GW - 109R

MONITORING REPORTS

DATE:
1994 - 1993

SUBSURFACE INVESTIGATION

TRANSWESTERN
WT-1 COMPRESSOR STATION
LEA COUNTY, NEW MEXICO

BROWN AND CALDWELL

APRIL, 1994

April 29, 1994

Mr. Larry Campbell
Transwestern Pipeline Company
6381 North Main
Roswell, New Mexico 88202-1717

19-7976

Subject: Subsurface Investigation at the Transwestern WT-1 Compressor Station, Lea County, New Mexico.

Dear Mr. Campbell:

Brown and Caldwell is pleased to present this final letter report to Transwestern Pipeline Company (Transwestern) summarizing results of the preliminary subsurface investigation conducted on land adjacent to the Transwestern WT-1 Compressor Station (WT-1 Compressor Station). Field work for this investigation was conducted from November 5 through November 10, 1993.

Introduction

The WT-1 Compressor Station is located approximately 28 miles east of Carlsbad, New Mexico, on the north side of Highway 180. Drilling was conducted on Bureau of Land Management (BLM) land located adjacent to the WT-1 Compressor Station. A site location map is included as Figure 1 in Appendix A.

Brown and Caldwell conducted a preliminary subsurface investigation on BLM land abutting the southwest boundary of the WT-1 Compressor Station in Lea County, New Mexico. The project scope involved drilling soil borings and investigating subsurface soil and groundwater conditions adjacent to an excavation located on the west boundary of the facility. The excavation was previously the location of dehydrator tubs. The dehydrator tubs functioned as catch basins for water and distillate. Eight soil borings were drilled on BLM land. Figure 2 in Appendix A, a

scale map of the site, identifies locations of the off-site soil borings and the excavation.

Field Activities

Prior to drilling activities, buried utility and gas transmission lines were located and marked by Transwestern site representatives.

Drilling was accomplished using nominal 9-inch outer diameter (O.D.) hollow-stem augers for the unconsolidated surface layers. From approximately 35 feet, the upper level of indurated rock, to total depth, samples were continuously obtained using a nominal 3-inch O.D. air rotary core barrel. Samples were collected from ground surface to total depth at two foot intervals for the first boring and at five foot intervals for the second boring. Samples were collected at ten foot intervals from approximately twenty feet below grade to total depth for the remaining six borings. Diagrammatic Boring Logs are included in Appendix A.

Auger flights were steam-cleaned prior to drilling the first borehole and following the drilling of each subsequent borehole to prevent cross-contamination. Potable water for decontamination and grouting was obtained on-site and was supplied by the local municipal water authority.

Soil samples obtained from the unconsolidated upper layers were collected using 2-foot split-spoon-samplers. Soil samples from the indurated deeper layers were collected using a 10-foot continuous core. Samples were screened for volatile organic compounds using a flame ionization detector (FID). Two soil samples from each boring were submitted for laboratory analysis. One soil sample was submitted for analyses on the basis of highest FID measurement. A second sample was collected from the either the deepest interval encountered if no groundwater was encountered or from the interval above groundwater, representing the capillary fringe. Groundwater samples were obtained from the borings via lowering a stainless steel bailer inside the hollow stem augers. No phase separated hydrocarbons (PSH) were encountered during drilling.

Soil samples collected using a split spoon were placed into a PVC collar and split lengthwise with a clean knife upon retrieval from the sampling tool. Soil samples collected using a 10-foot core barrel were laid out on clean plastic sheeting and split into five foot intervals. Sampling equipment was decontaminated prior to use with alconox and dionized water. The portions were then placed into separate plastic bags, where one was screened for volatile organic compounds (VOC's) using a FID. Soil samples selected for laboratory analyses were then transferred from

the remaining plastic bags to laboratory supplied glass jars.

Soil and groundwater samples were collected and placed in laboratory supplied containers, properly labeled, placed on ice in shipping coolers, and shipped to the analytical laboratory by common carrier. Upon completion of soil and groundwater sampling activities, the borings were grouted from total depth to ground surface with a Portland Cement/bentonite slurry. Appendix B, Table 1, lists total depths for all borings drilled adjacent to the WT-1 Compressor Station on BLM land. Also listed are the laboratory analyses performed and field screen data in parts per million (ppm) for all submitted soil and core sample intervals.

Geology

The WT-1 Compressor Station is situated in an area of recent Quaternary alluvium. Soils underlying the site consist of brown, medium to coarse grained, sand with interbedded quartz gravels. The sediment encountered in the upper 35 feet at the site consists of loosely consolidated sand and gravel layers. These loosely consolidated upper layers grade into dense, well consolidated sandstones and siltstones.

A basal clay was encountered in borings B-1, B-2, B-7 and B-8 between 61 and 64 feet below ground surface. This clay layer may act as an aquitard in this area.

Analytical Results

Soil and groundwater samples were analyzed for total petroleum hydrocarbons (TPH) and for benzene, toluene, ethyl benzene and xylenes (BTEX), using EPA methods 418.1 and 8020, respectively. Tables 2 and 3, Appendix B, summarize the analytical results for the submitted soil and groundwater samples at the site. Analytical laboratory reports are contained in Appendix C.

As shown in Table 2, TPH was detected in soil samples collected at around 20 feet BGL in borings B-3 and B-7 and deeper in borings B-1, B-2, and B-7. Both soil samples collected from the interval around 20 feet BGL detected TPH at a concentration of 50 milligrams per kilogram (mg/kg). Boring B-1, located approximately 30 feet southwest of the excavation, reported a TPH concentration of 6,700 mg/kg in the sample collected at the 51-56 foot BGL capillary fringe interval and 15,000 mg/kg in the sample collected at the 42-46 foot BGL interval. Soil samples collected of the basal clay layer from borings B-2, B-7, and B-8 were also analyzed for TPH. TPH concentrations of 130 and 470 mg/kg were detected in the samples collected from 60-65 oot BGL and 59-66 foot BGL from borings B-2 and B-7, respectively.

BTEX constituents were detected in the soil samples collected from the vadose zone and capillary fringe of boring B-1 and in the samples collected from the clay layer in borings B-2 and B-7. Total BTEX concentrations exceeding 318,000 and 136,000 µg/kg were detected in the samples collected from boring B-1. Total BTEX concentrations detected in the clay layer samples were 233,000 µg/kg in boring B-7 and exceeded 17,600 µg/kg in boring B-2. Precise quanitification of Total BTEX in samples from B-1 and B-2 is not possible due to elevated benzene and ethylbenzene concentrations of other constituents. Higher concentrations of analytes measured in the basal clay layer may be due to clay particles having a higher indigenous organic content than the sediment above, therefore making the clay more sorptive of petroleum hydrocarbons.

Analytical data for the groundwater samples collected from the borings are presented in Table 3. As shown, all samples detected BTEX constituents and TPH. Generally, concentrations of the constituents are highest near the excavation and decrease away from it. Figure 3, in Appendix A, is a contoured map of benzene concentrations detected in groundwater samples obtained from the eight soil borings. Benzene concentrations are highest near the excavation in borings B-1 and B-2, and decrease away from the excavation. Groundwater from borings B-1 through B-8 were analyzed to have benzene concentrations in the range of 5,800 to 720 micrograms per liter (µg/L) and toluene concentrations in the range of to 9,300 to 25 µg/L. Total xylenes concentrations were reported in the range of 4,700 to 42 µg/L and ethyl benzene concentrations in the range of 630 to 66 µg/L were reported in groundwater samples from borings B-1 through B-7.

TPH concentrations in the groundwater samples collected also tended to decrease away from the excavation. Groundwater samples from borings B-1 through B-8 were analyzed to have TPH concentrations in the range of 3,400 to 0.4 milligrams per liter (mg/L).

If you have any questions regarding this information, contact me at (713) 759-0999.

Very truly yours,

BROWN AND CALDWELL

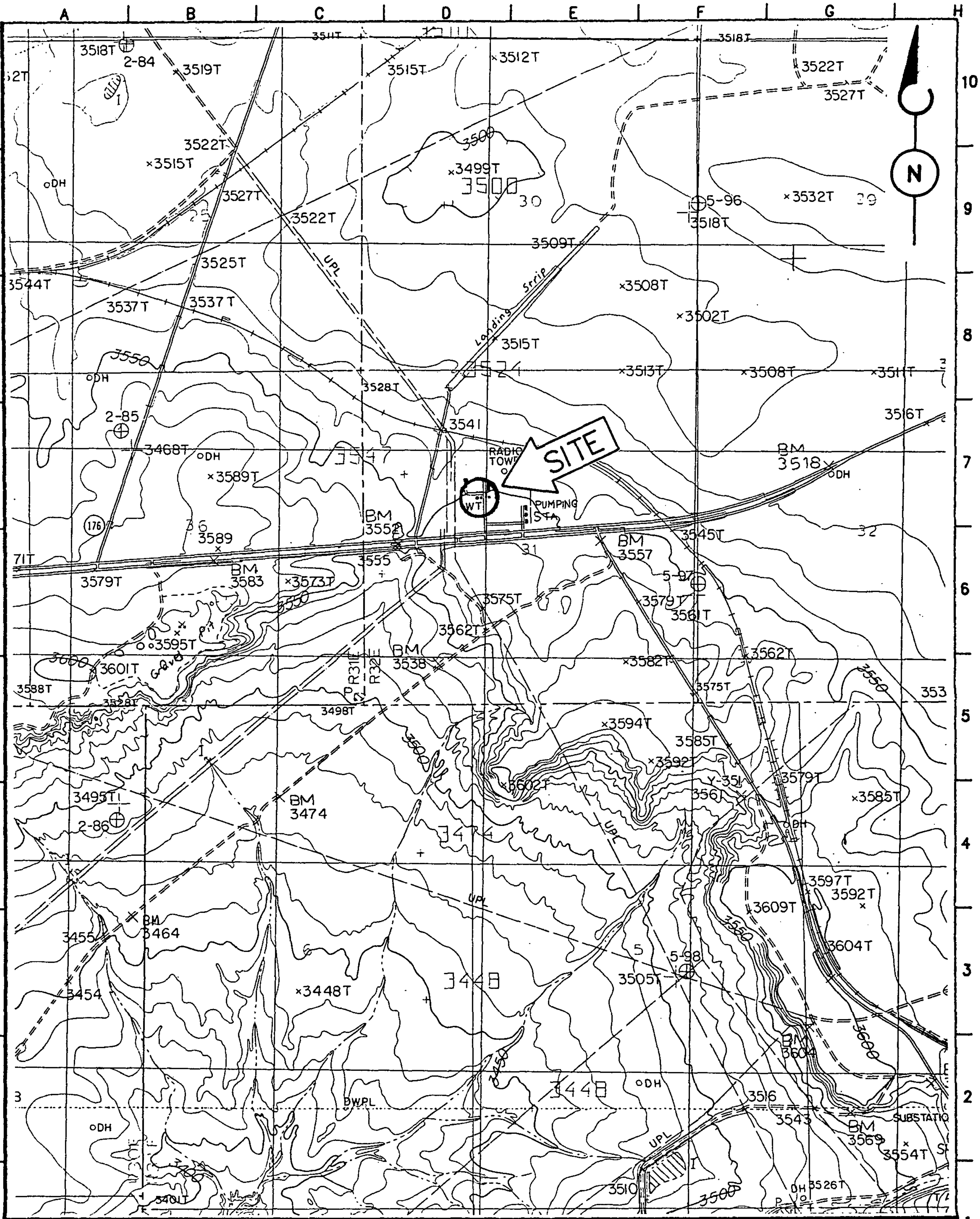
Susanne Richard

Susanne Richard, REM, REP
Project Manager

SR:lms

APPENDIX A

FIGURES AND BORING LOGS



Brown & Caldwell **Dallas-Houston, Texas**	0 1000 2000 SCALE: 1" = 2000' DRAWN BY: JDN DATE 12/7 CHK'D BY: AJF DATE 12/7 APPROVED: SR DATE 12/7	TITLE SITE LOCATION MAP WT-1 COMPRESSOR STATION CLIENT TRANSWESTERN PIPELINE CO. SITE LOCATION CARLSBAD, NEW MEXICO	DATE 12/07/93 PROJECT NUMBER 7976-04 FIGURE NUMBER 1

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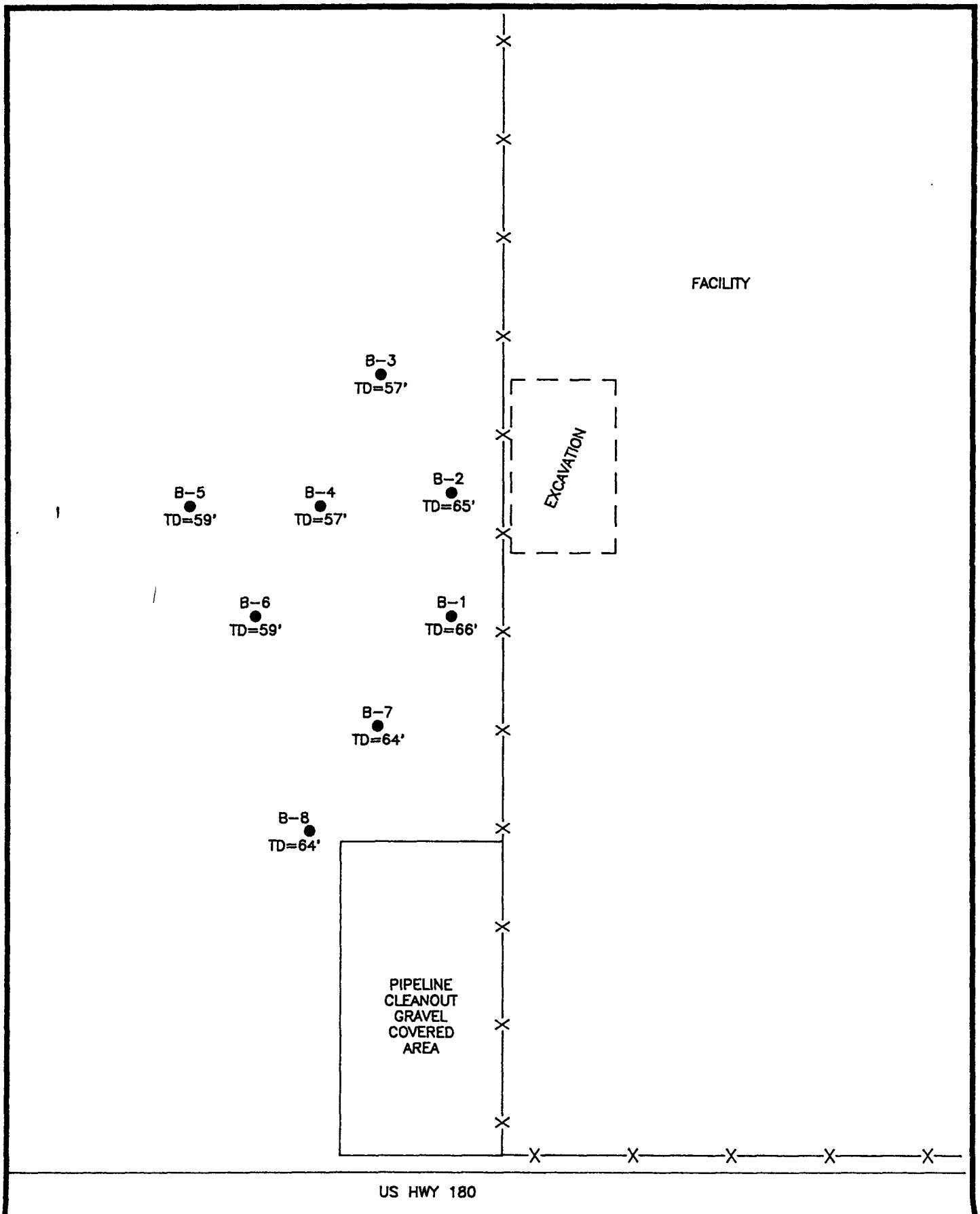

BROWN AND CALDWELL HOUSTON, TEXAS SUBMITTED: SUSANNE RICHARD PROJECT MANAGER DATE: APPROVED: BROWN AND CALDWELL DATE:	0 25 50 SCALE: 1" = 50' DRAWN BY: JDN DATE 1/4 CHK'D BY: AJF DATE APPROVED: SR DATE	TITLE: SITE MAP CLIENT: TRANSWESTERN PIPELINE CO. SITE: WT-1 COMPRESSOR STATION CARLSBAD, NEW MEXICO	DATE: 04/21/94 PROJECT NUMBER: 7976-04 FIGURE NUMBER: 2

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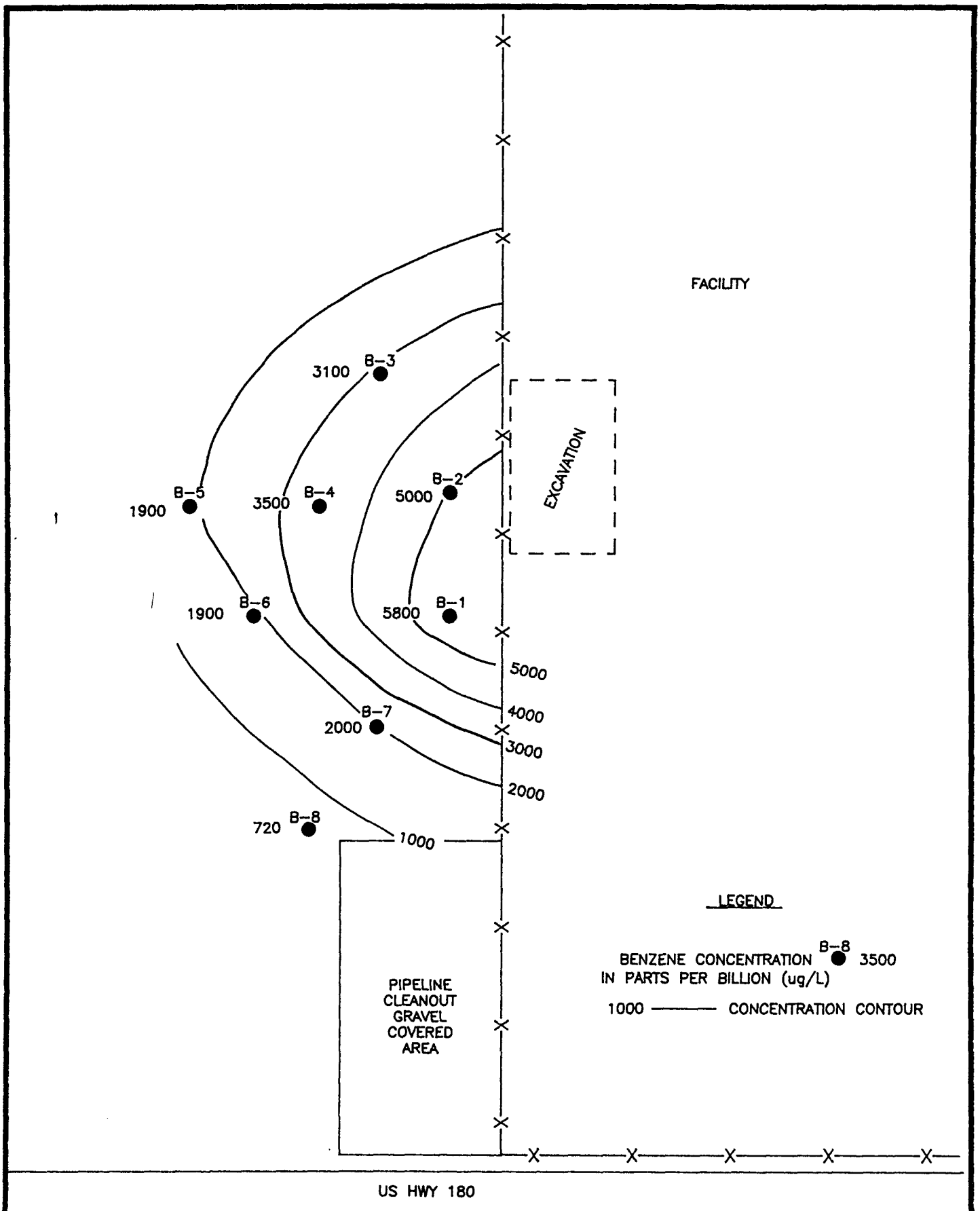

BROWN AND CALDWELL DALLAS, TEXAS SUBMITTED: SUSANNE RICHARD PROJECT MANAGER DATE: APPROVED: BROWN AND CALDWELL DATE:	0 25 50 SCALE: 1" = 50 DRAWN BY: JDN DATE 1/4 CHK'D BY: AJF DATE APPROVED: SR DATE	TITLE: BENZENE CONCENTRATIONS IN GROUNDWATER CLIENT: TRANSWESTERN PIPELINE CO. SITE: WT-1 COMPRESSOR STATION CARLSBAD, NEW MEXICO	DATE: 04/21/94 PROJECT NUMBER: 7976-04 FIGURE NUMBER: 3

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LOG OF EXPLORATORY BORING

PROJECT NUMBER 7976-04 BORING NO. B-1

PROJECT NAME WT-1 Transwestern Compressor Station, Carlsbad, New Mexico TOTAL DEPTH 66.0

BY A. Fear DATE 11/15/93 SURFACE ELEV. 0 FT

BLOWS (COUNT/ INCHES)	FID (PPM)	DESCRIPTION
50/6	0	Brown earthy soil and gravel
50/6	0	Light tan to white sandstone and gravel
50/6	7	Light tan silty sandstone and gravel
50/6	3	Light tan sandstone and gravel
50/6	5	
50/6	5	Reddish brown sandstone
50/8	2	
50/8	7	
50/8	10	Red sandstone, silty with clay
50/8	24	
50/8	140	
50/8	20	
50/8	30	
50/8	62	
50/8	30	
50/8	85	
50/8	300	
50/8	900	
50/8	1000	
50/8	1000	
50/8	1000	Red sandstone, silty, moist
50/8	1000	
CORE	1000	Core: Red sandstone, silty, moist
CORE	1000	
CORE	1000	Core: Red sandstone, silty clay

GROUND WATER LEVELS ▽

DEPTH IN FT.: 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55, 60, 65

SAMPLES

LITHO-GRAPHIC COLUMN

REMARKS:

Drilling Contractor: Layne Environmental

Driller: Wes Cowser

Drilling Method: Hollow Stem Auger

Drilling Equipment: Failing F6

LOG OF EXPLORATORY BORING

PROJECT NUMBER 7976-04 BORING NO. B-2

PROJECT NAME WT-1 Transwestern Compressor Station, Carlsbad, New Mexico TOTAL DEPTH 65.0

BY A. Fear DATE 11/15/93 SURFACE ELEV. 0 FT

BLOWS (COUNT/ INCHES)	FID (PPM)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION
50/8	160		5			White to light tan sandstone and gravel
50/8	300		10			Light tan sandstone and gravel
50/8	140		15			Tan to reddish brown sandstone
50/8	150		20			
50/6	1000		25			Red silty sandstone and clay
			30			No sample
						Red silty sandstone and clay
50/6	275		35			
50/6	1000		40			
						No sample
Core	1000		45			Core: Red consolidated sandstone
Core	1000	▽	50			Core: Red silty sandstone with white mottles, moist
Core	1000		55			
1000	1000		60			
			65			

REMARKS: Drilling Contractor: Layne Environmental
Driller: Wes Cowser
Drilling Method: Hollow Stem Auger
Drilling Equipment: Failing F6

LOG OF EXPLORATORY BORING

PROJECT NUMBER 7976-04 BORING NO. B-3

PROJECT NAME WT-1 Transwestern Compressor Station, Carlsbad, New Mexico TOTAL DEPTH 57.0

BY A. Fear DATE 11/15/93 SURFACE ELEV. 0 FT

BLOWS (COUNT/ INCHES)	FID (PPM)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION
			5			No sample
			10			
			15			
50/8	600		20			Light red sandstone
						No sample
			25			
			30			Core: Light brown to red sandstone, silty with white mottles
Core	3		35			
						Core: Reddish brown sandstone
			40			
Core	3					
			45			
						Core: Red sandstone - moist
						Core: White sandstone
			50			Core: Red sandstone
Core	16					
		▽	55			

REMARKS: Drilling Contractor: Layne Environmental

Driller: Wes Cowser

Drilling Method: Hollow Stem Auger

Drilling Equipment: Failing F6

LOG OF EXPLORATORY BORING

PROJECT NUMBER 7976-04 — BORING NO. B-4

PROJECT NAME WT-1 Transwestern Compressor Station, Carlsbad, New Mexico — TOTAL DEPTH 57.0

BY A. Fear — DATE 11/15/93 — SURFACE ELEV. 0 FT

BLOWS (COUNT/ INCHES)	FID (PPM)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION
			5			No sample
			10			
			15			
50/12	60		20			Reddish brown sandstone and gravel
						No sample
			25			
			30			Core: Light red to reddish brown sandstone
Core	1		35			
						Core: Reddish brown sandstone
			40			
Core	20					
			45			
						Core: Reddish brown sandstone, moist
			50			
Core	1000	▽				
			55			

REMARKS:

Drilling Contractor: Layne Environmental

Driller: Wes Cowser

Drilling Method: Hollow Stem Auger

Drilling Equipment: Failing F6

LOG OF EXPLORATORY BORING

PROJECT NUMBER 7976-04 | BORING NO. B-5

PROJECT NAME WT-1 Transwestern Compressor Station, Carlsbad, New Mexico | TOTAL DEPTH 59.0

BY A. Fear | DATE 11/15/93 | SURFACE ELEV. 0 FT

BLOWS (COUNT/ INCHES)	FID (PPM)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION
			5			No sample
			10			
			15			
50/8	28		20			Reddish brown sandstone
			25			No sample
			30			
			35			Core: Reddish brown sandstone
Core	3		40			
			45			
Core	1		50			Core: Red sandstone - moist
		▽				
Core	6		55			

REMARKS:

Drilling Contractor: Layne Environmental

Driller: Wes Cowser

Drilling Method: Hollow Stem Auger

Drilling Equipment: Failing F6

LOG OF EXPLORATORY BORING

PROJECT NUMBER 7976-04 — BORING NO. B-6

PROJECT NAME WT-1 Transwestern Compressor Station, Carlsbad, New Mexico — TOTAL DEPTH 59.0

BY A. Fear — DATE 11/15/93 — SURFACE ELEV. 0 FT

BLOWS (COUNT/ INCHES)	FID (PPM)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION
			5			No sample
			10			
			15			
50/6	3		20			Light red to reddish brown consolidated sandstone
			25			No sample
Core	4		30			Core: Light red to reddish brown consolidated sandstone
Core	2		35			
Core	1		40			Core: Reddish brown sandstone, consolidated with gravel
Core	1		45			
Core	5	▽	50			Core: Reddish brown sandstone, consolidated with gravel, moist
Core	40		55			Core: Reddish brown sandstone, consolidated with gravel, saturated

REMARKS:

Drilling Contractor: Layne Environmental

Driller: Wes Cowser

Drilling Method: Hollow Stem Auger

Drilling Equipment: Failing F6

LOG OF EXPLORATORY BORING

PROJECT NUMBER 7976-04 — BORING NO. B-7

PROJECT NAME WT-1 Transwestern Compressor Station, Carlsbad, New Mexico — TOTAL DEPTH 64.0

BY A. Fear — DATE 11/15/93 — SURFACE ELEV. 0 FT

BLOWS (COUNT/ INCHES)	FID (PPM)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION
			5			No sample
			10			
			15			
50/12	18		20			Light reddish brown sandstone
						No sample
			25			
			30			Core: Light reddish brown sandstone
Core	3					
			35			
Core	1					
			40			
Core	2					
			45			
Core	4					
			50			Core: Light reddish brown sandstone, moist
Core	30					
						Core: Light reddish brown sandstone
Core	48	▽	55			Core: Reddish brown and gray/green sandstone
			60			
Core	1000					

REMARKS:

Drilling Contractor: Layne Environmental

Driller: Wes Cowser

Drilling Method: Hollow Stem Auger

Drilling Equipment: Failing F6

LOG OF EXPLORATORY BORING

PROJECT NUMBER 7976-04 BORING NO. B-8

PROJECT NAME WT-1 Transwestern Compressor Station, Carlsbad, New Mexico TOTAL DEPTH 64.0

BY A. Fear DATE 11/15/93 SURFACE ELEV. 0 FT

BLOWS (COUNT/ INCHES)	FID (PPM)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION
			5			No sample
			10			
			15			
			20			
			25			
			30			Core: Light brownish red consolidated sandstone
Core	1		35			
			40			
Core	2		45			
			50			
Core	2	▽				Core: Light brownish red consolidated sandstone, moist
			55			Core: Reddish brown/green sandstone, moist
Core	50					Core: Reddish brown silty clay, moist
Core	8		60			
Core	1000					

REMARKS: Drilling Contractor: Layne Environmental
Driller: Wes Cowser
Drilling Method: Hollow Stem Auger
Drilling Equipment: Failing F6

APPENDIX B

TABLES

TABLE 1.
SUMMARY OF DRILLING ACTIVITY
BLM LAND ADJACENT TO
TRANSWESTERN WT-1 COMPRESSOR STATION
CARLSBAD, NEW MEXICO

Boring Number	Total Depth	Groundwater Sampled	Soil Interval Analyzed	Field Screen	Laboratory Analytical
B-1	66	YES	42-46 ft. BGL 51-56 ft. BGL	1000 ppm 1000 ppm	418.1, BTEX-8020
B-2	65	YES	5-10 ft. BGL 60-65 ft. BGL	300 ppm 1000 ppm	418.1, BTEX-8020
B-3	57	YES	20-30 ft. BGL 47-57 ft. BGL	600 ppm 16 ppm	418.1, BTEX-8020
B-4	57	YES	19-21 ft. BGL 47-57 ft. BGL	60 ppm 1000 ppm	418.1, BTEX-8020
B-5	59	YES	20-30 ft. BGL 52-59 ft. BGL	28 ppm 6 ppm	418.1, BTEX-8020
B-6	59	YES	20-30 ft. BGL 49-59 ft. BGL	3 ppm 40 ppm	418.1, BTEX-8020
B-7	64	YES	20-30 ft. BGL 49-59 ft. BGL 59-64 ft. BGL	18 ppm 48 ppm 1000 ppm	418.1, BTEX-8020
B-8	64	YES	54-59 ft. BGL 62-64 ft. BGL	50 ppm 1000 ppm	418.1, BTEX-8020

TABLE 2.
SOIL ANALYTICAL RESULTS
BLM LAND ADJACENT TO
TRANSWESTERN WT-1 COMPRESSOR STATION
CARLSBAD, NEW MEXICO

Boring Number	Sample Depth	TPH (mg/kg)	Total BTEX (µg/kg)	Benzene (µg/kg)	Toluene (µg/kg)	Ethyl-benzene (µg/kg)	Total Xylenes (µg/kg)
B-1	(42-46)	15,000	318,000	< 12,000*	96,000	< 12,000*	222,000
	(51-56)	6,700	136,000	< 12,000*	49,000	< 12,000*	87,000
B-2	(05-10)	< 20	74	< 10	< 10	< 10	74
	(60-65)	130	17,600	< 3,100*	8,200	< 3,100*	9,400
B-3	(20-30)	50	< 5	< 5	< 5	< 5	< 5
	(47-57)	< 20	< 5	< 5	< 5	< 5	< 5
B-4	(19-21)	< 20	< 5	< 5	< 5	< 5	< 5
	(47-57)	< 20	< 5	< 5	< 5	< 5	< 5
B-5	(20-30)	< 20	< 5	< 5	< 5	< 5	< 5
	(52-59)	< 20	< 5	< 5	< 5	< 5	< 5
B-6	(20-30)	< 20	< 10	< 10	< 10	< 10	< 10
	(49-59)	< 20	< 10	< 10	< 10	< 10	< 10
B-7	(20-30)	50	< 10	< 10	< 10	< 10	< 10
	(49-59)	< 20	< 10	< 10	< 10	< 10	< 10
	(59-64)	470	233,000	13,000	65,000	24,000	131,000
B-8	(54-59)	< 20	< 10	< 10	< 10	< 10	< 10
	(62-64)	< 20	< 10	< 10	< 10	< 10	< 10

* = The detection limits were elevated due to the dilution required because of the high concentration of target analytes.
µg/kg = micrograms per kilogram
mg/kg = milligrams per kilogram

TABLE 3.
GROUNDWATER ANALYTICAL RESULTS
BLM LAND ADJACENT TO
TRANSWESTERN WT-1 COMPRESSOR STATION
CARLSBAD, NEW MEXICO

Boring Number	TPH (mg/L)	Total BTEX (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-Benzene (µg/L)	Total Xylenes (µg/L)
B-1	3,400	20,250	5,800	9,300	450	4,700
B-2	120	15,460	5,000	7,000	360	3,100
B-3	790	11,000	3,100	4,200	480	3,300
B-4	99	11,030	3,500	3,900	630	3,000
B-5	45	3,062	1,900	230	190	742
B-6	11.1	3,334	1,900	1,200	66	168
B-7	0.4	4,052	2,000	880	200	972
B-8	0.7	787	720	25	< 10	42

µg/L = micrograms per liter
mg/L = milligrams per liter

APPENDIX C

LABORATORY ANALYTICAL REPORTS

pace INCORPORATED
THE ASSURANCE OF QUALITY

REPORT OF LABORATORY ANALYSIS

November 24, 1993
Report No.: 00028884
Section A Page 11

LABORATORY ANALYSIS REPORT

CLIENT NAME:	TRANSWESTERN PIPELINE COMPANY	LSG CLIENT NO:	0734 0001
ADDRESS:	P.O. BOX 1717	PACE PROJECT:	H07340001
	ROSWELL, NM 88202-1717	PACE CLIENT:	620562
ATTENTION:	LARRY CAMPBELL		
SAMPLE ID:	GRD WTR BORING-1	DATE SAMPLED:	07-NOV-93
LSG SAMPLE NO:	H0258758	DATE RECEIVED:	10-NOV-93
P.O. NO.:	VERBAL	APPROVED BY:	L Beyer

LN	TEST CODE	DETERMINATION	RESULT	UNITS
3	I685	Petroleum Hydrocarbons	3,400	mg/L
4	OVAROW	Volatile Aromatics		
		Benzene	5,800	ug/L
		Ethylbenzene	450	ug/L
		Toluene	9,300	ug/L
		m-Xylene	3,400 *	ug/L
		o-Xylene	1,300	ug/L
		p-Xylene	*	ug/L

COMMENTS: * The compounds m-Xylene and p-Xylene co-elute. The reported result is the sum of the two.

900 Gemini Avenue
Houston, TX 77058
TEL: 713-488-1810
FAX: 713-488-4661

pace INCORPORATED
THE ASSURANCE OF QUALITY

REPORT OF LABORATORY ANALYSIS

November 24, 1993
Report No.: 00028884
Section A Page 1

LABORATORY ANALYSIS REPORT

CLIENT NAME:	TRANSWESTERN PIPELINE COMPANY	LSG CLIENT NO:	0734 0001
ADDRESS:	P.O. BOX 1717	PACE PROJECT:	H07340001
	ROSWELL, NM 88202-1717	PACE CLIENT:	620562
ATTENTION:	LARRY CAMPBELL		
SAMPLE ID:	SOIL BORING-1 (42-46)	DATE SAMPLED:	05-NOV-93
LSG SAMPLE NO:	H0258748	DATE RECEIVED:	10-NOV-93
P.O. NO.:	VERBAL	APPROVED BY:	L Beyer

LN	TEST CODE	DETERMINATION	RESULT	UNIT
3	I685S	Petroleum Hydrocarbons	15,000	mg/kg
4	OVAROS	Volatile Aromatics		
		Benzene	< 12,000 **	ug/kg
		Ethlybenzene	< 12,000	ug/kg
		Toluene	96,000	ug/kg
		m-Xylene	180,000 *	ug/kg
		o-Xylene	42,000	ug/kg
		p-Xylene	*	ug/kg

COMMENTS: Results are reported on an "as received" basis without correction for percent moisture unless previously specified.
* The compounds m-Xylene and p-Xylene co-elute. The reported result is the sum of the two.
** The detection limits were elevated due to the dilution required because of the high concentrations of target analytes.

RECEIVED
NOV 29 1993

900 Gemini Avenue
Houston, TX 77058
TEL: 713-488-1810
FAX: 713-488-4661

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THE ASSURANCE OF QUALITY

REPORT OF LABORATORY ANALYSIS

November 24, 1993
Report No.: 00028884
Section A Page 2

LABORATORY ANALYSIS REPORT

CLIENT NAME:	TRANSWESTERN PIPELINE COMPANY	LSG CLIENT NO:	0734 0001
ADDRESS:	P.O. BOX 1717	PACE PROJECT:	H07340001
	ROSWELL, NM 88202-1717	PACE CLIENT:	620562
ATTENTION:	LARRY CAMPBELL		
SAMPLE ID:	SOIL BORING-1 (51-56)	DATE SAMPLED:	06-NOV-93
LSG SAMPLE NO:	H0258749	DATE RECEIVED:	10-NOV-93
P.O. NO.:	VERBAL	APPROVED BY:	L Beyer

LN	TEST CODE	DETERMINATION	RESULT	UNITS
3	I685S	Petroleum Hydrocarbons	6,700	mg/kg
4	OVAROS	Volatile Aromatics		
		Benzene	< 12,000 **	ug/kg
		Ethlybenzene	< 12,000	ug/kg
		Toluene	49,000	ug/kg
		m-Xylene	71,000 *	ug/kg
		o-Xylene	16,000	ug/kg
		p-Xylene	*	ug/kg

COMMENTS: Results are reported on an "as received" basis without correction for percent moisture unless previously specified.
* The compounds m-Xylene and p-Xylene co-elute. The reported result is the sum of the two.
** The detection limits were elevated due to the dilution required because of the high concentrations of target analytes.

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REPORT OF LABORATORY ANALYSIS

November 24, 1993
Report No.: 00028884
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LABORATORY ANALYSIS REPORT

CLIENT NAME: TRANSWESTERN PIPELINE COMPANY
ADDRESS: P.O. BOX 1717
ROSWELL, NM 88202-1717
ATTENTION: LARRY CAMPBELL

LSG CLIENT NO: 0734 0001
PACE PROJECT: H07340001
PACE CLIENT: 620562

SAMPLE ID: GRD WTR BORING-2
LSG SAMPLE NO: H0258759
P.O. NO.: VERBAL

DATE SAMPLED: 06-NOV-93
DATE RECEIVED: 10-NOV-93
APPROVED BY: L Beyer

LN	TEST CODE	DETERMINATION	RESULT	UNITS
3	I685	Petroleum Hydrocarbons	120	mg/L
4	OVAROW	Volatile Aromatics		
		Benzene	5,000	ug/L
		Ethylbenzene	360	ug/L
		Toluene	7,000	ug/L
		m-Xylene	2,000 *	ug/L
		o-Xylene	1,100	ug/L
		p-Xylene	*	ug/L

COMMENTS: * The compounds m-Xylene and p-Xylene co-elute. The reported result is the sum of the two.

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REPORT OF LABORATORY ANALYSIS

November 24, 1993
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LABORATORY ANALYSIS REPORT

CLIENT NAME: TRANSWESTERN PIPELINE COMPANY
ADDRESS: P.O. BOX 1717
ROSWELL, NM 88202-1717
ATTENTION: LARRY CAMPBELL

LSG CLIENT NO: 0734 0001
PACE PROJECT: H07340001
PACE CLIENT: 620562

SAMPLE ID: SOIL BORING-2 (5-10)
LSG SAMPLE NO: H0258750
P.O. NO.: VERBAL

DATE SAMPLED: 07-NOV-93
DATE RECEIVED: 10-NOV-93
APPROVED BY: L Beyer

LN	TEST CODE	DETERMINATION	RESULT	UNITS
3	I685S	Petroleum Hydrocarbons	< 20	mg/kg
4	OVAROS	Volatile Aromatics		
		Benzene	< 10	ug/kg
		Ethlybenzene	< 10	ug/kg
		Toluene	< 10	ug/kg
		m-Xylene	54 *	ug/kg
		o-Xylene	20	ug/kg
		p-Xylene	*	ug/kg

COMMENTS: Results are reported on an "as received" basis without correction for percent moisture unless previously specified.
* The compounds m-Xylene and p-Xylene co-elute. The reported result is the sum of the two.

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LABORATORY ANALYSIS REPORT

CLIENT NAME: TRANSWESTERN PIPELINE COMPANY
ADDRESS: P.O. BOX 1717
ROSWELL, NM 88202-1717
ATTENTION: LARRY CAMPBELL

LSG CLIENT NO: 0734 0001
PACE PROJECT: H07340001
PACE CLIENT: 620562

SAMPLE ID: SOIL BORING-2 (60-65)
LSG SAMPLE NO: H0258751
P.O. NO.: VERBAL

DATE SAMPLED: 07-NOV-93
DATE RECEIVED: 10-NOV-93
APPROVED BY: L Beyer

LN	TEST CODE	DETERMINATION	RESULT	UNITS
3	I685S	Petroleum Hydrocarbons	130	mg/kg
4	OVAROS	Volatile Aromatics		
		Benzene	< 3,100 **	ug/kg
		Ethlybenzene	< 3,100	ug/kg
		Toluene	8,200	ug/kg
		m-Xylene	9,400 *	ug/kg
		o-Xylene	< 3,100	ug/kg
		p-Xylene	*	ug/kg

COMMENTS: Results are reported on an "as received" basis without correction for percent moisture unless previously specified.
* The compounds m-Xylene and p-Xylene co-elute. The reported result is the sum of the two.
** The detection limits were elevated due to the dilution required because of the high concentrations of non-target analytes.

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LABORATORY ANALYSIS REPORT

CLIENT NAME:	TRANSWESTERN PIPELINE COMPANY	LSG CLIENT NO:	0734 0001
ADDRESS:	P.O. BOX 1717	PACE PROJECT:	H07340001
	ROSWELL, NM 88202-1717	PACE CLIENT:	620562
ATTENTION:	LARRY CAMPBELL		
SAMPLE ID:	SOIL BORING-3 (20-30)	DATE SAMPLED:	07-NOV-93
LSG SAMPLE NO:	H0258752	DATE RECEIVED:	10-NOV-93
P.O. NO.:	VERBAL	APPROVED BY:	L Beyer

LN	TEST CODE	DETERMINATION	RESULT	UNITS
3	I685S	Petroleum Hydrocarbons	50	mg/kg
4	OVAROS	Volatile Aromatics		
		Benzene	< 5	ug/kg
		Ethlybenzene	< 5	ug/kg
		Toluene	< 5	ug/kg
		m-Xylene	< 5	ug/kg
		o-Xylene	< 5	ug/kg
		p-Xylene	< 5	ug/kg

COMMENTS: Results are reported on an "as received" basis without correction for percent moisture unless previously specified.

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November 24, 1993
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LABORATORY ANALYSIS REPORT

CLIENT NAME:	TRANSWESTERN PIPELINE COMPANY	LSG CLIENT NO:	0734 0001
ADDRESS:	P.O. BOX 1717	PACE PROJECT:	H07340001
	ROSWELL, NM 88202-1717	PACE CLIENT:	620562
ATTENTION:	LARRY CAMPBELL		
SAMPLE ID:	GRD WTR BORING-3	DATE SAMPLED:	07-NOV-93
LSG SAMPLE NO:	H0258760	DATE RECEIVED:	10-NOV-93
P.O. NO.:	VERBAL	APPROVED BY:	L Beyer

LN	TEST CODE	DETERMINATION	RESULT	UNITS
3	I685	Petroleum Hydrocarbons	790	mg/L
4	OVAROW	Volatile Aromatics		
		Benzene	3,100	ug/L
		Ethylbenzene	480	ug/L
		Toluene	4,200	ug/L
		m-Xylene	2,000 *	ug/L
		o-Xylene	1,300	ug/L
		p-Xylene	*	ug/L

COMMENTS: * The compounds m-Xylene and p-Xylene co-elute. The reported result is the sum of the two.

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REPORT OF LABORATORY ANALYSIS

LABORATORY ANALYSIS REPORT

CLIENT NAME:	TRANSWESTERN PIPELINE COMPANY	LSG CLIENT NO:	0734 0001
ADDRESS:	P.O. BOX 1717	PACE PROJECT:	H07340001
	ROSWELL, NM 88202-1717	PACE CLIENT:	620562
ATTENTION:	LARRY CAMPBELL		
SAMPLE ID:	SOIL BORING-3 (47-57)	DATE SAMPLED:	07-NOV-93
LSG SAMPLE NO:	H0258753	DATE RECEIVED:	10-NOV-93
P.O. NO.:	VERBAL	APPROVED BY:	L Beyer

LN	TEST CODE	DETERMINATION	RESULT	UNITS
3	I685S	Petroleum Hydrocarbons	< 20	mg/kg
4	OVAROS	Volatile Aromatics		
		Benzene	< 5	ug/kg
		Ethlybenzene	< 5	ug/kg
		Toluene	< 5	ug/kg
		m-Xylene	< 5	ug/kg
		o-Xylene	< 5	ug/kg
		p-Xylene	< 5	ug/kg

COMMENTS: Results are reported on an "as received" basis without correction for percent moisture unless previously specified.

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REPORT OF LABORATORY ANALYSIS

LABORATORY ANALYSIS REPORT

CLIENT NAME:	TRANSWESTERN PIPELINE COMPANY	LSG CLIENT NO:	0734 0001
ADDRESS:	P.O. BOX 1717	PACE PROJECT:	H07340001
	ROSWELL, NM 88202-1717	PACE CLIENT:	620562
ATTENTION:	LARRY CAMPBELL		
SAMPLE ID:	GRD WTR BORING-4	DATE SAMPLED:	07-NOV-93
LSG SAMPLE NO:	H0258761	DATE RECEIVED:	10-NOV-93
P.O. NO.:	VERBAL	APPROVED BY:	L Beyer

LN	TEST CODE	DETERMINATION	RESULT	UNITS
3	I685	Petroleum Hydrocarbons	99	mg/L
4	OVAROW	Volatile Aromatics		
		Benzene	3,500	ug/L
		Ethylbenzene	630	ug/L
		Toluene	3,900	ug/L
		m-Xylene	1,500 *	ug/L
		o-Xylene	1,500	ug/L
		p-Xylene	*	ug/L

COMMENTS: * The compounds m-Xylene and p-Xylene co-elute. The reported result is the sum of the two.

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REPORT OF LABORATORY ANALYSIS

November 24, 1993
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LABORATORY ANALYSIS REPORT

CLIENT NAME:	*TRANSWESTERN PIPELINE COMPANY*	LSG CLIENT NO:	0734 0001
ADDRESS:	P.O. BOX 1717	PACE PROJECT:	H07340001
	ROSWELL, NM 88202-1717	PACE CLIENT:	620562
ATTENTION:	LARRY CAMPBELL		
SAMPLE ID:	SOIL BORING-4 (19-21)	DATE SAMPLED:	07-NOV-93
LSG SAMPLE NO:	H0258754	DATE RECEIVED:	10-NOV-93
P.O. NO.:	VERBAL	APPROVED BY:	L Beyer

LN	TEST CODE	DETERMINATION	RESULT	UNITS
3	I685S	Petroleum Hydrocarbons	< 20	mg/kg
4	OVAROS	Volatile Aromatics		
		Benzene	< 5	ug/kg
1		Ethlybenzene	< 5	ug/kg
		Toluene	< 5	ug/kg
		m-Xylene	< 5	ug/kg
		o-Xylene	< 5	ug/kg
	/	p-Xylene	< 5	ug/kg

COMMENTS: Results are reported on an "as received" basis without correction for percent moisture unless previously specified.

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REPORT OF LABORATORY ANALYSIS

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LABORATORY ANALYSIS REPORT

CLIENT NAME: TRANSWESTERN PIPELINE COMPANY
ADDRESS: P.O. BOX 1717
ROSWELL, NM 88202-1717
ATTENTION: LARRY CAMPBELL

LSG CLIENT NO: 0734 0001
PACE PROJECT: H07340001
PACE CLIENT: 620562

SAMPLE ID: SOIL BORING-4 (47-57)
LSG SAMPLE NO: H0258755
P.O. NO.: VERBAL

DATE SAMPLED: 07-NOV-93
DATE RECEIVED: 10-NOV-93
APPROVED BY: L Beyer

LN	TEST CODE	DETERMINATION	RESULT	UNITS
3	I685S	Petroleum Hydrocarbons	< 20	mg/kg
4	OVAROS	Volatile Aromatics		
		Benzene	< 5	ug/kg
		Ethlybenzene	< 5	ug/kg
		Toluene	< 5	ug/kg
		m-Xylene	< 5	ug/kg
		o-Xylene	< 5	ug/kg
		p-Xylene	< 5	ug/kg

COMMENTS: Results are reported on an "as received" basis without correction for percent moisture unless previously specified.

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REPORT OF LABORATORY ANALYSIS

LABORATORY ANALYSIS REPORT

CLIENT NAME:	TRANSWESTERN PIPELINE COMPANY	LSG CLIENT NO:	0734 0001
ADDRESS:	P.O. BOX 1717	PACE PROJECT:	H07340001
	ROSWELL, NM 88202-1717	PACE CLIENT:	620562
ATTENTION:	LARRY CAMPBELL		
SAMPLE ID:	GRD WTR BORING-5	DATE SAMPLED:	08-NOV-93
LSG SAMPLE NO:	H0258762	DATE RECEIVED:	10-NOV-93
P.O. NO.:	VERBAL	APPROVED BY:	L Beyer

LN	TEST CODE	DETERMINATION	RESULT	UNITS
3	I685	Petroleum Hydrocarbons	45	mg/L
4	OVAROW	Volatile Aromatics		
		Benzene	1,900	ug/L
		Ethylbenzene	190	ug/L
		Toluene	230	ug/L
		m-Xylene	650 *	ug/L
		o-Xylene	92	ug/L
		p-Xylene	*	ug/L

COMMENTS: * The compounds m-Xylene and p-Xylene co-elute. The reported result is the sum of the two.

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REPORT OF LABORATORY ANALYSIS

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LABORATORY ANALYSIS REPORT

CLIENT NAME: TRANSWESTERN PIPELINE COMPANY
ADDRESS: P.O. BOX 1717
ROSWELL, NM 88202-1717
ATTENTION: LARRY CAMPBELL

LSG CLIENT NO: 0734 0001
PACE PROJECT: H07340001
PACE CLIENT: 620562

SAMPLE ID: SOIL BORING-5 (20-30)
LSG SAMPLE NO: H0258756
P.O. NO.: VERBAL

DATE SAMPLED: 08-NOV-93
DATE RECEIVED: 10-NOV-93
APPROVED BY: L Beyer

LN	TEST CODE	DETERMINATION	RESULT	UNITS
3	I685S	Petroleum Hydrocarbons	< 20	mg/kg
4	OVAROS	Volatile Aromatics		
		Benzene	< 5	ug/kg
		Ethlybenzene	< 5	ug/kg
		Toluene	< 5	ug/kg
		m-Xylene	< 5	ug/kg
		o-Xylene	< 5	ug/kg
		p-Xylene	< 5	ug/kg

COMMENTS: Results are reported on an "as received" basis without correction for percent moisture unless previously specified.

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REPORT OF LABORATORY ANALYSIS

LABORATORY ANALYSIS REPORT

CLIENT NAME: TRANSWESTERN PIPELINE COMPANY
ADDRESS: P.O. BOX 1717
ROSWELL, NM 88202-1717
ATTENTION: LARRY CAMPBELL

LSG CLIENT NO: 0734 0001
PACE PROJECT: H07340001
PACE CLIENT: 620562

SAMPLE ID: SOIL BORING-5 (52-59)
LSG SAMPLE NO: H0258757
P.O. NO.: VERBAL

DATE SAMPLED: 08-NOV-93
DATE RECEIVED: 10-NOV-93
APPROVED BY: L Beyer

LN	TEST CODE	DETERMINATION	RESULT	UNITS
3	I685S	Petroleum Hydrocarbons	20	mg/kg
4	OVAROS	Volatile Aromatics		
		Benzene	< 5	ug/kg
		Ethlybenzene	< 5	ug/kg
		Toluene	< 5	ug/kg
		m-Xylene	< 5	ug/kg
		o-Xylene	< 5	ug/kg
		p-Xylene	< 5	ug/kg

COMMENTS: Results are reported on an "as received" basis without correction for percent moisture unless previously specified.

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REPORT OF LABORATORY ANALYSIS

LABORATORY ANALYSIS REPORT

CLIENT NAME:	TRANSWESTERN PIPELINE COMPANY	LSG CLIENT NO:	0734 0001
ADDRESS:	P.O. BOX 1717	PACE PROJECT:	H07340001
	ROSWELL, NM 88202-1717	PACE CLIENT:	620562
ATTENTION:	LARRY CAMPBELL		
SAMPLE ID:	GRD. WTR. BORING 6	DATE SAMPLED:	09-NOV-93
LSG SAMPLE NO:	H0259301	DATE RECEIVED:	13-NOV-93
P.O. NO.:	VERBAL	APPROVED BY:	L Beyer

LN	TEST CODE	DETERMINATION	RESULT	UNITS
1	G107W	BTEX Package		
		Benzene	1,900	ug/L
		Ethylbenzene	66	ug/L
		Toluene	1,200	ug/L
		m-Xylene	96 *	ug/L
		o-Xylene	72	ug/L
		p-Xylene	*	ug/L
3	1685	Petroleum Hydrocarbons	11.1	mg/L

COMMENTS: * The compounds m-Xylene and p-Xylene co-elute. The reported result is the sum of the two.

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REPORT OF LABORATORY ANALYSIS

December 01, 1993
Report No.: 00028994
Section A Page 1

LABORATORY ANALYSIS REPORT

CLIENT NAME: TRANSWESTERN PIPELINE COMPANY
ADDRESS: P.O. BOX 1717
ROSWELL, NM 88202-1717
ATTENTION: LARRY CAMPBELL

LSG CLIENT NO: 0734 0001
PACE PROJECT: H07340001
PACE CLIENT: 620562

SAMPLE ID: SAND: BORING 6 (20-30')
LSG SAMPLE NO: H0259294
P.O. NO.: VERBAL

DATE SAMPLED: 09-NOV-93
DATE RECEIVED: 13-NOV-93
APPROVED BY: L Beyer

LN	TEST CODE	DETERMINATION	RESULT	UNIT
1	G107S	BTEX Package		
		Benzene	< 10	ug/kg
		Ethylbenzene	< 10	ug/kg
		Toluene	< 10	ug/kg
		m-Xylene	< 10	ug/kg
		o-Xylene	< 10	ug/kg
		p-Xylene	< 10	ug/kg
3	I685S	Petroleum Hydrocarbons	< 20	mg/kg

COMMENTS: Results are reported on an "as received" basis without correction for percent moisture unless previously specified.

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REPORT OF LABORATORY ANALYSIS

LABORATORY ANALYSIS REPORT

CLIENT NAME:	TRANSWESTERN PIPELINE COMPANY	LSG CLIENT NO:	0734 0001
ADDRESS:	P.O. BOX 1717	PACE PROJECT:	H07340001
	ROSWELL, NM 88202-1717	PACE CLIENT:	620562
ATTENTION:	LARRY CAMPBELL		
SAMPLE ID:	SAND: BORING 6 (49-59')	DATE SAMPLED:	09-NOV-93
LSG SAMPLE NO:	H0259295	DATE RECEIVED:	13-NOV-93
P.O. NO.:	VERBAL	APPROVED BY:	L Beyer

LN	TEST CODE	DETERMINATION	RESULT	UNITS
1	G107S	BTEX Package		
		Benzene	< 10	ug/kg
		Ethylbenzene	< 10	ug/kg
		Toluene	< 10	ug/kg
		m-Xylene	< 10	ug/kg
		o-Xylene	< 10	ug/kg
		p-Xylene	< 10	ug/kg
3	I685S	Petroleum Hydrocarbons	< 20	mg/kg

COMMENTS: Results are reported on an "as received" basis without correction for percent moisture unless previously specified.

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REPORT OF LABORATORY ANALYSIS

December 01, 1993
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LABORATORY ANALYSIS REPORT

CLIENT NAME:	TRANSWESTERN PIPELINE COMPANY	LSG CLIENT NO:	0734 0001
ADDRESS:	P.O. BOX 1717	PACE PROJECT:	H07340001
	ROSWELL, NM 88202-1717	PACE CLIENT:	620562
ATTENTION:	LARRY CAMPBELL		
SAMPLE ID:	GRD. WTR. BORING 7	DATE SAMPLED:	10-NOV-93
LSG SAMPLE NO:	H0259302	DATE RECEIVED:	13-NOV-93
P.O. NO.:	VERBAL	APPROVED BY:	L Beyer

LN	TEST CODE	DETERMINATION	RESULT	UNITS
1	G107W	BTEX Package		
		Benzene	2,000 *	ug/L
		Ethylbenzene	200	ug/L
		Toluene	880	ug/L
		m-Xylene	910 **	ug/L
		o-Xylene	62	ug/L
		p-Xylene	**	ug/L
3	I685	Petroleum Hydrocarbons	0.4	mg/L

COMMENTS: * The analysis for Benzene was done after the holding time had expired to get a result within the calibration range.
** The compounds m-Xylene and p-Xylene co-elute. The reported result is the sum of the two.

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REPORT OF LABORATORY ANALYSIS

December 01, 1993
Report No.: 00028994
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LABORATORY ANALYSIS REPORT

CLIENT NAME: TRANSWESTERN PIPELINE COMPANY
ADDRESS: P.O. BOX 1717
ROSWELL, NM 88202-1717
ATTENTION: LARRY CAMPBELL

LSG CLIENT NO: 0734 0001
PACE PROJECT: H07340001
PACE CLIENT: 620562

SAMPLE ID: SAND: BORING 7 (20-30')
LSG SAMPLE NO: H0259296
P.O. NO.: VERBAL

DATE SAMPLED: 09-NOV-93
DATE RECEIVED: 13-NOV-93
APPROVED BY: L Beyer

LN	TEST CODE	DETERMINATION	RESULT	UNITS
1	G107S	BTEX Package		
		Benzene	< 10	ug/kg
		Ethylbenzene	< 10	ug/kg
		Toluene	< 10	ug/kg
		m-Xylene	< 10	ug/kg
		o-Xylene	< 10	ug/kg
		p-Xylene	< 10	ug/kg
3	I685S	Petroleum Hydrocarbons	50	mg/kg

COMMENTS: Results are reported on an "as received" basis without correction for percent moisture unless previously specified.

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REPORT OF LABORATORY ANALYSIS

LABORATORY ANALYSIS REPORT

CLIENT NAME:	TRANSWESTERN PIPELINE COMPANY	LSG CLIENT NO:	0734 0001
ADDRESS:	P.O. BOX 1717	PACE PROJECT:	H07340001
	ROSWELL, NM 88202-1717	PACE CLIENT:	620562
ATTENTION:	LARRY CAMPBELL		
SAMPLE ID:	SAND: BORING 7 (49-59')	DATE SAMPLED:	09-NOV-93
LSG SAMPLE NO:	H0259297	DATE RECEIVED:	13-NOV-93
P.O. NO.:	VERBAL	APPROVED BY:	L Beyer

LN	TEST CODE	DETERMINATION	RESULT	UNITS
1	G107S	BTEX Package		
		Benzene	< 10	ug/kg
		Ethylbenzene	< 10	ug/kg
		Toluene	< 10	ug/kg
		m-Xylene	< 10	ug/kg
		o-Xylene	< 10	ug/kg
		p-Xylene	< 10	ug/kg
3	I685S	Petroleum Hydrocarbons	< 20	mg/kg

COMMENTS: Results are reported on an "as received" basis without correction for percent moisture unless previously specified.

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REPORT OF LABORATORY ANALYSIS

February 02, 1994
Report No.: -00000001
Section A Page 1

LABORATORY ANALYSIS REPORT

CLIENT NAME:	TRANSWESTERN PIPELINE COMPANY	LIMS CLIENT:	0734 0001
ADDRESS:	P.O. BOX 1717	PACE PROJECT:	H07340001
	ROSWELL, NM 88202-1717	PACE CLIENT:	620562
ATTENTION:	LARRY CAMPBELL	P.O. NO:	VERBAL
SAMPLE ID:	SAND: BORING 7 (59-64')	DATE SAMPLED:	10-NOV-93
SAMPLE NO:	H259298	DATE RECEIVED:	13-NOV-93

LN	TEST CODE	DETERMINATION	RESULT	UNITS
1	G107S	BTEX Package		
		Benzene	13,000	ug/kg
		Ethylbenzene	24,000	ug/kg
		Toluene	65,000	ug/kg
		m-Xylene	96,000 *	ug/kg
		o-Xylene	35,000	ug/kg
		p-Xylene	*	ug/kg
3	I685S	Petroleum Hydrocarbons	470*	mg/kg

COMMENTS: * Sample was rerun due to lab error.
* The compounds m-Xylene and p-Xylene co-elute. The reported result is the sum of the two.

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REPORT OF LABORATORY ANALYSIS

LABORATORY ANALYSIS REPORT

CLIENT NAME: TRANSWESTERN PIPELINE COMPANY
ADDRESS: P.O. BOX 1717
ROSWELL, NM 88202-1717
ATTENTION: LARRY CAMPBELL

LSG CLIENT NO: 0734 0001
PACE PROJECT: H07340001
PACE CLIENT: 620562

SAMPLE ID: GRD. WTR. BORING 8
LSG SAMPLE NO: H0259303
P.O. NO.: VERBAL

DATE SAMPLED: 10-NOV-93
DATE RECEIVED: 13-NOV-93
APPROVED BY: L Beyer

LN	TEST CODE	DETERMINATION	RESULT	UNITS
1	G107W	BTEX Package		
		Benzene	720	ug/L
		Ethylbenzene	< 10 *	ug/L
		Toluene	25	ug/L
		m-Xylene	42 **	ug/L
		o-Xylene	< 10	ug/L
		p-Xylene	**	ug/L
3	I685	Petroleum Hydrocarbons	0.7	mg/L

COMMENTS: * The detection limits were elevated due to the dilution required because of the high concentrations of target analytes.
** The compounds m-Xylene and p-Xylene co-elute. The reported result is the sum of the two.

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REPORT OF LABORATORY ANALYSIS

December 01, 1993
Report No.: 00028994
Section A Page 6

LABORATORY ANALYSIS REPORT

CLIENT NAME: TRANSWESTERN PIPELINE COMPANY
ADDRESS: P.O. BOX 1717
ROSWELL, NM 88202-1717
ATTENTION: LARRY CAMPBELL

LSG CLIENT NO: 0734 0001
PACE PROJECT: H07340001
PACE CLIENT: 620562

SAMPLE ID: SAND: BORING 8 (54-59')
LSG SAMPLE NO: H0259299
P.O. NO.: VERBAL

DATE SAMPLED: 10-NOV-93
DATE RECEIVED: 13-NOV-93
APPROVED BY: L Beyer

LN	TEST CODE	DETERMINATION	RESULT	UNITS
1	G107S	BTEX Package		
		Benzene	< 10	ug/kg
		Ethylbenzene	< 10	ug/kg
		Toluene	< 10	ug/kg
		m-Xylene	< 10	ug/kg
		o-Xylene	< 10	ug/kg
		p-Xylene	< 10	ug/kg
3	I685S	Petroleum Hydrocarbons	< 20	mg/kg

COMMENTS: Results are reported on an "as received" basis without correction for percent moisture unless previously specified.

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LABORATORY ANALYSIS REPORT

CLIENT NAME: TRANSWESTERN PIPELINE COMPANY
ADDRESS: P.O. BOX 1717
ROSWELL, NM 88202-1717
ATTENTION: LARRY CAMPBELL

LSG CLIENT NO: 0734 0001
PACE PROJECT: H07340001
PACE CLIENT: 620562

SAMPLE ID: SAND: BORING 8 (62-64')
LSG SAMPLE NO: H0259300
P.O. NO.: VERBAL

DATE SAMPLED: 10-NOV-93
DATE RECEIVED: 13-NOV-93
APPROVED BY: L Beyer

LN	TEST CODE	DETERMINATION	RESULT	UNITS
1	G107S	BTEX Package		
		Benzene	< 10	ug/kg
		Ethylbenzene	< 10	ug/kg
		Toluene	< 10	ug/kg
		m-Xylene	< 10	ug/kg
		o-Xylene	< 10	ug/kg
		p-Xylene	< 10	ug/kg
3	I685S	Petroleum Hydrocarbons	< 20	mg/kg

COMMENTS: Results are reported on an "as received" basis without correction for percent moisture unless previously specified.

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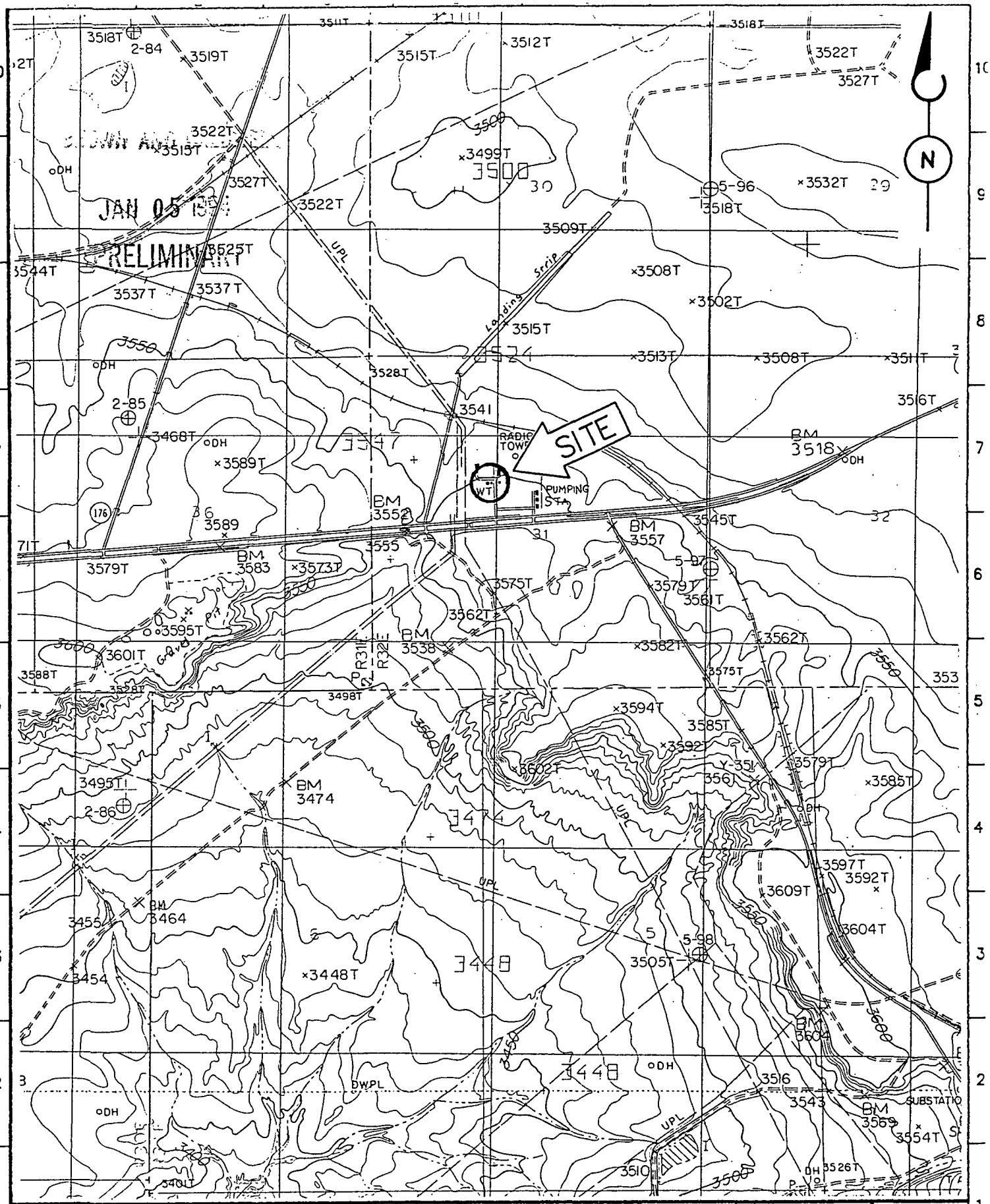
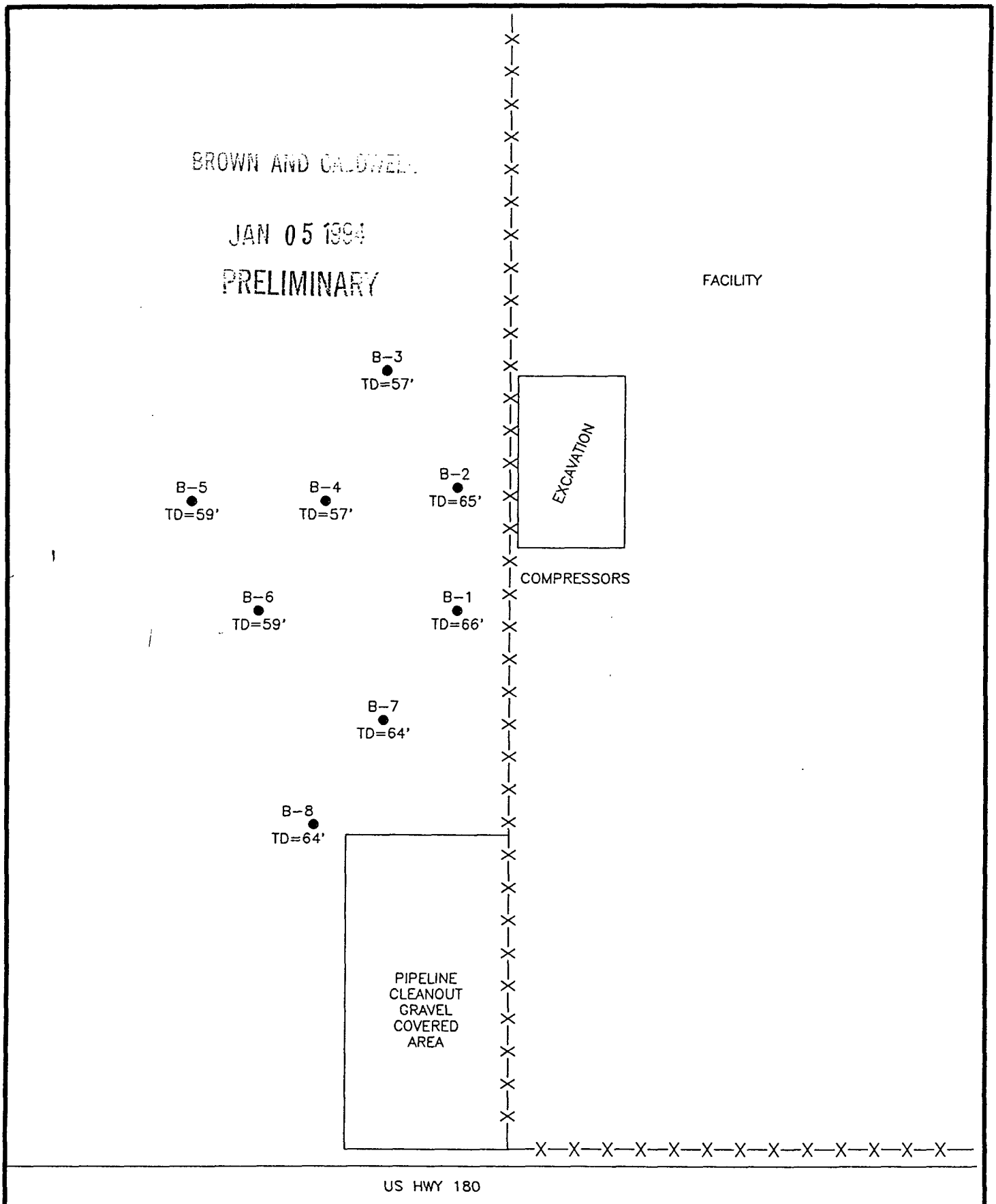


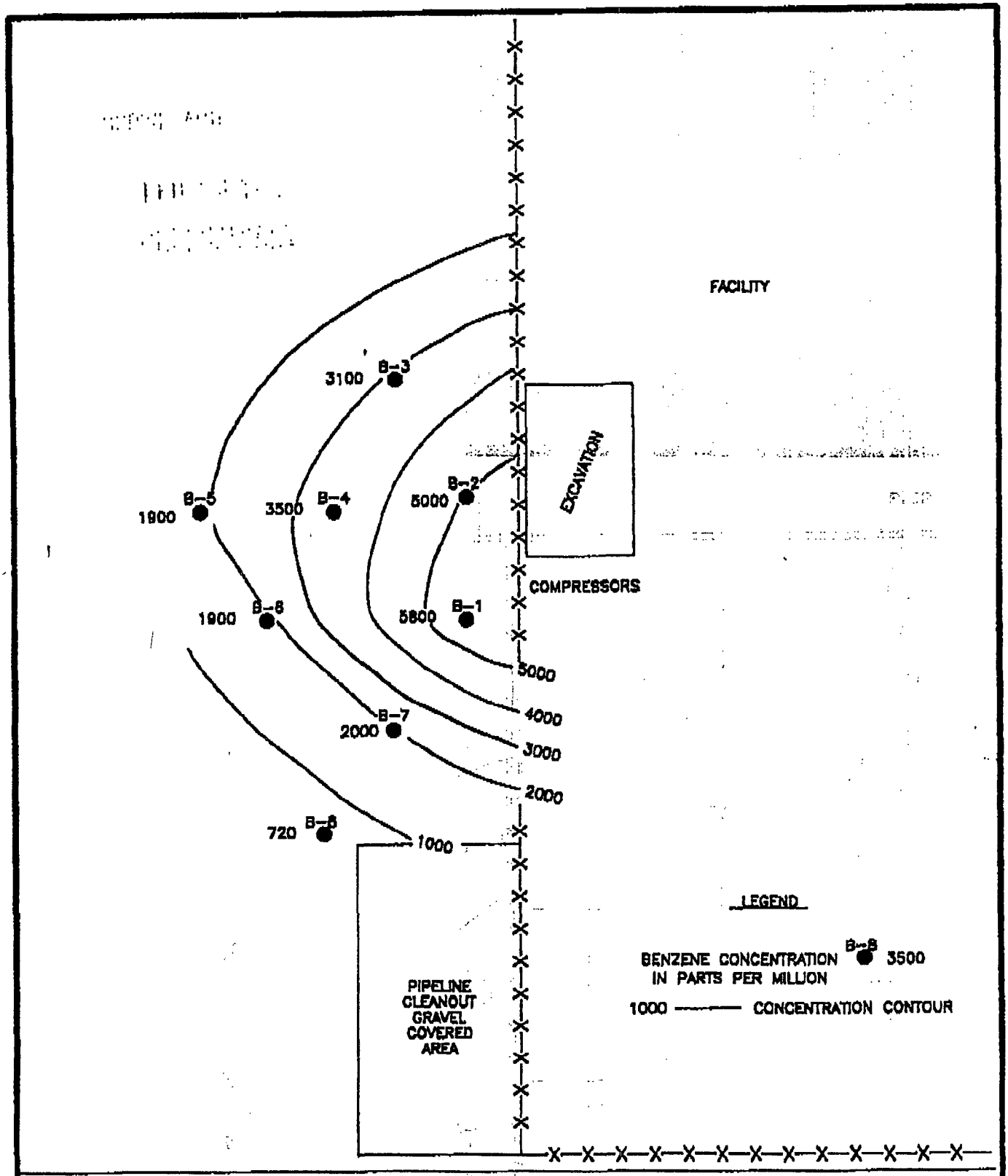
Brown & Caldwell Dallas–Houston, Texas	0 1000 2000 SCALE: 1" = 2000'	TITLE: SITE LOCATION MAP WT–1 COMPRESSOR STATION	DATE: 12/07/93
	DRAWN BY: JDN DATE 12/7 CHK'D BY: AJF DATE 12/7 APPROVED: SR DATE 12/7	CLIENT: TRANSWESTERN PIPELINE CO.	PROJECT NUMBER: 7976–04
		SITE LOCATION: CARLSBAD, NEW MEXICO	FIGURE NUMBER: 1

E:\7976\7976-04



BROWN AND CALDWELL HOUSTON, TEXAS SUBMITTED: SUSANNE RICHARD, PROJECT MANAGER DATE: APPROVED: BROWN AND CALDWELL DATE:	0 25 50 SCALE: 1" = 50' DRAWN BY: JDN DATE 1/4 CHK'D BY: AJF DATE APPROVED: SR DATE	TITLE: SITE MAP CLIENT: TRANSWESTERN PIPELINE CO. SITE: WT-1 COMPRESSOR STATION CARLSBAD, NEW MEXICO	DATE: 01/04/94 PROJECT NUMBER: 7976-04 FIGURE NUMBER: 2

E:\7976\7976-04



BROWN AND CALDWELL DALLAS, TEXAS SUBMITTED: SUSANNE RICHARD, PROJECT MANAGER DATE: APPROVED: BROWN AND CALDWELL DATE:	0 25 50 SCALE: 1" = 50 DRAWN BY: JON DATE: 1/4 CHK'D BY: AJF DATE: APPROVED: SR DATE:	TITLE: BENZENE CONCENTRATIONS IN GROUNDWATER CLIENT: TRANSWESTERN PIPELINE CO. SITE: WT-1 COMPRESSOR STATION, CARLSBAD, NEW MEXICO	DATE: 02/09/94 PROJECT NUMBER: 7976-04 FIGURE NUMBER: 3

G:\7976\7976-04

LOG OF EXPLORATORY BORING

PROJECT NUMBER 7975-04 BORING NO. B-1

PROJECT NAME NT-1 Transwestern Compressor Station, Carlsbad, New Mexico TOTAL DEPTH 65.0

BY A. Fear DATE 11/16/93 SURFACE ELEV. 0 FT

BLOWS (COUNT/ INCHES)	PID (PPM)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION
50/5	0					Brown earthy soil and gravel
50/5	0					Light tan to white sandstone and gravel
50/5	7		5			Light tan silty sandstone and gravel
50/5	9					Light tan sandstone and gravel
50/5	8		10			Reddish brown sandstone
50/5	5					
50/5	2					
50/5	7		15			
50/5	10					Red sandstone, silty with clay
50/5	24		20			
50/5	140					
50/5	20					
50/5	20		25			
50/5	62					
50/5	30		30			
50/5	85					
50/5	300					
			35			
50/5	800					
50/5	1000		40			
50/5	1000					
50/5	1000					
50/5	1000		45			Red sandstone, silty, moist
CORE	1000					CORE: Red sandstone, silty, moist
			50			
CORE	1000					
			55			CORE: Red sandstone 57 to 64 feet
						CORE: Continued from 57 feet, change in lithology
						Red silty clay 64 to 65 feet
CORE	1000		60			
			65			

REMARKS: Drilling Contractor: Layne Environmental
Driller: Wes Conner
Drilling Method: Hollow Stem Auger
Drilling Equipment: Failing F8

LOG OF EXPLORATORY BORING

PROJECT NUMBER 7376-04 BORING NO. B-2

PROJECT NAME WT-1 Transwestern Compressor Station, Carlsbad, New Mexico TOTAL DEPTH 65.0

BY A. Fear DATE 11/15/93 SURFACE ELEV. 0 FT

BLOWS (COUNT/ INCHES)	PID (PPM)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION
						No sample
50/6	150		5			White to light tan sandstone and gravel
50/6	800		10			Light tan sandstone and gravel
50/6	140		15			Tan to reddish brown sandstone
50/6	150		20			
50/6	1000		25			Red silty sandstone and clay
			30			No sample
						Red silty sandstone and clay
50/6	270		35			
50/6	1000		40			
						No sample
			45			CORE: Red consolidated sandstone
CORE	1000					
			50			CORE: Red silty sandstone with white mottles, moist
CORE	1000					CORE: Red silty sandstone with white mottles, moist
			55			CORE: Continued from 60 feet, change in lithology Red silty clay 62 to 65 feet
CORE	1000					
			60			
CORE	1000					
			65			

REMARKS: Drilling Contractor: Layne Environmental
Driller: Wes Cowser
Drilling Method: Hollow Stem Auger
Drilling Equipment: Failing F6

LOG OF EXPLORATORY BORING

PROJECT NUMBER 7976-04 BORING NO. B-3

PROJECT NAME NT-1 Transwestern Compressor Station, Carlsbad, New Mexico TOTAL DEPTH 57.0

BY A. Fuer DATE 11/10/93 SURFACE ELEV. 0 FT

BLOWS (COUNT/ INCHES)	PID (PPM)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION
			5			No sample
			10			
			15			
50/3	600		20			Light red sandstone
						No sample
			25			
			30			CORE: Light brown to red sandstone, silty with white mottles
CORE	3		35			
						CORE: Reddish brown sandstone
			40			
CORE	3		45			
						CORE: Red sandstone
			50			
CORE	15		55	SZ		

REMARKS: Drilling Contractor: Layne Environmental
Driller: Wes Conser
Drilling Method: Hollow Stem Auger
Drilling Equipment: Failing F6

LOG OF EXPLORATORY BORING

PROJECT NUMBER 7978-04 BORING NO. B-4

PROJECT NAME NT-1 Transwestern Compressor Station, Carlsbad, New Mexico TOTAL DEPTH 57.0

BY A. Fear DATE 11/12/93 SURFACE ELEV. 0 FT

BLOWS (COUNT/ INCHES)	PID (PPM)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION
			5			No sample
			10			
			15			
50/12	80		20			Reddish brown sandstone and gravel
			25			No sample
			30			CORE: Light red to reddish brown sandstone
CORE	1		35			
			40			CORE: Reddish brown sandstone
CORE	20		45			
			50			CORE: Reddish brown sandstone, moist
CORE	1000		55			

REMARKS: Drilling Contractor: Layne Environmental
Driller: Wes Cowser
Drilling Method: Hollow Stem Auger
Drilling Equipment: Failing F8

LOG OF EXPLORATORY BORING

PROJECT NUMBER 7978-04 BORING NO. B-5

PROJECT NAME WT-1 Transwestern Compressor Station, Carlsbad, New Mexico TOTAL DEPTH 59.0

BY R. Fear DATE 11/15/93 SURFACE ELEV. 0 FT

BLOWS (COUNT/ INCHES)	PID (PPM)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION
			5			No sample
			10			
			15			
50/0	28		20			Reddish brown sandstone
						No sample
			25			
			30			
						CORE: Reddish brown sandstone
CORE	9		35			
			40			
						CORE: Reddish brown sandstone
CORE	1		45			
			50			CORE: Red sandstone - moist
CORE	6		55			

REMARKS: Drilling Contractor: Layne Environmental
Driller: Wes Causer
Drilling Method: Hollow Stem Auger
Drilling Equipment: Failing F8

LOG OF EXPLORATORY BORING

PROJECT NUMBER 7975-04 BORING NO. B-8

PROJECT NAME NT-1 Transwestern Compressor Station, Carlsbad, New Mexico TOTAL DEPTH 60.0

BY A. Fear DATE 11/15/93 SURFACE ELEV. 0 FT

BLOWS (COUNT/ INCHES)	PID (PPM)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION
			5			No sample
			10			
			15			
50/6	3		20			Light red to reddish brown consolidated sandstone
						No sample
			25			
CORE	4		30			CORE: Light red to reddish brown consolidated sandston
CORE	8		35			
CORE	3		40			CORE: Reddish brown sandstone, consolidated with gravel
CORE	3		45			
CORE	5		50			CORE: Reddish brown sandstone, consolidated with gravel, moist
CORE	40		55			

REMARKS: Drilling Contractor: Layne Environmental
Driller: Wes Conner
Drilling Method: Hollow Stem Auger
Drilling Equipment: Failing F6

LOG OF EXPLORATORY BORING

PROJECT NUMBER 7976-04 BORING NO. B-7

PROJECT NAME NT-1 Transwestern Compressor Station, Carlsbad, New Mexico TOTAL DEPTH 64.0

BY A. Fuer DATE 11/10/93 SURFACE ELEV. 0 FT

BLOWS (COUNT/ INCHES)	PID (PPM)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION
			5			No sample
			10			
			15			
50/12	18		20			Light reddish brown sandstone
			25			No sample
CORE	3		30			CORE: Light reddish brown sandstone
CORE	1		35			
CORE	2		40			CORE: Light reddish brown sandstone, moist
CORE	4		45			
CORE	30		50			CORE: Light reddish brown sandstone
CORE	48		55	SS2		CORE: Light reddish brown sandstone 52 to 61 feet CORE: Continued from 59 feet, change in lithology Red silty clay 61 to 64 feet
CORE	1000		60			

REMARKS: Drilling Contractor: Layne Environmental
Driller: Wes Cowser
Drilling Method: Hollow Stem Auger
Drilling Equipment: Failing F8

LOG OF EXPLORATORY BORING

PROJECT NUMBER 7976-04 BORING NO. B-8

PROJECT NAME NT-1 Transwestern Compressor Station, Carlsbad, New Mexico TOTAL DEPTH 64.0

BY A. Fesr DATE 11/10/93 SURFACE ELEV. 0 FT

BLOWS (COUNT/ INCHES)	PID @PPM	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION
			5			No sample
			10			
			15			
			20			
			25			
			30			CORE: Light brownish red consolidated sandstone
CORE	1		35			
			40			CORE: Light brownish red consolidated sandstone, moist
CORE	2		45			
			50			CORE: Reddish brown/green sandstone, moist
CORE	2					CORE: Reddish brown/green sandstone, moist
CORE	80		55			CORE: Continued from 59 feet, change in lithology Reddish brown silty clay, moist
CORE	8		60			
CORE	1000					

REMARKS: Drilling Contractor: Layne Environmental
Driller: Wes Cowser
Drilling Method: Hollow Stem Auger
Drilling Equipment: Failing F6

LOG OF EXPLORATORY BORING

PROJECT NUMBER 7976-04 BORING NO. B-8

PROJECT NAME NT-1 Transwestern Compressor Station, Carlsbad, New Mexico TOTAL DEPTH 54.0

BY A. Faur DATE 11/10/93 SURFACE ELEV. 0 FT

BLOWS (COUNT/ INCHES)	PID (PPM)	GROUND WATER LEVELS	DEPTH IN FT.	SAMPLES	LITHO-GRAPHIC COLUMN	DESCRIPTION
			5			No sample
			10			
			15			
			20			
			25			
			30			CORE: Light brownish red consolidated sandstone
CORE	1		35			
			40			CORE: Light brownish red consolidated sandstone, moist
CORE	2		45			
CORE	2		50			CORE: Reddish brown/green sandstone, moist
						CORE: Reddish brown/green sandstone, moist
CORE	80		55			CORE: Continued from 50 feet, change in lithology Reddish brown silty clay, moist
CORE	8		60			
CORE	1000					

REMARKS: Drilling Contractor: Layne Environmental
Driller: Mac Cowser
Drilling Method: Hollow Stem Auger
Drilling Equipment: Failing F8

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REPORT OF LABORATORY ANALYSIS

QUALITY CONTROL REPORT
SUPPLEMENTAL INFORMATION

			SAMPLE PREPARATION			SAMPLE ANALYSIS				
LN	TEST CODE	BATCH	LR-METHOD	DATE/TIME	ANALYST	LR-METHOD	DATE/TIME	ANALYST	ANLS BATCH	INSTRUMENT
SAMPLE ID: SOIL BORING-1 (42-46)							LSG SAMPLE NO: H0258748			
3	I685S	35865	19-3550			02-418.1	18-NOV-93 1300	Rus	35865	302WAT
4	OVAROS	35647	NA			19-8240	11-NOV-93 1820	E M	35480	GCMSQ
SAMPLE ID: SOIL BORING-1 (51-56)							LSG SAMPLE NO: H0258749			
3	I685S	35865	19-3550			02-418.1	18-NOV-93 1300	Rus	35865	302WAT
4	OVAROS	35647	NA			19-8240	11-NOV-93 1845	E M	35480	GCMSQ
SAMPLE ID: SOIL BORING-2 (5-10)							LSG SAMPLE NO: H0258750			
3	I685S	35865	19-3550			02-418.1	18-NOV-93 1300	Rus	35865	302WAT
4	OVAROS	35647	NA			19-8240	11-NOV-93 1915	E M	35480	GCMSQ
SAMPLE ID: SOIL BORING-2 (60-65)							LSG SAMPLE NO: H0258751			
3	I685S	35865	19-3550			02-418.1	18-NOV-93 1300	Rus	35865	302WAT
4	OVAROS	35673	NA			19-8240	12-NOV-93 1939	E M	35581	GCMSQ

LR Method Literature Reference
02 EPA-Methods for Chemical Analysis of Water & Wastes, 1984.
19 EPA-Test Methods for Evaluating Solid Waste, 3rd ed, Nov. 1986

LR Method Literature Reference
02 EPA-Methods for Chemical Analysis of Water & Wastes, 1984.
19 EPA-Test Methods for Evaluating Solid Waste, 3rd ed, Nov. 1986

LR Method Literature Reference
02 EPA-Methods for Chemical Analysis of Water & Wastes, 1984.
19 EPA-Test Methods for Evaluating Solid Waste, 3rd ed, Nov. 1986

LR Method Literature Reference

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QUALITY CONTROL REPORT
SUPPLEMENTAL INFORMATION

			SAMPLE PREPARATION			SAMPLE ANALYSIS				
LN	TEST CODE	BATCH	LR-METHOD	DATE/TIME	ANALYST	LR-METHOD	DATE/TIME	ANALYST	ANLS BATCH	INSTRUMENT

LR Method Literature Reference

02 EPA-Methods for Chemical Analysis of Water & Wastes, 1984.
19 EPA-Test Methods for Evaluating Solid Waste, 3rd ed, Nov. 1986

SAMPLE ID: SOIL BORING-3 (20-30) LSG SAMPLE NO: H0258752

3	I685S	35865	19-3550			02-418.1	18-NOV-93	1300 Rus	35865	302WAT
4	OVAROS	35647	NA			19-8240	11-NOV-93	2004 E M	35581	GCMSQ

LR[1] Method Literature Reference
02 EPA-Methods for Chemical Analysis of Water & Wastes, 1984.
19 EPA-Test Methods for Evaluating Solid Waste, 3rd ed, Nov. 1986

SAMPLE ID: SOIL BORING-3 (47-57) LSG SAMPLE NO: H0258753

3	I685S	35865	19-3550			02-418.1	18-NOV-93	1300 Rus	35865	302WAT
4	OVAROS	35673	NA			19-8240	12-NOV-93	1639 E M	35581	GCMSQ

LR Method Literature Reference
02 EPA-Methods for Chemical Analysis of Water & Wastes, 1984.
19 EPA-Test Methods for Evaluating Solid Waste, 3rd ed, Nov. 1986

SAMPLE ID: SOIL BORING-4 (19-21) LSG SAMPLE NO: H0258754

3	I685S	35865	19-3550			02-418.1	18-NOV-93	1300 Rus	35865	302WAT
4	OVAROS	35647	NA			19-8240	11-NOV-93	2056 E M	35581	GCMSQ

LR Method Literature Reference

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QUALITY CONTROL REPORT
SUPPLEMENTAL INFORMATION

			SAMPLE PREPARATION			SAMPLE ANALYSIS				
LN	TEST CODE	BATCH	LR-METHOD	DATE/TIME	ANALYST	LR-METHOD	DATE/TIME	ANALYST	ANLS BATCH	INSTRUMENT

LR Method Literature Reference

02 EPA-Methods for Chemical Analysis of Water & Wastes, 1984.
19 EPA-Test Methods for Evaluating Solid Waste, 3rd ed, Nov. 1986

SAMPLE ID: SOIL BORING-4 (47-57) LSG SAMPLE NO: H0258755

3	I685S	35865	19-3550			02-418.1	18-NOV-93	1300 Rus	35865	302WAT
4	OVAROS	35673	NA			19-8240	12-NOV-93	1704 E M	35581	GCMSQ

LR[1] Method Literature Reference
02 EPA-Methods for Chemical Analysis of Water & Wastes, 1984.
19 EPA-Test Methods for Evaluating Solid Waste, 3rd ed, Nov. 1986

SAMPLE ID: SOIL BORING-5 (20-30) LSG SAMPLE NO: H0258756

3	I685S	35865	19-3550			02-418.1	18-NOV-93	1300 Rus	35865	302WAT
4	OVAROS	35647	NA			19-8240	11-NOV-93	2148 E M	35581	GCMSQ

LR Method Literature Reference
02 EPA-Methods for Chemical Analysis of Water & Wastes, 1984.
19 EPA-Test Methods for Evaluating Solid Waste, 3rd ed, Nov. 1986

SAMPLE ID: SOIL BORING-5 (52-59) LSG SAMPLE NO: H0258757

3	I685S	35865	19-3550			02-418.1	18-NOV-93	1300 Rus	35865	302WAT
4	OVAROS	35673	NA			19-8240	12-NOV-93	1729 E M	35581	GCMSQ

LR Method Literature Reference

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QUALITY CONTROL REPORT
SUPPLEMENTAL INFORMATION

LN	TEST CODE	BATCH	SAMPLE PREPARATION LR-METHOD	SAMPLE PREPARATION DATE/TIME	SAMPLE PREPARATION ANALYST	SAMPLE ANALYSIS LR-METHOD	SAMPLE ANALYSIS DATE/TIME	SAMPLE ANALYSIS ANALYST	ANLS BATCH	INSTRUMENT
LR	Method Literature Reference									
02	EPA-Methods for Chemical Analysis of Water & Wastes, 1984.									
19	EPA-Test Methods for Evaluating Solid Waste, 3rd ed, Nov. 1986									
SAMPLE ID: GRD WTR BORING-1							LSG SAMPLE NO: H0258758			
3	I685	35702	02-418.1			02-418.1	12-NOV-93 1100	T M	0	302WAT
4	OVAROW	35783	NA			19-8240	16-NOV-93 1840	J P	35645	GCMSR
LR	Method Literature Reference									
02	EPA-Methods for Chemical Analysis of Water & Wastes, 1984.									
19	EPA-Test Methods for Evaluating Solid Waste, 3rd ed, Nov. 1986									
SAMPLE ID: GRD WTR BORING-2							LSG SAMPLE NO: H0258759			
3	I685	35702	02-418.1			02-418.1	12-NOV-93 1100	T M	0	302WAT
4	OVAROW	35783	NA			19-8240	16-NOV-93 1908	J P	35645	GCMSR
LR	Method Literature Reference									
02	EPA-Methods for Chemical Analysis of Water & Wastes, 1984.									
19	EPA-Test Methods for Evaluating Solid Waste, 3rd ed, Nov. 1986									
SAMPLE ID: GRD WTR BORING-3							LSG SAMPLE NO: H0258760			
3	I685	35702	02-418.1			02-418.1	12-NOV-93 1100	T M	0	302WAT
4	OVAROW	35783	NA			19-8240	16-NOV-93 1937	J P	35645	GCMSR
LR	Method Literature Reference									

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TEL: 713-488-1810
FAX: 713-488-4661

QUALITY CONTROL REPORT
SUPPLEMENTAL INFORMATION

			SAMPLE PREPARATION			SAMPLE ANALYSIS				
LN	TEST CODE	BATCH	LR-METHOD	DATE/TIME	ANALYST	LR-METHOD	DATE/TIME	ANALYST	ANLS BATCH	INSTRUMENT

LR Method Literature Reference

02 EPA-Methods for Chemical Analysis of Water & Wastes, 1984.
19 EPA-Test Methods for Evaluating Solid Waste, 3rd ed, Nov. 1986

SAMPLE ID: GRD WTR BORING-4 LSG SAMPLE NO: H0258761

3	I685	35702	02-418.1			02-418.1	12-NOV-93	1100 T M	0	302WAT
4	OVAROW	35783	NA			19-8240	16-NOV-93	2005 J P	35645	GCMSR

LR[1] Method Literature Reference
02 EPA-Methods for Chemical Analysis of Water & Wastes, 1984.
19 EPA-Test Methods for Evaluating Solid Waste, 3rd ed, Nov. 1986

SAMPLE ID: GRD WTR BORING-5 LSG SAMPLE NO: H0258762

3	I685	35702	02-418.1			02-418.1	12-NOV-93	1100 T M	0	302WAT
4	OVAROW	35683	NA			19-8240	13-NOV-93	109 J P	35645	GCMSR

LR Method Literature Reference
02 EPA-Methods for Chemical Analysis of Water & Wastes, 1984.
19 EPA-Test Methods for Evaluating Solid Waste, 3rd ed, Nov. 1986

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QUALITY CONTROL REPORT
SURROGATE STANDARD RECOVERY

LN	TEST CODE	SURROGATE COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS	REF LN
SAMPLE ID: SOIL BORING-1 (42-46)			LSG SAMPLE NO: H0258748		
	5	$VOAS GC/MS Volatiles Surrogates			4
		1,2-Dichloroethane-d4	*	-	
		4-Bromofluorobenzene	*	-	
		Toluene-d8	*	-	
* The surrogates were not recovered due to the dilution required because of the high analyte concentration.					
SAMPLE ID: SOIL BORING-1 (51-56)			LSG SAMPLE NO: H0258749		
	5	$VOAS GC/MS Volatiles Surrogates			4
		1,2-Dichloroethane-d4	*	-	
		4-Bromofluorobenzene	*	-	
		Toluene-d8	*	-	
* The surrogates were not recovered due to the dilution required because of the high analyte concentration.					
SAMPLE ID: SOIL BORING-2 (5-10)			LSG SAMPLE NO: H0258750		
	5	$VOAS GC/MS Volatiles Surrogates			4
		1,2-Dichloroethane-d4	107	-	
		4-Bromofluorobenzene	112	-	
		Toluene-d8	87	-	
SAMPLE ID: SOIL BORING-2 (60-65)			LSG SAMPLE NO: H0258751		
	5	$VOAS GC/MS Volatiles Surrogates			4
		1,2-Dichloroethane-d4	80	-	
		4-Bromofluorobenzene	90	-	
		Toluene-d8	86	-	
SAMPLE ID: SOIL BORING-3 (20-30)			LSG SAMPLE NO: H0258752		
	5	$VOAS GC/MS Volatiles Surrogates			4
		1,2-Dichloroethane-d4	106	-	
		4-Bromofluorobenzene	96	-	
		Toluene-d8	96	-	
SAMPLE ID: SOIL BORING-3 (47-57)			LSG SAMPLE NO: H0258753		
	5	$VOAS GC/MS Volatiles Surrogates			4
		1,2-Dichloroethane-d4	98	-	
		4-Bromofluorobenzene	104	-	

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QUALITY CONTROL REPORT
SURROGATE STANDARD RECOVERY

LN	TEST CODE	SURROGATE COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS	REF LN
		Toluene-d8	107	-	
SAMPLE ID:		SOIL BORING-4 (19-21)	LSG SAMPLE NO:	H0258754	
5	$VOAS	GC/MS Volatiles Surrogates			4
		1,2-Dichloroethane-d4	100	-	
		4-Bromofluorobenzene	87	-	
		Toluene-d8	87	-	
SAMPLE ID:		SOIL BORING-4 (47-57)	LSG SAMPLE NO:	H0258755	
5	$VOAS	GC/MS Volatiles Surrogates			4
		1,2-Dichloroethane-d4	110	-	
		4-Bromofluorobenzene	101	-	
		Toluene-d8	101	-	
SAMPLE ID:		SOIL BORING-5 (20-30)	LSG SAMPLE NO:	H0258756	
5	$VOAS	GC/MS Volatiles Surrogates			4
		1,2-Dichloroethane-d4	104	-	
		4-Bromofluorobenzene	90	-	
		Toluene-d8	99	-	
SAMPLE ID:		SOIL BORING-5 (52-59)	LSG SAMPLE NO:	H0258757	
5	$VOAS	GC/MS Volatiles Surrogates			4
		1,2-Dichloroethane-d4	108	-	
		4-Bromofluorobenzene	101	-	
		Toluene-d8	107	-	
SAMPLE ID:		GRD WTR BORING-1	LSG SAMPLE NO:	H0258758	
5	$VOAW	GC/MS Volatiles Surrogates			4
		1,2-Dichloroethane-d4	97	-	
		4-Bromofluorobenzene	103	-	
		Toluene-d8	97	-	
SAMPLE ID:		GRD WTR BORING-2	LSG SAMPLE NO:	H0258759	
5	$VOAW	GC/MS Volatiles Surrogates			4
		1,2-Dichloroethane-d4	101	-	
		4-Bromofluorobenzene	105	-	
		Toluene-d8	104	-	

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QUALITY CONTROL REPORT
SURROGATE STANDARD RECOVERY

LN	TEST CODE	SURROGATE COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS	REF LN
SAMPLE ID:	GRD WTR BORING-3		LSG SAMPLE NO:	H0258760	
5	$VOAW	GC/MS Volatiles Surrogates			4
		1,2-Dichloroethane-d4	97	-	
		4-Bromofluorobenzene	96	-	
		Toluene-d8	96	-	
SAMPLE ID:	GRD WTR BORING-4		LSG SAMPLE NO:	H0258761	
5	$VOAW	GC/MS Volatiles Surrogates			4
		1,2-Dichloroethane-d4	99	-	
		4-Bromofluorobenzene	92	-	
		Toluene-d8	94	-	
SAMPLE ID:	GRD WTR BORING-5		LSG SAMPLE NO:	H0258762	
5	$VOAW	GC/MS Volatiles Surrogates			4
		1,2-Dichloroethane-d4	96	-	
		4-Bromofluorobenzene	93	-	
		Toluene-d8	104	-	

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QUALITY CONTROL REPORT
LABORATORY CONTROL SAMPLE RECOVERY

TEST CODE	DETERMINATION	PERCENT RECOVERY	ACCEPTANCE LIMITS
BATCH: 35647	SAMPLE ID: Lab Control Sample		LSG SAMPLE NO: H0259846
OVARO	Volatile Aromatics		
	1,1-Dichloroethene	99	-
	Benzene	92	-
	Chlorobenzene	94	-
	Toluene	102	-
	Trichloroethene	93	-
BATCH: 35673	SAMPLE ID: Lab Control Sample		LSG SAMPLE NO: H0259875
OVARO	Volatile Aromatics		
	1,1-Dichloroethene	100	-
	Benzene	98	-
	Chlorobenzene	101	-
	Toluene	98	-
	Trichloroethene	101	-
BATCH: 35683	SAMPLE ID: Lab Control Sample		LSG SAMPLE NO: H0259893
OVARO	Volatile Aromatics		
	1,1-Dichloroethene	93	-
	Benzene	90	-
	Chlorobenzene	102	-
	Toluene	96	-
	Trichloroethene	97	-
BATCH: 35702	SAMPLE ID: Lab Control Sample		LSG SAMPLE NO: H0259925
1685	Petroleum Hydrocarbons	95.1	-
BATCH: 35783	SAMPLE ID: Lab Control Sample		LSG SAMPLE NO: H0261044
OVARO	Volatile Aromatics		
	1,1-Dichloroethene	87	-
	Benzene	101	-
	Chlorobenzene	103	-
	Toluene	96	-
	Trichloroethene	90	-

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QUALITY CONTROL REPORT
LABORATORY CONTROL SAMPLE RECOVERY

TEST CODE	DETERMINATION	PERCENT RECOVERY	ACCEPTANCE LIMITS
BATCH: 35865	SAMPLE ID: Lab Control Sample		LSG SAMPLE NO: H0261179
I685S	Petroleum Hydrocarbons	91	-

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QUALITY CONTROL REPORT
METHOD BLANK DATA

	TEST CODE	Determination	RESULT	UNITS
BATCH: 35647	SAMPLE ID: Method Blank		LSG SAMPLE NO: H0259847	
	OVAROS	Volatile Aromatics		
		Benzene	< 5	ug/kg
		Ethlybenzene	< 5	ug/kg
		Toluene	< 5	ug/kg
		m-Xylene	< 5	ug/kg
		o-Xylene	< 5	ug/kg
		p-Xylene	< 5	ug/kg
BATCH: 35673	SAMPLE ID: Method Blank		LSG SAMPLE NO: H0259876	
	OVAROS	Volatile Aromatics		
		Benzene	< 5	ug/kg
		Ethlybenzene	< 5	ug/kg
		Toluene	< 5	ug/kg
		m-Xylene	< 5	ug/kg
		o-Xylene	< 5	ug/kg
		p-Xylene	< 5	ug/kg
BATCH: 35683	SAMPLE ID: Method Blank		LSG SAMPLE NO: H0259894	
	OVAROW	Volatile Aromatics		
		Benzene	< 5	ug/L
		Ethylbenzene	< 5	ug/L
		Toluene	< 5	ug/L
		m-Xylene	< 5	ug/L
		o-Xylene	< 5	ug/L
		p-Xylene	< 5	ug/L
BATCH: 35702	SAMPLE ID: Method Blank		LSG SAMPLE NO: H0259926	
	I685	Petroleum Hydrocarbons	< 0.2	mg/L
BATCH: 35783	SAMPLE ID: Method Blank		LSG SAMPLE NO: H0261045	
	OVAROW	Volatile Aromatics		
		Benzene	< 2	ug/L
		Ethylbenzene	< 2	ug/L
		Toluene	< 2	ug/L
		m-Xylene	< 2	ug/L
		o-Xylene	< 2	ug/L

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QUALITY CONTROL REPORT
METHOD BLANK DATA

TEST CODE	Determination	RESULT	UNITS
	p-Xylene	< 2	ug/L
BATCH: 35865	SAMPLE ID: Method Blank	LSG SAMPLE NO:	H0261180
I685S	Petroleum Hydrocarbons	< 20	mg/kg

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QUALITY CONTROL REPORT
MATRIX SPIKE AND MATRIX SPIKE DUPLICATE DATA

ANLS BATCH: 35480 LSG SAMPLE NO: H0257242

TEST	DETERMINATION	MS RESULT	MSD RESULT	UNITS	RPD	MS PCT RECOVERY	MSD PCT RECOVERY
OVAROS	1,1-Dichloroethene	45.9	45.0	ug/kg	1.98	92	90
OVAROS	Benzene	54.5	55.7	ug/kg	2.19	109	111
OVAROS	Chlorobenzene	46.3	48.1	ug/kg	3.74	93	96
OVAROS	Toluene	45.1	47.7	ug/kg	5.59	90	95
OVAROS	Trichloroethene	51.0	50.5	ug/kg	0.981	102	101

ANLS BATCH: 35581 LSG SAMPLE NO: H0258719

TEST	DETERMINATION	MS RESULT	MSD RESULT	UNITS	RPD	MS PCT RECOVERY	MSD PCT RECOVERY
OVAROS	1,1-Dichloroethene	49.3	52.5	ug/kg	6.28	99	105
OVAROS	Benzene	49.9	50.6	ug/kg	1.39	100	101
OVAROS	Chlorobenzene	48.3	49.9	ug/kg	3.40	97	100
OVAROS	Toluene	48.6	50.6	ug/kg	3.94	97	101
OVAROS	Trichloroethene	52.8	50.5	ug/kg	4.49	106	101

ANLS BATCH: 35645 LSG SAMPLE NO: H0257894

TEST	DETERMINATION	MS RESULT	MSD RESULT	UNITS	RPD	MS PCT RECOVERY	MSD PCT RECOVERY
OVAROW	1,1-Dichloroethene	57.1	54.4	ug/L	4.86	114	109
OVAROW	Benzene	53.2	51.8	ug/L	2.52	106	104
OVAROW	Chlorobenzene	55.2	55.8	ug/L	1.09	110	112
OVAROW	Toluene	55.1	54.8	ug/L	0.486	110	110
OVAROW	Trichloroethene	51.1	51.7	ug/L	1.32	102	103

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QUALITY CONTROL REPORT
SUPPLEMENTAL INFORMATION

		SAMPLE PREPARATION			SAMPLE ANALYSIS			
LN	TEST CODE	PREP BATCH	LR-METHOD	DATE/TIME ANALYST	LR-METHOD	DATE/TIME ANALYST	ANLS BATCH	INSTRUMENT
SAMPLE ID: SAND: BORING 6 (20-30')						LSG SAMPLE NO: H0259294		
1	G107S	35929	NA		19-8020	20-NOV-93 1844 GMW	35929	7287GC
3	I685S	35859	19-3550		02-418.1	18-NOV-93 1950 LJH	35859	302WAT
SAMPLE ID: SAND: BORING 6 (49-59')						LSG SAMPLE NO: H0259295		
1	G107S	35929	NA		19-8020	20-NOV-93 1920 GMW	35929	7287GC
3	I685S	35859	19-3550		02-418.1	18-NOV-93 1950 LJH	35859	302WAT
SAMPLE ID: SAND: BORING 7 (20-30')						LSG SAMPLE NO: H0259296		
1	G107S	35929	NA		19-8020	20-NOV-93 1956 GMW	35929	7287GC
3	I685S	35859	19-3550		02-418.1	18-NOV-93 1950 LJH	35859	302WAT
SAMPLE ID: SAND: BORING 7 (49-59')						LSG SAMPLE NO: H0259297		
1	G107S	35929	NA		19-8020	20-NOV-93 2033 GMW	35929	7287GC
3	I685S	35859	19-3550		02-418.1	18-NOV-93 1950 LJH	35859	302WAT

LR	Method Literature Reference
02	EPA-Methods for Chemical Analysis of Water & Wastes, 1984.
19	EPA-Test Methods for Evaluating Solid Waste, 3rd ed, Nov. 1986

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19	EPA-Test Methods for Evaluating Solid Waste, 3rd ed, Nov. 1986

LR Method Literature Reference

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QUALITY CONTROL REPORT
SUPPLEMENTAL INFORMATION

LN	TEST CODE	PREP BATCH	SAMPLE PREPARATION LR-METHOD	SAMPLE PREPARATION DATE/TIME	SAMPLE PREPARATION ANALYST	SAMPLE ANALYSIS LR-METHOD	SAMPLE ANALYSIS DATE/TIME	SAMPLE ANALYSIS ANALYST	ANLS BATCH	INSTRUMENT
LR	Method Literature Reference									
02	EPA-Methods for Chemical Analysis of Water & Wastes, 1984.									
19	EPA-Test Methods for Evaluating Solid Waste, 3rd ed, Nov. 1986									
SAMPLE ID: SAND: BORING 7 (59-64')							LSG SAMPLE NO: H0259298			
1	G107S	36006	NA			19-8020	23-NOV-93 47	SLB	35929	7287GC
3	I685S	35859	19-3550			02-418.1	18-NOV-93 1950	LJH	35859	302WAT
LR	Method Literature Reference									
02	EPA-Methods for Chemical Analysis of Water & Wastes, 1984.									
19	EPA-Test Methods for Evaluating Solid Waste, 3rd ed, Nov. 1986									
SAMPLE ID: SAND: BORING 8 (54-59')							LSG SAMPLE NO: H0259299			
1	G107S	35929	NA			19-8020	20-NOV-93 2257	GMW	35929	7287GC
3	I685S	35859	19-3550			02-418.1	18-NOV-93 1950	LJH	35859	302WAT
LR	Method Literature Reference									
02	EPA-Methods for Chemical Analysis of Water & Wastes, 1984.									
19	EPA-Test Methods for Evaluating Solid Waste, 3rd ed, Nov. 1986									
SAMPLE ID: SAND: BORING 8 (62-64')							LSG SAMPLE NO: H0259300			
1	G107S	36165	NA			19-8020	24-NOV-93 1535	GMW	36165	7287GC
3	I685S	35859	19-3550			02-418.1	18-NOV-93 1950	LJH	35859	302WAT
LR	Method Literature Reference									

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QUALITY CONTROL REPORT
SUPPLEMENTAL INFORMATION

		SAMPLE PREPARATION			SAMPLE ANALYSIS				
LN	TEST CODE	PREP BATCH	LR-METHOD	DATE/TIME ANALYST	LR-METHOD	DATE/TIME	ANALYST	ANLS BATCH	INSTRUMENT

LR Method Literature Reference

02 EPA-Methods for Chemical Analysis of Water & Wastes, 1984.
19 EPA-Test Methods for Evaluating Solid Waste, 3rd ed, Nov. 1986

SAMPLE ID: GRD. WTR. BORING 6 LSG SAMPLE NO: H0259301

1	G107W	36087	NA	05-602	25-NOV-93 604	SLB	35804	3618GC
3	I685	35961	02-418.1	02-418.1	23-NOV-93 1930	LJH	0	302WAT

LR Method Literature Reference
02 EPA-Methods for Chemical Analysis of Water & Wastes, 1984.
05 EPA-40 CFR 136, October 26, 1984.

SAMPLE ID: GRD. WTR. BORING 7 LSG SAMPLE NO: H0259302

1	G107W	36179	NA	05-602	24-NOV-93 4	SLB	35329	3618GC
3	I685	35961	02-418.1	02-418.1	23-NOV-93 1930	LJH	0	302WAT

LR Method Literature Reference
02 EPA-Methods for Chemical Analysis of Water & Wastes, 1984.
05 EPA-40 CFR 136, October 26, 1984.

SAMPLE ID: GRD. WTR. BORING 8 LSG SAMPLE NO: H0259303

1	G107W	36079	NA	05-602	24-NOV-93 35	SLB	36080	3618GC
3	I685	35961	02-418.1	02-418.1	23-NOV-93 1930	LJH	0	302WAT

LR Method Literature Reference

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QUALITY CONTROL REPORT
SUPPLEMENTAL INFORMATION

			SAMPLE PREPARATION			SAMPLE ANALYSIS				
LN	TEST CODE	PREP BATCH	LR-METHOD	DATE/TIME	ANALYST	LR-METHOD	DATE/TIME	ANALYST	ANLS BATCH	INSTRUMENT

LR Method Literature Reference

02 EPA-Methods for Chemical Analysis of Water & Wastes, 1984.
05 EPA-40 CFR 136, October 26, 1984.

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QUALITY CONTROL REPORT
SURROGATE STANDARD RECOVERY

LN	TEST CODE	SURROGATE COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS	REF LN
SAMPLE ID:	SAND: BORING 6 (20-30')		LSG SAMPLE NO:	H0259294	
2	$VARS	GC Volatile Aromatics Surrogate alpha,alpha,alpha-Trifluorotoluene	99	-	1
SAMPLE ID:	SAND: BORING 6 (49-59')		LSG SAMPLE NO:	H0259295	
2	$VARS	GC Volatile Aromatics Surrogate alpha,alpha,alpha-Trifluorotoluene	94	-	1
SAMPLE ID:	SAND: BORING 7 (20-30')		LSG SAMPLE NO:	H0259296	
2	$VARS	GC Volatile Aromatics Surrogate alpha,alpha,alpha-Trifluorotoluene	97	-	1
SAMPLE ID:	SAND: BORING 7 (49-59')		LSG SAMPLE NO:	H0259297	
2	$VARS	GC Volatile Aromatics Surrogate alpha,alpha,alpha-Trifluorotoluene	99	-	1
SAMPLE ID:	SAND: BORING 7 (59-64')		LSG SAMPLE NO:	H0259298	
2	$VARS	GC Volatile Aromatics Surrogate alpha,alpha,alpha-Trifluorotoluene	286 *	-	1
* The surrogate was out of range due to matrix interferences.					
SAMPLE ID:	SAND: BORING 8 (54-59')		LSG SAMPLE NO:	H0259299	
2	$VARS	GC Volatile Aromatics Surrogate alpha,alpha,alpha-Trifluorotoluene	93	-	1
SAMPLE ID:	SAND: BORING 8 (62-64')		LSG SAMPLE NO:	H0259300	
2	$VARS	GC Volatile Aromatics Surrogate alpha,alpha,alpha-Trifluorotoluene	92	-	1
SAMPLE ID:	GRD. WTR. BORING 6		LSG SAMPLE NO:	H0259301	
2	$VARW	GC Volatile Aromatics Surrogate alpha,alpha,alpha-Trifluorotoluene	101	-	1
SAMPLE ID:	GRD. WTR. BORING 7		LSG SAMPLE NO:	H0259302	
2	$VARW	GC Volatile Aromatics Surrogate			1

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REPORT OF LABORATORY ANALYSIS

QUALITY CONTROL REPORT
SURROGATE STANDARD RECOVERY

LN	TEST CODE	SURROGATE COMPOUND	PERCENT RECOVERY	ACCEPTANCE LIMITS	REF LN
		alpha,alpha,alpha-Trifluorotoluene	110	-	
SAMPLE ID:	GRD.	WTR. BORING 8	LSG SAMPLE NO:	H0259303	
2	$VARW	GC Volatile Aromatics Surrogate			1
		alpha,alpha,alpha-Trifluorotoluene	100	-	

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QUALITY CONTROL REPORT
LABORATORY CONTROL SAMPLE RECOVERY

TEST CODE	DETERMINATION	PERCENT RECOVERY	ACCEPTANCE LIMITS
BATCH: 35859	SAMPLE ID: Lab Control Sample		LSG SAMPLE NO: H0261167
I685S	Petroleum Hydrocarbons	101.1	-
BATCH: 35929	SAMPLE ID: Lab Control Sample		LSG SAMPLE NO: H0261289
G107S	BTEX Package		
	Benzene	88	-
	Ethylbenzene	89	-
	Toluene	90	-
	m-Xylene	93 *	-
	o-Xylene	93	-
	p-Xylene	*	-

* The compounds m-Xylene and p-Xylene co-elute. The reported result is the sum of the two.

BATCH: 35961	SAMPLE ID: Lab Control Sample		LSG SAMPLE NO: H0261332
I685	Petroleum Hydrocarbons	104	-
BATCH: 36006	SAMPLE ID: Lab Control Sample		LSG SAMPLE NO: H0261411
G107S	BTEX Package		
	Benzene	88	-
	Ethylbenzene	88	-
	Toluene	88	-
	m-Xylene	92 *	-
	o-Xylene	91	-
	p-Xylene	*	-

* The compounds m-Xylene and p-Xylene co-elute. The reported result is the sum of the two.

BATCH: 36079	SAMPLE ID: Lab Control Sample		LSG SAMPLE NO: H0261530
G107W	BTEX Package		
	Benzene	116	-
	Ethylbenzene	116	-
	Toluene	115	-
	m-Xylene	119 *	-
	o-Xylene	115	-
	p-Xylene	*	-

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QUALITY CONTROL REPORT
DUPLICATE AND MATRIX SPIKE DATA

PREP BATCH: 36079 LSG SAMPLE NO: H0261530

* The compounds m-Xylene and p-Xylene co-elute. The reported result is the sum of the two.

BATCH: 36087 SAMPLE ID: Lab Control Sample LSG SAMPLE NO: H0261546

G107W BTEX Package		
Benzene	90	-
Ethylbenzene	90	-
Toluene	89	-
m-Xylene	98 *	-
o-Xylene	92	-
p-Xylene	*	-

* The compounds m-Xylene and p-Xylene co-elute. The reported result is the sum of the two.

BATCH: 36165 SAMPLE ID: Lab Control Sample LSG SAMPLE NO: H0261686

G107S BTEX Package		
Benzene	98	-
Ethylbenzene	102	-
Toluene	100	-
m-Xylene	103 *	-
o-Xylene	100	-
p-Xylene	*	-

* The compounds m-Xylene and p-Xylene co-elute. The reported result is the sum of the two.

BATCH: 36179 SAMPLE ID: Lab Control Sample LSG SAMPLE NO: H0261710

G107W BTEX Package		
Benzene	90	-
Ethylbenzene	90	-
Toluene	89	-
m-Xylene	98 *	-
o-Xylene	92	-
p-Xylene	*	-

* The compounds m-Xylene and p-Xylene co-elute. The reported result is the sum of the two.

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REPORT OF LABORATORY ANALYSIS

December 01, 1993
Report No.: 00028994

QUALITY CONTROL REPORT
METHOD BLANK DATA

	TEST CODE	Determination	RESULT	UNITS
BATCH: 35859	SAMPLE ID: Method Blank		LSG SAMPLE NO: H0261168	
	I685S	Petroleum Hydrocarbons	< 20	mg/kg
BATCH: 35929	SAMPLE ID: Method Blank		LSG SAMPLE NO: H0261290	
	G107S	BTEX Package		
		Benzene	< 10	ug/kg
		Ethylbenzene	< 10	ug/kg
		Toluene	< 10	ug/kg
		m-Xylene	< 10	ug/kg
		o-Xylene	< 10	ug/kg
		p-Xylene	< 10	ug/kg
BATCH: 35961	SAMPLE ID: Method Blank		LSG SAMPLE NO: H0261333	
	I685	Petroleum Hydrocarbons	< 0.2	mg/L
BATCH: 36006	SAMPLE ID: Method Blank		LSG SAMPLE NO: H0261412	
	G107S	BTEX Package		
		Benzene	< 10	ug/kg
		Ethylbenzene	< 10	ug/kg
		Toluene	< 10	ug/kg
		m-Xylene	< 10	ug/kg
		o-Xylene	< 10	ug/kg
		p-Xylene	< 10	ug/kg
BATCH: 36079	SAMPLE ID: Method Blank		LSG SAMPLE NO: H0261531	
	G107W	BTEX Package		
		Benzene	< 2	ug/L
		Ethylbenzene	< 2	ug/L
		Toluene	< 2	ug/L
		m-Xylene	< 2	ug/L
		o-Xylene	< 2	ug/L
		p-Xylene	< 2	ug/L
BATCH: 36087	SAMPLE ID: Method Blank		LSG SAMPLE NO: H0261547	
	G107W	BTEX Package		
		BTEX (Total)	< 6	ug/L

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QUALITY CONTROL REPORT
METHOD BLANK DATA

TEST CODE	Determination	RESULT	UNITS
	Benzene	< 1	ug/L
	Ethylbenzene	< 1	ug/L
	Toluene	< 1	ug/L
	m-Xylene	< 1	ug/L
	o-Xylene	< 1	ug/L
	p-Xylene	< 1	ug/L
BATCH: 36165	SAMPLE ID: Method Blank	LSG SAMPLE NO:	H0261687
G107S	BTEX Package		
	Benzene	< 10	ug/kg
	Ethylbenzene	< 10	ug/kg
	Toluene	< 10	ug/kg
	m-Xylene	< 10	ug/kg
	o-Xylene	< 10	ug/kg
	p-Xylene	< 10	ug/kg
BATCH: 36179	SAMPLE ID: Method Blank	LSG SAMPLE NO:	H0261711
G107W	BTEX Package		
	Benzene	< 2	ug/L
	Ethylbenzene	< 2	ug/L
	Toluene	< 2	ug/L
	m-Xylene	< 2	ug/L
	o-Xylene	< 2	ug/L
	p-Xylene	< 2	ug/L

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REPORT OF LABORATORY ANALYSIS

December 01, 1993
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Section F Page 1

QUALITY CONTROL REPORT
DUPLICATE AND MATRIX SPIKE DATA

PREP BATCH: 35859 LSG SAMPLE NO: H0259296

TEST	DETERMINATION	ORIGINAL RESULT	DUPLICATE RESULT	UNITS	RANGE / RPD	UNITS	MS RESULT	MS % RCVRY
I685S	Petroleum Hydrocarbons	50	40	mg/kg	10	mg/kg	320	82.2

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QUALITY CONTROL REPORT
MATRIX SPIKE AND MATRIX SPIKE DUPLICATE DATA

PREP BATCH: 35929 LSG SAMPLE NO: H0259294

TEST	DETERMINATION	MS RESULT	MSD RESULT	UNITS	RPD	MS PCT RECOVERY	MSD PCT RECOVERY
G107S	Benzene	0.0109	0.0104	mg/kg	4.69	54 *	52 *
G107S	Ethylbenzene	0.0137	0.0119	mg/kg	14.1	68	60 *
G107S	Toluene	0.0109	0.00956	mg/kg	13.1	54 *	48 *
G107S	m-Xylene	0.0111	0.00956	mg/kg	14.9	56 *	48 *
G107S	o-Xylene	0.0111	0.00932	mg/kg	17.4	56 *	47 *
G107S	p-Xylene	0.0109	0.00901	mg/kg	18.9	54 *	45 *

* Recovery of the spike indicates the presence of a matrix interference.
This should be considered in evaluating the data.

PREP BATCH: 35929 LSG SAMPLE NO: H0259299

TEST	DETERMINATION	MS RESULT	MSD RESULT	UNITS	RPD	MS PCT RECOVERY	MSD PCT RECOVERY
G107S	Benzene	17.3	16.4	ug/kg	5.34	86	82
G107S	Ethylbenzene	17.3	15.0	ug/kg	14.2	86	75
G107S	Toluene	17.3	15.7	ug/kg	9.70	86	78
G107S	m-Xylene	34.0 *	28.9 *	ug/kg	16.8	85	72
G107S	o-Xylene	17.0	14.8	ug/kg	17.3	85	64 **
G107S	p-Xylene	*	*	ug/kg	16.8	85	72

** Recovery of the spike indicates the presence of a matrix interference.
This should be considered in evaluating the data.
* The compounds m-Xylene and p-Xylene co-elute. The reported result is the sum of the two.

PREP BATCH: 36165 LSG SAMPLE NO: H0259300

TEST	DETERMINATION	MS RESULT	MSD RESULT	UNITS	RPD	MS PCT RECOVERY	MSD PCT RECOVERY
G107S	Benzene	18.0	19.0	ug/kg	5.40	90	95
G107S	Ethylbenzene	19.3	20.4	ug/kg	5.54	96	102
G107S	Toluene	18.6	19.5	ug/kg	4.72	93	98
G107S	m-Xylene	38.8 *	41.4 *	ug/kg	6.48	97	104
G107S	o-Xylene	18.7	20.3	ug/kg	8.20	94	102
G107S	p-Xylene	*	*	ug/kg	6.48	97	104

* The compounds m-Xylene and p-Xylene co-elute. The reported result is the

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QUALITY CONTROL REPORT
MATRIX SPIKE AND MATRIX SPIKE DUPLICATE DATA

PREP BATCH: 36165 LSG SAMPLE NO: H0259300

sum of the two.

ANLS BATCH: 35329 LSG SAMPLE NO: H0257077

TEST	DETERMINATION	MS RESULT	MSD RESULT	UNITS	RPD	MS PCT RECOVERY	MSD PCT RECOVERY
G107W	Benzene	19.9	19.4	ug/L	2.54	100	97
G107W	Ethylbenzene	18.2	18.0	ug/L	1.10	91	90
G107W	Toluene	18.1	17.6	ug/L	3.92	90	88
G107W	m-Xylene	36.2 *	35.2 *	ug/L	2.80	90	88
G107W	o-Xylene	19.8	18.1	ug/L	8.97	99	90
G107W	p-Xylene	*	*	ug/L	2.80	90	88

* The compounds m-Xylene and p-Xylene co-elute. The reported result is the sum of the two.
* The compounds m-Xylene and p-Xylene co-elute. The reported result is the sum of the two.

ANLS BATCH: 35804 LSG SAMPLE NO: H0257795

TEST	DETERMINATION	MS RESULT	MSD RESULT	UNITS	RPD	MS PCT RECOVERY	MSD PCT RECOVERY
G107W	Benzene	21.2	20.0	ug/L	5.82	106	100
G107W	Ethylbenzene	23.3	22.0	ug/L	5.74	116	110
G107W	Toluene	22.6	21.5	ug/L	4.99	113	108
G107W	m-Xylene	46.8 *	44.8 *	ug/L	4.37	117	112
G107W	o-Xylene	23.3	22.2	ug/L	4.84	116	111
G107W	p-Xylene	*	*	ug/L	4.37	117	112

* The compounds m-Xylene and p-Xylene co-elute. The reported result is the sum of the two.

ANLS BATCH: 36080 LSG SAMPLE NO: H0259007

TEST	DETERMINATION	MS RESULT	MSD RESULT	UNITS	RPD	MS PCT RECOVERY	MSD PCT RECOVERY
G107W	Benzene	17.8	18.2	ug/L	2.22	89	91
G107W	Ethylbenzene	17.2	17.9	ug/L	3.99	86	90

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REPORT OF LABORATORY ANALYSIS

QUALITY CONTROL REPORT
MATRIX SPIKE AND MATRIX SPIKE DUPLICATE DATA

ANLS BATCH: 36080 LSG SAMPLE NO: H0259007

TEST	DETERMINATION	MS RESULT	MSD RESULT	UNITS	RPD	MS PCT RECOVERY	MSD PCT RECOVERY
G107W	Toluene	17.4	17.9	ug/L	2.83	87	90
G107W	m-Xylene	36.4 *	37.3 *	ug/L	2.44	91	93
G107W	o-Xylene	17.4	18.1	ug/L	3.94	87	90
G107W	p-Xylene	*	*	ug/L	2.44	91	93

* The compounds m-Xylene and p-Xylene co-elute. The reported result is the sum of the two.

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VOLUME I

FINAL REPORT

SITE INVESTIGATION

TRANSWESTERN PIPELINE COMPANY

COMPRESSOR STATION WT-1

CARLSBAD, NEW MEXICO

PROJECT NO. 1548/7P54

FEBRUARY 1993

BROWN & ROOT ENVIRONMENTAL

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NOTICE

Effective January 1, 1993, the environmental unit of HALLIBURTON NUS Environmental Corporation became a part of the Brown & Root group and began doing business as Brown & Root Environmental.

Brown & Root Environmental will operate as a division of Halliburton NUS Corporation. Our proper legal name is now "Brown & Root Environmental, a division of Halliburton NUS Corporation." (As a part of this change, the word "Environmental" has been dropped from the corporate name.)

Since there is no change in the corporate entity, all general services agreements and basic ordering agreements, etc., are still valid and no novation or assignment of those contracts is required.

1.0 INTRODUCTION

The purpose of this report is to present the findings of the Site Investigation (SI) conducted by HALLIBURTON NUS Environmental Corporation (HALLIBURTON NUS) at Transwestern Pipeline Company (Transwestern) Compressor Station WT-1 located approximately 32 miles east of Carlsbad, New Mexico on Highway 62-180 in Lea County. Figure 1-1 is a site location map.

Field activities conducted during the investigation included characterization of site specific geologic and hydrologic conditions and the collection of environmental samples for laboratory analysis. Specific elements included the installation of three monitor wells, 28 soil borings and the collection of 70 soil and 15 groundwater samples. Sergent, Hauskins & Beckwith (SH&B) of Albuquerque, New Mexico, and Layne Environmental Services (Layne) of San Antonio, Texas, provided drilling services. Pettigrew & Associates of Hobbs, New Mexico, was the surveying subcontractor. Laboratory analysis was performed by Assaigai Laboratories of Albuquerque, New Mexico, and HALLIBURTON NUS Laboratory of Houston, Texas.

1.1 OBJECTIVE

The objective of the SI was to:

- Delineate the horizontal and vertical extent of soil and groundwater impact, if any, at selected locations at the compressor station.

The approach to meeting the SI objective was to drill soil borings, install monitor wells, collect soil and groundwater samples for laboratory analysis, evaluate the data collected, and submit a report detailing the results.

FIGURE 1-1

SCALE: 1" = 2000'
REFERENCE: USGS MAP
WILLIAMS SINK QUADRANGLE

DRAWN BY:	D.G.
DATE:	1/29/93
ENGINEER:	L. BASILIO
DATE:	1/29/93
CAD DWG. NO:	CARLS1.DWG

SITE LOCATION MAP
COMPRESSOR STATION WT-1
TRANSWESTERN PIPELINE COMPANY
CARLSBAD, NEW MEXICO

SCALE: 1" = 2000' | DWG. NO. 1548-2A01 | REV. 0

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1.2 BACKGROUND

Three areas at Compressor Station WT-1 were previously identified for evaluation. The areas are: 1) the Burn Collection Area, 2) the Filter Collection Area, and 3) the Trash Collection Area. All three collection areas were put out of service in the second quarter of 1989 and backfilled. An investigation performed by Metric Corporation (report dated December 1991) indicated hydrocarbon impact at the Burn Collection Area and Filter Collection Area.

2.0 FIELD ACTIVITIES

The following sections describe the field activities that were performed as part of the site investigation. Prior to mobilization, a site specific Health and Safety Plan (HASP) was developed. The HASP is contained in Appendix A. HALLIBURTON NUS conducted site investigation activities at Compressor Station WT-1, located near Carlsbad, New Mexico, between August 3, 1992 and October 23, 1992. All field activities were conducted under OSHA Level D personal protection protocols. Figure 2-1 depicts boring locations and general site layout.

2.1 DRILLING

Drilling activities conducted by SH&B utilized a CME-55 drilling rig. Borings were advanced using a NQ size (2.98-inch outside diameter) core barrel sampling system utilizing air as the drilling fluid. Drilling activities conducted by Layne utilized a Mobile B-61 drilling rig. Borings were advanced using a NWD4 size (2.98-inch outside diameter) core barrel sampling system. Core samples were continuously collected from each boring to determine lithology beneath the site and for laboratory analysis, where appropriate. The length of the core barrel was 10-feet long. Most of the samples collected, however, were 5-feet in length in order to have better control over defining lithologic and impacted horizons. All cores recovered were described in the field by a HALLIBURTON NUS geologist and were scanned using a photoionization detector (PID) and/or a flame ionization detector (FID). Upon completion, borings were grouted from total depth to ground surface with a cement/bentonite slurry. Three borings were drilled in the vicinity of the Trash Collection Area, seven borings were drilled in the vicinity of the Filter Collection Area, six borings were drilled in the vicinity of the Burn Collection Area and 12 borings were drilled off-site to the north of the collection areas. Boring logs are included in Appendix B.

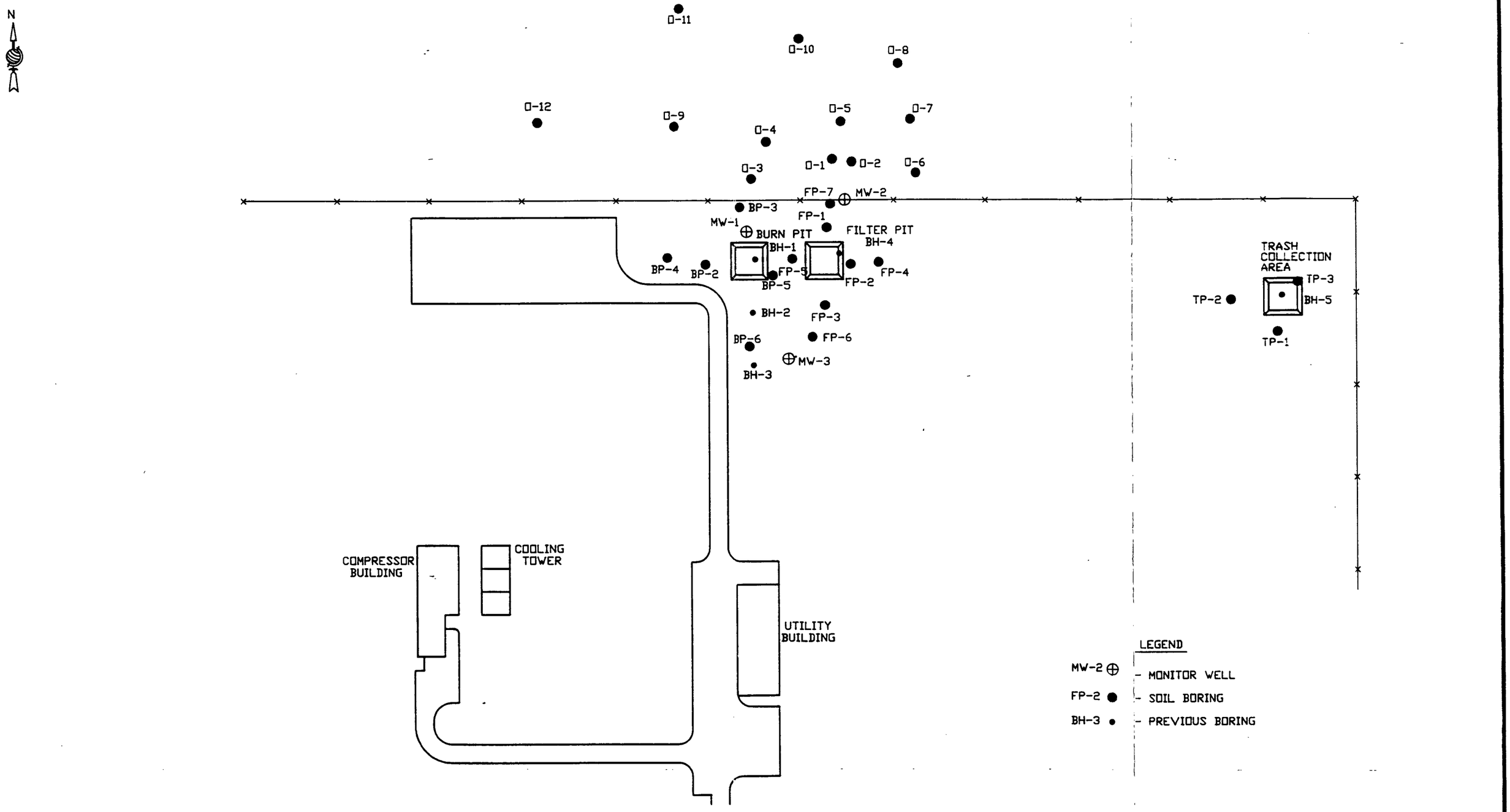


FIGURE 2-1

DRAWN BY:	D.G
DATE:	11/20/92
GEOLOGIST:	L. BASILIO
DATE:	11/21/92
CAD DWG. NO:	15522A.DWG

BORING LOCATIONS
COMPRESSOR STATION WT-1
TRANSWESTERN PIPELINE COMPANY
CARLSBAD, NEW MEXICO

SCALE: 1"=100'-0" | DWG. NO. 1552-2801 | REV. 0

HALLIBURTON NUS
Environmental Corporation

At each collection area, three to five soil borings were initially drilled at locations to the exterior of the collection area. Borings situated outside the collection area were located as far as approximately 35 feet from the perimeter of the collection area. At locations where samples collected from the exterior borings displayed evidence of hydrocarbon impact based on PID/FID field screening and visual examination of recovered cores, step out borings were drilled at locations further removed from the collection area. The step out process continued until groundwater samples recovered from the step out borings displayed no PID/FID evidence of hydrocarbon impact.

2.2 SUBSURFACE SOIL SAMPLING

Subsurface soil samples were collected by using a NQ or NWD4 size core barrel sampling system. The diameter of the NQ and NWD4 core samples retrieved was 1.875 and 2.060 inches, respectively. The length of the core run was between 1 and 10 feet in length. In general however, the length was kept to 5 feet in order to have better control over defining lithologic and impacted horizons. A 6 5/8-inch hollow-stem auger was inserted into the ground to a depth of approximately 4 to 5 feet below land surface (BLS) to serve as a guide shoe for the core barrel. When a sample was brought to the surface it was described, placed in a zip-lock bag, scanned with a PID/FID, and kept on ice until total depth of the boring was reached. Criteria for selection of samples for laboratory analysis were: 1) any sample which exhibited a PID/FID reading greater than 5 ppm; 2) the sample from the bottom of the hole. When the appropriate samples were selected for laboratory analysis, they were placed in laboratory-supplied containers, sealed, labeled, and placed in zip-lock bags in a cooler filled with ice. Soil sample log sheets are presented in Appendix C.

2.3 MONITOR WELL INSTALLATION

A total of three monitor wells were installed to collect groundwater samples and to determine the direction of groundwater flow at the site. As-built well diagrams for each

well are presented in Appendix B. Locations of the wells are shown on Figure 2-1. Well specifications are summarized in Table 2-1.

The monitor wells were screened in the shallowest zone of saturated materials encountered. The boreholes for all monitor wells installed at the site were advanced using a NQ size core barrel sampling system utilizing air as the drilling fluid. Core samples were continuously collected as previously described.

Upon reaching total depth in the borehole, the monitor well installation began by placing the casing and well screen through the hollow-stem auger. The monitor wells consisted of two-inch outside diameter flush-threaded Schedule 40 PVC casing, horizontally machine-slotted screen sections, and a flush-threaded cap at the bottom of each well. The slot size for all screens was 0.020 inches. A 10-foot screen length was used in all wells. PVC casing was added to each well so that the well extended approximately 2 to 3 feet above grade.

Well completion involved installation of a filter pack, consisting of 10-20 Colorado silica packsand, a minimum of two feet above the top of the screen. A seal, consisting of a minimum thickness of two feet of fine bentonite flakes, was added above the filter pack. A thick grout consisting of Type I/II Portland cement and bentonite was placed in the hole from the bentonite seal to the surface. A steel protective casing was then placed over the PVC well and embedded in the wet grout. Well installation was completed by the placing of a 2-foot by 2-foot concrete pad around the well.

The wells were developed by bailing with a nominal 2-inch disposable bailer until the well was relatively clear of sediment or the well was bailed dry.

2.4 GROUNDWATER SAMPLING

Groundwater samples were collected from all three wells installed. Immediately after each well was uncapped, a PID was used to measure the headspace and the results were noted

TABLE 2-1

WELL SPECIFICATIONS
COMPRESSOR STATION WT-1
CARLSBAD, NEW MEXICO

Station	North Coordinate (1)	East Coordinate (1)	Natural Ground Elevation (2)	Top of Casing Elevation (2)	Total Depth of Well (feet below grade)	Screened Interval (feet below grade)	Filter Pack Interval (feet below grade)
MW-1	9960.10	9337.66	3592.5	3594.67	53.5	43.5 - 53.5	41 - 53.5
MW-2	9993.11	9447.15	3591.1	3593.32	50	40 - 50	38 - 50
MW-3	9821.95	9379.61	3593.7	3596.04	48.5	38.5 - 48.5	35.5 - 48.5

(1) Coordinates based on northeast corner of property being N 10000 E 10000.
(2) Elevations based on benchmark, northeast footing of maintenance building, El. 3598.50.
(3) All measurements in feet.

on the sample log sheet. The initial water level (below the top of casing) was measured in each well to the nearest 0.01 foot using an electronic water level indicator. The total depth of the well (below the top of casing) was also measured and recorded. After measuring the water level the cable and probe were thoroughly rinsed with distilled water before moving on to the next well. The height of the water column in each well was calculated using the measurements obtained. The water column height was multiplied by 0.16 gallons/foot to determine the quantity of water in one well volume for each of the 2-inch diameter wells.

After measuring the water, a semi-opaque disposable bailer was used to determine whether floating free product was present in the well. The bailer was slowly lowered into the well until partial submergence of the bailer occurred. The bailer was then removed and the water observed for signs of floating free product.

The wells were purged of three to five well volumes or until "dry," whichever came first. Purging was accomplished using a disposable bailer and dedicated bailer rope. Purge volumes were measured by pouring the purge water into a pail of known volume and keeping track of the number of pails filled. Each pail of purge water was poured into a 55-gallon drum adjacent to the well. Conductivity, pH, temperature, color, turbidity and visual observations of the water were recorded after each well volume was removed. The groundwater sample sheets are located in Appendix C.

After purging and allowing the wells to recover, each well was sampled using a disposable bailer. Sample containers were filled to nearly full, with the exception of the sample containers designated for volatile organics analysis. Bottles containing samples designated for volatile organic analysis were collected prior to collection of other samples and were filled so that no head space remained in the sample bottle.

In addition to the groundwater samples collected from monitor wells, groundwater samples were collected from borings that intersected the water table. Initially a 1-inch diameter PVC well casing was inserted into the borehole and a groundwater sample collected through

it. Field experience then showed that the lithified nature of the sediments would keep the borehole open. Thereafter, groundwater samples were collected directly from the borehole using a 1-inch PVC bailer or a 2-inch disposable bailer. No purging was performed in association with these borehole samples.

2.5 SAMPLE HANDLING PROCEDURES

After placement in appropriate sample bottles, samples were sealed and the containers labeled to uniquely identify the samples. The sample containers were then sealed in zip-lock bags and placed in coolers containing ice. Chain-of-custody forms were filled out for each cooler and the coolers prepared for shipment to the laboratory by common carrier. Sample coolers at the WT-1 site were delivered to Transwestern personnel who took responsibility for shipping the coolers to the laboratory.

2.6 WASTE MANAGEMENT

Drill cuttings generated during the installation of monitor wells and soil borings were containerized and stored at the respective locations pending the results of laboratory analysis of soil and groundwater samples. The containers were appropriately marked to indicate the source of the material. At boring locations where no significant soil impact relative to regulatory standards was detected as a result of laboratory analysis, cuttings will be spread on the ground surface and raked level. Development water, purge water, and decontamination fluids were properly disposed based upon the analytical results of the representative soil and/or groundwater samples.

2.7 DECONTAMINATION PROCEDURES

The following decontamination procedures were performed to minimize the potential for cross contamination:

- The drilling tools, augers, and core barrels were steam cleaned with hot water from a pressure sprayer after completion of each boring. In the event free product was encountered, a small amount of Alconox, a laboratory grade detergent, was added to the reservoir of the pressure sprayer.

- The inner core barrels were steam cleaned after each use. In the event free product was encountered, a small amount of Alconox, a laboratory grade detergent, was added to the reservoir of the pressure sprayer.

- Sampling equipment (e.g., PVC bailers) was cleaned with distilled water and isopropyl alcohol.

- Disposable bailers, bailer rope, gloves and other disposable material were discarded after a sample was collected.

2.8 SURVEYING

Land surveying was provided by Pettigrew and Associates, Hobbs, New Mexico, in order to establish horizontal and vertical positions of borings and monitor wells. Horizontal position (north and east) is site relative and is tied to the northeast corner of the property at the fenceline. Vertical position is tied to mean sea level. Ground elevation is determined to an accuracy of 0.1 foot and top of casing elevation is determined to an accuracy of 0.01 foot.

Survey information for borings drilled during the SI is presented in Appendix D.

3.0 GEOLOGY

The following sections present findings based on the field investigation portion of the site investigation.

3.1 REGIONAL GEOLOGY

The WT-1 compressor station is located within the Pecos Valley section of the Southern Great Plains physiographic province. The area surrounding the site is a slightly hummocky plain covered with caliche and sand.

The site is located in the northern portion of the Delaware Basin, which is the most prominent regional geologic structure in the area. Geologic units in the area range from early Paleozoic to Recent.

The Delaware Basin also lies within the groundwater boundaries of the Unglaiciated Central Region which includes some of the least productive aquifers in the nation. Water bearing strata in the area include the Santa Rosa Sandstone and Rustler Formation. Depths to these strata average 300 feet below land surface. Groundwater is also found in small, isolated, near-surface perched bodies (Sandia Laboratories, 1978).

3.2 SITE GEOLOGY

The geological setting of the site for this report was determined through the drilling of 28 soil borings during this investigation.

The boring log data indicate that the subsurface consists of two distinct formations, the Mescalero Caliche and the underlying Gatuna Formation.

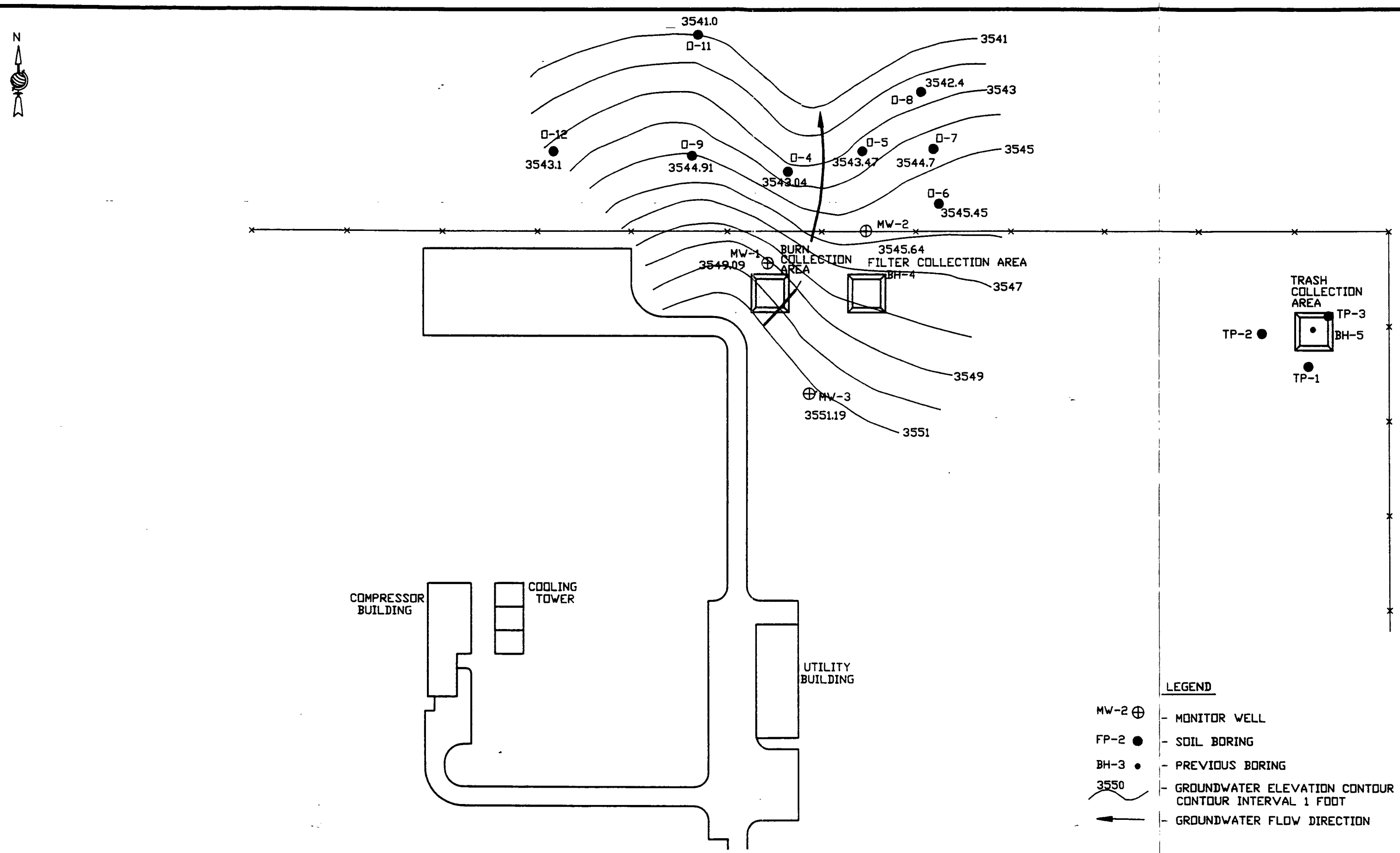
The first sequence of sediments encountered is the Mescalero Caliche. This sequence consists of white to reddish-white to tan calcium carbonate which cements a fine silty sand. The caliche is hard to very hard. The sands range from hard and well indurated to very friable. The interval is generally dry with some occasional damp areas, and the cores recovered were generally broken. Thickness of this sequence ranges generally from 10 to 20 feet. The Mescalero Caliche grades downward into the underlying Gatuna Formation.

The Gatuna Formation is a reddish-brown fine-grained, cemented sandstone. Localized thin layers of siltstone, shale, and claystone are found. The degree of cementation varies from strong to poor. The cementing agents are aluminum and ferric oxides which give the sandstone its color. The sandstone is slightly to very micaceous. The top of the formation is encountered approximately 10 to 20 feet below grade. It is in this formation that groundwater was first encountered during the SI conducted by HALLIBURTON NUS. Porosity and permeability estimates are difficult to determine without running geotechnical tests. Field observations indicate that porosity/permeability of the cemented sandstone is variable. Zones above the water table exhibit alternating dry and moist areas, indicating preferred pathways for fluid migration. Fractures at varying angles were found to contain fluids and it is believed that migration along the fractures is a primary method of fluid migration through the lithified sediments.

3.3 SITE HYDROGEOLOGY

Groundwater at the site is encountered approximately 45 feet below land surface. A groundwater contour map is presented in Figure 3-1. The direction of groundwater flow is to the northeast across the collection areas and more towards the north farther down gradient. The groundwater gradient across the site is approximately 0.025 ft/ft. The flow direction is coincident with the surface topography, which also dips to the northeast.

It should be noted that the data used in generation of the groundwater elevation map depicted in Figure 3-1 were collected over a four-day period. Water level data from



NOTE: GROUNDWATER ELEVATION DATA COLLECTED 10/19/92-10/23/92.

FIGURE 3-1

DRAWN BY:	D.G
DATE:	11/20/92
GEOLOGIST:	L. BASILIO
DATE:	11/21/92
CAD DWG. NO:	15522B.DWG

GROUNDWATER ELEVATION MAP
COMPRESSOR STATION WT-1
CARLSBAD, NEW MEXICO

SCALE: 1"=100'-0" | DWG. NO. 1552-2B01 | REV. 0

HALLIBURTON NUS
Environmental Corporation

Monitor Wells MW-1 through MW-3 were collected October 23, 1992, but water level data from the soil borings were collected as the soil borings were drilled during the period from October 19, 1992 through October 23, 1992. Upon completion of the soil borings, they were left open and undisturbed over night, and water level data were collected the following morning. The groundwater elevation and flow direction map generated using this data is considered to be technically valid as a result of the following considerations:

- There was no rainfall during the period between October 19, 1992 through October 23, 1992

- Groundwater at the site was encountered at a depth of approximately 40 feet below grade, indicating the likelihood of equilibrium on a day-to-day basis throughout the period of investigationn.

- The indicated flow direction is in general conformance with the surface topography.

4.0 ANALYTICAL RESULTS

This section summarizes the results of laboratory analysis of samples collected during the HALLIBURTON NUS SI. Samples collected were analyzed by Assaigai Laboratory of Albuquerque, New Mexico and HALLIBURTON NUS Laboratory of Houston, Texas. Laboratory reports are located in Appendix E. Chain-of-Custody sheets are located in Appendix F. Figure 2-1 shows the sampling locations. Soil samples were analyzed for a combination of the following parameters:

- Total Petroleum Hydrocarbons (TPH)
- Benzene, Toluene, Ethylbenzene, and Xylene (BTEX)
- TCLP-O
- TCLP-M
- TCLP-F

The specific analytical parameters pertaining to TCLP-O, TCLP-M, and TCLP-F are listed in Table 4-1.

Soil and groundwater samples collected from Soil Borings O-4 to O-12 were analyzed for BTEX and TPH only. At this point in the investigation, the extent of impacted soil had been delineated; therefore, a reduced analytical program would determine the extent of the dissolved phase in the groundwater.

4.1 SOIL

4.1.1 Trash Collection Area

Soil samples collected from the Trash Collection Area were analyzed for TPH, BTEX, TCLP-F, TCLP-O, and TCLP-M constituents. Table 4-1 presents the analytical results for samples collected from the Trash Collection area.

TPH concentrations were detected in all six samples submitted for laboratory analysis. Concentrations ranged from 11 mg/kg to 55 mg/kg.

BTEX, TCLP-F, and TCLP-O constituents were not detected in samples submitted for laboratory analysis from the Trash Collection Area.

A varied distribution of arsenic, barium, cadmium, chromium, mercury, selenium, and silver concentrations were detected in the samples submitted for laboratory analysis. All concentrations, however, are well below TCLP regulatory levels.

4.1.2 Filter Collection Area

Soil samples collected from the Filter Collection Area were analyzed for TPH, BTEX, and TCLP-M constituents. Table 4-2 presents the analytical results for samples collected from the Filter Collection Area.

TPH concentrations were detected in all but two samples submitted for laboratory analysis. Detected concentrations ranged from 21 mg/kg to 25,760 mg/kg. Samples collected from Borings FP-2, -3, -5, -6, and -7 exhibited concentrations in excess of 100 mg/kg. Within Boring FP-2, the duplicate samples collected from the 23.5- to 28.5-foot depth interval displayed TPH concentrations of 3,600 and 6,600 mg/kg. Additionally, the 28.5- to 33.5-foot sample collected from Boring FP-2 displayed a TPH concentration of 3,050 mg/kg, and the

TABLE 4-1
ANALYTICAL RESULTS - TRASH COLLECTION AREA SOIL SAMPLES
COMPRESSOR STATION WT-1
CARLSBAD, NEW MEXICO

Parameter	T-1A	T-1B	T-2A	T-2B	T-3A	T-3B
Depths (ft)	6.5 - 8.5	23.5 - 30.0	13.5 - 18.5	23.5 - 30.0	13.5 - 18.5	23.5 - 30.0
TCLP-F (mg/l)						
Alcohols						
Acetone	ND	ND	ND	ND	ND	ND
Ethyl Acetate	ND	ND	ND	ND	ND	ND
Isobutanol	ND	ND	ND	ND	ND	ND
n-Butyl Alcohol	ND	ND	ND	ND	ND	ND
Methanol	ND	ND	ND	ND	ND	ND
Volatiles						
Methylene Chloride	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND
Trichloro-Trifluoroethane	ND	ND	ND	ND	ND	ND
Ortho-Dichlorobenzene	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND
Xylene	ND	ND	ND	ND	ND	ND
Ethyl Benzene	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND
Ethyl Ester	ND	ND	ND	ND	ND	ND
Methyl Isobutyl Ketone	ND	ND	ND	ND	ND	ND
Cyclohexanone	ND	ND	ND	ND	ND	ND

ND Not Detected

TABLE 4-1 (Continued)
ANALYTICAL RESULTS - TRASH COLLECTION AREA SOIL SAMPLES
COMPRESSOR STATION WT-1
CARLSBAD, NEW MEXICO

Parameter	T-1A	T-1B	T-2A	T-2B	T-3A	T-3B
Depths (ft)	6.5 - 8.5	23.5 - 30.0	13.5 - 18.5	23.5 - 30.0	13.5 - 18.5	23.5 - 30.0
TCLP-O (mg/l)						
Semivolatiles						
Pyridine	ND	ND	ND	ND	ND	ND
O-Cresol/2-Methylphenol	ND	ND	ND	ND	ND	ND
M/P-Cresol/3,4-Methylphenol	ND	ND	ND	ND	ND	ND
2,4,5-Trichlorophenol	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ND	ND	ND	ND	ND	ND
Hexachloroethane	ND	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	ND
Pentachlorophenol	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND
Volatiles						
Benzene	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ND	ND	ND	ND	ND	ND

ND Not Detected

TABLE 4-1 (Continued)
ANALYTICAL RESULTS - TRASH COLLECTION AREA SOIL SAMPLES
COMPRESSOR STATION WT-1
CARLSBAD, NEW MEXICO

Parameter	T-1A	T-1B	T-2A	T-2B	T-3A	T-3B
Depths (ft)	6.5 - 8.5	23.5 - 30.0	13.5 - 18.5	23.5 - 30.0	13.5 - 18.5	23.5 - 30.0
Tetrachloroethylene	ND	ND	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND
Methyl Ethyl Ketone	ND	ND	ND	ND	ND	ND
TCLP-M (mg/l)						
Arsenic	0.011	0.006	0.015	ND	0.043	0.051
Barium	ND	ND	ND	ND	ND	2.3
Cadmium	ND	ND	0.006	ND	ND	ND
Chromium	0.06	ND	0.05	0.03	0.06	0.05
Lead	ND	ND	ND	ND	ND	ND
Mercury	0.0006	0.0003	0.0003	0.0002	0.0007	0.0003
Selenium	ND	ND	ND	0.006	ND	ND
Silver	ND	ND	0.04	ND	ND	ND
TPH (mg/kg)	55	29	30	11	21	25

ND Not Detected

TABLE 4-1 (Continued)
ANALYTICAL RESULTS - TRASH COLLECTION AREA SOIL SAMPLES
COMPRESSOR STATION WT-1
CARLSBAD, NEW MEXICO

Parameter	T-1A	T-1B	T-2A	T-2B	T-3A	T-3B
Depths (ft)	6.5 - 8.5	23.5 - 30.0	13.5 - 18.5	23.5 - 30.0	13.5 - 18.5	23.5 - 30.0
BTEX (mg/kg)						
Benzene	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND
P&M-Xylene	ND	ND	ND	ND	ND	ND
O-Xylene	ND	ND	ND	ND	ND	ND
Total BTEX	0	0	0	0	0	0

ND Not Detected

TABLE 4-2
ANALYTICAL RESULTS - FILTER COLLECTION AREA SOIL SAMPLES
COMPRESSOR STATION WT-1
CARLSBAD, NEW MEXICO

Parameter	FP-1A 23.5-28.5	FP-1B 33.5-36.5	FP-1C 41.5-43.5	FP-2A 23.5-28.5	FP-2A-D Duplicate	FP-2B 28.5-33.5	FP-2C 33.5-38.5	FP-2D 38.5-43.5
TCLP-M (mg/l)								
Arsenic	0.005	ND	ND	0.007	0.015	ND	ND	ND
Barium	2	2.1	4.7	1.1	ND	1.2	5.2	4.1
Cadmium	ND	0.007	0.011	0.007	0.003	0.005	ND	0.003
Chromium	0.04	ND	ND	0.03	0.04	0.04	0.04	0.03
Lead	ND	ND	ND	ND	ND	ND	ND	ND
Mercury	ND	ND	ND	ND	0.0004	ND	0.0007	ND
Selenium	ND	ND	ND	ND	ND	ND	ND	ND
Silver	0.02	ND	ND	ND	ND	ND	ND	ND
TPH (mg/kg)	22	21	32	3600	6600	3050	8500	ND
BTEX (mg/kg)								
Benzene	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	0.111	1.18	0.427	3.52	ND
Ethylbenzene	ND	ND	ND	0.175	2.14	0.325	1.72	ND
P&M-Xylene	ND	ND	ND	0.549	9.12	0.781	6.67	ND
O-Xylene	ND	ND	ND	0.389	5.28	0.657	4.18	ND
Total BTEX	0	0	0	1.224	17.72	2.19	16.09	0

ND Not Detected
NA Not Analyzed

TABLE 4-2 (Continued)
ANALYTICAL RESULTS - FILTER COLLECTION AREA SOIL SAMPLES
COMPRESSOR STATION WT-1
CARLSBAD, NEW MEXICO

Parameter	FP-3A 28.5-33.5	FP-3B 39-43.5	FP-3C 45.5-48	FP-4A 28.5-33.5	FP-4B 33.5-40	FP-5A 13.5-18.5	FP-5B 18.5-23.5
TCLP-M (mg/l)							
Arsenic	0.005	ND	ND	ND	ND	ND	ND
Barium	1.9	1.4	ND	1.9	2.1	1.6	3.2
Cadmium	0.006	0.006	0.008	0.006	0.008	0.007	0.009
Chromium	0.06	ND	ND	ND	ND	ND	ND
Lead	ND	ND	ND	ND	ND	ND	ND
Mercury	0.0011	0.0002	ND	ND	0.0002	ND	0.0003
Selenium	ND	ND	ND	ND	ND	ND	ND
Silver	ND	ND	ND	ND	ND	ND	ND
TPH (mg/kg)	800	7500	38	25	64	340	1190
BTEX (mg/kg)							
Benzene	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	1.76	ND	ND	ND	ND	ND
Ethylbenzene	ND	1.39	ND	ND	ND	ND	ND
P&M-Xylene	ND	6.42	ND	ND	ND	ND	ND
O-Xylene	ND	4.22	ND	ND	ND	ND	ND
Total BTEX	0	13.79	0	0	0	0	0

ND Not Detected
NA Not Analyzed

TABLE 4-2 (Continued)
ANALYTICAL RESULTS - FILTER COLLECTION AREA SOIL SAMPLES
COMPRESSOR STATION WT-1
CARLSBAD, NEW MEXICO

Parameter	FP-5C 23.5-28.5	FP-6A 18.5-23.5	FP-6B 38-40	FP-7A 8.5-13.5	FP-7B 38.5-43	FP-7C 43.5-47	FP-7D 47-48	FP-7E 48-50
TCLP-M (mg/l)								
Arsenic	ND	ND	ND	0.005	ND	ND	ND	ND
Barium	0.8	1.9	4.4	0.9	1.7	3.9	ND	ND
Cadmium	0.006	0.008	0.009	0.01	0.01	0.008	0.01	0.016
Chromium	ND	ND	ND	0.02	0.02	ND	ND	ND
Lead	ND	ND	ND	0.11	0.11	0.1	ND	ND
Mercury	0.0002	ND	ND	ND	ND	0.0002	ND	ND
Selenium	ND	ND	0.005	ND	ND	ND	ND	ND
Silver	ND	ND	ND	ND	ND	ND	ND	ND
TPH (mg/kg)	25760	42	156	30	ND	21030	10620	71
BTEX (mg/kg)								
Benzene	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	0.22	ND	ND	ND	ND	0.57	0.2	ND
Ethylbenzene	ND	ND	ND	ND	ND	0.34	0.14	ND
P&M-Xylene	0.28	ND	ND	ND	ND	4.62	1.89	ND
O-Xylene	0.21	ND	ND	ND	ND	0.95	0.43	ND
Total BTEX	0.71	0	0	0	0	6.48	2.66	0

ND Not Detected
NA Not Analyzed

33.5- to 38.5-foot sample from this boring displayed a TPH concentration of 8,500 mg/kg. In Boring FP-3, samples collected from the 28.5- to 33.5-foot and 39- to 43.5-foot depth intervals displayed TPH concentrations of 800 and 7,500 mg/kg, respectively. Within Boring FP-5, TPH concentrations of 340 mg/kg in the 13.5- to 18.5-foot interval, 1,190 mg/kg in the 18.5- to 23.5-foot interval, and 25,760 mg/kg in the 23.5- to 28.5-foot depth interval were recorded. The sample collected from 38 to 40 feet below grade in Boring SB-6 contained TPH at a concentration of 156 mg/kg. Samples collected from the 43.5- to 47-foot interval and the 47- to 48-foot interval of Boring FP-7 displayed TPH concentrations of 21,030 and 10,620 mg/kg, respectively.

Total BTEX concentrations ranged from non-detect in samples from Borings FP-1, -4, and -6 to a maximum of 17.72 mg/kg in Boring FP-2 (23.5 - 28.5 foot interval). Benzene was not detected in any of these samples.

A varied distribution of arsenic, barium, cadmium, chromium, mercury, and silver concentrations were detected in the samples submitted for laboratory analysis. All metals concentrations, however, are well below TCLP regulatory levels.

4.1.3 Burn Collection Area

Soil samples collected from the Burn Collection Area were analyzed for BTEX and TCLP-O constituents. Table 4-3 presents the analytical results for samples collected from the Burn Collection Area.

BTEX concentrations ranged from non-detect in several samples to a maximum of concentration of 14.08 mg/kg in Sample BP-1E. Benzene was not detected in any of these samples.

TABLE 4-3
ANALYTICAL RESULTS - BURN COLLECTION AREA SOIL SAMPLES
COMPRESSOR STATION WT-1
CARLSBAD, NEW MEXICO

Parameter	BP-1A 23.5-28.5	BP-1B 28.5-31.5	BP-1C 18.5-23.5	BP-1D 38.5-43.5	BP-1E 48.5-53.5	BP-2A 23.5-28.5
TCLP-O (mg/l)						
Semivolatiles						
Pyridine	NA	NA	NA	ND	ND	NA
O-Cresol/2-Methylphenol	NA	NA	NA	ND	ND	NA
M/P-Cresol/3,4-Methylphenol	NA	NA	NA	0.002	ND	NA
2,4,5-Trichlorophenol	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	0.039	0.018	0.006	ND	ND	ND
Hexachlorobutadiene	0.013	0.005	0.003	ND	ND	ND
Hexachloroethane	NA	NA	NA	ND	ND	NA
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	ND
Pentachlorophenol	NA	NA	NA	ND	ND	NA
1,4-Dichlorobenzene	NA	NA	NA	ND	ND	NA
Volatiles						
Benzene	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND

ND Not Detected
NA Not Analyzed

TABLE 4-3 (Continued)
ANALYTICAL RESULTS - BURN COLLECTION AREA SOIL SAMPLES
COMPRESSOR STATION WT-1
CARLSBAD, NEW MEXICO

Parameter	BP-1A 23.5-28.5	BP-1B 28.5-31.5	BP-1C 18.5-23.5	BP-1D 38.5-43.5	BP-1E 48.5-53.5	BP-2A 23.5-28.5
1,1-Dichloroethylene	ND	ND	ND	ND	ND	0.002
Tetrachloroethylene	NA	NA	NA	0.008	0.008	NA
Trichloroethylene	0.026	0.016	0.001	ND	ND	0.145
Vinyl Chloride	NA	NA	NA	ND	ND	NA
1,4-Dichlorobenzene	NA	NA	NA	ND	ND	NA
Methyl Ethyl Ketone	ND	ND	ND	ND	ND	ND
BTEX (mg/kg)						
Benzene	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	1.76	0.21
Ethylbenzene	ND	0.13	ND	ND	0.44	0.27
P&M-Xylene	0.53	0.4	ND	ND	8.8	0.82
O-Xylene	0.44	0.49	ND	ND	3.08	0.78
Total BTEX	0.97	1.02	0	0	14.08	2.08

ND Not Detected
NA Not Analyzed

TABLE 4-3 (Continued)
ANALYTICAL RESULTS - BURN COLLECTION AREA SOIL SAMPLES
COMPRESSOR STATION WT-1
CARLSBAD, NEW MEXICO

Parameter	BP-2B 28.5-33.5	BP-2C 33.5-38.5	BP-2D 38.5-43.5	BP-2E 43.5-48.5	BP-3A 28.5-31	BP-3B 32.5-39
TCLP-O (mg/l)						
Semivolatiles						
Pyridine	NA	NA	NA	NA	NA	NA
O-Cresol/2-Methylphenol	NA	NA	NA	NA	NA	NA
M/P-Cresol/3,4-Methylphenol	NA	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	0.004	ND	0.004	0.01	ND	ND
Hexachlorobutadiene	ND	ND	ND	0.004	ND	ND
Hexachloroethane	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	ND
Pentachlorophenol	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA
Volatiles						
Benzene	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND

ND Not Detected
NA Not Analyzed

TABLE 4-3 (Continued)
ANALYTICAL RESULTS - BURN COLLECTION AREA SOIL SAMPLES
COMPRESSOR STATION WT-1
CARLSBAD, NEW MEXICO

Parameter	BP-2B 28.5-33.5	BP-2C 33.5-38.5	BP-2D 38.5-43.5	BP-2E 43.5-48.5	BP-3A 28.5-31	BP-3B 32.5-39
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	NA	NA	NA	NA	NA	NA
Trichloroethylene	0.129	ND	0.001	ND	0.001	ND
Vinyl Chloride	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA
Methyl Ethyl Ketone	ND	ND	ND	ND	ND	ND
BTEX (mg/kg)						
Benzene	ND	ND	ND	ND	ND	ND
Toluene	0.13	0.38	0.14	ND	ND	ND
Ethylbenzene	0.17	0.23	ND	ND	ND	ND
P&M-Xylene	1.65	1.42	0.7	ND	ND	ND
O-Xylene	0.52	0.82	0.43	ND	ND	ND
Total BTEX	2.47	2.85	1.27	0	0	0

ND Not Detected
NA Not Analyzed

TABLE 4-3 (Continued)
ANALYTICAL RESULTS - BURN COLLECTION AREA SOIL SAMPLES
COMPRESSOR STATION WT-1
CARLSBAD, NEW MEXICO

Parameter	BP-3C 39-43	BP-4A 38-40	BP-5A 8.5-13.5	BP-5B 15-18.5	BP-5C 18.5-23.5	BP-5D 23.5-27
TCLP-O (mg/l)						
Semivolatiles						
Pyridine	NA	NA	NA	NA	NA	NA
O-Cresol/2-Methylphenol	NA	NA	NA	NA	NA	NA
M/P-Cresol/3,4-Methylphenol	NA	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	ND	ND	ND	ND	ND	0.005
Hexachlorobutadiene	ND	ND	ND	ND	ND	ND
Hexachloroethane	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	ND
Pentachlorophenol	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA
Volatiles						
Benzene	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND

ND Not Detected
NA Not Analyzed

TABLE 4-3 (Continued)
ANALYTICAL RESULTS - BURN COLLECTION AREA SOIL SAMPLES
COMPRESSOR STATION WT-1
CARLSBAD, NEW MEXICO

Parameter	BP-3C 39-43	BP-4A 38-40	BP-5A 8.5-13.5	BP-5B 15-18.5	BP-5C 18.5-23.5	BP-5D 23.5-27
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	NA	NA	NA	NA	NA	NA
Trichloroethylene	ND	ND	0.019	0.057	0.007	0.003
Vinyl Chloride	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA
Methyl Ethyl Ketone	ND	ND	ND	ND	ND	ND
BTEX (mg/kg)						
Benzene	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	0.17
Ethylbenzene	ND	ND	0.17	ND	ND	0.16
P&M-Xylene	ND	ND	0.55	0.23	0.24	0.45
O-Xylene	ND	ND	0.63	0.23	0.21	0.41
Total BTEX	0	0	1.35	0.46	0.45	1.19

ND Not Detected
NA Not Analyzed

TABLE 4-3 (Continued)
ANALYTICAL RESULTS - BURN COLLECTION AREA SOIL SAMPLES
COMPRESSOR STATION WT-1
CARLSBAD, NEW MEXICO

Parameter	BP-5E 27-28.5	BP-5F 28.5-33	BP-5G 34.5-36	BP-5H 42-43	BP-6A 18.5-23.5	BP-6B 38-40
TCLP-O (mg/l)						
Semivolatiles						
Pyridine	NA	NA	NA	NA	NA	NA
O-Cresol/2-Methylphenol	NA	NA	NA	NA	NA	NA
M/P-Cresol/3,4-Methylphenol	NA	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	0.017	ND	ND	ND	ND	ND
Hexachlorobutadiene	0.004	ND	ND	ND	ND	ND
Hexachloroethane	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	ND	ND	ND	ND	ND	ND
Pentachlorophenol	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA
Volatiles						
Benzene	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND

ND Not Detected
NA Not Analyzed

TABLE 4-3 (Continued)
ANALYTICAL RESULTS - BURN COLLECTION AREA SOIL SAMPLES
COMPRESSOR STATION WT-1
CARLSBAD, NEW MEXICO

Parameter	BP-5E 27-28.5	BP-5F 28.5-33	BP-5G 34.5-36	BP-5H 42-43	BP-6A 18.5-23.5	BP-6B 38-40
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	0.005	ND	ND	ND	ND	ND
Tetrachloroethylene	NA	NA	NA	NA	NA	NA
Trichloroethylene	0.037	0.035	0.017	ND	ND	ND
Vinyl Chloride	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA
Methyl Ethyl Ketone	ND	ND	ND	ND	ND	ND
BTEX (mg/kg)						
Benzene	ND	ND	ND	ND	ND	ND
Toluene	0.26	ND	0.81	ND	ND	ND
Ethylbenzene	0.26	ND	0.65	ND	ND	ND
P&M-Xylene	0.75	0.33	3.04	ND	ND	ND
O-Xylene	0.74	0.33	2.04	ND	ND	ND
Total BTEX	2.01	0.66	6.54	0	0	0

ND Not Detected
NA Not Analyzed

A varied distribution of TCLP-O volatile and semivolatile constituents were detected at low concentrations in the samples submitted for laboratory analysis from the Burn Collection Area. All concentrations are well below TCLP regulatory levels, however.

4.1.4 Off-Site Area

Soil samples were collected from soil borings placed north of the Filter Collection Area and Burn Collection Area on property controlled by the Bureau of Land Management. These samples were analyzed for BTEX, TPH, TCLP-O and TCLP-M constituents. Table 4-4 presents analytical results for sample collected from the off-site area.

BTEX was only detected in Sample O-3C, collected from the 48.5 - 51 foot interval. The total BTEX concentration was reported as 0.44 mg/kg. Benzene was not detected in any of the samples collected from the off-site area.

TPH concentrations ranged from non-detect to a maximum of 32 mg/kg in Sample O-1A.

TCLP-O constituent concentrations were determined in Soil Boring O-3 only. No TCLP-O constituents were detected.

TCLP-M constituent concentrations were determined in samples from Soil Borings O-1 and O-2. A varied distribution of barium, cadmium, selenium and silver concentrations were detected. All detections are well below 40 CFR 261 TCLP regulatory levels.

4.2 GROUNDWATER

Groundwater samples collected from monitor wells and soil borings were analyzed for TPH and BTEX. One groundwater sample was also analyzed for TCLP-O semivolatile and volatile constituents. Table 4-5 presents the analytical results for groundwater samples.

TABLE 4-4
ANALYTICAL RESULTS - OFF-SITE AREA SOIL SAMPLES
COMPRESSOR STATION WT-1
CARLSBAD, NEW MEXICO

Parameter	O-1A 18.5-23.5	O-1B 43.5-48.5	O-2A 13.5-18.5	O-2B 38.5-43.5	O-2C 43.5-47	O-2C-D Duplicate	O-3A 27-32	O-3B 43.5-48.5	O-3C 48.5-51
TCLP-O (mg/l)									
Semivolatiles									
Pyridine	NA	NA	NA	NA	NA	NA	ND	ND	ND
O-Cresol/2-Methylphenol	NA	NA	NA	NA	NA	NA	ND	ND	ND
M/P-Cresol/3,4-Methylphenol	NA	NA	NA	NA	NA	NA	ND	ND	ND
2,4,5-Trichlorophenol	NA	NA	NA	NA	NA	NA	ND	ND	ND
Hexachlorobenzene	NA	NA	NA	NA	NA	NA	ND	ND	ND
Hexachlorobutadiene	NA	NA	NA	NA	NA	NA	ND	ND	ND
Hexachloroethane	NA	NA	NA	NA	NA	NA	ND	ND	ND
2,4,6-Trichlorophenol	NA	NA	NA	NA	NA	NA	ND	ND	ND
Pentachlorophenol	NA	NA	NA	NA	NA	NA	ND	ND	ND
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	ND	ND	ND
Volatiles									
Benzene	NA	NA	NA	NA	NA	NA	ND	ND	ND
Carbon Tetrachloride	NA	NA	NA	NA	NA	NA	ND	ND	ND
Chlorobenzene	NA	NA	NA	NA	NA	NA	ND	ND	ND
1,2-Dichloroethane	NA	NA	NA	NA	NA	NA	ND	ND	ND
1,1-Dichloroethylene	NA	NA	NA	NA	NA	NA	ND	ND	ND

ND Not Detected
NA Not Analyzed

TABLE 4-4 (Continued)
ANALYTICAL RESULTS - OFF-SITE AREA SOIL SAMPLES
COMPRESSOR STATION WT-1
CARLSBAD, NEW MEXICO

Parameter	O-1A 18.5-23.5	O-1B 43.5-48.5	O-2A 13.5-18.5	O-2B 38.5-43.5	O-2C 43.5-47	O-2C-D Duplicate	O-3A 27-32	O-3B 43.5-48.5	O-3C 48.5-51
Tetrachloroethylene	NA	NA	NA	NA	NA	NA	ND	ND	ND
Trichloroethylene	NA	NA	NA	NA	NA	NA	ND	ND	ND
Vinyl Chloride	NA	NA	NA	NA	NA	NA	ND	ND	ND
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	ND	ND	ND
Methyl Ethyl Ketone	NA	NA	NA	NA	NA	NA	ND	ND	ND
TCLP-M (mg/l)									
Arsenic	ND	ND	ND	ND	ND	ND	NA	NA	NA
Barium	0.64	0.58	ND	ND	1.89	0.5	NA	NA	NA
Cadmium	0.008	0.012	0.012	0.013	0.01	0.012	NA	NA	NA
Chromium	ND	ND	ND	ND	ND	ND	NA	NA	NA
Lead	ND	ND	ND	ND	ND	ND	NA	NA	NA
Mercury	ND	ND	ND	ND	ND	ND	NA	NA	NA
Selenium	ND	0.03	0.023	0.023	0.024	0.033	NA	NA	NA
Silver	ND	0.01	ND	0.03	ND	ND	NA	NA	NA
TPH (mg/kg)	32	16	8.7	5.3	2.0	18	NA	NA	NA

ND Not Detected
NA Not Analyzed

TABLE 4-4 (Continued)
ANALYTICAL RESULTS - OFF-SITE AREA SOIL SAMPLES
COMPRESSOR STATION WT-1
CARLSBAD, NEW MEXICO

Parameter	O-1A 18.5-23.5	O-1B 43.5-48.5	O-2A 13.5-18.5	O-2B 38.5-43.5	O-2C 43.5-47	O-2C-D Duplicate	O-3A 27-32	O-3B 43.5-48.5	O-3C 48.5-51
BTEX (mg/kg)									
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
P&M-Xylene	ND	ND	ND	ND	ND	ND	ND	ND	0.33
O-Xylene	ND	ND	ND	ND	ND	ND	ND	ND	0.11
Total BTEX	0	0	0	0	0	0	0	0	0.44

ND Not Detected
NA Not Analyzed

TABLE 4-4 (Continued)
ANALYTICAL RESULTS - OFF-SITE AREA SOIL SAMPLES
COMPRESSOR STATION WT-1
CARLSBAD, NEW MEXICO

Parameter	O-4A 34-39	O-4B 39-44	O-5A 42-47	O-6A 39-44	O-7A 39-44	O-8A 39-44	O-9A 42-44	O-10A 39-44	O-11A 39-44	O-12A 39-44
TCLP-O (mg/l)										
Semivolatiles										
Pyridine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
O-Cresol/2-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
M/P-Cresol/3,4-Methylphenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,5-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pentachlorophenol	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Volatiles										
Benzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

ND Not Detected
NA Not Analyzed

TABLE 4-4 (Continued)
ANALYTICAL RESULTS - OFF-SITE AREA SOIL SAMPLES
COMPRESSOR STATION WT-1
CARLSBAD, NEW MEXICO

Parameter	O-4A 34-39	O-4B 39-44	O-5A 42-47	O-6A 39-44	O-7A 39-44	O-8A 39-44	O-9A 42-44	O-10A 39-44	O-11A 39-44	O-12A 39-44
Tetrachloroethylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethylene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vinyl Chloride	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl Ethyl Ketone	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TCLP-M (mg/l)										
Arsenic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mercury	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Selenium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Silver	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TPH (mg/kg)	ND	ND	20	ND	ND	ND	ND	ND	ND	ND

ND Not Detected
NA Not Analyzed

TABLE 4-4 (Continued)
ANALYTICAL RESULTS - OFF-SITE AREA SOIL SAMPLES
COMPRESSOR STATION WT-1
CARLSBAD, NEW MEXICO

Parameter	O-4A 34-39	O-4B 39-44	O-5A 42-47	O-6A 39-44	O-7A 39-44	O-8A 39-44	O-9A 42-44	O-10A 39-44	O-11A 39-44	O-12A 39-44
BTEX (mg/kg)										
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
P&M-Xylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
O-Xylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Total BTEX	0	0	0	0	0	0	0	0	0	0

ND Not Detected
NA Not Analyzed

TABLE 4-5
GROUNDWATER ANALTYICAL RESULTS
COMPRESSOR STATION WT-1
CARLSBAD, NEW MEXICO

Parameter	O-1W	MW-1	MW-2	MW-3	FP-2W	FP-3W	BP-2W	O-4W	O-5W	O-6W	O-7W	O-8W	O-9W	O-10W	O-12W
TPH (mg/l)	1.5	12	3	0.52	65	240	NA	0.6	0.2	ND	ND	ND	110	ND	2.5
BTEX (ug/l)															
Benzene	45.5	14	45	24.4	218	47.7	6	7	7	8	ND	ND	45	ND	4
Toluene	5	91	101	ND	825	120	18.7	3	ND	ND	ND	ND	9	ND	ND
Ethylbenzene	4.6	ND	17	22.6	130	31.7	3.5	7	ND	ND	ND	ND	59	ND	ND
P&M-Xylene	2.7	43	99	20.4	482	93.1	13.7	7	ND	ND	ND	ND	25	ND	ND
O-Xylene	3.3	26	51	5.7	316	73.5	12.3	5	ND	ND	ND	ND	43	ND	ND
Total BTEX	61.1	174	313	73.1	1971	366	54.2	29	7	8	0	0	181	0	4
TCLP-O (mg/l)															
Semivolatiles															
2,4,5-Trichlorophenol	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA	NA	NA	2.65	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobutadiene	NA	NA	NA	NA	NA	NA	1.01	NA	NA	NA	NA	NA	NA	NA	NA
2,4,6-Trichlorophenol	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA

ND Not Detected
NA Not Analyzed

TABLE 4-5 (Continued)
GROUNDWATER ANALYTICAL RESULTS
COMPRESSOR STATION WT-1
CARLSBAD, NEW MEXICO

Parameter	O-1W	MW-1	MW-2	MW-3	FP-2W	FP-3W	BP-2W	O-4W	O-5W	O-6W	O-7W	O-8W	O-9W	O-10W	O-12W
Volatiles															
Benzene	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA
Chlorobenzene	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethylene	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA
Trichloroethylene	NA	NA	NA	NA	NA	NA	0.013	NA	NA	NA	NA	NA	NA	NA	NA
Methyl Ethyl Ketone	NA	NA	NA	NA	NA	NA	ND	NA	NA	NA	NA	NA	NA	NA	NA

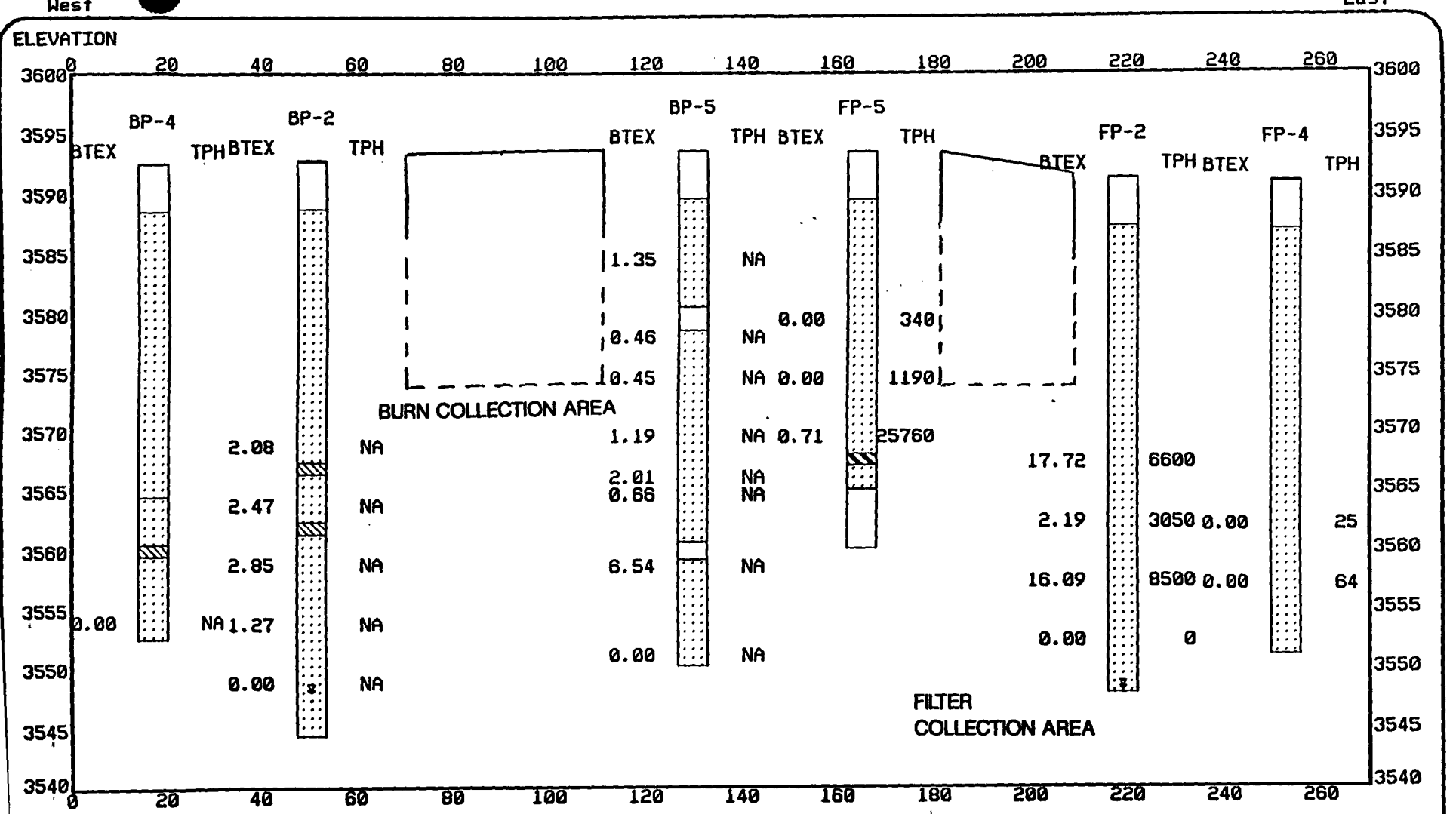
ND Not Detected
NA Not Analyzed

TPH concentrations in groundwater samples ranged from non-detect to a maximum of 240 mg/l in the groundwater sample collected from Boring FP-3. BTEX concentrations ranged from non-detect to a maximum of 1971 μg/l in the groundwater sample collected from Boring FP-3. Two semivolatiles, hexachlorobenzene and hexachlorobutadiene, along with the volatile organic compound trichloroethylene were detected in the groundwater sample collected from Boring BP-2.

4.3 IMPACTED SOIL AND GROUNDWATER

Evidence of soil impact and free product was discovered in several borings located around the Burn Collection Area and Filter Collection Area. These two collection areas are located approximately 60 feet apart, though their exact locations and depths are not known. The tops of both collection areas are slightly elevated from the surrounding terrain. This is probably due to the backfill cap which was previously placed on them. The area above the Filter Collection Area has exposed filter material on the surface in several locations.

The presence of free product in recovered core samples was noted in three soil borings located outside the perimeter of the Burn Collection Area. These soil borings, BP-1, BP-5, and BP-2, were located to the north, east, and west, respectively of the Burn Collection Area. The oil impacted zones ranged from 8 to 20 feet in thickness. The largest zone occurred in Boring BP-5, which is located to the east of the Burn Collection Area, between the Burn Collection Area and Filter Collection Area. All samples collected from these zones for laboratory analysis exhibited elevated total BTEX concentrations. Three soil borings installed around the Filter Collection Area also displayed the presence of free product in recovered core samples. The affected borings were Soil Borings FP-7, FP-2, and FP-5, which are located north, south, and west, respectively of the Filter Collection Area. The oil impacted zones ranged from 3 to 4 feet in thickness. The samples collected from these borings exhibited elevated TPH and BTEX concentrations. Cross-sections A-A', B-B', and C-C' (i.e., Figures 4-1, 4-2, and 4-3) depict lithology and analytical results. The locations of Cross-Sections A-A', B-B', and C-C' are shown in Figure 4-4.



Boring	North	East	Elev.	Depth
BP-2	9929.3	9289.8	3592.8	48.5
BP-4	9929.0	9256.5	3592.5	40.0
BP-5	9918.4	9368.0	3593.6	43.5
FP-2	9928.6	9452.4	3591.3	43.5
FP-4	9926.8	9486.0	3591.0	40.0
FP-5	9933.7	9398.5	3593.5	33.5

All Analytical Results in MG/KG

DISTANCES:
Beginning 0.0
Ending 270.0
VIEWING ANGLES (degrees):
Horizontal 0.0
Vertical 0.0

HALLIBURTON NUS
Environmental Corporation

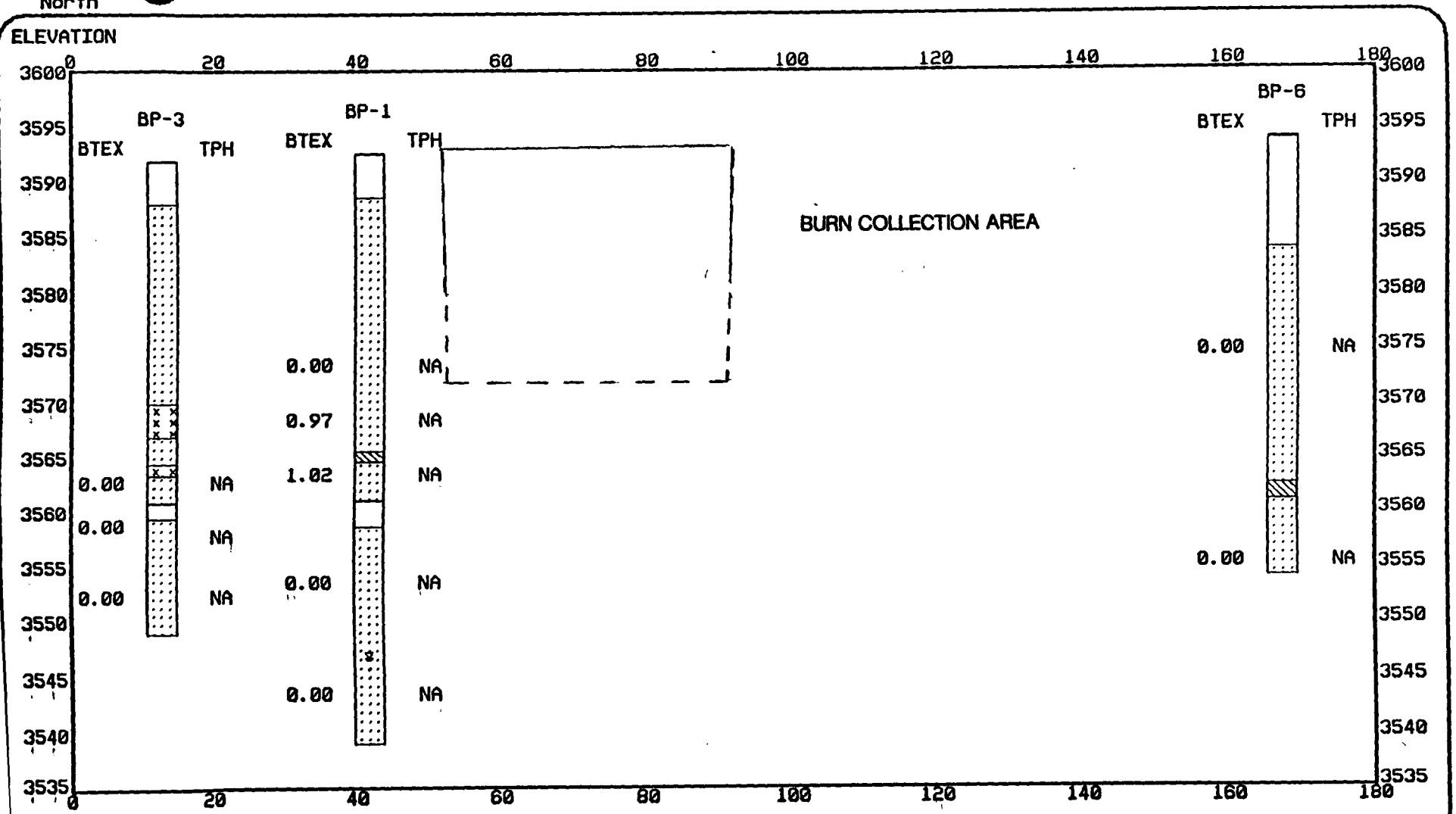
GEOLOGIC CROSS-SECTION A-A'

E/W - Burn & Filter Collection Areas

Transwestern Pipeline Company

Carlsbad, New Mexico

PROJECT #	DATE	FIGURE
1548	FEB 93	4-1



All Analytical Results in MG/KG

Boring	North	East	Elev.	Depth
BP-1	9960.1	9337.7	3592.5	53.5
BP-3	9989.2	9338.7	3591.8	43.0
BP-6	9834.7	9345.9	3593.7	40.0

DISTANCES:
Beginning 0.0
Ending 180.0
VIEWING ANGLES (degrees):
Horizontal 0.0
Vertical 0.0

HALLIBURTON NUS Environmental Corporation

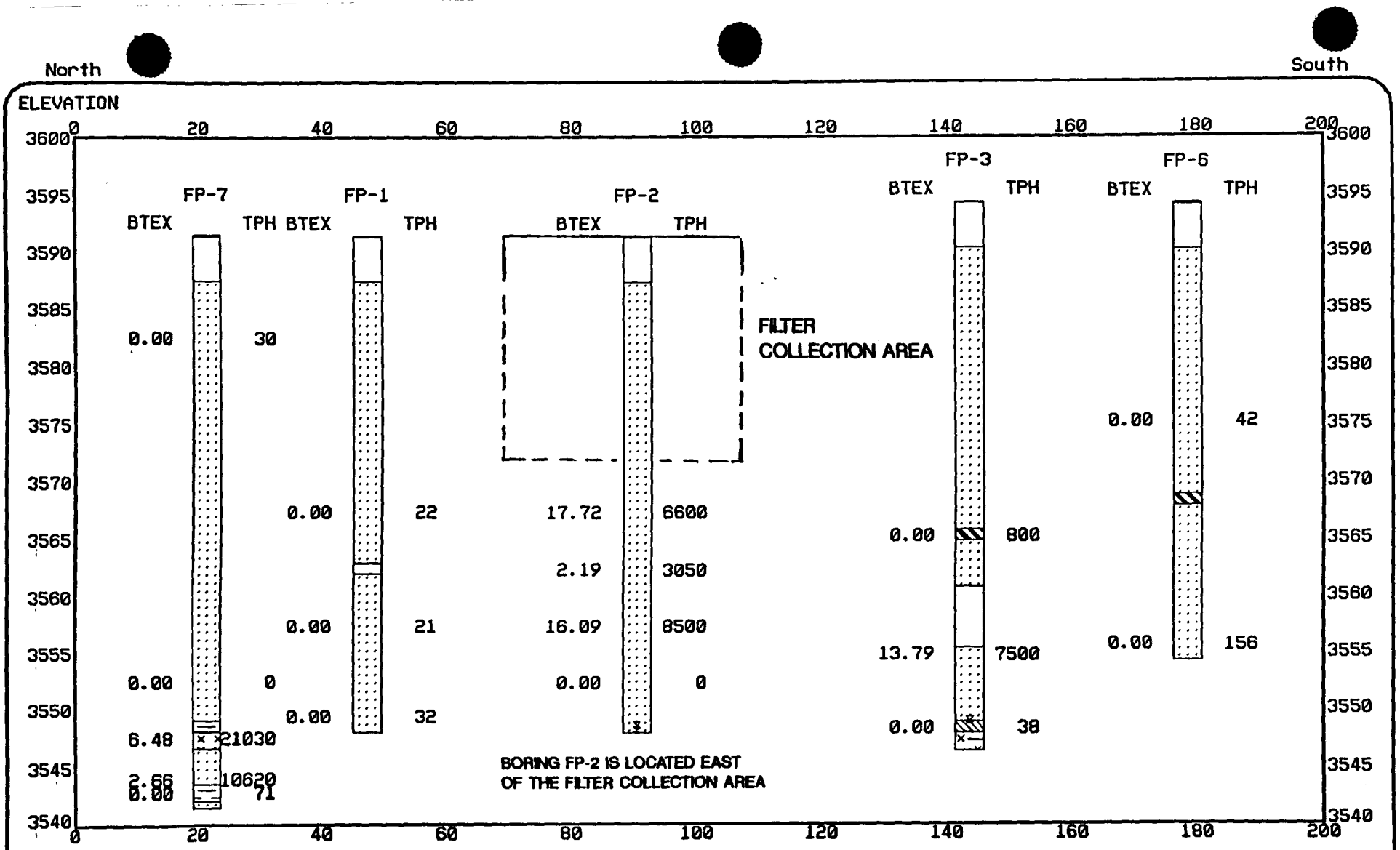
GEOLOGIC CROSS-SECTION B-B'

N/S Through Burn Collection Area

Transwestern Pipeline Company

Carlsbad, New Mexico

PROJECT #	DATE	FIGURE
1548	FEB 93	4-2



Boring	North	East	Elev.	Depth
FP-1	9965.9	9430.4	3591.4	43.5
FP-2	9928.6	9452.4	3591.3	43.5
FP-3	9883.3	9424.5	3594.3	48.0
FP-6	9849.4	9416.6	3594.2	40.0
FP-7	9991.3	9434.1	3591.5	50.0

All Analytical Results in MG/KG

DISTANCES:
Beginning 0.0
Ending 200.0
VIEWING ANGLES (degrees):
Horizontal 0.0
Vertical 0.0

HALLIBURTON NUS
Environmental Corporation

GEOLOGIC CROSS-SECTION C-C'

N/S Through Filter Collection Area

Transwestern Pipeline Company

Carlsbad, New Mexico

PROJECT #	DATE	FIGURE
1548	FEB 93	4-3

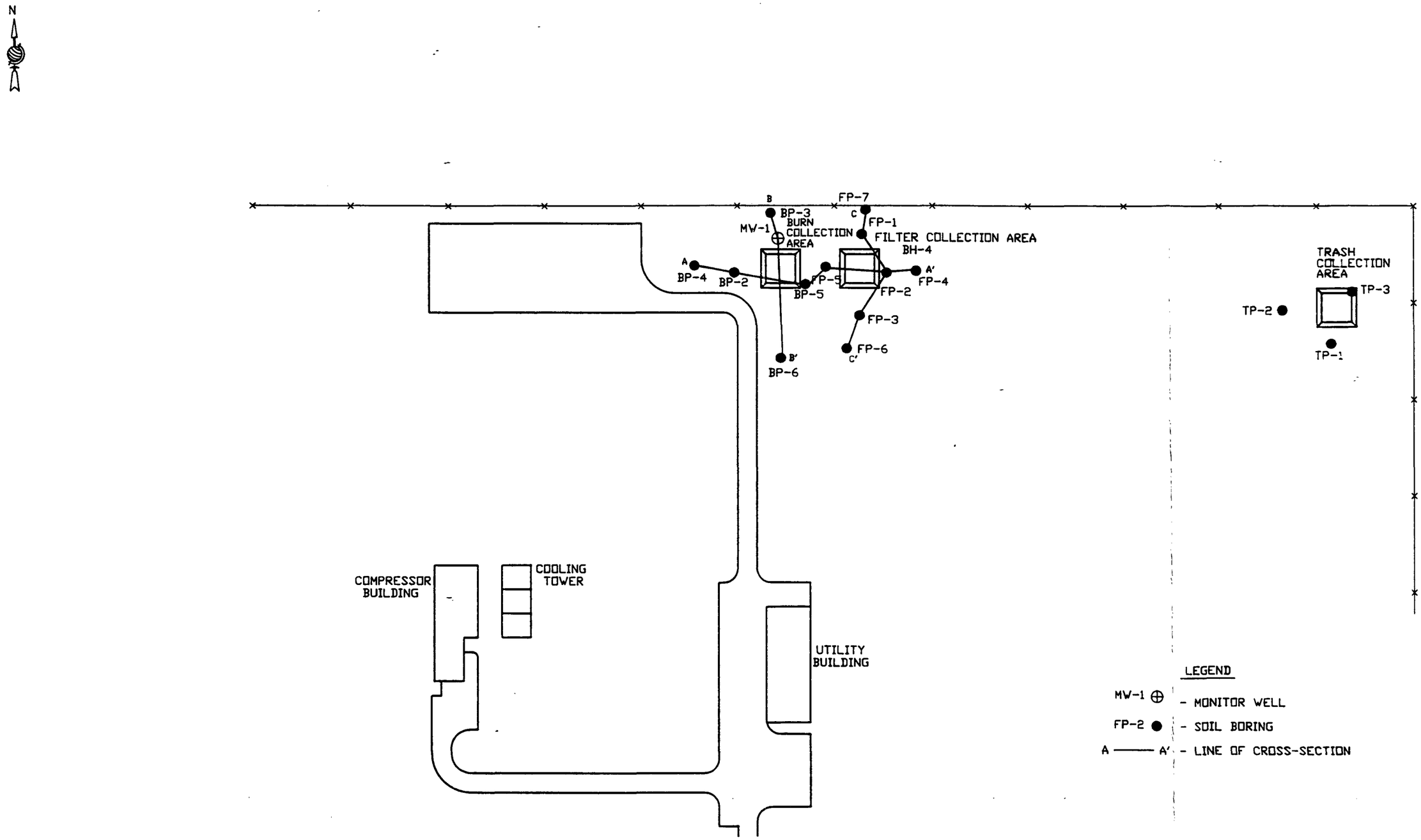


FIGURE 4-4

DRAWN BY:	D.G
DATE:	11/20/92
GEOLOGIST:	L. BASILIO
DATE:	11/21/92
CAD DWG. NO:	15522A.DWG

CROSS-SECTION LOCATIONS
COMPRESSOR STATION WT-1
TRANSWESTERN PIPELINE COMPANY
CARLSBAD, NEW MEXICO

SCALE: 1"=100'-0" | DWG. NO. 1552-2B01 | REV. 0

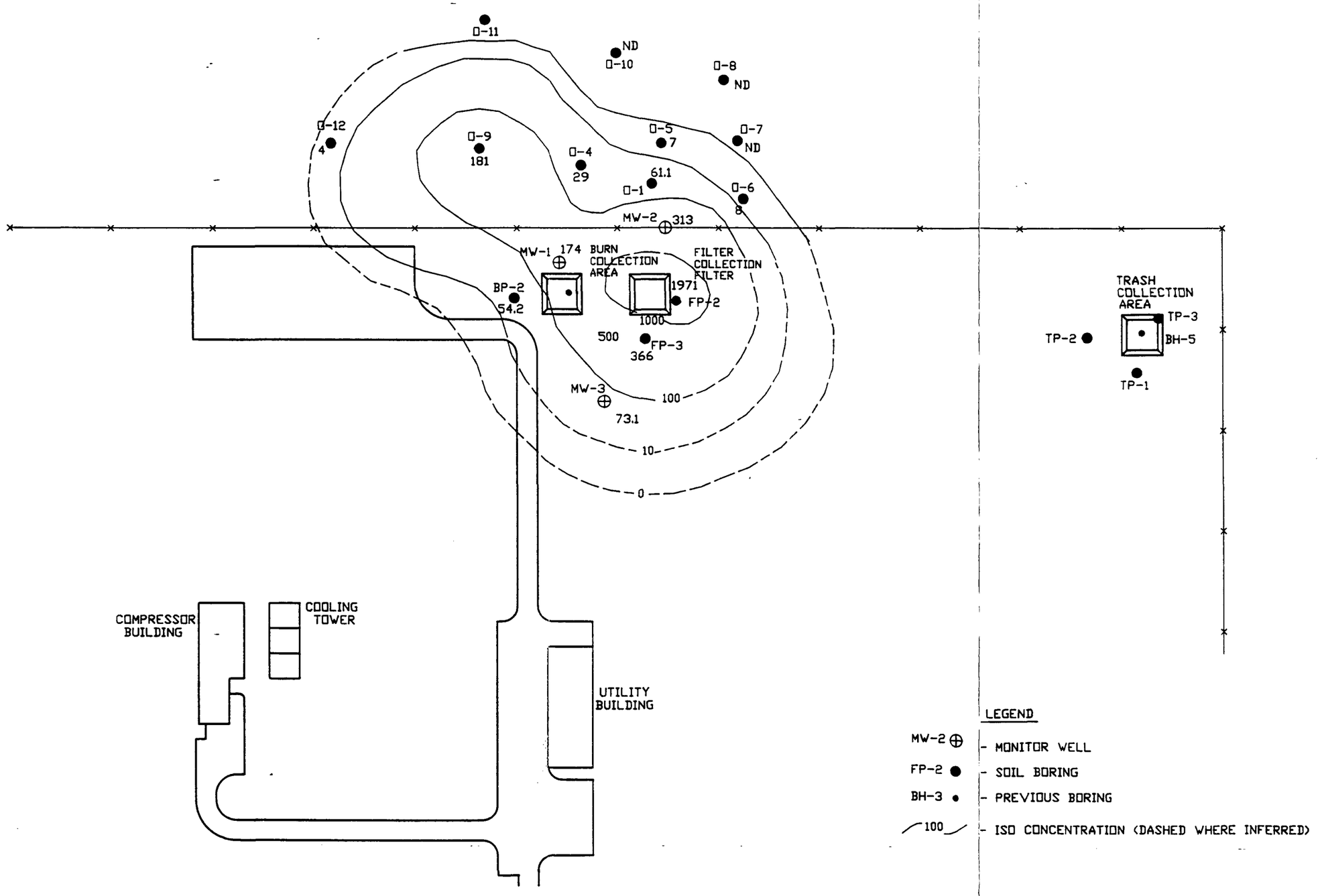
HALLIBURTON NUS
Environmental Corporation

Step out borings were drilled where soil impact was discovered. Soil impact included physical presence of free product and/or elevated PID/FID readings. These borings were drilled to depths of approximately 40 to 50 feet. Step out borings continued until a boring was found to be free of soil impact, as previously described.

Twelve soil borings were placed north of the WT-1 property boundary to determine the extent of soil and groundwater contamination. Only one of these off-site borings, Boring O-3, contained free product in a core sample. Free product was also observed in on-site Borings FB-5, FP-7, BP-1, BP-2, and BP-5. Therefore, it appears that soil impact by free product is limited to the areas immediately surrounding the collection areas.

Groundwater was encountered in numerous borings drilled at the WT-1 site. Samples were collected from the three monitor wells installed at the site and from 12 borings that encountered groundwater. Borings O-3 and MW-2 were the only borings in which free product was discovered in direct association with groundwater. Free product thicknesses in Boring O-3 and Monitor Well MW-2 were 2.08 feet and 0.34 feet, respectively. Boring O-3 is located approximately 80 feet north of the Burn Collection Area and Monitor Well MW-2 is located approximately 30 feet north of the Filter Collection Area. When Monitor Well MW-2 was developed, pinhead-sized droplets of oil were observed floating on the water surface of the bailer during the development process. Purging prior to groundwater sample collection removed any sign of these droplets. Upon inspection of the groundwater recovered from Borings FP-2 and FP-3 approximately one month after completion of groundwater sampling, sheens were observed on the surface of the recovered groundwater contained within the 55-gallon drums. Groundwater samples collected from all other monitor wells and borings showed no evidence of free product or sheen on the water surface.

A dissolved phase plume was detected at the site based on BTEX analysis of groundwater samples. Figure 4-5 is an iso-concentration map depicting total BTEX in groundwater. The highest concentration is centered around the Filter Collection Area. The plume also shows a small lobe extending to the northwest of this collection area. The impacted groundwater plume does not exactly coincide with the hydraulic gradient depicted. Therefore, it is likely that the migration of the containment is along preferential transport pathways (i.e., fractures or porosity zones). Also, it should be noted that the movement of chemical compounds in the groundwater is further complicated by the effects of dilution, dispersion, absorption, and degradation within the subsurface environment.



NOTE: 1. ND - NOT DETECTED
2. VALUES IN ug/l

FIGURE 4-5

DRAWN BY:	D.G	TOTAL BTEX ISO-CONCENTRATION IN GROUNDWATER COMPRESSOR STATION WT-1 CARLSBAD, NEW MEXICO			HALLIBURTON NUS Environmental Corporation
DATE:	11/20/92				
GEOLOGIST:	L. BASILIO				
DATE:	11/21/92				
CAD DWG. NO:	15522C.DWG	SCALE: 1"=100'-0"	DWG. NO. 1552-2801	REV. 0	

5.0 CONCLUSIONS

The following conclusions are based on the results of the field investigation and analytical data.

- The lithology of the site consists of poorly to well indurated sandstone and caliche. Geologic formations encountered at the site are the Mescalaro Caliche and the Gatuna Formation.

- The primary means of downward migration of fluids through the lithified surficial materials into the subsurface appears to be by migration along fractures within the surficial sedimentary rocks.

- Groundwater at the site is encountered approximately 45 feet below grade. Groundwater flow direction is to the north-northeast, coincident with surface topography.

- The northwestward extension of the total BTEX contaminant plume from the presumed source area(s) (i.e., the Burn Collection Area and/or the Filter Collection Area), as depicted in Figure 4-5, is somewhat at variance with the north to northeast direction of groundwater flow at the site, as depicted in Figure 3-1. This phenomenon suggests that BTEX constituents may be migrating preferentially northwestward along near-surface fractures.

- Impact to soils from hydrocarbons was noted in several borings around both the Filter Collection Area and Burn Collection Area. Impact included both free product (i.e., phase-separated hydrocarbons) and elevated analytical results.

- Impact to groundwater by hydrocarbons was evidenced within groundwater samples collected. Both free product and dissolved phase impacts were noted.

- Impact to groundwater extends off-site to the north of the Burn and Filter Collection Areas approximately 60 to 180 feet north, respectively, of the north fenceline.

6.0 REFERENCES

Sandia Laboratories, 1978, Geological Characterization Report, Waste Isolation Pilot Plant (WIPP) Site, Southeastern New Mexico, Volume II, August 1978: Sandia Laboratories Report SAND 78-1596.

APPENDIX A

HEALTH AND SAFETY PLAN

R-48-02-3-001H

SITE-SPECIFIC

HEALTH AND SAFETY PLAN

PREPARED FOR

TRANSWESTERN GAS PIPELINE COMPANY

WT-1 COMPRESSOR STATION, CARLSBAD, NEW MEXICO

PREPARED BY

HALLIBURTON NUS ENVIRONMENTAL CORPORATION

ENVIRONMENTAL SERVICES

SOUTHWEST REGION

FEBRUARY 1993

HALLIBURTON NUS PROJECT NUMBER 1548/7P54

HALLIBURTON NUS
Environmental Corporation

Project Name: Compressor Station WT-1 Subsurface Investigation

Project No.: 6250

Scope of Work and Purpose of Visit:

B. WT-1 - Carlsbad Compressor Station - To delineate the lateral and vertical extent of contamination. Eleven soil borings will be drilled; four surrounding oil filter pit and burn pit and three around the trash pit.

Site Visit Personnel:	Responsibility:
Larry Basilio	Geologist & SSO

Other Contacts:	Phone Nos.:
S. Richard - HALLIBURTON Project Manager	(713) 492-1888
Larry Campbell - Transwestern Env. Affairs Manager	(505) 625-8022
Earl Chandly - Transwestern NM Operation Man	(505) 625-8031
Randy Smith - Carlsbad, NM, WT-1 C.S. Man	(505) 885-8525
Dave Tanner - SH&B Drilling Manager	(505) 884-0950

Emergency Information: WT-1 Compressor Station; Carlsbad, New Mexico

Type	Name	Phone Nos.
Sheriff		911
Ambulance		911
Hospital	Guadalupe Medical Center	(505) 887-4100
Rescue Service		911
Poison Control Center	N.M. Poison Control	1-800-432-6866
Site Manager	Susanne Richard	(713) 492-1888
PMHS	Tom Samson	713-561-1564

Hospital Route:

Guadlupe Medical Center

2430 W. Pierce

Carlsbad, New Mexico

Directions from the Site:

To west on 62-180. Turn north (right on Canal St. (in Carlsbad). Canal St. becomes Pierce. Hospital on right-hand side (east) just before you get out of town.

Inclement Weather Procedures:

No working during electrical storm, extremely high ambient heat loads, or other extreme weather conditions as determined by the SSO.

Site Background/Overall Information:

WT-1 - Carlsbad Compressor Station - Previous investigations have determined that activities associated with the former oil pit, burn pit, and trash pit had impacted the sediments below these structures. Soils in borings were found impacted by total petroleum hydrocarbons (TPH) down to 30 feet, TD of borings.

Hazard Assessment:

Hazards expected to be present include:

1. - Fire and explosion from flammable/combustible materials
2. - Moving machinery
3. - Animal hazards - i.e., snakes, and ticks
5. - Manual lifting and slip/trip hazards
6. - Heat stress
7. - Underground utilities, underground gas pipelines

Standard Operating Procedures: (i.e., basic hygiene, buddy system, no hand-to-mouth activities when working on site, etc.)

Other: SSO will perform air monitoring during drilling and sampling activities.

PPE Requirements: Level D

Minimum - Steel toe/shank shoes or boots, standard field clothes. (If hard hats and safety glasses not worn, indicate why.)

Other: Hard hat and safety glass to be worn in vicinity of drilling operations. Rubber gloves to be worn during sampling activities.
Modified Level CPPE will be available on site and used if so determined by the SSO.

PPE Selection Criteria:

Upgrade to modified Level C PPE if HNU reading in the breathing zone is greater than 60 ppm.

PPE Decon/Disposal (if applicable):

Inspection - generated waste will be placed in plastic bags and disposed of properly.

Monitoring Equipment and Calibration Information:

HNU - Calibrate daily with known calibration gas.
OVA - Factor calibrated. Check for positive response with a marking pen.

Monitoring Equipment Selection Criteria:

HNU - 10.2 eV probe to scan for organic and inorganic vapor concentrations.

OVA - Used to monitor organic vapor concentrations.

Action Levels for Upgrading of PPE and/or Site Withdrawal:

Begin work in Level D and upgrade PPE as site conditions warrant.

Level D - <60 ppm reading on HNU in breathing zone.

Modified Level C - >60 ppm reading on HNU/OVA in breathing zone or if workers are affected by vapors.

Note:

Incident Report, Site Safety Follow-up Report, and Site Map must be attached.

MEDICAL DATA SHEET FOR FIELD TEAM MEMBERS

This brief Medical Data Sheet will be completed by all on site personnel and will be kept in the command post during the conduct of site operations. This data sheet will accompany any personnel when medical assistance is needed or if transport to hospital facilities is required.

Project _____

Name _____ Home Telephone _____

Address _____

Age _____ Height _____ Weight _____

Name of Next of Kin _____

Drug or other Allergies _____

Particular Sensitivities _____

Do You Wear Contacts? _____

Provide a Checklist of Previous Illnesses or Exposure to Hazardous Chemicals. _____

_____

_____

What medications are you presently using? _____

_____

_____

Do you have any medical restrictions? _____

_____

_____

Name, Address, and Phone Number of personal physician: _____

_____

_____

_____

_____

_____

I am the individual described above. I have read and understand this HASP.

_____ _____

Signature Date

HALLIBURTON NUS *Environmental Corporation*

BORING T-1 SHEET 1 OF 1

PROJECT Transwestern Pipeline Company

LOCATION Carlsbad, New Mexico

COORDINATES N 9,855 E 9,912

PROJECT NUMBER 1548

SURFACE ELEVATION 3590.6 DATUM MSL

LOGGED BY L. Basilio DATE DRILLED 8/4/92

ELEVATION FEET	SOIL DESCRIPTION	STRATA	Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	PID/FID (ppm)	REMARKS
	GROUND SURFACE Tan dry rocky soil			AUGER				1/0	Surface Conditions: Vegetated, dry rocky soil.
3585	SANDSTONE - red, hard, cemented, broken		5	CORE		26/12		1/0	Auger to 4 feet BLS.
	SANDSTONE - red, hard, clayey in spots, moist in clay zones			CORE	T-1A	28/24		0/0	
3580	SANDSTONE - red, very, broken, crumbly, white caliche lenses		10	CORE		60/24		0/0	
3575	SANDSTONE - red to brick red at base, dry, cemented, white caliche at top		15	CORE		60/30		0/0	
3570	SANDSTONE - dark red, hard, cemented, dry, friable at top,		20	CORE		60/54		0/0	
	CLAY - red to gray, very silty to sandy, moist, grades to sandstone				T-1B				
3565	SANDSTONE - dark red, firm, cemented, occasional thin gray red clay lenses which are moist, friable to crumbly		25	CORE		78/78		0/0	
	Total depth = 30 feet BLS		30						

DRILLING CONTRACTOR: SH&B

DRILLER: E. Adams

DRILLING METHOD: NQ Core Barrel

DRILLING EQUIPMENT: CME-55

COMMENTS: Boring located south of Trash Collection Area.

HALLIBURTON NUS
Environmental Corporation

BORING T-2 SHEET 1 OF 1

PROJECT Transwestern Pipeline Company

LOCATION Carlsbad, New Mexico

COORDINATES N 9,886 E 9,861

PROJECT NUMBER 1548

SURFACE ELEVATION 3590.7 DATUM MSL

LOGGED BY L. Basilio

DATE DRILLED 8/4/92

ELEVATION FEET	SOIL DESCRIPTION	STRATA	SAMPLE INFORMATION: Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	PID/FID (ppm)	REMARKS
	GROUND SURFACE								
3590	Tan rocky soil			AUGER					Surface Conditions: Vegetated, dry rocky soil.
	SANDSTONE - tan, hard, dry, caliche, broken		5	CORE		54/12		0/0	Auger to 4 feet BLS.
3585	SANDSTONE - tan, hard, dry								
3580			10	CORE		60/18		0/0	
	SANDSTONE - tan to red, dry, slightly friable								
	SANDSTONE - tan to red, slightly moist, friable, dark red towards base				T-2A				
3575			15	CORE		60/54		0/0	
	SANDSTONE - dark red, dry, clayey, friable, micaceous								
3570			20	CORE		60/42		0/0	
	SANDSTONE - red, cemented, broken				T-2B				
3565			25						
	CLAY - red, sandy, moist			CORE		78/54		0/0	
	SANDSTONE - gray, dry, dark inclusions								
	SANDSTONE - dark red, cemented, dry, micaceous		30						
	Total depth = 30 feet BLS								

DRILLING CONTRACTOR: SH&B

DRILLER: E. Adams

DRILLING METHOD: NQ Core Barrel

DRILLING EQUIPMENT: CME-55

COMMENTS: Boring located west of Trash Collection Area.

HALLIBURTON NUS *Environmental Corporation*

BORING T-3 SHEET 1 OF 1

PROJECT Transwestern Pipeline Company

LOCATION Carlsbad, New Mexico

COORDINATES N 9,906 E 9,932

PROJECT NUMBER 1548

SURFACE ELEVATION 3590.4 DATUM MSL

LOGGED BY L. Basilio DATE DRILLED 8/4/92

ELEVATION FEET	SOIL DESCRIPTION	STRATA	SAMPLE INFORMATION: Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	PID/FID (ppm)	REMARKS
	GROUND SURFACE								
	Tan dry soil			AUGER				0/0	Surface Conditions: Vegetated, dry rocky soil.
	No Recovery		5	CORE		54/0			Auger to 4 feet BLS.
3585									
3580	SANDSTONE gray to red, dry, moderately hard, broken		10	CORE		60/24		0/0	
					T-3A				
3575	SANDSTONE - light red, dry, broken, grades to dark red at base, slightly clayey in middle section		15	CORE		60/36		0/0	
3570	SANDSTONE - red, red with gray sandy lenses towards base, broken, clayey, dry,		20	CORE		60/36		0/0	
	SANDSTONE - red, clayey lenses, moist in upper one foot				T-3B				
3565	SANDSTONE - dark red, moderately hard, moist, micaceous, occasional gray sandy lenses		25	CORE		78/78		0/0	
	Total depth = 30 feet BLS		30						

DRILLING CONTRACTOR: SH&B

DRILLER: E. Adams

DRILLING METHOD: NQ Core Barrel

DRILLING EQUIPMENT: CME-55

COMMENTS: Boring located northeast of Trash Collection Area.

HALLIBURTON NUS
Environmental Corporation

BORING FP-1 SHEET 1 OF 1
PROJECT Transwestern Pipeline Company
LOCATION Carlsbad, New Mexico
COORDINATES N 9,966 E 9,430
PROJECT NUMBER 1548
SURFACE ELEVATION 3591.4 DATUM MSL
LOGGED BY L. Basilio DATE DRILLED 8/5/92

ELEVATION FEET	SOIL DESCRIPTION	STRATA	SAMPLE INFORMATION: Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	PID/FID (ppm)	REMARKS
	GROUND SURFACE								
3590	Tan dry rocky soil			AUGER				0/0	Surface Conditions: Vegetated, dry rocky soil.
			5						Auger to 4 feet BLS.
3585	SANDSTONE - tan with red tint, broken, dry, slightly friable, cemented white caliche at top			CORE		54/18		0/0	
			10						
3580	SANDSTONE - tan with red tint, occasionally gray, dry, slightly clayey, moderately hard, broken at top			CORE		60/24		0/0	
	SANDSTONE - tan to gray, reddish tint, red at base, cemented, calcareous inclusions,		15						
3575	dry, black nodules			CORE		60/54		0/0	
	SANDSTONE - red, broken, moist, slightly clayey								
	SANDSTONE - tan to red, dry		20						
3570				CORE		60/60		1/0	
	SANDSTONE - dark red, dry, micaceous, clayey lenses at base				FP-1A				
	SANDSTONE - red, cemented, slightly moist, clayey lenses, gray sandy lense at base		25						
3565	SANDSTONE - dark red, hard, micaceous, dry, clay laminae			CORE		60/60		0/0	
	No sample collected in the 28.5 to 29.5 foot interval								Re-enter hole on 8/18/92. Auger to 29.5 feet BLS and resume coring.
	SANDSTONE - red, damp, micaceous, clayey with clay laminae at top, hard to slightly		30						
3560	friable, moist to wet 33.5 to 36.5 feet			CORE		48/48		0/0	
					FP-1B				
			35						
3555	SANDSTONE - red brown, hard, dry, massive, micaceous			CORE		12/20		50/15	
			40						
3550					FP-1C			1/8	
	Total depth = 43.5 feet BLS								

DRILLING CONTRACTOR: SH&B
DRILLER: E. Adams
DRILLING METHOD: NQ Core Barrel
DRILLING EQUIPMENT: CME-55

COMMENTS: Boring located north of Filter Collection Area.

HALLIBURTON NUS *Environmental Corporation*

BORING FP-2 SHEET 1 OF 1

PROJECT Transwestern Pipeline Company

LOCATION Carlsbad, New Mexico

COORDINATES N 9,929 E 9,452

PROJECT NUMBER 1548

SURFACE ELEVATION 3591.3 DATUM MSL

LOGGED BY L. Basilio DATE DRILLED 8/6/92

ELEVATION FEET	SOIL DESCRIPTION	STRATA	Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	PID (ppm)	REMARKS
	GROUND SURFACE								
3590	Tan dry rocky soil			AUGER				1	Surface Conditions: Not vegetated, dry rocky soil.
			5						Auger to 4 feet BLS.
3585	SANDSTONE - light tan to tan with depth, cemented, dry, broken			CORE		54/24		0	FID not operational.
			10						
3580	SANDSTONE - tan to gray, clayey in spots, black gravel at top, slightly moist			CORE		60/36		0	
	SANDSTONE - tan with gray mottling, hard, grades to red, dry, slightly friable		15						
3575				CORE		60/60		0	
	SANDSTONE - gray with red staining, interbedded with red silty clay		20						
3570	SANDSTONE - dark red, hard, micaceous, dry			CORE		60/48		1	
	SANDSTONE - dark red, micaceous, hard, moist at bottom, clay lenses at top				FP-2A				
3565			25	CORE		60/60		200	
	SANDSTONE - dark red, hard, micaceous, thin clayey laminae, slightly moist				FP-2B				
3560			30	CORE		60/60		280	
	SANDSTONE - dark red, upper two feet is oily and moist, clayey lenses toward base				FP-2C				
3555			35	CORE		60/60		320	
	SANDSTONE - red, hard, dry, micaceous, clayey with clay laminae at base				FP-2D				
3550			40	CORE		60/60		3	
	Total depth = 43.5 feet BLS								▽ Water level 43. 0 feet BLS after 16 hours

DRILLING CONTRACTOR: SH&B

DRILLER: E. Adams

DRILLING METHOD: NQ Core Barrel

DRILLING EQUIPMENT: CME-55

COMMENTS: Boring located east of Filter Collection Area.

HALLIBURTON NUS *Environmental Corporation*

BORING FP-3 SHEET 1 OF 1

PROJECT Transwestern Pipeline Company

LOCATION Carlsbad, New Mexico

COORDINATES N 9,883 E 9,424

PROJECT NUMBER 1548

SURFACE ELEVATION 3594.3 DATUM MSL

LOGGED BY L. Basilio DATE DRILLED 8/7/92

ELEVATION FEET	SOIL DESCRIPTION	STRATA	Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	PID/FID (ppm)	REMARKS
	GROUND SURFACE Tan, dry, rocky soil			AUGER				0/0	Surface Conditions: sparse vegetation, dry rocky soil.
3590			5						Auger to 4 feet BLS.
	SANDSTONE - tan, cemented, brown calcareous laminae and inclusions, slightly moist at top			CORE		54/24		0/0	
3585	SANDSTONE - tan, slightly red towards base, hard, slightly clayey, dry, slightly moist at top, slightly friable with black and white inclusions towards base, broken		10	CORE		60/48		0/0	
3580	SANDSTONE - light red with gray to tan tint, dry, calcareous lenses SANDSTONE - gray with red tint, dry SANDSTONE - light red, dry, hard, tan inclusions, very broken		15	CORE		60/54		0/0	
3575	SANDSTONE - light red to gray, moist at top, broken		20						
	SANDSTONE - red, dry, slightly clayey, slightly friable, black nodules at top and base SANDSTONE - gray to tan, crumbly, dry, broken			CORE		60/54		0/0	
3570	SANDSTONE - red, dry, massive, micaceous		25	CORE		60/54		1/0	
	SANDSTONE - red, clayey, clay laminae, slightly moist				FP-3A				
3565	CLAY - red, moist, sandy lenses		30						
	SANDSTONE - red, hard, slightly moist, micaceous, occasional clayey laminae			CORE		60/60		70/50	
3560			35						Interval from 33.5 feet to 39 feet not sampled.
3555	SANDSTONE - red, massive, micaceous, clayey lenses at top, moist at top		40		FP-3B				
				CORE		54/48		200/450	
3550			45						
	CLAY - red hard, silty, moist, gray clay laminae			CORE	FP-3C	54/54		0/10	▽ Water level 45.6 feet BLS after 1 hour
	SILTSTONE - red, clayey, hard, dry Total depth = 48 feet BLS								

DRILLING CONTRACTOR: SH&B

DRILLER: E. Adams

DRILLING METHOD: NQ Core Barrel

DRILLING EQUIPMENT: CME-55

COMMENTS: Boring originally drilled to 33.5 feet BLS on 8/7/92 where hole conditions did not permit further drilling at that time. Boring continued 5 feet to west in auger hole which was previously drilled on 7/23/92 to 38 feet BLS. Continue coring from 39 feet BLS.

HALLIBURTON NUS *Environmental Corporation*

BORING FP-4 SHEET 1 OF 1

PROJECT Transwestern Pipeline Company

LOCATION Carlsbad, New Mexico

COORDINATES N 9,927 E 9,486

PROJECT NUMBER 1548

SURFACE ELEVATION 3591.0 DATUM MSL

LOGGED BY L. Basilio DATE DRILLED 8/11/92

ELEVATION FEET	SOIL DESCRIPTION	STRATA	SAMPLE INFORMATION: Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	PID/FID (ppm)	REMARKS
	GROUND SURFACE								
3590	Tan dry rocky soil			AUGER				0/0	Surface Conditions: sparse vegetation, dry rocky soil.
			5						Auger to 4 feet BLS.
3585	SANDSTONE - tan to gray with red staining, dry, broken at top, friable, brown limestone lenses and nodules			CORE		54/42		0/0	
	SANDSTONE - tan, hard, broken, dry, moist at top, abundant brown limestone nodules at top, chalky towards base		10						
3580				CORE		60/54		1/0	
	SANDSTONE - tan with red tint, grades to red, hard, chalky		15						
3575	SANDSTONE - red, slightly micaceous, silty, dry, broken			CORE		60/60		0/1	
	SANDSTONE - red, clayey with clay lenses, slightly moist		20						
3570	SANDSTONE - light to dark red to golden, hard, massive, micaceous, dry, occasional clay laminae			CORE		60/60		0/1	
	SANDSTONE - red, clayey, broken, dry		25						
3565	SANDSTONE - dark red, hard, micaceous, slightly friable, dry, occasional clay laminae			CORE		60/48		0/0	
	SANDSTONE - dark red, hard, micaceous, slightly friable, occasional clay laminae at top				FP-4A				
3560			30	CORE		60/60		3/2	
					FP-4B				
			35						
3555	SANDSTONE - red, hard, moist								
	SANDSTONE - red, hard, dry, occasional clay laminae			CORE		78/54		0/1	
			40						
	Total depth = 40 feet BLS								

DRILLING CONTRACTOR: SH&B

DRILLER: E. Adams

DRILLING METHOD: NQ Core Barrel

DRILLING EQUIPMENT: CME-55

COMMENTS: Boring located east of Filter Collection Area.

HALLIBURTON NUS *Environmental Corporation*

BORING FP-5 SHEET 1 OF 1

PROJECT Transwestern Pipeline Company

LOCATION Carlsbad, New Mexico

COORDINATES N 9,934 E 9,399

PROJECT NUMBER 1548

SURFACE ELEVATION 3593.5 DATUM MSL

LOGGED BY L. Basilio DATE DRILLED 8/12/92

ELEVATION FEET	SOIL DESCRIPTION	STRATA	Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	PID/FID (ppm)	REMARKS
	GROUND SURFACE								
	Tan dry rocky soil			AUGER				0/0	Surface Conditions: Vegetation, dry rocky soil
3590									
	SANDSTONE - tan, clayey, broken, caliche nodules, friable and chalky towards base		5	CORE		54/42		0/0	Auger to 4 feet BLS
3585									
	SANDSTONE - tan, slightly moist, clayey, broken		10	CORE		60/54		0/0	
	SANDSTONE - tan, also light red at top, dry, very friable and broken at top, friable to chalky at base				FP-5A				
3580			15	CORE		60/36		35/7	
	SANDSTONE - tan to light red, clayey, slightly moist, brown to dark green limestone inclusions								
3575	SANDSTONE - gray with red tint, very friable, broken, red clayey sand at base				FP-5B				
	SANDSTONE - red, moist, broken, clayey		20	CORE		60/48		55/15	
	SANDSTONE - red to tan, hard, slightly moist, white calcareous inclusions, vugs								
3570	SANDSTONE - red, dry, slightly friable, slightly clayey				FP-5C				
	SANDSTONE - red, clayey, very moist, oily		25	CORE		60/60		50/10	
	CLAY - red, silty, hard, oily, grades to red sandstone								
	SANDSTONE - red, hard, moist, slightly micaceous, oily and wet at bottom, golden tint to oily areas								
3565	No recovery in the 28.5 to 33.5 ft interval		30	CORE		60/0			
3560	Total depth = 33.5 feet								Drilling halted at 33.5 feet BLS due to auger refusal.

DRILLING CONTRACTOR: SH&B

DRILLER: E. Adams

DRILLING METHOD: NQ Core Barrel

DRILLING EQUIPMENT: CME-55

COMMENTS: Boring located west of Filter Collection Area.

HALLIBURTON NUS Environmental Corporation

BORING FP-6 SHEET 1 OF 1

PROJECT Transwestern Pipeline Company

LOCATION Carlsbad, New Mexico

COORDINATES N 9,849 E 9,417

PROJECT NUMBER 1548

SURFACE ELEVATION 3594.2 DATUM MSL

LOGGED BY L. Basilio DATE DRILLED 8/18/92

ELEVATION FEET	SOIL DESCRIPTION	STRATA	Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	PID/FID (ppm)	REMARKS
	GROUND SURFACE Tan dry rocky soil			AUGER				1/0	Surface Conditions: Vegetation, dry rocky soil.
3590			5						Auger to 4 feet BLS.
	SANDSTONE - tan with red tint, dry, broken, slightly friable, white caliche that increases with depth			CORE		54/24		0/0	
3585			10	CORE		60/24		0/0	
3580	SANDSTONE - tan to red, gray tint, dry, broken at top, slightly friable, slightly chalky, white caliche		15	CORE		60/54		0/0	
3575			20		FP-6A				
	SANDSTONE - red, dry, silty, slightly micaceous, chalky, grades to red brown sandstone			CORE		60/48		0/0	
3570	SANDSTONE - red brown with black and gold staining, very micaceous, dry, hard, slightly friable		25	CORE		60/54		0/0	
	SANDSTONE - red, micaceous, dry, clayey at base								
3565	CLAY - red, dry, sandstone lenses, broken, gray sandstone at base		30	CORE		60/42		0/0	
	SANDSTONE - light red, gray at top, red brown with depth, dry, micaceous, very friable, crumbly								
3560	SANDSTONE - red brown, damp, finer grained with depth, very micaceous, friable		35						
	SANDSTONE - red, damp, micaceous, very micaceous towards base, clay laminae in upper portion, occasional thin gray sandy lenses, damp to moist in upper section			CORE		78/78		0/0	
3555	SANDSTONE - red brown, very micaceous, damp, friable		40		FP-6B			2/0	
	Total depth = 40 feet BLS								

DRILLING CONTRACTOR: SH&B

DRILLER: R. Godfrey

DRILLING METHOD: NQ Core Barrel

DRILLING EQUIPMENT: CME-55

COMMENTS: Boring located south of Filter Collection Area.

HALLIBURTON NUS
Environmental Corporation

BORING FP-7 SHEET 1 OF 1

PROJECT Transwestern Pipeline Company

LOCATION Carlsbad, New Mexico

COORDINATES N 9,991 E 9,434

PROJECT NUMBER 1548

SURFACE ELEVATION 3591.5 DATUM MSL

LOGGED BY L. Basilio DATE DRILLED 8/25/92

ELEVATION FEET	SOIL DESCRIPTION	STRATA	SAMPLE INFORMATION: Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	PID/FID (ppm)	REMARKS
	GROUND SURFACE								
3590	Tan dry soil			AUGER				0/0	Surface Conditions: Sparse vegetation, dry rocky soil Auger to 4 feet BLS
	SANDSTONE - tan to off-white, dry, broken, chalky, white caliche			CORE		54/18		1/0	
3580	SANDSTONE - tan, pinkish, reddish tint, dry, broken, chalky, friable, abundant white caliche		10	CORE	FP-7A	60/36		5/1	
	SANDSTONE - tan to red, silty to clayey, slightly micaceous, damp in spots, white caliche nodules			CORE		60/60		2/0	
3570	SANDSTONE - red brown, dry, micaceous, friable, silty, interbedded with tan sandstone, occasional dark red dry clay laminae		20	CORE		60/48		2/0	
	SANDSTONE - red, damp, micaceous, massive, slightly friable, slightly clayey in spots, occasional clay laminae towards base			CORE		60/42		2/0	
3560	SANDSTONE - red, hard, damp, micaceous, massive, slightly clayey, occasional clay laminae towards base, 2-inch thick damp to moist silty clay at 32.5 feet		30	CORE		60/48		1/0	
	SANDSTONE - red, hard, clayey to silty, damp, slight micaceous, coarser and more micaceous towards base			CORE		60/60		1/1	
3550	SANDSTONE - red, damp to moist, micaceous, clayey, slightly friable		40	CORE	FP-7B	54/48		3/4	
	CLAYSTONE - dark red, dry to damp at top, very sandy at top, very broken to crushed			CORE	FP-7C	42/42		50/15	
	SILTSTONE - dark red, slightly micaceous, slightly moist, clayey laminae, even breaks along planes			CORE	FP-7D FP-7E	36/36		5/1 1/0	
	SANDSTONE - red, moist, micaceous, massive, coarser towards base, clay laminae in upper portion, oily along side of core, oil along fracture in sandstone at 45.5 feet		50						
	SANDSTONE - red. moist, silty, micaceous, oily along fractures								
	CLAYSTONE - red to gray, silty, micaceous, dry to damp								
	SANDSTONE - dark red, silty to clayey, micaceous, damp, slightly friable								
	Total Depth = 50 feet BLS								

DRILLING CONTRACTOR: SH&B

DRILLER: C. Elms

DRILLING METHOD: NQ Core Barrel

DRILLING EQUIPMENT: CME-55

COMMENTS: Boring located north of Filter Collection Area along fenceline.

HALLIBURTON NUS *Environmental Corporation*

BORING/WELL NUMBER **BP-1** SHEET **1** OF **1**

PROJECT **Transwestern Pipeline Company**

LOCATION **Carlsbad, New Mexico**

COORDINATES **N 9,960 E 9,338**

PROJECT NUMBER **1548**

SURFACE ELEVATION **3592.5** DATUM **MSL**

LOGGED BY **L. Basilio**

DATE DRILLED **8/12/92**

ELEVATION FEET	SOIL DESCRIPTION	STRATA	Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	PID/FID (ppm)	WELL CONSTRUCTION DETAIL & REMARKS
	GROUND SURFACE								T.O.C. Elev. 3594.67
	Tan dry soil			AUGER				0/0	Surface Conditions: Sparse vegetation, dry rocky soil
3590									Auger to 34 feet BLS
	SANDSTONE - tan to light gray, clayey, brown limestone laminae, hard to slightly friable at base, dry			CORE		54/36		0/0	
			10	CORE		60/24		0/0	2-inch Schedule 40 PVC riser
3580	SANDSTONE - tan, broken, white caliche nodules, dry								
	SANDSTONE - tan to light gray, broken, slightly moist, white caliche nodules			CORE		60/60		1/0	
	SANDSTONE - tan with red tint, slightly moist, fractured, chalky, white and brown limestone nodules, grades to red sandstone				BP-1C				
	SANDSTONE - red, clayey, slightly moist, occasional white limestone laminae, scattered black nodules		20	CORE		60/60		4/1	Portland Type I/II grout
3570	SANDSTONE - gray, hard, slightly moist				BP-1A				
	SANDSTONE - red to gray, grades to dark red, moist			CORE		60/60		50/8	
	SANDSTONE - dark red, slightly micaceous, clayey laminae, occasional gray sand lenses, moist and oily				BP-1B				
	CLAY - red, hard, oily		30	CORE		36/36		30/5	
3560	SANDSTONE - red to dark red with depth, micaceous, moist, oily, free product along core and in fractures, oil is golden to dark brown			CORE		54/0			Bentonite seal
	No sampling from 31.5 feet to 34 feet. Drilling ceased on 8/12/92 due to hole problems. On 8/27/92, 8-inch diameter augers were used to drill to 34 feet BLS. Coring resumed at this point.				BP-1D				
			40	CORE		60/48		60/25	
3550	SANDSTONE - red, hard, slightly micaceous, clayey, damp								10-20 silica sand filter pack
	SANDSTONE - red, very micaceous, broken, interbedded with red and gray clay			CORE		60/36		1/3	
	SANDSTONE - red, damp, micaceous, broken, silty				BP-1E				0.020 slot screen
	SANDSTONE - red, damp, micaceous, broken, silty to clayey		50	CORE		60/48		0/1	
3540	Total depth = 53.5 feet BLS								
	Monitor Well MW-1 was installed in Boring BP-1.								

DRILLING CONTRACTOR: **SH&B**

DRILLER: **E. Adams**

DRILLING METHOD: **NQ Core Barrel**

DRILLING EQUIPMENT: **CME-55**

DIAMETER, TYPE & INTERVAL OF CASING: **2-inch Schedule 40 PVC**

WELL SCREEN/INTERVAL: **0.020 Slot/43.5-53.5 feet BLS**

FILTER PACK-INTERVAL/QUANTITY: **10-20 Silica sand/41-53.5 feet BLS**

WELL SEAL-INTERVAL/QUANTITY: **Bentonite flakes/35-41 feet BLS**

HALLIBURTON NUS Environmental Corporation

BORING BP-2 SHEET 1 OF 1

PROJECT Transwestern Pipeline Company

LOCATION Carlsbad, New Mexico

COORDINATES N 9,929 E 9,290

PROJECT NUMBER 1548

SURFACE ELEVATION 3592.8 DATUM MSL

LOGGED BY L. Basilio DATE DRILLED 8/12/92

ELEVATION FEET	SOIL DESCRIPTION	STRATA	Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	PID/FID (ppm)	REMARKS
	GROUND SURFACE								
	Tan dry soil			AUGER				0/0	Surface Conditions: Sparse vegetation, dry rocky soil
3590									
			5						Auger to 4 feet BLS
				CORE		54/6		0/0	
3585									
	SANDSTONE - tan to light gray, broken, slightly clayey, limestone nodules, dry, friable and chalky towards base		10	CORE		60/48		0/0	
3580									
	SANDSTONE - light red to red at base, clayey, hard, broken, abundant white to brown calcareous nodules, damp		15	CORE		60/42		0/0	
3575									
	SANDSTONE - red, clayey to silty, clayey towards base, slightly micaceous in spots, moist, hard, slightly friable, gray sandy laminae in middle section, white nodules in lower section		20	CORE		60/60		1/0	
3570									
	SANDSTONE - gray, slightly clayey		25		BP-2A				
	CLAY - red to tan, broken, dry			CORE		60/60		65/40	
	SANDSTONE - red, hard, slightly micaceous, clayey laminae, wet to moist with oil in several spots								
3565					BP-2B				
	SANDSTONE - dark red, moist to wet with oil		30						
	CLAY - dark red brown, indurated, silty, broken, oily			CORE		60/60		150/100	
3560									
	SANDSTONE - red, micaceous, clayey laminae, oily at top				BP-2C				
	SANDSTONE - red, hard, micaceous, clayey laminae at top, oil along fractures at 36 feet		35	CORE		60/60		22/9	
3555									
	SANDSTONE - red, hard, massive, micaceous, oily interval at 39.5 to 40.5 feet, occasional clay laminae, red to black broken sandy clay at base		40		BP-2D				
				CORE		60/60		48/25	
3550									
	SANDSTONE - red brown, hard, massive, micaceous, clayey laminae in lower section				BP-2E				
	Red and black sandy clay lens, 2 inches thick		45						▽ Water level 44.6 feet BLS after 22 hours
				CORE		60/60		3/3	
3545									
	Total Depth = 48.5 feet BLS								

DRILLING CONTRACTOR: SH&B

DRILLER: E. Adams

DRILLING METHOD: NQ Core Barrel

DRILLING EQUIPMENT: CME-55

COMMENTS: Boring located west of Burn Collection Area.

HALLIBURTON NUS
Environmental Corporation

BORING BP-3 SHEET 1 OF 1
PROJECT Transwestern Pipeline Company
LOCATION Carlsbad, New Mexico
COORDINATES N 9,989 E 9,339
PROJECT NUMBER 1548
SURFACE ELEVATION 3591.8 DATUM MSL
LOGGED BY L. Basilio DATE DRILLED 8/14/92

ELEVATION FEET	SOIL DESCRIPTION	STRATA	Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	PID/FID (ppm)	REMARKS
	GROUND SURFACE								
3590	Tan dry soil			AUGER				0/0	Surface Conditions: Vegetation, dry rocky soil
			5						Auger to 4 feet BLS
3585	SANDSTONE - off-white to tan, calcareous, hard, broken, caliche			CORE		54/12		0/0	
	SANDSTONE - tan with red tint, red with depth, damp, moderately hard, slightly friable, caliche		10	CORE		60/48		0/0	
3580	SANDSTONE - light red to red at base, tan to gray mottling, slightly clayey, damp in spots, abundant white and brown nodules, silty and slightly chalky at base, occasional black nodules		15	CORE		60/60		0/0	
3575			20	CORE		60/18		0/0	
3570	SILTSTONE - red, slightly micaceous, sandy in spots		25	CORE		60/36		0/1	
3565	SANDSTONE - light to dark red, micaceous, silty, broken, friable			CORE	BP-3A	30/24		0/0	
	SILTSTONE - dark red, clayey, slightly fissile, broken, red micaceous sandstone at base		30	CORE		12/12		0/0	
	SANDSTONE - red, hard, moist, clayey, wet clay at base				BP-3B				
3560	Interval from 31 to 32.5 feet not sampled due to hole problems. Auger to 32.5 feet and resume coring at that point.		35	CORE		66/60		0/10	
	SANDSTONE - red, hard, dry to damp at base, slightly clayey, micaceous at base				BP-3C				
3555			40	CORE		48/48		0/2	
3550	SANDSTONE - red brown, hard, massive, micaceous, wet at bottom, sandy clay at base								
	Total depth = 43 feet BLS								

DRILLING CONTRACTOR: SH&B
DRILLER: R. Godfrey
DRILLING METHOD: NQ Core Barrel
DRILLING EQUIPMENT: CME-55

COMMENTS: Boring located north of Burn Collection Area.

HALLIBURTON NUS *Environmental Corporation*

BORING **BP-4** SHEET **1** OF **1**

PROJECT **Transwestern Pipeline Company**

LOCATION **Carlsbad, New Mexico**

COORDINATES **N 9,929 E 9,257**

PROJECT NUMBER **1548**

SURFACE ELEVATION **3592.5** DATUM **MSL**

LOGGED BY **L. Basilio**

DATE DRILLED **8/15/92**

ELEVATION FEET	SOIL DESCRIPTION	STRATA	SAMPLE INFORMATION: Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	PID/FID (ppm)	REMARKS
	GROUND SURFACE								
	Brown dry rocky soil			AUGER				0/0	Surface Conditions: Sparse vegetation, dry rocky soil
3590									
									Auger to 4 feet BLS
			5						
	SANDSTONE - tan to gray to off-white, hard, dry, chalky, caliche			CORE		54/24		0/0	
3585									
			10						
	SANDSTONE - tan with red tint, grades to red with depth, dry, chalky, broken, slightly friable			CORE		60/30		0/0	
3580									
			15						
	SANDSTONE - red, hard, damp, friable, silty, slightly micaceous			CORE		60/54		0/0	
3575	SANDSTONE - red, broken, slightly clayey to silty								
			20						
	SANDSTONE - red, damp, silty to very silty, slightly micaceous, grades to siltstone in spots, brown calcareous laminae and nodules			CORE		60/60		0/0	
3570									
			25						
	SANDSTONE - red, hard, tan mottling, pitted, slightly micaceous			CORE		42/18		0/0	
3565	SANDSTONE - red, silty, crushed, large white limestone nodules			CORE		12/ 3		0/0	
	SANDSTONE - red to gray at base, hard, micaceous, gray and red clayey lenses, damp		30						Auger to 29 feet BLS. No samples collected in the 28 to 29 foot interval due to auger refusal.
				CORE		54/48		0/0	
3560	CLAY - red with red and gray sandy lenses, broken, slightly fissile, micaceous, dry								
	SANDSTONE - red, hard, micaceous, dry, occasional clay laminae towards base, broken along bedding planes		35						
				CORE		78/60		0/0	
3555									
	SANDSTONE - dark red, damp, slightly clayey, silty, moderately hard				BP-4A			0/0	
	Total depth = 40 feet BLS		40						

DRILLING CONTRACTOR: **SH&B**

DRILLER: **R. Godfrey**

DRILLING METHOD: **NQ Core Barrel**

DRILLING EQUIPMENT: **CME-55**

COMMENTS: **Boring located west of Burn Collection Area.**

HALLIBURTON NUS
Environmental Corporation

BORING **BP-5** SHEET **1** OF **1**

PROJECT **Transwestern Pipeline Company**

LOCATION **Carlsbad, New Mexico**

COORDINATES **N 9,916 E 9,368**

PROJECT NUMBER **1548**

SURFACE ELEVATION **3593.6** DATUM **MSL**

LOGGED BY **L. Basilio**

DATE DRILLED **8/16/92**

ELEVATION FEET	SOIL DESCRIPTION	STRATA	Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	PID (ppm)	REMARKS
	GROUND SURFACE Tan dry rocky soil			AUGER				0	Surface Conditions: Sparse vegetation, dry rocky soil
3590									Auger to 4 feet BLS
			5	CORE		54/18		0	FID not operational
3585	SANDSTONE - tan to off-white, hard, very broken, white caliche				BP-5A				
			10	CORE		54/24		8	
3580	SANDSTONE - gray with natural black staining, broken, friable, wet, dark gray to tan with black naturally stained caliche at top								
	No samples collected in the 13 to 15 foot interval due to hole problems		15		BP-5B				
	SANDSTONE - gray to green to tan, natural black staining, moderately hard, fractured, moist to wet in spots with greenish yellow slightly oily liquid, abundant black to white to brown nodules			CORE		42/42		20	
3575					BP-5C				
			20	CORE		60/48		15	
	SANDSTONE - red, gray green at 22.5 feet, silty, fractured, slightly friable, moist to wet with green yellow oily liquid				BP-5D				
3570	SANDSTONE - red to gray, micaceous, moderately hard, slightly friable, moist, occasionally wet with green yellow oil		25	CORE		42/24		10	
				CORE	BP-5E	18/18		20	
3565	SANDSTONE - dark red brown, micaceous, very friable, moist				BP-5F				
	SANDSTONE - gray black, black staining, micaceous, crumbly, very friable, wet with oil		30	CORE		54/54		50	
	SANDSTONE - red, hard, massive, micaceous, occasional clay laminae, clay lens at base, wet with oil on side of core								
3560									
	No samples collected in the 33 to 35 foot interval due to hole problems		35		BP-5G				
	SANDSTONE - red, slightly micaceous, slightly clayey, oily in upper 2 feet								
3555				CORE		10/02		38	
			40						
	SANDSTONE - gray, micaceous, damp, slightly friable				BP-5H			0	
	SANDSTONE - dark red brown, hard, micaceous, slightly friable								
	Total depth = 43.5 feet BLS								

DRILLING CONTRACTOR: **SH&B**

DRILLER: **R. Godfrey**

DRILLING METHOD: **NQ Core Barrel**

DRILLING EQUIPMENT: **CME-55**

COMMENTS: **Boring located east of Burn Collection Area.**

HALLIBURTON NUS
Environmental Corporation

BORING **BP-6** SHEET **1** OF **1**

PROJECT **Transwestern Pipeline Company**

LOCATION **Carlsbad, New Mexico**

COORDINATES **N 9,835 E 9,346**

PROJECT NUMBER **1548**

SURFACE ELEVATION **3593.7** DATUM **MSL**

LOGGED BY **L. Basilio**

DATE DRILLED **8/17/92**

ELEVATION FEET	SOIL DESCRIPTION	STRATA	SAMPLE INFORMATION: Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	PID (ppm)	REMARKS
	GROUND SURFACE								
	Brown moist soil			AUGER				0/0	Surface Conditions: Sparse vegetation, dry rocky soil
3590	Tan dry rocky cuttings		5						
3585			10						Auger to 10 feet BLS
	SANDSTONE - tan with red tint, dry, friable, crumbly, white caliche nodules			CORE		42/36		0/0	
3580	SANDSTONE - red, tan tint, hard, broken, abundant white caliche nodules		15	CORE		60/48		0/0	
3575					BP-6A				
	SANDSTONE - red, hard, dry, silty, slightly micaceous, broken, fractured		20	CORE		60/60		0/0	
3570	SANDSTONE - red, hard, slightly micaceous, clayey laminae, dry, 1 inch clay seam at base								
	SANDSTONE - dark red, massive, hard, very micaceous, dry		25	CORE		60/60		0/0	
3565	SANDSTONE - red, dry, clayey laminae								
	SANDSTONE - gray, dry, micaceous, friable		30	CORE		60/60		0/0	
	CLAY - red, hard, gray sandy lenses, grades to sandstone at base								
3560	SANDSTONE - red, clayey, clay seams, slightly micaceous, grades to dark red sandstone		35	CORE		78/78		0/0	
3555					BP-6B				
	Total depth = 40 feet BLS		40						

DRILLING CONTRACTOR: **SH&B**

DRILLER: **R. Godfrey**

DRILLING METHOD: **NQ Core Barrel**

DRILLING EQUIPMENT: **CME-55**

COMMENTS: **Boring located south of Burn Collection Area.**

HALLIBURTON NUS *Environmental Corporation*

BORING O-1 SHEET 1 OF 1

PROJECT Transwestern Pipeline Company

LOCATION Carlsbad, New Mexico

COORDINATES N 10,037 E 9,435

PROJECT NUMBER 1548

SURFACE ELEVATION 3590.9 DATUM MSL

LOGGED BY L. Basilio DATE DRILLED 9/1/92

ELEVATION FEET	SOIL DESCRIPTION	STRATA	Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	PID/FID (ppm)	REMARKS
	GROUND SURFACE								
3590	Tan dry sandy soil			AUGER				0/0	Surface Conditions: Sparse vegetation, moist rocky soil
									Auger to 4 feet BLS
	SANDSTONE - off-white, very broken, dry, white caliche			CORE		54/18		0/0	
	SANDSTONE - tan to off-white, reddish with depth, broken at top, hard, white caliche		10	CORE		60/54		0/0	
3580	SANDSTONE - tan to light red, grades to red tan, dry, silty to clayey, white caliche			CORE		60/60		0/0	
	SANDSTONE - red tan, dry, slightly chalky, white caliche				O-1A				
3570	SANDSTONE - red brown, micaceous to very micaceous in spots, damp, occasional clay laminae		20	CORE		60/54		2/1	
	SANDSTONE - red to tan, dry, slightly micaceous, occasional caliche			CORE		60/0			
	No recovery in the 23.5 to 38.5 foot interval due to mechanical problems with the core barrel sampling system		30	CORE		60/0			
3560				CORE		60/0			
			40	CORE		60/6		1/0	
3550	SANDSTONE - red, micaceous, damp to wet, broken			CORE	O-1B	60/18		3/0	▽ Water level 46.7 feet BLS after 18.5 hours
	Total depth = 48.5 feet BLS								

DRILLING CONTRACTOR: SH&B

DRILLER: C. Elms

DRILLING METHOD: NQ Core Barrel

DRILLING EQUIPMENT: CME-55

COMMENTS: Boring located off-site on BLM land north of WT-1 site.

HALLIBURTON NUS *Environmental Corporation*

BORING O-2 SHEET 1 OF 1

PROJECT Transwestern Pipeline Company

LOCATION Carlsbad, New Mexico

COORDINATES N 10,033 E 9,449

PROJECT NUMBER 1548

SURFACE ELEVATION 3591.1 DATUM MSL

LOGGED BY L. Basilio DATE DRILLED 9/2/92

ELEVATION FEET	SOIL DESCRIPTION	STRATA	SAMPLE INFORMATION: Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	PID/FID (ppm)	REMARKS
	GROUND SURFACE								
3590	Tan dry soil			AUGER				0/0	Surface Conditions: Sparse vegetation, dry rocky soil
	No recovery in the 4 to 8.5 foot interval.			CORE		54/0			Auger to 4 feet BLS
3580	SANDSTONE - tan, pinkish to off-white, dry, broken, white caliche		10	CORE		60/36		1/0	
	SANDSTONE - tan to pinkish to reddish, dry, broken at top, white caliche, silty, slightly micaceous			CORE	O-2A	60/48		5/1	
3570	SANDSTONE - gray with tan tint, dry, hard, slightly friable, micaceous, coarser with depth, occasional red clay laminae at base grades to claystone		20	CORE		60/60		0/0	
	CLAYSTONE - red to gray, dry, very silty to sandy, micaceous, grades to red sandstone			CORE		60/54		1/1	
	SANDSTONE = red, dry, broken								
3560	SANDSTONE - tan to gold to gray, coarse, very micaceous, friable, grades to red sandstone		30	CORE		60/48		0/0	
	SANDSTONE - red, damp, silty, micaceous, occasional red clay laminae, coarse at top and base			CORE		60/18		1/1	
	SANDSTONE - gray, dry, very micaceous, friable, silty								
3550	SANDSTONE - red brown, dry, very micaceous, very friable, occasional red clay laminae, silty		40	CORE	O-2B	60/48		0/5	
	SANDSTONE - red, dry, micaceous, very friable, crumbly, occasional gray sandstone								
	SANDSTONE - red, damp, micaceous, clayey to silty, broken			CORE	O-2C	42/30		1/2	
	SANDSTONE - red brown, gold tint, very micaceous, hard, occasional clay laminae. dry								
	SANDSTONE - red, broken, moist to damp, silty, micaceous								
	Total depth = 47 feet BLS								

DRILLING CONTRACTOR: SH&B

DRILLER: C. Elms

DRILLING METHOD: NQ Core Barrel

DRILLING EQUIPMENT: CME-55

COMMENTS: Boring located off-site on BLM land north of WT-1 site.

HALLIBURTON NUS *Environmental Corporation*

BORING O-3 SHEET 1 OF 1

PROJECT Transwestern Pipeline Company

LOCATION Carlsbad, New Mexico

COORDINATES N 10,015 E 9,352

PROJECT NUMBER 1548

SURFACE ELEVATION 3591.1 DATUM MSL

LOGGED BY L. Basilio DATE DRILLED 9/2/92

ELEVATION FEET	SOIL DESCRIPTION	STRATA	SAMPLE INFORMATION: Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	PID/FID (ppm)	REMARKS
	GROUND SURFACE								
3590	Tan dry sandy soil			AUGER				0/0	Surface Conditions: Sparse vegetation, dry rocky soil
									Auger to 4 feet BLS
				CORE		54/18		0/1	
	SANDSTONE - tan to off-white, dry, hard, broken, white caliche								
3580	SANDSTONE - tan to off-white, reddish tint towards base, dry, hard, white caliche, slightly chalky		10	CORE		60/48		0/2	
	SANDSTONE - tan to light red to red at base, dry, broken, white caliche, slightly chalky			CORE		60/60		0/0	
3570	SANDSTONE - red, dry, broken, silty, borders on siltstone		20	CORE		60/48		0/0	
	SANDSTONE - red, damp, silty to clayey, very friable, crumbly, very broken, occasional red clay and gray sandstone at base			CORE		42/36		0/0	
	SANDSTONE - red and gray, damp, micaceous, friable, crumbly, grades to gray sandstone at base.			CORE	O-3A	60/54		1/0	
3560	SANDSTONE - gray, dry, micaceous, silty, occasionally clayey at base, friable to crumbly		30						
	CLAYSTONE - red, dry, interbedded with gray sandstone			CORE		78/24		0/1	
	SANDSTONE - red, damp,micaceous, silty, occasional clay laminae								
3550			40	CORE		60/12		0/0	
	SANDSTONE - red, damp, micaceous, friable				O-3B				
	SANDSTONE - dark red brown, damp, micaceous, friable, broken			CORE		60/48		3/1	Water level 46.1 feet BLS after 14.5 hours
	SANDSTONE - red, moist, core coated with oil		50	CORE	O-3C	30/24		180	FID not operational
	Total depth = 51 feet BLS								

DRILLING CONTRACTOR: SH&B

DRILLER: C. Elms

DRILLING METHOD: NQ Core Barrel

DRILLING EQUIPMENT: CME-55

COMMENTS: Boring located off-site on BLM land north of WT-1 site.

HALLIBURTON NUS
Environmental Corporation

BORING O-4 SHEET 1 OF 1

PROJECT **Transwestern Pipeline Company**

LOCATION **Carlsbad, New Mexico**

COORDINATES **N 10,058 E 9,364**

PROJECT NUMBER **1548**

SURFACE ELEVATION **3590.2** DATUM **MSL**

LOGGED BY **L. Basilio**

DATE DRILLED **10/19/92**

ELEVATION FEET	SOIL DESCRIPTION	STRATA	SAMPLE INFORMATION: Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	PID (ppm)	REMARKS
	GROUND SURFACE								
	Tan dry rocky soil			AUGER					Surface Conditions: Sparse vegetation, dry rocky soil
	SANDSTONE - tan to white, poorly consolidated, silty, dry, slightly micaceous, slightly indurated in spots			SPT		24/24		1	Auger to 5 feet BLS
	SANDSTONE - A/A, harder, caliche present			SPT		24/18		0	
3580	SANDSTONE - red to tan to off-white, hard, friable white caliche abundant towards base		10	CORE		60/54		0	
	SANDSTONE - red brown, hard, slightly micaceous, friable, slightly clayey in spots, abundant caliche			CORE		60/48		1	
3570	SANDSTONE - red brown, gray, pinkish in spots, medium to coarse grained, friable, micaceous, 3-inch thick gray brown siltstone at 22.5 ft		20	CORE		60/60		1	
	SANDSTONE - red brown to light gray, medium grained, slightly friable, micaceous, slightly clayey			CORE		60/60		0	
3560	SANDSTONE - red brown, damp, friable, micaceous, clayey, clay laminae		30	CORE		60/60		0	
	CLAY - red, silty, broken, interbedded with gray sandstone				O-4A				
	SANDSTONE - dark red brown, micaceous, clayey, clay laminae, damp			CORE		60/60		20	
	SANDSTONE - dark red, silty, micaceous, clay laminae, damp, core surface moist in spots				O-4B				
3550	SANDSTONE red brown, very micaceous, clayey, damp		40	CORE		60/60		50	
	SANDSTONE - dark red, micaceous, fine grain, friable, very clayey, clay laminae, damp			CORE		60/60		80	▽ Water level 45.8 ft BLS after 14 hours
	SANDSTONE - A/A, moist in spots								
	CLAY - dark red, silty broken, damp								
	SILTSTONE - red, interbedded with gray sandstone								
	Total depth = 49 feet BLS								

DRILLING CONTRACTOR: **Layne Environmental**

DRILLER: **W. Cowsur**

DRILLING METHOD: **NWD4 Core Barrel**

DRILLING EQUIPMENT: **Mobile B-61**

COMMENTS: **Boring located off-site on BLM land north of WT-1 site.**

HALLIBURTON NUS
Environmental Corporation

BORING O-5 SHEET 1 OF 1
PROJECT Transwestern Pipeline Company
LOCATION Carlsbad, New Mexico
COORDINATES N 10,081 E 9,447
PROJECT NUMBER 1548
SURFACE ELEVATION 3590.4 DATUM MSL
LOGGED BY L. Basilio DATE DRILLED 10/20/92

ELEVATION FEET	SOIL DESCRIPTION	STRATA	SAMPLE INFORMATION: Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	PID (ppm)	REMARKS
	GROUND SURFACE Tan dry rocky soil			AUGER					Surface Conditions: Sparse vegetation, dry rocky soil
	SANDSTONE - tan to off-white, pinkish tint with depth,broken, hard, dry, slightly friable and silty, white caliche			SPT		24/18		1	Auger to 5 feet BLS
3580			10	CORE		60/24		0	
	SANDSTONE - tan to off-white, pinkish tint, dry, very broken at top, hard, slightly friable, white caliche			CORE		60/48		1	
3570	SANDSTONE - light red to tan, darker red at base, pinkish tint, dry to damp, pitted, hard, friable in spots, abundant caliche, white and black calcareous nodules		20	CORE		60/60		0	
				CORE		60/60		0	
	SANDSTONE - red brown, medium grained, dry, moderately friable, gypsum flakes, calcite filled 45 degree fracture at 27 feet								
3560	SANDSTONE - light red brown, red at base, medium grained, hard, micaceous, silty, slightly friable		30	CORE		60/36		0	
	SANDSTONE - red, dry, hard, micaceous, slightly friable, silty to clayey, abundant clay laminae and inclusions			CORE		60/60		0	
3550	SANDSTONE - dark red, damp, micaceous, slightly friable, clay laminae, silty, grades to siltstone in spots (<1/4-inch thick layers)		40	CORE		60/60		1	
	SANDSTONE - red, hard, damp, micaceous, silty, occasional clay laminae				O-5A				
				CORE		60/36		20	
				CORE		24/24		20	▽ Water level 46.9 ft BLS after 21 hours
	Total depth = 49 feet BLS								

DRILLING CONTRACTOR: Layne Environmental
DRILLER: W. Cowsur
DRILLING METHOD: NWD4 Core Barrel
DRILLING EQUIPMENT: Mobile B-61

COMMENTS: Boring located off-site on BLM land north of WT-1 site.

HALLIBURTON NUS
Environmental Corporation

BORING O-6 SHEET 1 OF 1
PROJECT Transwestern Pipeline Company
LOCATION Carlsbad, New Mexico
COORDINATES N 10,023 E 9,522
PROJECT NUMBER 1548
SURFACE ELEVATION 3590.1 DATUM MSL
LOGGED BY L. Basilio DATE DRILLED 10/20/92

ELEVATION FEET	SOIL DESCRIPTION	STRATA	SAMPLE INFORMATION: Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	FID (ppm)	REMARKS
	GROUND SURFACE Tan dry rocky soil			AUGER					Surface Conditions: Sparse vegetation, dry rocky soil
	SANDSTONE - off-white to tan, light red with depth, slight pink tint, very broken, dry, caliche towards base			SPT		24/18		0	Auger to 5 feet BLS
				SPT		24/12		0	
3580			10	CORE		60/18		1	
	SANDSTONE - off-white to red with depth, pink tint, hard, dry, massive white caliche			CORE		42/42		1	
3570	SANDSTONE - red brown, micaceous, dry, clayey, white caliche at base		20						
	SANDSTONE - light red brown, dry, micaceous, very friable, clayey and broken at base			CORE		60/60		0	
	SANDSTONE - red brown, damp, slightly micaceous, friable			CORE		60/48		0	
	SANDSTONE - A/A, interbedded with dark red brown siltstone								
3560	SANDSTONE - red brown, damp, micaceous, friable, occasional clay laminae		30	CORE		60/48		0	
	SANDSTONE - dark red, damp, micaceous, friable, broken at top, clay laminae			CORE		60/60		1	
3550	SANDSTONE - red brown, damp, silty, micaceous, friable, clay laminae		40		O-6A				
				CORE		60/60		1	
	SILTSTONE - dark red, hard, interbedded with clay and sandstone								▽ Water level 44.6 ft BLS after 18 hours
	SANDSTONE - red, damp, friable, micaceous, occasional clay laminae			CORE		60/54		0	
	Total depth = 49 feet BLS								

DRILLING CONTRACTOR: Layne Environmental
DRILLER: W. Cowsur
DRILLING METHOD: NWD4 Core Barrel
DRILLING EQUIPMENT: Mobile B-61

COMMENTS: Boring located off-site on BLM land north of WT-1 site.

HALLIBURTON NUS
Environmental Corporation

BORING O-7 SHEET 1 OF 1
PROJECT Transwestern Pipeline Company
LOCATION Carlsbad, New Mexico
COORDINATES N 10,082 E 9,520
PROJECT NUMBER 1548
SURFACE ELEVATION 3589.1 DATUM MSL
LOGGED BY L. Basilio DATE DRILLED 10/20/92

ELEVATION FEET	SOIL DESCRIPTION	STRATA	Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	FID (ppm)	REMARKS
	GROUND SURFACE Tan dry rocky soil			AUGER					Surface Conditions: Sparse vegetation, dry rocky soil
	SANDSTONE - tan to off-white, pink tint with depth, broken, dry, white caliche			SPT		24/18		0	Auger to 5 feet BLS
				SPT		24/18		0	
3580			10	CORE		60/42		0	
	SANDSTONE - light tan, off-white, pink tint, dark red at base, dry, hard, broken at base, white caliche			CORE		60/60		0	
3570	SANDSTONE - red to off-white, hard, silty, clay laminae, abundant white caliche, gypsum flakes, grades to red brown sandstone		20	CORE		60/60		0	
	SANDSTONE - red brown, grades to brown in spots, medium grained, micaceous, slightly friable			CORE		60/60		0	
3560	SANDSTONE - red brown, dark red brown at top, hard, dry, friable, interbedded with clay seams, very friable with calcite seams at top		30	CORE		60/60		0	
	SANDSTONE - red, damp, slightly micaceous and friable, occasional clay laminae			CORE		60/54		0	
	SANDSTONE - red brown, damp, slightly micaceous, clayey at top, occasional silt laminae at top				O-7A				
3550	SANDSTONE - red, damp to moist, micaceous, slightly friable, clayey laminae		40	CORE		60/60		0	
				CORE		60/60		0	▽ Water level 44.4 ft BLS after 15.5 hours
	Total depth = 49 feet BLS								

DRILLING CONTRACTOR: Layne Environmental
DRILLER: W. Cowsur
DRILLING METHOD: NWD4 Core Barrel
DRILLING EQUIPMENT: Mobile B-61

COMMENTS: Boring located off-site on BLM land north of WT-1 site.

HALLIBURTON NUS
Environmental Corporation

BORING **O-8** SHEET **1** OF **1**

PROJECT **Transwestern Pipeline Company**

LOCATION **Carlsbad, New Mexico**

COORDINATES **N 10,144 E 9,508**

PROJECT NUMBER **1548**

SURFACE ELEVATION **3589.1** DATUM **MSL**

LOGGED BY **L. Basilio**

DATE DRILLED **10/21/92**

ELEVATION FEET	SOIL DESCRIPTION	STRATA	SAMPLE INFORMATION: Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer / Blow Counts	FID (ppm)	REMARKS
	GROUND SURFACE Tan dry rock soil			AUGER					Surface Conditions: Sparse vegetation, dry rocky soil
3580	SANDSTONE - tan to off-white, dry, hard, broken at top, slightly friable, white caliche		10	CORE		60/30		0	Auger to 9 feet BLS
	SANDSTONE - red, darker red towards base, pink tint, dry, hard, slightly friable, abundant white caliche, occasional black staining at base			CORE		60/60		1	
3570	SANDSTONE - red to tan, dry, hard, broken in upper section, slightly micaceous, white caliche at top, gypsum flakes		20	CORE		60/54		1	
	SANDSTONE - brown, dry, hard, micaceous, slightly friable, gray siltstone at base, gypsum flakes			CORE		60/54		0	
3560	SANDSTONE - light brown, dry, very micaceous, very friable, gypsum flakes, clay lamina towards base SANDSTONE - red brown, dry, micaceous, slightly friable, gypsum flakes, occasional clay laminae towards base		30	CORE		60/60		0	
				CORE		60/48		0	
3550	SANDSTONE - dark red, damp, very friable, very micaceous SANDSTONE - red, damp, silty, micaceous, slightly friable, clay laminae towards base		40	CORE	O-8A	60/60		0	
	SILTSTONE - dark red, broken, damp, very clayey, grades to clay in parts, occasional gray sandstone lenses			CORE		60/60		0	▽ Water level 46.7 ft BLS after 16 hours
	SANDSTONE - red damp, micaceous, friable								
	CLAY - dark red, silty, sandy, broken								
	SANDSTONE - red, silty, micaceous, core wet on surface								
	Total depth = 49 feet BLS								

DRILLING CONTRACTOR: **Layne Environmental**

DRILLER: **W. Cowsur**

DRILLING METHOD: **NWD4 Core Barrel**

DRILLING EQUIPMENT: **Mobile B-61**

COMMENTS: **Boring located off-site on BLM land north of WT-1 site.**

HALLIBURTON NUS *Environmental Corporation*

BORING O-9 SHEET 1 OF 1

PROJECT Transwestern Pipeline Company

LOCATION Carlsbad, New Mexico

COORDINATES N 10,075 E 9,262

PROJECT NUMBER 1548

SURFACE ELEVATION 3590.7 DATUM MSL

LOGGED BY L. Basilio

DATE DRILLED 10/21/92

ELEVATION FEET	SOIL DESCRIPTION	STRATA	SAMPLE INFORMATION: Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	FID (ppm)	REMARKS
	GROUND SURFACE								
	Tan dry rocky soil			AUGER					Surface Conditions: Sparse vegetation, dry rocky soil
3580	SANDSTONE - light brown, broken, damp, friable, occasional white caliche		10	CORE		60/36		1	Auger to 9 feet BLS
	SANDSTONE - red brown, moist in spots, very clayey, white caliche			CORE		60/36		1	
3570	SANDSTONE - red, damp, hard, slightly friable, abundant gypsum		20	CORE		60/48		0	
	SANDSTONE - red, damp, clayey, broken, gypsum flakes			CORE		48/48		0	
	SANDSTONE - brown, dry, slightly friable, slightly micaceous								
3560	SANDSTONE - brown to gray at top, micaceous, slightly friable, clay seam at top, dry, occasional clay laminae towards base		30	CORE		60/60		0	
	SANDSTONE - red brown, damp, micaceous, slightly friable, abundant clay laminae and inclusions, clay is red, silty, moderately firm			CORE		60/54		0	
3550	SANDSTONE - dark red, damp, silty, very friable, crumbly, broken, micaceous		40	CORE	O-9A	60/60		40	
	CLAY - red, broken, silty to sandy, interbedded with gray sandstone								
	SANDSTONE - dark red, moist from 42.5 to 53.5 ft			CORE		60/48		55	▽ Water level 45.8 ft BLS after 23.5 hours
	CLAY - red, moderately soft, broken, gray silt seams								
	SANDSTONE - red, hard, slightly micaceous and friable, damp								
	SANDSTONE - red, medium to coarse grained, micaceous, friable, broken, abundant clay seams and gray silt seams								
	SILTSTONE - red, hard, micaceous, broken								
	Total depth = 49 feet BLS								

DRILLING CONTRACTOR: Layne Environmental

DRILLER: W. Cowsur

DRILLING METHOD: NWD4 Core Barrel

DRILLING EQUIPMENT: Mobile B-61

COMMENTS: Boring located off-site on BLM land north of WT-1 site.

HALLIBURTON NUS
Environmental Corporation

BORING O-10 SHEET 1 OF 1
PROJECT Transwestern Pipeline Company
LOCATION Carlsbad, New Mexico
COORDINATES N 10,169 E 9,402
PROJECT NUMBER 1548
SURFACE ELEVATION 3589.1 DATUM MSL
LOGGED BY L. Basilio DATE DRILLED 10/22/92

ELEVATION FEET	SOIL DESCRIPTION	STRATA	SAMPLE INFORMATION: Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	FID (ppm)	REMARKS
	GROUND SURFACE								
	Brown dry soil			AUGER					Surface Conditions: Sparse vegetation, dry rocky soil
	Tan dry silty, white caliche								
3580	SANDSTONE - tan to light brown, pink tint, broken, damp to moist in spots, friable, white caliche		10	CORE		60/30		0	Auger to 9 feet BLS
	SANDSTONE - red, damp, broken, very clayey, gypsum flakes			CORE		60/60		0	
3570	SANDSTONE - red, silty to clayey, damp, micaceous, friable, gypsum flakes		20	CORE		60/60		0	
	SANDSTONE - red brown, hard, damp, slightly friable and micaceous, gypsum flakes, calcite filled fractures in upper portion			CORE		60/60		0	
3560	SANDSTONE - brown, red, micaceous, damp, slightly friable, silty		30	CORE		60/48		0	
	CLAY - red, broken, silty, damp			CORE		60/60		3	
	SANDSTONE - dark red, damp, micaceous, clayey, slightly friable, increasingly silty with depth								
3550	SANDSTONE - A/A, coarse grained, very micaceous		40		O-10A				
	SANDSTONE - red, damp, micaceous, slightly friable			CORE		60/60		4	
	SANDSTONE - red brown, coarse, very micaceous, slightly friable, abundant clay laminae and inclusions			CORE		60/60		15	
	SILTSTONE - dark red, hard, micaceous								
	SANDSTONE - dark red, damp, micaceous. friable, occasional clay laminae								
	Total depth = 49 feet BLS								

DRILLING CONTRACTOR: Layne Environmental
DRILLER: W. Cowsur
DRILLING METHOD: NWD4 Core Barrel
DRILLING EQUIPMENT: Mobile B-61

COMMENTS: Boring located off-site on BLM land north of WT-1 site.

HALLIBURTON NUS Environmental Corporation

BORING O-11 SHEET 1 OF 1

PROJECT Transwestern Pipeline Company

LOCATION Carlsbad, New Mexico

COORDINATES N 10,200 E 9,270

PROJECT NUMBER 1548

SURFACE ELEVATION 3589.5 DATUM MSL

LOGGED BY L. Basilio DATE DRILLED 10/22/92

ELEVATION FEET	SOIL DESCRIPTION	STRATA	SAMPLE INFORMATION: Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	FID (ppm)	REMARKS
	GROUND SURFACE Tan dry rocky soil			AUGER					Surface Conditions: Sparse vegetation, dry rocky soil
3580	SANDSTONE - off-white to tan, pink tint, dry, broken, friable to crumbly, white caliche		10	CORE		60/36		1	Auger to 9 feet BLS
	SANDSTONE - light red brown, darker red with depth, pink tint, dry, broken at top, slightly micaceous, friable to crumbly in spots, white caliche, gypsum flakes			CORE		60/60		1	
3570	Yellow and white crystals		20	CORE		60/60		1	
	SILTSTONE - red, black streaks, dry, hard, slightly micaceous, abundant gypsum flakes, broken towards base			CORE		60/54		1	
3560	SANDSTONE - brown, dry, micaceous, very friable, scattered gypsum, calcite laminae at top		30	CORE		60/60		1	
	SANDSTONE - red, damp, silty, micaceous, slightly friable, clay laminae			CORE		60/54		0	
3550	SANDSTONE - red, damp, micaceous, abundant clay laminae and inclusions, clay is dark red		40		O-11A				
	CLAY - dark red, silty to sandy, broken, slightly friable, interbedded with gray sandstone and clay			CORE		60/48		1	
	SANDSTONE - red, moist, micaceous, friable, clayey with clay laminae towards base, gray sandstone at base			CORE		60/48		5	
	SILTSTONE - red, hard, sandy to clayey, micaceous								
	Total depth = 49 feet BLS								

DRILLING CONTRACTOR: Layne Environmental

DRILLER: W. Cowsur

DRILLING METHOD: NWD4 Core Barrel

DRILLING EQUIPMENT: Mobile B-61

COMMENTS: Boring was dry, no water produced.
Boring located off-site on BLM land north of WT-1 site.

HALLIBURTON NUS *Environmental Corporation*

BORING O-12 SHEET 1 OF 1

PROJECT Transwestern Pipeline Company

LOCATION Carlsbad, New Mexico

COORDINATES N 10,083 E 9,119

PROJECT NUMBER 1548

SURFACE ELEVATION 3590.9 DATUM MSL

LOGGED BY L. Basilio DATE DRILLED 10/22/92

ELEVATION FEET	SOIL DESCRIPTION	STRATA	SAMPLE INFORMATION: Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	FID (ppm)	REMARKS
	GROUND SURFACE								
3590	Tan dry silty soil			AUGER					Surface Conditions: Sparse vegetation, dry rocky soil
	SANDSTONE - tan to light red, dry, slightly micaceous and friable, white caliche at base		10	CORE		60/48		1	Auger to 9 feet BLS
3580	SANDSTONE - light red, off-white, darker with depth, dry, hard, broken at top, white caliche			CORE		60/60		0	
			20	CORE		60/48		0	
3570	SILTSTONE - dark red, hard, clayey in spots, broken, micaceous								
	SANDSTONE - red, dry, hard, silty, gypsum flakes			CORE		60/48		2	
	SILTSTONE - red to dark red, dry, broken, slightly clayey and micaceous, gypsum flakes								
	SANDSTONE - red, damp, very silty, slightly friable, calcareous nodules, gypsum flakes		30	CORE		60/60		0	
3560	CLAY - red, slightly fissile, broken, silty								
	SANDSTONE - dark red, damp, micaceous, crumbly, clay and silt laminae at top			CORE		60/60		0	
	SANDSTONE - dark red, damp, slightly micaceous, friable, broken								
	Brown sandy silt zone at 35 ft BLS								
	Red brown hard silty clay at 37.5 ft BLS		40		O-12A				
3550	SANDSTONE - dark red, damp to moist in spots, slightly micaceous, very friable, crumbly, clayey with clay and silt laminae towards base			CORE		60/48		0	
				CORE		60/48		2	▽ Water level 47.8 ft BLS after 14.5 hours
	Total depth = 49 feet BLS								

DRILLING CONTRACTOR: Layne Environmental

DRILLER: W. Cowsur

DRILLING METHOD: NWD4 Core Barrel

DRILLING EQUIPMENT: Mobile B-61

COMMENTS: Boring located off-site on BLM land north of WT-1 site.

HALLIBURTON NUS
Environmental Corporation

BORING/WELL NUMBER **BP-1** SHEET **1** OF **1**

PROJECT **Transwestern Pipeline Company**

LOCATION **Carlsbad, New Mexico**

COORDINATES **N 9,960 E 9,338**

PROJECT NUMBER **1548**

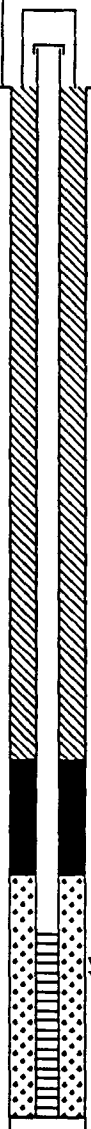
SURFACE ELEVATION **3592.5** DATUM **MSL**

LOGGED BY **L. Basilio**

DATE DRILLED **8/12/92**

ELEVATION FEET	SOIL DESCRIPTION	STRATA	Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer / Blow Counts	PID/FID (ppm)
	GROUND SURFACE							
	Tan dry soil			AUGER				0/0
3590								
	SANDSTONE - tan to light gray, clayey, brown limestone laminae, hard to slightly friable at base, dry			CORE		54/36		0/0
			10	CORE		60/24		0/0
3580	SANDSTONE - tan, broken, white caliche nodules, dry SANDSTONE - tan to light gray, broken, slightly moist, white caliche nodules SANDSTONE - tan with red tint, slightly moist, fractured, chalky, white and brown limestone nodules, grades to red sandstone			CORE		60/60		1/0
	SANDSTONE - red, clayey, slightly moist, occasional white limestone laminae, scattered black nodules		20	CORE	BP-1C	60/60		4/1
3570	SANDSTONE - gray, hard, slightly moist SANDSTONE - red to gray, grades to dark red, moist			CORE	BP-1A	60/60		50/8
	SANDSTONE - dark red, slightly micaceous, clayey laminae, occasional gray sand lenses, moist and oily		30	CORE	BP-1B	36/36		30/5
	CLAY - red, hard, oily							
3560	SANDSTONE - red to dark red with depth, micaceous, moist, oily, free product along core and in fractures, oil is golden to dark brown			CORE		54/0		
	No sampling from 31.5 feet to 34 feet. Drilling ceased on 8/12/92 due to hole problems. On 8/27/92, 8-inch diameter augers were used to drill to 34 feet BLS. Coring resumed at this point.		40	CORE	BP-1D	60/48		60/25
3550	SANDSTONE - red, hard, slightly micaceous, clayey, damp			CORE		60/36		1/3
	SANDSTONE - red, very micaceous, broken, interbedded with red and gray clay SANDSTONE - red, damp, micaceous, broken, silty		50	CORE	BP-1E	60/48		0/1
3540	SANDSTONE - red, damp, micaceous, broken, silty to clayey							
	Total depth = 53.5 feet BLS Monitor Well MW-1 was installed in Boring BP-1.							

WELL CONSTRUCTION DETAIL & REMARKS



DRILLING CONTRACTOR: **SH&B**

DRILLER: **E. Adams**

DRILLING METHOD: **NQ Core Barrel**

DRILLING EQUIPMENT: **CME-55**

DIAMETER, TYPE & INTERVAL OF CASING: **2-inch Schedule 40 PVC**

WELL SCREEN/INTERVAL: **0.020 Slot/43.5-53.5 feet BLS**

FILTER PACK-INTERVAL/QUANTITY: **10-20 Silica sand/41-53.5 feet BLS**

WELL SEAL-INTERVAL/QUANTITY: **Bentonite flakes/35-41 feet BLS**

HALLIBURTON NUS
Environmental Corporation

BORING/WELL NUMBER MW-2 SHEET 1 OF 1
PROJECT Transwestern Pipeline Company
LOCATION Carlsbad, New Mexico
COORDINATES N 9,993 E 9,447
PROJECT NUMBER 1548
SURFACE ELEVATION 3591.1 DATUM MSL
LOGGED BY L. Basilio DATE DRILLED 9/1/92

ELEVATION FEET	SOIL DESCRIPTION	STRATA	SAMPLE INFORMATION: Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	PID/FID (ppm)	WELL CONSTRUCTION DETAIL & REMARKS
	GROUND SURFACE								T.O.C. Elev. 3593.32
3590	Monitor well MW-2 is located 5 feet east of Boring FP-7. Due to the close proximity of the two borings, no samples were collected or logged from MW-2. The following lithologic log has been copied from Boring FP-7.								2-inch Schedule 40 PVC riser
	SANDSTONE - tan to off-white, dry, broken, chalky, white caliche								
3580	SANDSTONE - tan, pinkish, reddish tint, dry, broken, chalky, friable, abundant white caliche		10						
	SANDSTONE - tan to red, silty to clayey, slightly micaceous, damp in spots, white caliche nodules								
3570	SANDSTONE - red brown, dry, micaceous, friable, silty, interbedded with tan sandstone, occasional dark red dry clay laminae		20						Portland Type I/II grout
	SANDSTONE - red, damp, micaceous, massive, slightly friable, slightly clayey in spots, occasional clay laminae towards base								
3560	SANDSTONE - red, hard, damp, micaceous, massive, slightly clayey, occasional clay laminae towards base, 2-inch thick damp to moist silty clay at 32.5 feet		30						Bentonite seal
	SANDSTONE - red, hard, clayey to silty, damp, slight micaceous, coarser and more micaceous towards base								
3550	SANDSTONE - red, damp to moist, micaceous, clayey, slightly friable		40						10-20 silica sand filter pack
	CLAYSTONE - dark red, dry to damp at top, very sandy at top, very broken to crushed								0.020 slot screen
	SILTSTONE - dark red, slightly micaceous, slightly moist, clayey laminae, even breaks along planes								
	SANDSTONE - red, moist, micaceous, massive, coarser towards base, clay laminae in upper portion, oily along side of core, oil along fracture in sandstone at 45.5 feet		50						
	SANDSTONE - red. moist, silty, micaceous, oily along fractures								
	CLAYSTONE - red to gray, silty, micaceous, dry to damp								
	SANDSTONE - dark red, silty to clayey, micaceous, damp, slightly friable								
	Total Depth = 50 feet BLS								

DRILLING CONTRACTOR: SH&B
DRILLER: C. Elms
DRILLING METHOD: Hollow Stem Augers
DRILLING EQUIPMENT: CME-55

DIAMETER, TYPE & INTERVAL OF CASING: 2-inch Schedule 40 PVC
WELL SCREEN/INTERVAL: 0.020 slot/40-50 feet BLS
FILTER PACK-INTERVAL/QUANTITY: 10-20 silica sand/38-50 feet BLS
WELL SEAL-INTERVAL/QUANTITY: Bentonite flakes-fine/36-38 feet BLS

HALLIBURTON NUS
Environmental Corporation

BORING/WELL NUMBER MW-3 SHEET 1 OF 1
PROJECT Transwestern Pipeline Company
LOCATION Carlsbad, New Mexico
COORDINATES N 9,822 E 9,380
PROJECT NUMBER 1548
SURFACE ELEVATION 3593.7 DATUM MSL
LOGGED BY L. Basilio DATE DRILLED 8/28/92

ELEVATION FEET	SOIL DESCRIPTION	STRATA	Depth Feet	Sample Type	Sample ID	Inches Adv. / Inches Rec.	Penetrometer Blow Counts	PID/FID (ppm)
	GROUND SURFACE							
	Tan dry sandy soil			AUGER				1/1
3590								
	SANDSTONE - tan to off-white, hard, dry, broken, white caliche		10	CORE		10/36		0/0
3580								
			20	CORE		12/48		0/0
	SANDSTONE - red to tan, hard, broken, dry, occasional caliche							
3570	No recovery in the 23.5 to 43.5 foot interval							
			30	CORE		12/0		
3560								
				CORE		60/0		
			40	CORE		60/0		
3550								
	SANDSTONE - red, damp, broken, interbedded with red and gray clay and gray sandstone			CORE		60/24		0/3
	Total depth = 48.5 feet BLS							

WELL CONSTRUCTION DETAIL & REMARKS

T.O.C. Elev. 3596.04
Surface Conditions: Sparse vegetation, dry rocky soil
Auger to 5 feet BLS
Monitor well located south of Filter Pit and Burn Pit
2-inch Schedule 40 PVC riser
Portland Type I/II grout
Bentonite seal
10-20 silica sand filter pack
0.020 slot screen

DRILLING CONTRACTOR: SH&B
DRILLER: C. Elms
DRILLING METHOD: NQ Core Barrel
DRILLING EQUIPMENT: CME-55

DIAMETER, TYPE & INTERVAL OF CASING: 2-inch Schedule 40 PVC
WELL SCREEN/INTERVAL: 0.020 slot/38.5-48.5 feet BLS
FILTER PACK-INTERVAL/QUANTITY: 10-20 Silica sand/35.5 to 48.5 feet BLS
WELL SEAL-INTERVAL/QUANTITY: Bentonite flakes/32.5-35.5 feet BLS

APPENDIX C

SOIL SAMPLE LOG SHEETS

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
16360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. FP-1A SOURCE Filter Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 23.5 - 28.5

SAMPLE DATE & TIME: 8/6/92 1220

SAMPLED BY: BASILIO

SIGNATURE(S): T Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:
- TPH
- BTEX
- TCLP M

HNU - 0

OVA - 0

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - dark red, hard, micaceous, dry
	clayey laminae

OBSERVATIONS/NOTES:

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A Halliburton Company
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HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. FP-1B SOURCE Filter Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 33.5-36.5

SAMPLE DATE & TIME: 8/18/92 1345

SAMPLED BY: BASILIO

SIGNATURE(S): L Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

TPH
BTEX
TCLP-M

HNU - 50
OVA - 15

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red, hard, micaceous, clayey with clay laminae, moist to wet in spots

OBSERVATIONS/NOTES:

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HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. FP-1C SOURCE Filter Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 41.5 - 43.5

SAMPLE DATE & TIME: 8/18/92 1350

SAMPLED BY: BASILIO

SIGNATURE(S): L Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:
TPH
BTEX
TCLP-M

HNU - 1
OVA - 8

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red brown, hard, dry,
	massive, micaceous, dry

OBSERVATIONS/NOTES:

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HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6252

NUS SAMPLE NO. FP-2A SOURCE Filter Area WT-1

SAMPLE METHOD: NQ (core barrel

DEPTH SAMPLED: 23.5 - 28.5

SAMPLE DATE & TIME: 8/6/92 1457

SAMPLED BY: BASILIO

SIGNATURE(S): D. Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

TPH
BTEX
TCLP - M

HNU - 200

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - cavernous, micaceous, hard,
	moist at bottom

OBSERVATIONS/NOTES:

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HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 250

NUS SAMPLE NO. FP-2B SOURCE Filter Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 28.5 - 33.5

SAMPLE DATE & TIME: 8/6/92 1510

SAMPLED BY: BASLO

SIGNATURE(S): Gail

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

TPH
BTEX
TCLP - M

HNU - 280

~~DUA~~ -

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - dark red, hard, micaceous, thin clayey laminae, slightly moist

OBSERVATIONS/NOTES:

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SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6210

NUS SAMPLE NO. FP-2C SOURCE Filter Area WTF

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 33.5 - 38.5

SAMPLE DATE & TIME: 8/6/92 1525

SAMPLED BY: BASILIO

SIGNATURE(S): T Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

TPH
BTEX
TCLP-M

HNU - 320

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - dark red, moist, oily and wet in upper 2 ft, clayey laminae at base

OBSERVATIONS/NOTES:

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SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 5250

NUS SAMPLE NO. FP-2D SOURCE Filter Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 38.5 - 43.5

SAMPLE DATE & TIME: 8/6/92 1540

SAMPLED BY: BASILIO

SIGNATURE(S): Z Basili

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red, hard, micaceous, clayey

ANALYSIS:

TPH
BTEX
TCLP - M

HNU - 3

OBSERVATIONS/NOTES:

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SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 3250

NUS SAMPLE NO. FP-3A SOURCE Filter Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 28.5 - 33.5

SAMPLE DATE & TIME: 8/7/92 1025

SAMPLED BY: BASILIO

SIGNATURE(S): I Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red, hard, slight moist, micaceous, clayey laminae

ANALYSIS:
- TPH
- BTEX
- TCLP-M

HNU - 70

OVA - 50

OBSERVATIONS/NOTES:

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(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER -250

NUS SAMPLE NO. FP-3B SOURCE Filter Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 39-43.5

SAMPLE DATE & TIME: 8/11/92 915

SAMPLED BY: BASILIO

SIGNATURE(S): L Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:
TPH
BTEX
TCLP-M

HNU - 200

OVA - 450

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red dark, massive, micaceous, clayey lenses at top

OBSERVATIONS/NOTES:

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(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 5270

NUS SAMPLE NO. FP-3C SOURCE Filter Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 45.5-48

SAMPLE DATE & TIME: 8/11/92 945

SAMPLED BY: BASILIO

SIGNATURE(S): Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

TPH
BTEX
TCLP-M

HNU - 0

OVA - 10

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red hard, micaceous,
	Clay - red, hard, silty, moist

OBSERVATIONS/NOTES:

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HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 3250

NUS SAMPLE NO. FP-4A SOURCE Filter Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 28.5 - 33.5

SAMPLE DATE & TIME: 8/11/92 1315

SAMPLED BY: BASILIO

SIGNATURE(S): L Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

TPH
BTEX
TCLP-M

HNU - 3

OVA - 2

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone, dark red, hard, micaceous,
	dry, friable, occ clay laminae

OBSERVATIONS/NOTES:

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HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6210

NUS SAMPLE NO. FP-4B SOURCE Filter Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 33.5 - 40

SAMPLE DATE & TIME: 8/11/92 1340

SAMPLED BY: BASILIO

SIGNATURE(S): L. Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

TPH
BTEX
TCLP-M

HNU - 0

OVA - 1

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red, hard, dry, occ
	clay laminae

OBSERVATIONS/NOTES:

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SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 3250

NUS SAMPLE NO. FP-5A SOURCE Filter Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 13.5-18.5

SAMPLE DATE & TIME: 8/12/92 835

SAMPLED BY: BASILIC

SIGNATURE(S): J Basil

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:
- TPH
- BTEX
- TCLP-M

HNU - 35

OVA - 7

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - tan to light red to gray, clayey, friable

OBSERVATIONS/NOTES:

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HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 1250

NUS SAMPLE NO. FP-5B SOURCE Filter Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 18.5 - 23.5

SAMPLE DATE & TIME: 8/12/92 855

SAMPLED BY: BASILIO

SIGNATURE(S): Z. Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

TPH
BTEX
TCLP-M

HNU - 55

OVA - 15

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red, hard, clayey in spots, slightly moist

OBSERVATIONS/NOTES:

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SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 250

NUS SAMPLE NO. FP-5C SOURCE Filter Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 23.5 - 28.5

SAMPLE DATE & TIME: 8/12/92 920

SAMPLED BY: BASILIO

SIGNATURE(S): L Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

TPH
BTEX
TCLP-M

HNU - 50

OVA - 10

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red, hard, moist, oily

OBSERVATIONS/NOTES:

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SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. FP-6A SOURCE Filter Area WTY

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 18.5 - 23.5

SAMPLE DATE & TIME: 8/18/92 940

SAMPLED BY: BASILIO.

SIGNATURE(S): L Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

TPH
BTEX
TCLP - M

HNU - 0

OVA - 0

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone red, dry, silty, slightly mica, red brown with black and gold stain
	very micaceous silt

OBSERVATIONS/NOTES:

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SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. FP-6B SOURCE Filter Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 38-40

SAMPLE DATE & TIME: 8/18/92 1055

SAMPLED BY: BASILIO

SIGNATURE(S): T. Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:
TPH
BTEX
TCLP-M

HNU - 2

OVA - 0

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red brown, very micaceous, damp, friable

OBSERVATIONS/NOTES:

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SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. FP-7A SOURCE Eddy Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 8.5 - 13.5

SAMPLE DATE & TIME: 8/25/92 1110

SAMPLED BY: BASILIO

SIGNATURE(S): E Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

TPH
BTEX
TCLP-M

HNU - 5

OVA - 1

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - tan, pinkish, reddish tint, dry,
	broken, chalky, friable, abundant
	white caliche

OBSERVATIONS/NOTES:

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SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. FP-7B SOURCE Filter Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 38.5 - 43

SAMPLE DATE & TIME: 8/26/92 930

SAMPLED BY: BASILIO

SIGNATURE(S): Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

TPH
BTEX
TCLP-M

LIN4 - 3

DUP - 4

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red, sand & moist, clayey
	Micaceous, slightly friable

OBSERVATIONS/NOTES:

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SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 250

NUS SAMPLE NO. FP-7C SOURCE Filter Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 43.5-47

SAMPLE DATE & TIME: 8/26/92 1250

SAMPLED BY: BASILIO

SIGNATURE(S): B Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:
- TPH
- BTEX
- TCLP-M

HNU - 50
OVA - 15

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red moist, Micaceous, massive,
	oily along sides of core, oil at fracture
	at 45.5' clay laminae

OBSERVATIONS/NOTES:

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SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 3250

NUS SAMPLE NO. FP-7D SOURCE Filter Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 47-48

SAMPLE DATE & TIME: 8/26/92 1450

SAMPLED BY: BASILIO

SIGNATURE(S): T. Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:
- TPH
- BTEX
- TCLP-M

HNU - 5
OVA - 1

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red, moist, silty, micaceous,
	oily along fractures

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
16360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 250

NUS SAMPLE NO. FP-7E SOURCE Filter Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 48-50

SAMPLE DATE & TIME: 8/26/92 1455

SAMPLED BY: BASILIO

SIGNATURE(S): Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

TPH
BTEX
TCLP-M

HNU - 1

OVA - 0

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Claystone - red to gray, silty, mica.
	Sandstone - dark red, silty - clayey, micaceous, damp, slightly friable

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
16360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 250

NUS SAMPLE NO. BP-1A SOURCE Burn Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 23.5 - 28.5

SAMPLE DATE & TIME: 8/12/92 1320

SAMPLED BY: BASILIO

SIGNATURE(S): L Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:
BTEX
TCLP-O

HNU - .50
OVA - 8

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - dark red, sl micaceous, moist, oily, occasional gray sandstone

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
16360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. BP-1B SOURCE Bisti Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 28.5 - 31.5

SAMPLE DATE & TIME: 8/12/92 1340

SAMPLED BY: BASILIO

SIGNATURE(S): Z Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

BTEX
TCLP-D
HNU - 30
OVA - 5

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - dark red, micaceous only moist coal only along sides and fractures

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
16360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. BP-1C SOURCE Burn Area WT-1

SAMPLE METHOD: DQ Core barrel

DEPTH SAMPLED: 18.5 - 23.5

SAMPLE DATE & TIME: 8/12/92 1300

SAMPLED BY: BASILIO

SIGNATURE(S): J Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

BTEX
TCLP-O

HNU - 4

OVA - 1

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red, clayey, slightly moist, occasional white calcareous nodules, scattered black nodules

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
16360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 2250

NUS SAMPLE NO. BP-1D SOURCE Bluff Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 38.5-43.5

SAMPLE DATE & TIME: 8/27/92 1450

SAMPLED BY: BASILIO

SIGNATURE(S): L Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)

ANALYSIS:

BTEX
TCLP-0

HNU - 60

OVA - 25

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
5360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. BP-1E SOURCE Buena Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 48.5 - 53.5

SAMPLE DATE & TIME: 8/27/92 1605

SAMPLED BY: BASILIO

SIGNATURE(S): Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ ~~COMPOSITE~~
- ☐ GRAB - COMPOSITE

ANALYSIS:

BTEX
TCLP-O

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red, damp, micaceous, broken, silty to clayey

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
6360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. BP-2A SOURCE Bloom Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 23.5-28.5

SAMPLE DATE & TIME: 8/13/92 815

SAMPLED BY: BASILIO

SIGNATURE(S): J Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

BTEX
TCLP-O

HNU - 65
OVA - 40

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red hard, slightly micaceous clayey laminae wet to moist, oily in several spots

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
6360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 3250

NUS SAMPLE NO. BP-2B SOURCE Burro Area WT-1

SAMPLE METHOD: N2 Core barrel

DEPTH SAMPLED: 28.5 - 33.5

SAMPLE DATE & TIME: 8/13/92 845

SAMPLED BY: BASILIO

SIGNATURE(S): Z Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red, moist, oily, mica, oily

ANALYSIS:

BTEX
TCLP-O

HNU - 150

OVA - 100

OBSERVATIONS/NOTES:

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GULF COAST DIVISION
A Halliburton Company
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HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. BP-2C SOURCE Dewa Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 33.5 - 38.5

SAMPLE DATE & TIME: 8/13/92 920

SAMPLED BY: BASILIO

SIGNATURE(S): T Basil

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

BTEX
TCLP-D

HNU - 22

OVA - 9

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone red, hard, micaceous, clay laminae at top, oil along fracture at 36 ft

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
6360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. BP-2D SOURCE Buena Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 38.5 - 43.5

SAMPLE DATE & TIME: 8/13/92 945

SAMPLED BY: BASILIO

SIGNATURE(S): Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

BTEX
TCLP-D

HNU 1

OVA 0

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red, clayey - silty, moist, hard, slightly micaceous, slightly friable, grey sandy laminae

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
6360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company -- PROJECT NUMBER 6250

NUS SAMPLE NO. BP-2E SOURCE Burn Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 43.5 - 48.5

SAMPLE DATE & TIME: 8/13/92 1020

SAMPLED BY: BASILIO

SIGNATURE(S): E Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

BTEX
TCLP-O

HNU - 3

OVA - 3

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red brown, hard, massive, micaceous, 2" red & black sand clay at 43.5 clay laminae at base

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
5360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1868

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company -- PROJECT NUMBER 6250

NUS SAMPLE NO. BP-3A SOURCE Burn Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 28.5 - 31

SAMPLE DATE & TIME: 8/15/92 940

SAMPLED BY: BASILCO

SIGNATURE(S): Z Basilco

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

BTEX
TCLP-O

HNU - O

OVA - O

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone red, hard, moist, clayey,
	wet clay at base

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
6360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. BP-38 SOURCE Buna Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 32.5-39

SAMPLE DATE & TIME: 8/15/92 1350

SAMPLED BY: BASILIO

SIGNATURE(S): C Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red hard, damp, micaceous
	at base

ANALYSIS:

BTEX
TCLP-O

HNU - O

OVA - 10

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
5360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. BP-3C SOURCE Burn Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 39-43

SAMPLE DATE & TIME: 8/15/92 1415

SAMPLED BY: BASILIO.

SIGNATURE(S): Z Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

BTEX
TCLP-D

HNU: 0

OVA 2

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone red brown hard, massive, micaceous, wet sandy clay at base.

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
6360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. BP-4A SOURCE Burn Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 38-40

SAMPLE DATE & TIME: 8/16/92 1030

SAMPLED BY: BASILIO

SIGNATURE(S): Z Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

BTEX
TCLP-0

HNU 1

OVA 1

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone dark red, damp, sl clayey, silty, moderately hard

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
5360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company - PROJECT NUMBER 6250

NUS SAMPLE NO. BP-5A SOURCE Buena Area

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 8.5 - 13

SAMPLE DATE & TIME: 8/16/92 1325

SAMPLED BY: BASILIO

SIGNATURE(S): Z Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

BTEX

TCLP-0

HNU - 8

OVA - 0

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - gray with black stainings,
	broken, friable, wet
	tan to gray caliche

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
5360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. BP-5B SOURCE Bloom Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 15 - 18.5

SAMPLE DATE & TIME: 8/16/92 1425

SAMPLED BY: BASILIO

SIGNATURE(S): Z Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

BTEX

TCLP - 0

HNU - 20

~~OVA~~

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone gray, green to tan with black staining hard fractured moist to wet in spots, slightly oily in spots

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
6360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. BP-5C SOURCE Bisti Area WT-1

SAMPLE METHOD: NQ Core Barrel

DEPTH SAMPLED: 18.5 - 23.5

SAMPLE DATE & TIME: 8/16/92 1445

SAMPLED BY: BASICO

SIGNATURE(S): T Basich

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

BTEX
TCLP-O

HNU - 15

DUA

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red silty, fractured, slightly friable, moist to wet with green yellow oily liquid.

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
6360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. BP-5E SOURCE Burn Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 27-28.5

SAMPLE DATE & TIME: 8/16/92 1525

SAMPLED BY: BASILIO

SIGNATURE(S): Z Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

BTEX
TCLP-O

HNU - 20

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - gray black, black staining, crumbly
	micaceous, wet with oil

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
6360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. BP-5D SOURCE Buena Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 23.5 - 27

SAMPLE DATE & TIME: 8/16/92 1515

SAMPLED BY: BASILIO

SIGNATURE(S): Z Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

BTEX
TCLP-D

HNU - 10

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone red to gray to dark brown, microcrystalline, friable moist occasionally wet w/ oil

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
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HOUSTON, TEXAS 77084
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SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. BP-5G SOURCE Burn Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 34.5 - 36.5

SAMPLE DATE & TIME: 5/16/92 1745

SAMPLED BY: BASILIO

SIGNATURE(S): J. Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

BTEX
TCLP-D
HNU-38

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red, slightly micaceous and clayey only on upper 2 ft.

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
6360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. BP-5F SOURCE Buena Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 28.5 - 33

SAMPLE DATE & TIME: 8/10/92 1605

SAMPLED BY: BASILIO

SIGNATURE(S): C Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

BTEX
TCLP-O

HNU- 50

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red hard, massive, mica, occasional clay laminae, core sides wet with oil

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
6360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. BP-5H SOURCE Bluff Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 42 - 43,5

SAMPLE DATE & TIME: 8/16/92 1750

SAMPLED BY: MASILIO

SIGNATURE(S): Z Bacmlo

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

BTEX

TCLP - O

HNU - O

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red brown, grey at top, hard, micaceous, slightly friable

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
6360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 5250

NUS SAMPLE NO. BP-6A SOURCE Burn Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 18.5 - 23.5

SAMPLE DATE & TIME: 8/17/92 1300

SAMPLED BY: BASILIO

SIGNATURE(S): Z Basili

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

BTEX
TCLP-0

HNU - 0

OVA - 0

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red, reid, dry, silty, broken, fractures

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
6360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. BP-6B SOURCE Burro Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 38-40

SAMPLE DATE & TIME: 8/17/92 1510

SAMPLED BY: BASILIO

SIGNATURE(S): Z Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

BTEX
TCLP-O

HNU - O

CUA - O

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - dark brown red, damp, micaceous.

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
16360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. T-1A SOURCE Trash Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 6.2 - 8.5

SAMPLE DATE & TIME: 8/4/92 910

SAMPLED BY: BASILIO

SIGNATURE(S): Z Basilio.

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:
- TPH
- BTEX
- TCLP-D
- TCLP-M
- TCLP-F

HNU - 0

OVA - 0

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red, hard, clayey in spots,
	moist in clay

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
16360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. T-1B SOURCE Trash Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 23.5-30

SAMPLE DATE & TIME: 8/4/92 1045

SAMPLED BY: BASILIO

SIGNATURE(S): E Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

TPH
BTEX
TCLP-O
TCLP-M
TCLP-F

HALL - O

DUA - O

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red dark. cemented, occ thin
	gray red clay cases which are moist
	friable to crumbly

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
16360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 3250

NUS SAMPLE NO. T-2A SOURCE Trash Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 13.5 - 18.5

SAMPLE DATE & TIME: 8/4/92 1315

SAMPLED BY: BASILIO

SIGNATURE(S): E Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:
- TPH
- BTEX
- TCLP-O
- TCLP-M
- TCLP-F

HNU - 0

OVA - 0

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red to tan, slightly moist, friable, broken, slightly clayey

OBSERVATIONS/NOTES:

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GULF COAST DIVISION
A Halliburton Company
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HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 2250

NUS SAMPLE NO. T-2B SOURCE Trash Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 23.5 - 30

SAMPLE DATE & TIME: 8/4/92 1435

SAMPLED BY: BASILIO

SIGNATURE(S): Z. Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

TPH
BTEX
TCLP-O
TCLP-M
TCLP-F

HNU - 0

OVA - 0

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red to cavitied, micaceous,
	dry, red clay and gray sand
	layers

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
16360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. T-3A SOURCE 6250 Trash Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 13.5 - 18.5

SAMPLE DATE & TIME: 8/5/92 835

SAMPLED BY: BASILIO

SIGNATURE(S): Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☒ GRAB
- ☐ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:
- TPH
- BTEX
- TCLP-M
- TCLP-O
- TCLP-F
- HNU - 0
- OVA - 0

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - light red, dry, broken, slightly clayey

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
16360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 3250

NUS SAMPLE NO. T-3B SOURCE Trash Area WT-1

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 23.5-30

SAMPLE DATE & TIME: 8/5/92 935

SAMPLED BY: BASILIO

SIGNATURE(S): Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:
- TPH
- BTEX
- TCLP-D
- TCLP-M
- TCLP-F

HNU · 0

OVA · 0

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red, hard, moist, occ
	gray sandy lenses.

OBSERVATIONS/NOTES:

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A Halliburton Company
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HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. O-1A SOURCE

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 18.5 - 23.5

SAMPLE DATE & TIME: 9/1/92 1025

SAMPLED BY: BASILIO

SIGNATURE(S): L Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:
- TPH
- BTEX
- TCLP - M

HNU 2
OVA 1

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red brown, tan, micaceous, damp
	occasional clay laminae

OBSERVATIONS/NOTES:

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GULF COAST DIVISION
A Halliburton Company
16360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. O-1B SOURCE

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 43.5-48.5

SAMPLE DATE & TIME: 9/1/92 1445

SAMPLED BY: BASILIO

SIGNATURE(S): L Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:
- TPH
- BTEX
- TCLP-M

HNU 3

OVA 0

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone, red, micaceous, damp to wet
	broken

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
16360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. O-2A SOURCE

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 13.5 - 18.5

SAMPLE DATE & TIME: 9/2/92 1235

SAMPLED BY: BASILIO

SIGNATURE(S): L Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:
- TPH
- BTEX
- TCLP-M

HNU 5

OVA 1

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - tan, pinkish, reddish, dry, broken at top, silty, slight mica, white caliche

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
16360 PARK 10 PLACE DRIVE. SUITE 300
HOUSTON. TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6350

NUS SAMPLE NO. 0-2B SOURCE

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 38.5-43.5

SAMPLE DATE & TIME: 9/2/92 1400

SAMPLED BY: BASILIO

SIGNATURE(S): L Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

TPH
BTEX
TCLP-M

LIN'LI 0

UVA 5

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone, red brown, red, gold tint, micaceous, clayey to silty, broken dry

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
16360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. 0-2C SOURCE

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 43.5 - 47

SAMPLE DATE & TIME: 9/2/92 1510

SAMPLED BY: BASILIO

SIGNATURE(S): L Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:
TPH
BTEX
TCLP-M

LINU 1
UVA 2

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red brown, broken, damp to
	moist, silty, micaceous

OBSERVATIONS/NOTES:
Duplicate sample collected

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
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HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. 0-3A SOURCE

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 27-32

SAMPLE DATE & TIME: 9/2/92 1800

SAMPLED BY: BASILIO

SIGNATURE(S): L Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

BTEX
TCLP-0

HNU 1
OVA 0

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red with gray, damp, mica,
	crumbly, grades to gray SS
	SS Gray, dry, mica, silty, friable

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
16360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. D-3B SOURCE

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 43.5-48.5

SAMPLE DATE & TIME: 9/2/92 1915

SAMPLED BY: BASILIO

SIGNATURE(S): L Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

BTEX
TCLP-D

HNU 3
OVA 1

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - dark red brown, damp, micg broken, friable

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
16360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6350

NUS SAMPLE NO. 0-3C SOURCE

SAMPLE METHOD: NQ Core barrel

DEPTH SAMPLED: 48.5 - 51

SAMPLE DATE & TIME: 9/3/92 935

SAMPLED BY: BASILIO

SIGNATURE(S): L Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☐ GRAB
- ☒ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

BTEX
TCLP-D

HNU1 180

UVA —

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red, coated with oil

OBSERVATIONS/NOTES:

HALLIBURTON NUS
Environmental Corporation

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 7P54

HNUS SAMPLE NO. 0-4A SOURCE WT-1

SAMPLE METHOD: NW Core barrel

DEPTH SAMPLED: 34-39

SAMPLE DATE & TIME: 10/19/92 1700

SAMPLED BY: BASILIO

SIGNATURE(S): L Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☒ GRAB
- ☐ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

TPH
BTEX

~~HNU~~
OVA - 20

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - dark red, silty, mica, clay laminae, core moist on surface in spots

OBSERVATIONS/NOTES:

HALLIBURTON NUS
Environmental Corporation

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline PROJECT NUMBER 7P54

HNUS SAMPLE NO. 0-48 SOURCE WT-1

SAMPLE METHOD: NW Core

DEPTH SAMPLED: 39-44

SAMPLE DATE & TIME: 10/19/92 1710

SAMPLED BY: BASILIO

SIGNATURE(S): Basil

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☒ GRAB
- ☐ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

TPH
BTEX

OUA - 50

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone red brown, coarse, very
	mica, clayey

OBSERVATIONS/NOTES:

HALLIBURTON NUS
Environmental Corporation

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline PROJECT NUMBER 7P54

HNUS SAMPLE NO. 0-5A SOURCE WT-1

SAMPLE METHOD: NW Core

DEPTH SAMPLED: 42-47

SAMPLE DATE & TIME: 10/20/92 1011

SAMPLED BY: BASILIO

SIGNATURE(S): Z Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☒ GRAB
- ☐ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

TPH
BTEX

OVA - 20

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red, hard, mica, damp
	silty, occ clay laminae

OBSERVATIONS/NOTES:

HALLIBURTON NUS
Environmental Corporation

SOIL/SEDIMENT
SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline PROJECT NUMBER 7P54

HNUS SAMPLE NO. O-6A SOURCE WT-1

SAMPLE METHOD: NW Core

DEPTH SAMPLED: 39-44

SAMPLE DATE & TIME: 10/20/92

SAMPLED BY: BASILIO

SIGNATURE(S): Z Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☒ GRAB
- ☐ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

TPH
BTEX

OVA - 1

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red brown, silty, mica,
	damp, friable, clay laminae

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
6360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline PROJECT NUMBER 7P54

NUS SAMPLE NO. 0-7A SOURCE WT-1

SAMPLE METHOD: NW Core barrel

DEPTH SAMPLED: 39-44

SAMPLE DATE & TIME: 10/20/92

SAMPLED BY: BASILIO

SIGNATURE(S): L Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☒ GRAB
- ☐ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

TPH
BTEX

OVA - 0

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red, mica, friable,
	clayey laminae, damp, moist

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
16360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline PROJECT NUMBER 7P54

NUS SAMPLE NO. 10-8A SOURCE WT-1

SAMPLE METHOD: NW Core barrel

DEPTH SAMPLED: 39-44

SAMPLE DATE & TIME: 10/21/92 1620

SAMPLED BY: BASILIO

SIGNATURE(S): Z Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☒ GRAB
- ☐ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

TPH
BTEX

OVA - 0

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red, damp, silty, mica, sl friable, clay lamina towards base

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
16360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline PROJECT NUMBER 7P54

NUS SAMPLE NO. 0-9A SOURCE WT-1

SAMPLE METHOD: NW Core barrel

DEPTH SAMPLED: 42-44

SAMPLE DATE & TIME: 10/22/92 823

SAMPLED BY: BASILIO

SIGNATURE(S): L Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☒ GRAB
- ☐ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

TPH
BTEX

OVA - 40

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone dark red, silty, friable,
	mica, core wet from 42.5-43.5

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
16360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline PROJECT NUMBER 7P54

NUS SAMPLE NO. 0-10A SOURCE WT-1

SAMPLE METHOD: NW Core barrel

DEPTH SAMPLED: 39-44

SAMPLE DATE & TIME: 10/22/92 1119

SAMPLED BY: BASILIO

SIGNATURE(S): Z Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☒ GRAB
- ☐ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

TPH
BTEX

OVA - 4

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red, damp, mica, sl friable

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
16360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline PROJECT NUMBER 7P54

NUS SAMPLE NO. O-11A SOURCE WT-1

SAMPLE METHOD: NW Core barrel

DEPTH SAMPLED: 39-44

SAMPLE DATE & TIME: 10/22/92 1459

SAMPLED BY: BASILIO

SIGNATURE(S): L Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☒ GRAB
- ☐ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

TPH
BTEX

OVA - 1

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - red, damp, mica, s/ friable,

OBSERVATIONS/NOTES:

NUS CORPORATION
GULF COAST DIVISION
A Halliburton Company
16360 PARK 10 PLACE DRIVE, SUITE 300
HOUSTON, TEXAS 77084
(713) 492-1888

SOIL/SEDIMENT SAMPLE LOG SHEET

- ☐ SURFACE SOIL
- ☒ SUBSURFACE SOIL
- ☐ SEDIMENT
- ☐ POND/LAGOON
- ☐ OTHER

PROJECT NAME Transwestern Pipeline PROJECT NUMBER 7P54

NUS SAMPLE NO. 0-12A SOURCE WT-1

SAMPLE METHOD: NW Core barrel

DEPTH SAMPLED: 39-44

SAMPLE DATE & TIME: 10/22/92

SAMPLED BY: BASILIO

SIGNATURE(S): Basilio

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☒ GRAB
- ☐ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:

TPH
BTEX

OVA - 0

COMPOSITE SAMPLE DATA

SAMPLE	TIME	COLOR/DESCRIPTION

SAMPLE DATA

COLOR	DESCRIPTION: (SAND, CLAY, DRY, MOIST, WET, ETC.)
	Sandstone - dark red, damp to moist in spots, sl mica, v friable, clay laminae

OBSERVATIONS/NOTES:

HALLIBURTON NUS
Environmental Corporation

GROUND WATER SAMPLE LOG SHEET

☒ MONITORING WELL DATA
☐ DOMESTIC WELL DATA
☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. BP-1 / MW-1 SOURCE WT-1 Site

TOTAL WELL DEPTH:

WELL CASING SIZE & DEPTH: 2" PVC 55.2 TOC

STATIC WATER LEVEL: 45.96 TOC

ONE CASING VOLUME: 1.57

START PURGE (HRS.): 900

END PURGE (HRS.): 923

TOTAL PURGE TIME (MIN.): 23

TOTAL AMOUNT PURGED (GAL.): 5

MONITOR READING: HNU - 5

PURGE METHOD: Disposable bailer

SAMPLE METHOD: Disposable bailer

DEPTH METHOD: Electric line

SAMPLE DATE & TIME: 9/3/92 1130

SAMPLED BY: BASILIO

SIGNATURE(S):

TYPE OF SAMPLE
- ☐ LOW CONCENTRATION
- ☐ HIGH CONCENTRATION
- ☒ GRAB
- ☐ COMPOSITE
- ☐ GRAB - COMPOSITE

ANALYSIS:	PRESERVATIVE
TPH	
BTEX	HCL

PURGE DATA

VOLUME	PH	S.C.	TEMP. (°C)	TDS	COLOR & TURBIDITY
1	6.25	4000	19		Light red brown, turbid
2	6.29	4120	9		A/A
3	6.40	4000	19		A/A

SAMPLE DATA

PH	S.C.	TEMP. (°C)	TDS	COLOR & TURBIDITY
6.47	4260	19		Clear, slightly turbid

OBSERVATIONS/NOTES:

HALLIBURTON NUS
Environmental Corporation

GROUND WATER SAMPLE LOG SHEET

☒ MONITORING WELL DATA
☐ DOMESTIC WELL DATA
☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. MW-2 SOURCE WT-1 Site

TOTAL WELL DEPTH:

WELL CASING SIZE & DEPTH: 2" PVC 52.2 TOC

STATIC WATER LEVEL: 48.07 TOC

ONE CASING VOLUME: 0.7

START PURGE (HRS.): 825

END PURGE (HRS.): 849

TOTAL PURGE TIME (MIN.): 24

TOTAL AMOUNT PURGED (GAL.): 3.5

MONITOR READING: Hnu - 17

PURGE METHOD: Disposable bailer

SAMPLE METHOD: Disposable bailer

DEPTH METHOD: Electric line

SAMPLE DATE & TIME: 9/3/92 1250

SAMPLED BY: BASILIO

SIGNATURE(S): Basilio

PURGE DATA

VOLUME	PH	S.C.	TEMP.(°C)	TDS	COLOR & TURBIDITY
1	6.27	4060	20		Brown w/black tint turbid
2	6.43	3910	20		Brown, turbid,
					Slight sheen
4	6.37	4010	19		A/A
5	6.46	4040	19		A/A no sheen

SAMPLE DATA

PH	S.C.	TEMP.(°C)	TDS	COLOR & TURBIDITY
7.00	3900	19°		Light brown sway, turbid

TYPE OF SAMPLE
☐ LOW CONCENTRATION
☐ HIGH CONCENTRATION
☒ GRAB
☒ COMPOSITE
☐ GRAB - COMPOSITE

ANALYSIS:	PRESERVATIVE
TPH	
BTEX	HCL

OBSERVATIONS/NOTES:

1st bailer on purging had pin hole size oil droplets.

HALLIBURTON NUS
Environmental Corporation

GROUND WATER SAMPLE LOG SHEET

☒ MONITORING WELL DATA
☐ DOMESTIC WELL DATA
☐ OTHER

PROJECT NAME Transwestern Pipeline Company PROJECT NUMBER 6250

NUS SAMPLE NO. MW-3 SOURCE WT-1 Site

TOTAL WELL DEPTH:

WELL CASING SIZE & DEPTH: 2" PVC 50' TOC

STATIC WATER LEVEL: 45.13 TOC

ONE CASING VOLUME: .87

START PURGE (HRS.): 1104

END PURGE (HRS.): 1113

TOTAL PURGE TIME (MIN.): 9

TOTAL AMOUNT PURGED (GAL.): 1.5

MONITOR READING: HNU - 3

PURGE METHOD: Disposable bailer

SAMPLE METHOD: Disposable bailer

DEPTH METHOD: Electric line

SAMPLE DATE & TIME: 9/3/92 1310

SAMPLED BY: BASILIO

SIGNATURE(S): V Basilio

PURGE DATA

VOLUME	PH	S.C.	TEMP. (°C)	TDS	COLOR & TURBIDITY
1	6.78	2920	19		Brown, turbid
2 ~~3.5~~	6.90	2970	19		A/A

SAMPLE DATA

PH	S.C.	TEMP. (°C)	TDS	COLOR & TURBIDITY
7.09	2910	19		light red slightly turbid

OBSERVATIONS/NOTES:

Well bailed dry after 1.5 gallons

TYPE OF SAMPLE

☐ LOW CONCENTRATION
☐ HIGH CONCENTRATION
☒ GRAB
☐ COMPOSITE
☐ GRAB - COMPOSITE

ANALYSIS:	PRESERVATIVE
TPH	
BTEX	HCL

APPENDIX D

SURVEY DATA

====== COGO ====== Friday November 6, 1992 4:19 PM

Coordinate File Name: HALIBNUS.CRD Lowest pt #: 1 Highest pt #: 39
Job # : 0
Description: HALLIBURTON NUS bor. & mon. wells at transwestern comp sta. E. of Carlsbad
# of chars. in point descr.: 18

FROM	TYPE	BEARING	DISTANCE	TO	NORTHING	EASTING

LIST POINTS

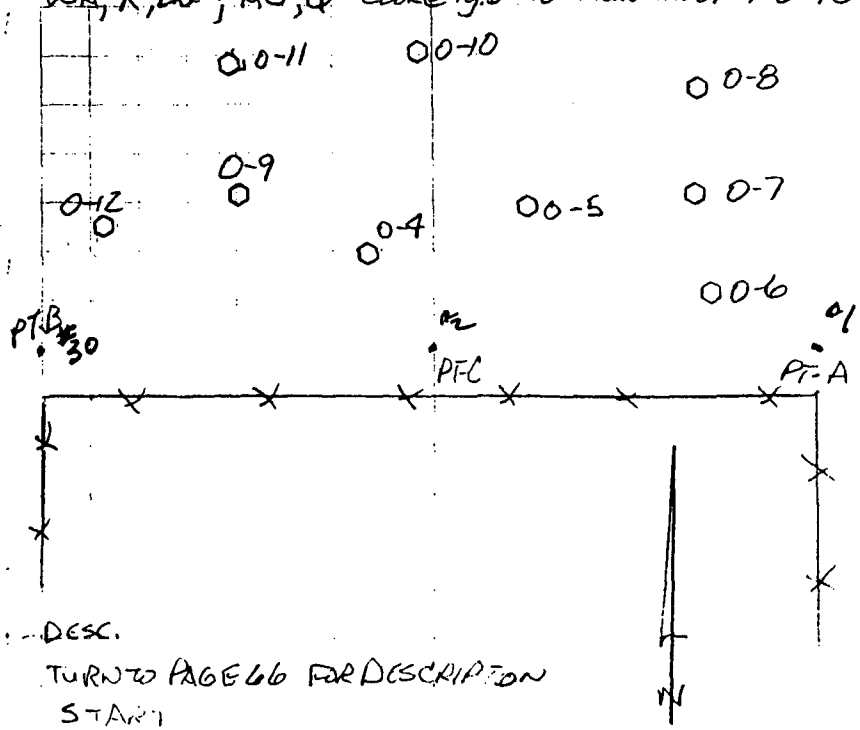
POINT	NORTHING	EASTING	ELEVATION		DESCR
1	10000.000000	10000.000000			
					5' N OF NE FN COR
2	10001.470745	9405.171818			
					NBC ON N PPTY LINE
3	9854.909147	9912.409391	3590.600000	BORING	TP-1
4	9886.130392	9861.357797	3590.700000	BORING	TP-2
5	9906.382233	9931.809194	3590.400000	BORING	TP-3
6	10036.821365	9434.916964	3590.900000	BORING	O-1 ?
7	10033.136997	9448.826067	3591.100000	BORING	O-2 ?
8	10014.563573	9352.360589	3591.100000	BORING	O-3 ?
9	9960.107807	9337.666291	3592.500000		
					MW-1, BORING BP-1
10	9929.309276	9289.788932	3592.800000	BORING	BP-2
11	9989.193929	9338.716298	3591.800000	BORING	BP-3
12	9928.981573	9256.525041	3592.500000	BORING	BP-4
13	9916.429638	9367.975548	3593.600000	BORING	BP-5
14	9834.682005	9345.922209	3593.700000	BORING	BP-6
15	9993.112822	9447.158021	3591.100000		
					MONITOR WELL #2
16	9965.890229	9430.388062	3591.400000	BORING	FP-1
17	9928.625288	9452.352784	3591.300000	BORING	FP-2
18	9883.289992	9424.494656	3594.300000	BORING	FP-3
19	9926.785989	9486.040809	3591.000000	BORING	FP-4
20	9933.743785	9398.549033	3593.500000	BORING	FP-5
21	9849.355756	9416.550814	3594.200000	BORING	FP-6
22	9991.255145	9434.079899	3591.500000	BORING	FP-7
23	9821.950747	9379.615235	3593.700000		
					MONITOR WELL #3
24	10003.280180	8673.364055			
25	0.000000	1.000000	3594.670000		
					MON. WELL #1 CASIN
26	0.000000	2.000000	3593.320000		
					MON. WELL #2 CASIN
27	0.000000	3.000000	3596.040000		
					MON. WELL #3 CASIN
28	0.000000	4.000000	3598.500000		
					BM NE COR MAIN. BL
30	10003.280180	8673.364055			
31	10058.074359	9363.920969	3590.200000	BORING	O-4
32	10081.425222	9446.643334	3590.400000	BORING	O-5
33	10023.162445	9522.178101	3590.100000	BORING	O-6
34	10081.761990	9520.445174	3589.100000	BORING	O-7
35	10144.316184	9508.107844	3589.100000	BORING	O-8
36	10074.730181	9262.467848	3590.700000	BORING	O-9
37	10168.951033	9402.016952	3589.100000	BORING	O-10
38	10200.119950	9269.532646	3589.500000	BORING	O-11
39	10083.473917	9119.009518	3590.900000	BORING	O-12

New 11-6-92

HALLIBURTON PROJECT TRANSWESTERN WT-1 COMPRESSOR STA CHAIN SEAL

WA, T, DD ; AG, ϕ LOOK @ Pg. 65 FOR MORE INFO. 11-6-92

TO	BS	FS	H ∠	DIST	DESC.
PT-C					
	#30 PT-B				
PT.	#31	0-4	53°46'30"	70.04'	CONC. FILLED DRILL HOLE
	32	0-5	117°16'25"	90.07'	" "
	33	0-6	169°21'20"	119.00'	" "
	34	0-7	45°00'00"	140.48'	" "
	35	0-8	125°38'07"	176.07'	" "
	36	0-9	27°01'58"	160.41'	" "
	37	0-10	88°46'45"	167.51'	" "
	38	0-11	55°31'58"	240.54'	" "
	39	0-12	15°30'55"	297.68'	" "



STA	+	HI	ROD	−	ELEV.	DESC.
BM	0.63	3599.13			3598.50	TURN TO PAGE 66 FOR DESCRIPTION
						START
0-4	#31		8.96		3590.17	GROUND SHOT
0-5	32		8.75		3590.38	" "
0-6	33		9.01		3590.12	" "
0-7	34		10.02		3589.11	" "
0-8	35		10.02		3589.11	" "
0-9	36		8.47		3590.66	" "
0-10	37		10.08		3589.05	" "
0-11	38		9.64		3589.49	" "
0-12	39		8.24		3590.89	" "
BM				0.63	3598.50	TURNOUT

BASIC ORDERING AGREEMENT NO. BO-92-048H

WORK RELEASE DOCUMENT

To:	Pettigrew and Associates	Date:	November 2, 1992
	1110 N. Grimes	Project No.:	2048-7P64 * CA
	Hobbs, New Mexico 88240	Work Release No.:	BO-92-048H-01
	(903) 596-4421	Rev. No.:	0
Attn:	W.M. Tres Hicks, III PE-LSI		
Subject:	Surveying at Transwestern Pipeline facility		

1) Definitions

The Project is surveying of 9 borings and 3 monitor wells located at Transwestern Pipeline in Carlsbad, New Mexico.

1.1 OWNER or CLIENT shall mean Transwestern Pipeline.
1.2 CONTRACTOR or HALLIBURTON NUS shall mean HALLIBURTON NUS Environmental Corporation.
1.3 SUBCONTRACTOR shall mean Pettigrew and Associates.

2) Scope of Work

SUBCONTRACTOR shall provide all labor, tools, equipment, supplies, material, and all other items necessary to perform the scope of work as described in Basic Ordering Agreement Number BO-92-048H and the attached Exhibit "A".

3) Cost of Sublet Work

All services shall be performed in accordance with the rates and charges set forth in the attached Exhibit "C". SUBCONTRACTOR shall not exceed the total estimated cost of $300.00 plus applicable taxes without prior written approval of HALLIBURTON NUS Project Manager.

4) Schedule

Services shall commence on or about September 7, 1992 and SUBCONTRACTOR shall exercise its best efforts to complete the work no later than September 30, 1992. Time is of the essence in the performance of work under this agreement. SUBCONTRACTOR shall not receive payment for services performed beyond this schedule without prior written approval of HALLIBURTON NUS Project Manager.

5) Invoices

SUBCONTRACTOR shall submit its invoice monthly, in such detail as HALLIBURTON NUS may require. Invoices shall be sent to:

HALLIBURTON NUS Environmental Corporation
16360 Park Ten Place, Suite 300
Houston, Texas 77084
Attn: Susanne Richard
Project Manager

All invoices must include HALLIBURTON NUS' Basic Ordering Agreement Number, Work Release Number, and Sublet Work Description.

6) Order of Precedence

All services shall be performed in strict accordance with the terms and conditions set forth in Basic Ordering Agreement No. BO-92-048H.

SUBCONTRACTOR Project Manager: W.M. Tres Hicks, III

HALLIBURTON NUS Project Manager: Susanne Richard

HALLIBURTON NUS Charge Number: 2048-7P54"CA

2048 Responsibility Center RC Suffix 1548

HALLIBURTON NUS Environmental Corporation:		SUBCONTRACTOR:	
Signature:		Signature:	William M. Hicks
Name:	Stephen T. Garland, P.E.	Name:	William M. Hicks
Title:	General Manager, Houston District	Title:	Secretary
Date:		Date:	November 6, 1992

EXHIBIT "A"

DETAILED SCOPE OF WORK

SUBCONTRACTOR shall provide all labor, tools, equipment, supplies, licenses, transportation, and insurance, and all other items necessary to perform groundwater sampling services. Services shall be performed in accordance with the terms and conditions set forth in Basic Ordering Agreement No. BO-92-048H and the more detailed Scope of Work as described below:

Pettigrew and Associates shall determine local X, Y, and Z Coordinates for 9 borings and 3 monitor wells located at a site approximately 26 miles east of Carlsbad, New Mexico just off US Highway 62-180. The site is roughly 400 square feet, relatively free from obstruction to visual surveying. The borings and wells will be marked, and HALLIBURTON NUS will provide right of way, access and survey permission as required for the area.

Pettigrew and Associates will locate the borings and wells from a known point as described by the client and provide the location and elevation information results in tabular form.

EXHIBIT "B"

SPECIAL CONDITIONS

NONE

EXHIBIT "C"

COST OF SUBLET WORK

SUBCONTRACTOR shall provide all labor, tools, equipment, supplies, licenses, transportation, and insurance, and all other items necessary to perform groundwater sampling services. Services shall be performed in accordance with the all-inclusive unit rates set forth below:

SUBCONTRACTOR shall not exceed the total estimated cost of THREE HUNDRED DOLLARS ($300.00) plus applicable taxes without prior written approval of HALLIBURTON NUS.