.0010	0.1170	0.1000	0.0010	117.0	65-135	
m,p-Xylenes	< 0.0020	0.2410	0.2000	0.0020	120.5	65-135	
o-Xylene	< 0.0010	0.1150	0.1000	0.0010	115.0	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

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 17A04B61

SW- 846 5030/8020 BTEX

Date Validated: May 12, 1997 14:50
Date Analyzed: May 9, 1997 13:42
QA/QC Manager: Edward H. Yonemoto, Ph.D.

Analyst: IF
Matrix: Liquid

MATRIX SPIKE / MATRIX SPIKE DUPLICATE AND RECOVERY

Q.C. Sample ID 171048- 001 / Parameter	[A] Sample Result ppm	[B] Matrix Spike Result ppm	[C] Matrix Spike Duplicate Result ppm	[D] Matrix Spike Amount ppm	[E] Method Detection Limit ppm	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
Benzene	< 0.0010	0.0868	0.0864	0.1000	0.0010	25.0	0.5	86.8	86.4	65-135	
Toluene	< 0.0010	0.1160	0.1120	0.1000	0.0010	25.0	3.5	116.0	112.0	65-135	
Ethylbenzene	< 0.0010	0.1180	0.1130	0.1000	0.0010	25.0	4.3	118.0	113.0	65-135	
m,p-Xylenes	< 0.0020	0.2420	0.2330	0.2000	0.0020	25.0	3.8	121.0	116.5	65-135	
o-Xylene	< 0.0010	0.1160	0.1120	0.1000	0.0010	25.0	3.5	116.0	112.0	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

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 17A34B35

SW-846 8100 PAHs by GC-MS

Date Validated: May 15, 1997 17:56
Date Analyzed: May 14, 1997 22:20
QA/QC Manager: Edward H. Yonemoto, Ph.D.

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] Method 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	0.0658	0.0670	0.1000	0.0020	31.0	1.8	65.8	67.0	46-118	
4-Chloro-3-Methylphenol	< 0.0020	0.0398	0.0332	0.1000	0.0020	42.0	18.1	39.8	33.2	23-97	
2-Chlorophenol	< 0.0020	0.0630	0.0644	0.1000	0.0020	40.0	2.2	63.0	64.4	27-123	
1,4-Dichlorobenzene	< 0.0020	0.0702	0.0724	0.1000	0.0020	28.0	3.1	70.2	72.4	36-97	
2,4-Dinitrotoluene	< 0.0020	0.0628	0.0632	0.1000	0.0020	38.0	0.6	62.8	63.2	24-96	
N-Nitroso-di-n-propylamine	< 0.0040	0.0742	0.0738	0.1000	0.0040	38.0	0.5	74.2	73.8	41-116	
4-Nitrophenol	< 0.0040	0.0250	0.0248	0.1000	0.0040	50.5	0.8	25.0	24.8	10-80	
Pentachlorophenol	< 0.0010	0.0738	0.0706	0.1000	0.0010	50.0	4.4	73.8	70.6	9-103	
Phenol	< 0.0010	0.0222	0.0224	0.1000	0.0010	42.0	0.9	22.2	22.4	12-89	
Pyrene	< 0.0020	0.0852	0.0840	0.1000	0.0020	31.0	1.4	85.2	84.0	26-127	
1,2,4-Trichlorobenzene	< 0.0010	0.0736	0.0714	0.1000	0.0010	28.0	3.0	73.6	71.4	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
All results are based on MDL and validated for QC purposes

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 17A20A24

SM4500CO2D Carbonate

Date Validated: May 14, 1997 15:30
Date Analyzed: May 10, 1997 09:20
QA/QC Manager: Edward H. Yonemoto, Ph.D.

Analyst: CG
Matrix: Liquid

	MATRIX DUPLICATE ANALYSIS					
Q.C. Sample ID 171047- 001	[A] Sample Result	[B] Duplicate Result	[C] Method Detection Limit	[D] QC Relative Difference	[E] LIMITS Relative Difference	[F] Qualifier
Parameter	ppm	ppm	ppm	%	%	
Carbonate	< 1.00	< 1.00	1.00	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

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 17A20A22

SM 4500CO2D Bicarbonate

Date Validated: May 14, 1997 15:30
Date Analyzed: May 10, 1997 09:20
QA/QC Manager: Edward H. Yonemoto, Ph.D.

Analyst: CG
Matrix: *Liquid*

	MATRIX DUPLICATE ANALYSIS					
Q.C. Sample ID 171047- 001	[A] Sample Result	[B] Duplicate Result	[C] Method Detection Limit	[D] QC Relative Difference	[E] LIMITS Relative Difference	[F] Qualifier
Parameter	mg/L	mg/L	mg/L	%	%	
Bicarbonate	127	127	0.5	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

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 17A19A95

EPA 160.1 Total Dissolved Solids

Date Validated: May 9, 1997 13:45
Date Analyzed: May 9, 1997 09:40
QA/QC Manager: Edward H. Yonemoto, Ph.D.

Analyst: CG
Matrix: Liquid

	MATRIX DUPLICATE ANALYSIS					
Q.C. Sample ID 171046- 001	[A] Sample Result	[B] Duplicate Result	[C] Method Detection Limit	[D] QC Relative Difference	[E] LIMITS Relative Difference	[F] Qualifier
Parameter	mg/L	mg/L	mg/L	%	%	
Total Dissolved Solids	526	504	4.0	4.3	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

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 17A10A40

EPA 300.0 Anions by Ion Chromatography

Date Validated: May 9, 1997 12:00
Date Analyzed: May 8, 1997 12:55
QA/QC Manager: Edward H. Yonemoto, Ph.D.

Analyst: JS
Matrix: Liquid

	MATRIX DUPLICATE ANALYSIS					
Q.C. Sample ID 171046- 001	[A] Sample Result	[B] Duplicate Result	[C] Method Detection Limit	[D] QC Relative Difference	[E] LIMITS Relative Difference	[F] Qualifier
Parameter	mg/L	mg/L	mg/L	%	%	
Chloride	72.400	75.900	0.050	4.7	20.0	
Sulfate	59.60	62.30	0.10	4.4	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

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 17Z99A23

MOD. 415.1 Total Inorganic Carbon

Date Validated: May 19, 1997 09:00
Date Analyzed: May 14, 1997 09:22
QA/QC Manager: Edward H. Yonemoto, Ph.D.

Analyst: IF
Matrix: Liquid

	BLANK SPIKE ANALYSIS						
Parameter	[A] Blank Result ppm	[B] Blank Spike Result ppm	[C] Blank Spike Amount ppm	[D] Method Detection Limit ppm	[E] QC LIMITS Blank Spike Recovery %	[F] Recovery Range %	[G] Qualifier
Total Inorganic Carbon	< 1.0	20.6	20.0	1.0	103.0	70-120	

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

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 17A10A40

EPA 300.0 Anions by Ion Chromatography

Date Validated: May 9, 1997 12:00
Date Analyzed: May 8, 1997 12:23
QA/QC Manager: Edward H. Yonemoto, Ph.D.

Analyst: JS
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] Method 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	< 0.050	5.070	5.090	5.000	0.050	20.0	0.4	101.4	101.8	70-125	
Sulfate	< 0.10	4.97	5.06	5.00	0.10	20.0	1.8	99.4	101.2	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

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

Certificate Of Quality Control for Batch : 17Z99A23

MOD. 415.1 Total Inorganic Carbon

Date Validated: May 19, 1997 09:00
Date Analyzed: May 14, 1997 11:41
QA/QC Manager: Edward H. Yonemoto, Ph.D.

Analyst: IF
Matrix: Liquid

	MATRIX DUPLICATE ANALYSIS					MATRIX SPIKE ANALYSIS				
Q.C. Sample ID 171049- 002	[A] Sample Result	[B] Duplicate Result	[C] Method Detection Limit	[D] QC LIMITS Relative Difference	[E] Relative Difference	[F] Matrix Spike Result	[G] Matrix Spike Amount	[H] QC Matrix Spike Recovery	[I] LIMITS Recovery Range	[G] Qualifier
Parameter	ppm	ppm	ppm	%	%	ppm	ppm	%	%	
Total Inorganic Carbon	56.61	55.44	1.00	2.1	20.0	74.6	20.0	90.0	70-120	

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

Edward H. Yonemoto, Ph.D.
QA/QC Manager

XENCO Laboratories

ANALYTICAL CHAIN OF CUSTODY REPORT
CHRONOLOGY OF SAMPLES

K.E.I. Consultants, Inc.

Project ID: 610057 Site #18
Project Manager: Ann Baker
Project Location: Site #18

Project Name: Monument

XENCO COC#: 1-71050
Date Received in Lab: May 6, 1997 10:00 by RT
XENCO contact : Carlos Castro/Edward Yonemoto

	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-2	171050-001	BTEX	SW-846	ppm	Standard	May 2, 1997 18:45		May 9, 1997 by IF	May 9, 1997 15:27 by IF
2			PAH	SW-846 8100	mg/L	Standard	May 2, 1997 18:45		May 9, 1997 by CY	May 15, 1997 06:51 by MM
3			TDS	EPA 160.1	mg/L	Standard	May 2, 1997 18:45		May 8, 1997 by CG	May 9, 1997 10:20 by CG
4			Anions	EPA 300.0	mg/L	Standard	May 2, 1997 18:45		May 8, 1997 by JS	May 8, 1997 15:06 by JS
5			Carbonate	SM4500CO2D	ppm	Standard	May 2, 1997 18:45		May 10, 1997 by CG	May 10, 1997 09:55 by CG
6			Bicarbonate	SM 4500CO2D	mg/L	Standard	May 2, 1997 18:45		May 10, 1997 by CG	May 10, 1997 09:55 by CG
7			Metals (ICP)	EPA 6010	mg/L	Standard	May 2, 1997 18:45		May 9, 1997 by EZ	May 13, 1997 19:33 by SA
8			Mercury, Tot	SW846-7470	mg/L	Standard	May 2, 1997 18:45		May 9, 1997 by EZ	May 12, 1997 13:18 by EZ
9			TIC Mod.	MOD. 415.1	ppm	Standard	May 2, 1997 18:45		May 14, 1997 by IF	May 14, 1997 12:38 by IF
10	MW-3	171050-002	BTEX	SW-846	ppm	Standard	May 2, 1997 18:05		May 9, 1997 by IF	May 9, 1997 15:46 by IF
11			TDS	EPA 160.1	mg/L	Standard	May 2, 1997 18:05		May 8, 1997 by CG	May 9, 1997 10:25 by CG
12			Anions	EPA 300.0	mg/L	Standard	May 2, 1997 18:05		May 8, 1997 by JS	May 8, 1997 15:30 by JS
13			Carbonate	SM4500CO2D	ppm	Standard	May 2, 1997 18:05		May 10, 1997 by CG	May 10, 1997 10:00 by CG
14			Bicarbonate	SM 4500CO2D	mg/L	Standard	May 2, 1997 18:05		May 10, 1997 by CG	May 10, 1997 10:00 by CG
15			Metals (ICP)	EPA 6010	mg/L	Standard	May 2, 1997 18:05		May 9, 1997 by EZ	May 13, 1997 19:40 by SA
16			Mercury, Tot	SW846-7470	mg/L	Standard	May 2, 1997 18:05		May 9, 1997 by EZ	May 12, 1997 13:19 by EZ
17			TIC Mod.	MOD. 415.1	ppm	Standard	May 2, 1997 18:05		May 14, 1997 by IF	May 14, 1997 13:41 by IF

XENCO Laboratories

11381 Meadowglen Suite L Houston, Texas 77082
(713) 589-0692 Fax (713) 589-0695

CHAIN OF CUSTODY RECORD AND ANALYSIS REQUEST FORM

Page / of /

Lab. Batch # 171050-N

Contractor: KET Consultants — Phone: (800) 253-0507

Address: 4800 Wurzbach Drive Suite 100 San Antonio, Tx

Project Name: Monument — Project Director: Paul Hartnet

Project Location: site #18 — Project Manager: Ann Baker

Sampler Signature: — Project No.: 610057 site #18

No. coolers this shipment: — Contractor COC #

Carrier: UPS — Quote #:

Airbill No. — P.O. No.:

	Field ID	Date	Time	DEPTH	SOIL	WATER	COMP	GRAB	Container Size	Container Type P, G	Preservative Ice	Preservative Other	Sample Description	No of CONTAINERS Total	BTEX (5030/8020-602)	TPH (418.1)	Heavy Metals	PAH (8100)	TDS (160.1)	CATIONS/ANIONS	Please Hold	LAB ONLY ID #
1	MW-2	5-2-97	1845			/					/	/		7	/	/	/	/	/	/		1
2	MW-3	5-2-97	1805			/					/	/		6	/	/	/	/	/	/		2
3																						3
4																						4
5																						5
6																						6
7																						7
8																						8
9																						9
10																						10

Turn-around: ASAP / 24 hrs / 48 hrs / Standard

SAMPLE CHARACTERIZATION: Unl Dies Ker Unknown; Waste Oil; PIT No.: Tank No.:

Remarks

Relinquished by: (Signature)	DATE	TIME	Received by: (Signature)	DATE	TIME
	5-5-97	0600			
			Received For Laboratory by	5-6-97	1000

Remarks

Pink (Contractor), Yellow & White (Lab).

* Pre-scheduling is recommended

Precision Analytical Services