1R - 238

REPORTS

DATE:

1993

CURA, INC.
3001 North Big Spring
Suite 101
Midland, Texas 79705
(915) 570-8408
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PHASE II
ENVIRONMENTAL SITE ASSESSMENT

HUGH STATION
LEA COUNTY, NEW MEXICO

CURA PROJECT NO. 15-9256714.3

SHELL PIPE LINE CORPORATION
TWO SHELL PLAZA
P.O. BOX 2099
HOUSTON, TEXAS 77252-2099

March 3, 1993

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Director of Geology/Hydrogeology

CURA

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1.0 REPORT SUMMARY

1.1 EXECUTIVE SUMMARY

The site, Hugh Station, is located approximately 3.5 miles south-southeast of the city of Eunice in Lea County, New Mexico (Appendix A, Figure 1) and is utilized as a crude oil pipeline pump station.

A review of the analytical results from the Preliminary Site Assessment conducted during December 1992 indicated hydrocarbon-impacted soils (> 100 ppm TPH) at a depth of 1 to 3 feet in borings B-2 (4,300 ppm TPH) and B-4 (3,300 TPH). Based on these analytical results, the sump and pumping equipment located in the southwest corner of the site were identified as potential sources of the crude oil contamination observed on site.

Based on the findings of the Preliminary Site Assessment, five additional soil borings (B-5 through B-9) were performed on February 4, 1993 to further delineate the horizontal and vertical extent of the hydrocarbon-impacted soils previously identified in borings B-2 and B-4.

Benzene levels were below method detection limits of 0.001 ppm in the sampled intervals of borings B-5 through B-9. The total BTEX levels ranged from below method detection limits of 0.001 ppm to 0.002 ppm. TPH levels ranged from below method detection limits of 10 ppm to 280 ppm. The current New Mexico Oil Conservation Division (OCD) recommended remediation levels for crude oil impacted soils are 10 ppm benzene, 50 ppm total BTEX, and either 100 ppm, 1,000 ppm, or 5,000 ppm TPH depending upon the risk assessment ranking for the site.

Based on the data obtained the extent of hydrocarbon-impacted soils near the sump and pump equipment in the southwest corner of the site is limited to an area approximately 110 feet by 60 feet with a maximum depth of 5 to 7 feet.

Additional borings are needed west of boring B-4 to delineate the extent of hydrocarbon-impacted soils. Due to the close proximity of B-4 to the property boundary (fence line), offsite access may be needed.

Groundwater was not encountered during this subsurface investigation. Based on the analytical data from borings B-1 through B-9 and field observations, the crude oil contamination was absorbed by the impacted soils and did not migrate downward to groundwater.

1.2 SCOPE OF SERVICES

The following scope of services was conducted for the Phase II - Environmental Site Assessment:

- Met with Shell Pipe Line Corporation to determine additional boring locations in order to further delineate the extent of hydrocarbon-impacted soils found during the Preliminary Site Assessment conducted in December 1992.

- Conducted a preliminary literature search of the geology and hydrogeology of the site area.

- Performed soil borings and obtained soil samples to aid in classifying subsurface conditions with respect to petroleum hydrocarbons.

- Constructed a soil hydrocarbon concentration map to help delineate the horizontal and vertical extent of hydrocarbon-affected soils.

- Assembled soil profile columns from soil boring logs and reviewed the soil classification for the site area.

- Summarized findings in the Phase II - Environmental Site Assessment Report.

2.0 INTRODUCTION

During December 1992, CURA was contracted by Shell Pipe Line Corporation to conduct a Preliminary Site Assessment prior to a planned site divestment. Based on the discovery of hydrocarbon-impacted soils in borings B-2 and B-4, the sump and pump equipment located in the southwest corner of the site were identified as potential sources.

A Phase II - Environmental Site Assessment (this report) was performed on February 4, 1992 to further delineate the extent of hydrocarbon-impacted soils near borings B-2 and B-4, and to provide a more comprehensive assessment of the subsurface soil conditions. The site, Hugh Station, is located approximately 3.5 miles south-southeast of the city of Eunice in Lea County, New Mexico (Appendix A, Figure 1) and is utilized as a crude oil pipeline pump station.

3.0 SITE DESCRIPTION

Hugh Station is utilized as a crude oil pipeline pumping station in which subsurface crude oil field lines from various oil field leases are manifolded into the main subsurface discharge pipeline currently operated by Shell Pipe Line Corporation. One 5,000 barrel aboveground crude oil storage tank (Tank 2029) is located in the center of the north portion of the site (Appendix A, Figure 2) and is surrounded by an earthen dike. A single-walled steel sump is located adjacent to the earthen dike and southeast of the tank. A pumping station and single-walled steel sump are located in the southwest corner of the site. An aboveground crude oil tank battery is located off-site and adjacent to the northwest corner of the site.

Hugh Station is surrounded by barbed-wire fencing with a locked gate located near the center of the west property boundary. The site is located in a rural area within the Monument-Jal Oil Field. No residences, public buildings, surface bodies of water, or water wells were observed within a 1,000 foot radius of the facility.

4.0 SITE HYDROGEOLOGY

The site is located in Lea County, New Mexico, within the Great Plains physiographic province along the southwestern edge of the High Plains Region of New Mexico and Texas.

Water wells in the site area typically produce water from three principal geologic units (from oldest to youngest), the Dockum group, the Ogallala formation, and Quaternary alluvium. The Ogallala formation is the major water-bearing formation in the area with well yields ranging from 30 gpm to 700 gpm. The Ogallala formation is of Pliocene age and consists of semiconsolidated fine-grained calcareous sand overlain by a thick layer of caliche. The formation contains some clay, silt, and often a basal gravel. It is a heterogeneous complex of terrestrial sediments deposited over an irregular erosional surface cut into the Triassic rocks and ranges in thickness from a few inches to approximately 300 feet.

Eolian and alluvial deposits of Recent to Pleistocene age overlie the Ogallala formation in the site area. These deposits consist of fine to medium grained sands, and calcareous silt and clays. Ranging in thickness from 0 to 400 feet, these Quaternary deposits often form a continuous aquifer with the underlying Ogallala formation and are considered to act as one aquifer beneath the site area. Where the Ogallala is not present, the Quaternary alluvium produces limited quantities of groundwater, with well yields generally less than 30 gpm.

The Triassic age Dockum group consists of the Chinle formation and the underlying Santa Rosa sandstone. The Chinle formation is a 0 - 1270 foot thick claystone containing minor fine-grained sandstones and siltstones. Wells completed in the Chinle formation generally yield less than 10 gpm. The Santa Rosa sandstone is a 140 - 300 foot thick fine to coarse-grained sandstone which generally yields small

quantities of water, but some wells yield up to 100 gpm. Produced waters from both the Chinle formation and the Santa Rosa sandstone are high in sulfate content.

According to published data (Nicholson, 1961), there are no registered water wells within a 1,000 foot radius of the site. The closest known water well is located approximately 3,000 feet southwest of the site. The well was drilled to a total depth of 77 feet and completed in Quaternary Alluvium with a reported depth to water of 55 feet in 1953. The current status and construction data on this well is unknown.

According to the U.S.G.S. Eunice, New Mexico, topographic quadrangle, the site is approximately 3,340 feet above mean sea level (Figure 4). The general trend of the local topography and surface drainage of the site area is to the southeast.

The soils on site belong to the Berino Series consisting of well-drained, sandy loam soils that have a sandy clay loam subsoil. These soils formed in wind-worked sands overlying alluvial, sandy, calcareous sediments on upland plains. Typically, the surface layer is reddish-brown loamy fine sand about 6 inches thick. The subsoil is red sandy clay loam to a depth of 42 inches. This is underlain by pink calcareous sandy clay loam (caliche) to a depth of 60 inches. The soils described in the soil survey are generally consistent with the observed soil on site.

Subsurface conditions were similar for borings B-1 through B-9. The soils consisted of 2 feet to 7 feet of light-brown to dark-brown silty sand (SM) underlain by white, gray to buff-pink calcareous sand (caliche) to a depth of approximately 17 feet (maximum boring depth). A 2.5 foot thick gray silty clay (ML) was present from 2 to 4.5 feet in boring B-4. The soil boring logs included in Appendix B provide a more detailed description of the subsurface conditions.

Currently, the groundwater in the site area is used primarily for stock and industrial use. The drinking water in Eunice, the nearest municipality, is supplied from a well

field located approximately 16 miles north-northwest of the site that produce from the Ogallala Formation at a depth of 80 to 120 feet.

A field survey of the site and surrounding area was conducted during the Preliminary Site Assessment to identify potential receptors (residences, public buildings, water supply wells, and surface bodies of water) in the site vicinity. No residences, public buildings, or water supply wells were identified within a 1000 foot radius of the site.

5.0 HYDROGEOLOGICAL INVESTIGATION AND FINDINGS

5.1 SOIL INVESTIGATION

5.1.1 SOIL BORING LOCATIONS

The locations of borings B-5 through B-9 were chosen based on the discovery of hydrocarbon-impacted soils in borings B-2 and B-4 during the Preliminary Site Assessment which indicated the potential source of the crude oil contamination is the pump equipment and/or sump in the southern portion of the site.

Borings B-5 and B-6 were placed northwest and northeast, respectfully, of the pump equipment and sump and upgradient to hydrocarbon-impacted soils with respect to the observed local surface drainage, which is to the southeast. Borings B-7, B-8, and B-9 were placed east, southeast, and southwest of the potential source to complete the delineation of the impacted area in the apparent downgradient direction of the observed local surface drainage.

5.1.2 SOIL SAMPLING OPERATIONS

Soil samples were retrieved from the borings to be analyzed for benzene, toluene, ethylbenzene, xylenes (BTEX) and total petroleum hydrocarbons (TPH). Samples were obtained at five foot intervals in each boring using a split spoon sampling device. The soil sample obtained from each interval was split into two separate containers. One sample was placed into a glass jar with teflon-lined lids and zero head space and preserved at 4°C in accordance with EPA protocol for shipment to the laboratory. The other soil sample from each interval

was placed in a sample jar and field-screened (head space analysis) with a flame ionization detector (FID) Century 128 Organic Vapor Analyzer (OVA). The OVA detects volatile petroleum and non-petroleum organic compounds in parts per million (ppm) methane equivalent.

5.1.2 SOIL SAMPLE ANALYTICAL RESULTS

OVA readings measured <1 ppm in all of the sampled intervals of borings B-5 through B-9 except for a reading of 2 ppm in the 5 to 7 foot sample interval of boring B-8. Two samples from each boring were submitted for laboratory analyses. The sample with the highest relative OVA reading and the sample at the total depth of each boring unless noted otherwise were submitted to the laboratory for BTEX and TPH analyses using EPA-approved analytical methods (EPA Method 8020 and EPA Method 418.1, respectively). Complete OVA readings and a listing of those samples submitted to the laboratory are presented in Table 1. No hydrocarbon staining or odors were observed during sampling operations.

TABLE 1
SOIL SAMPLE ANALYTICAL RESULTS

Boring	Date Sampled	Sample Interval (feet)	OVA	Benzene	Toluene	Ethyl-benzene	Xylenes	Total BTEX	TPH
B-1	12-09-93	1 - 3	<1	<0.001	<0.001	<0.001	0.001	0.001	16
		5 - 7	<1	<0.001	0.028	0.030	0.160	0.218	16
B-2	12-09-92	1 - 3	6	<0.001	<0.001	0.019	0.010	0.029	4,300
		5 - 7	<1	<0.001	0.003	<0.001	0.004	0.007	14
B-3	12-09-92	1 - 3	5	<0.001	0.004	0.001	0.004	0.009	15
		5 - 7	1						
		10 - 12	<1	<0.001	0.002	<0.001	0.003	0.005	13
B-4	12-09-92	1 - 3	31	<0.001	0.250	0.450	0.850	1.550	3,300
		5 - 7	5						
		10 - 12	<1	<0.001	0.001	<0.001	0.003	0.004	15
B-5	02-04-93	1 - 3	<1	<0.001	<0.001	<0.001	<0.001	<0.001	30
		5 - 7	<1						
		10 - 12	<1	<0.001	<0.001	<0.001	<0.001	<0.001	30
B-6	02-04-93	1 - 3	1	<0.001	<0.001	<0.001	<0.001	<0.001	30
		5 - 7	<1						
		10 - 12	<1	<0.001	<0.001	<0.001	<0.001	<0.001	20
B-7	02-04-93	1 - 3	<1	<0.001	<0.001	<0.001	<0.001	<0.001	20
		5 - 7	<1						
		10 - 12	<1						
		15 - 17	<1	<0.001	<0.001	<0.001	0.002	0.002	30
B-8	02-04-93	1 - 3	<1						
		5 - 7	2	<0.001	<0.001	<0.001	0.001	0.001	280
		10 - 12	<1						
		15 - 17	<1	<0.001	<0.001	<0.001	<0.001	<0.001	20

TABLE 1
SOIL SAMPLE ANALYTICAL RESULTS

Boring	Date Sampled	Sample Interval (feet)	OVA	Benzene	Toluene	Ethyl-benzene	Xylenes	Total BTEX	TPH
B-9	02-04-93	1 - 3	<1	<0.001	<0.001	<0.001	0.001	0.001	20
		5 - 7	<1						
		10 - 12	<1	<0.001	<0.001	<0.001	0.001	0.001	<10

OVA results listed in parts per million (ppm) equivalent methane.
BTEX results in mg/kg (parts per million; ppm) with method detection limits in Appendix D.
TPH results in mg/kg (parts per million; ppm) with method detection limits in Appendix D.
Analyses were conducted using EPA Method 8020 (BTEX) and EPA Method 418.1 (TPH) by SPL Environmental Laboratories.

A review of the analytical results from the Preliminary Site Assessment conducted during December 1992 indicated hydrocarbon-impacted soils (>100 ppm TPH) at a depth of 1 to 3 feet in borings B-2 (4,300 ppm TPH) and B-4 (3,300 TPH).

Results from this phase of the investigation recorded benzene levels below method detection limits of 0.001 ppm in every sampled interval of Borings B-5 through B-9. The total BTEX (benzene, toluene, ethylbenzene, xylenes) levels ranged from below method detection limits of 0.001 ppm in a majority of the sampled intervals to 0.002 ppm in the 15 to 17 foot interval of boring B-7. TPH (total petroleum hydrocarbons) levels ranged from below method detection limits of 10 ppm in the 10 to 12 foot interval of boring B-9 to 280 ppm in the 5 to 7 foot interval of boring B-8. Hydrocarbon concentrations are illustrated on the site map (Appendix B, Figure 2) to indicate soil sample depths and the corresponding hydrocarbon concentration levels.

A summary of the analytical results is presented in Table 1. Laboratory reports and the chain-of-custody are included in Appendix C.

5.2 GROUNDWATER ASSESSMENT

Groundwater was not expected or encountered during drilling operations. Based on the analytical data, OVA readings, and visual observations noted during sampling operations, the crude oil contamination was absorbed by the impacted soils and did not migrate downward to groundwater. Monitor wells were not installed on site.

6.0 CONCLUSIONS

1. No potential receptors were identified within a 1,000 foot radius of the site.

2. Based on the data obtained indicate the extent of hydrocarbon-impacted soils near the sump and pump equipment in the southwest corner of the site is limited to an area less than 110 feet by 60 feet with a depth of 5 to 7 feet.

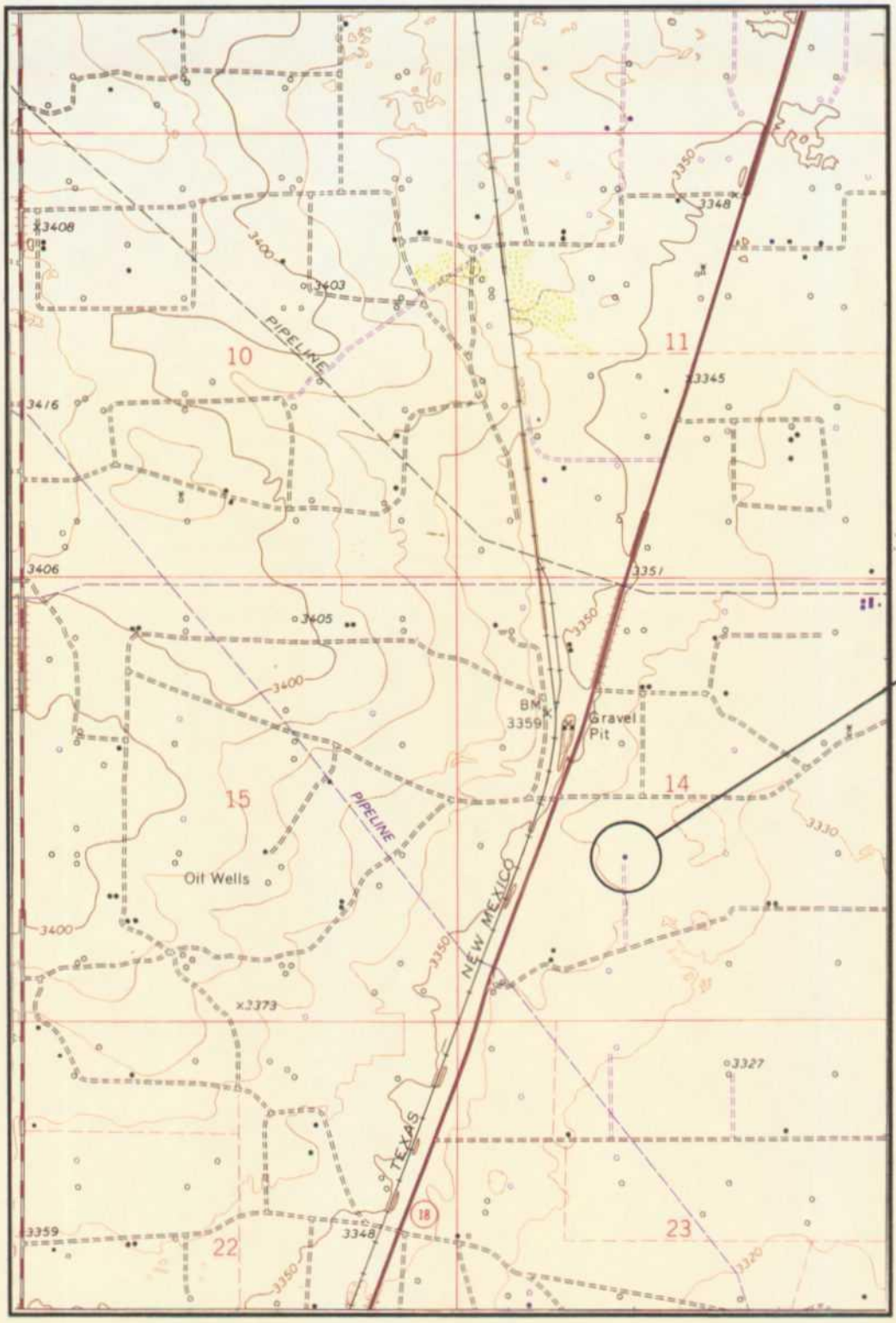
3. Additional borings are needed east of boring B-4 to delineate the extent of hydrocarbon-impacted soils. Due to the close proximity of B-4 to the property boundary (fence line) offsite access may be needed.

4. Groundwater was not encountered during this investigation. Based on the analytical results and field observations, the crude oil contamination was absorbed by the impacted soils and did not migrate downward to groundwater.

7.0 APPENDICES

APPENDIX A

FIGURES



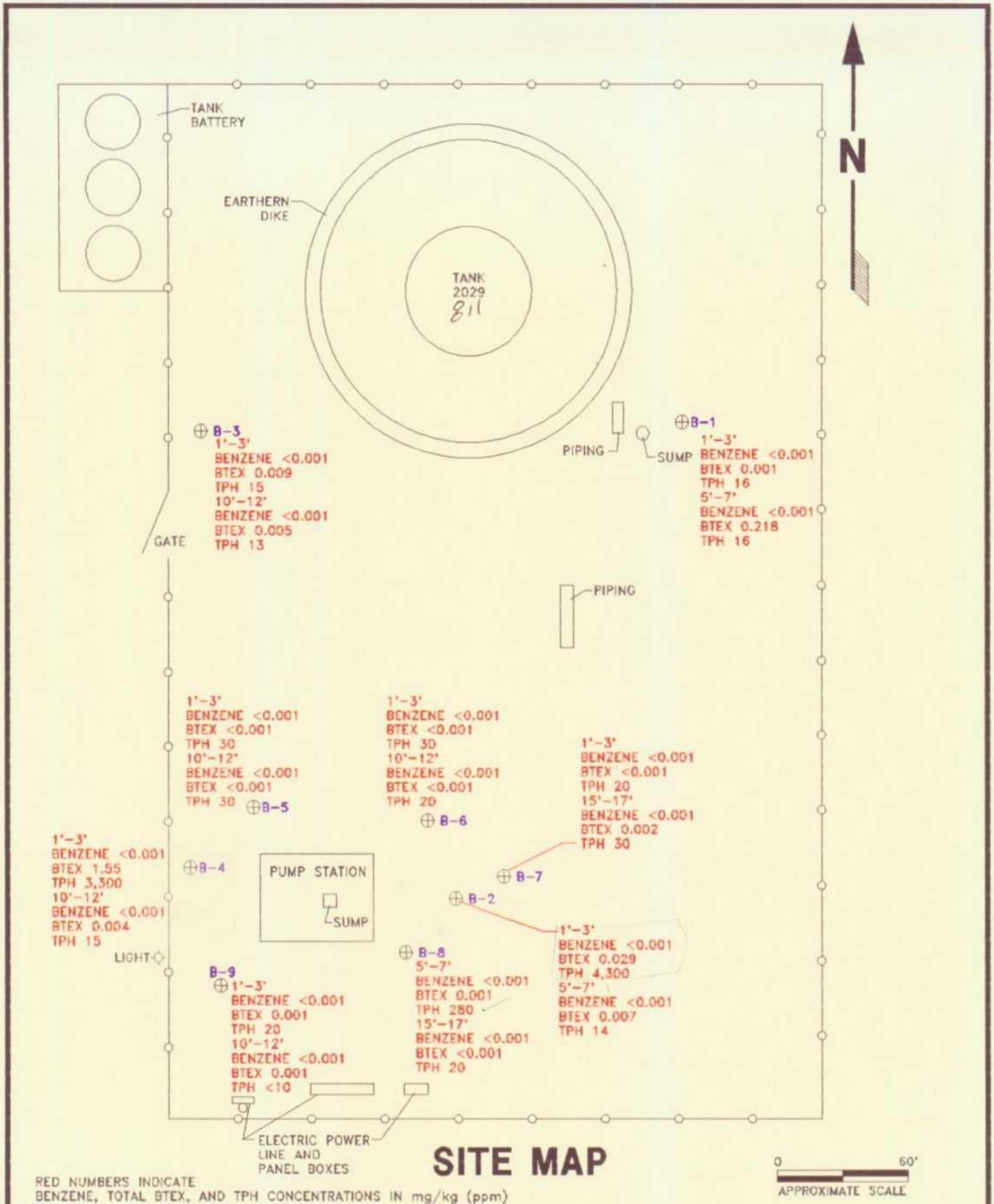
SITE LOCATION MAP

REF: USGS EUNICE, NEW MEXICO TOPOGRAPHIC QUADRANGLE (1969)
PHOTOREVISED 1977

CURA INC.
2735 VILLA CREEK DRIVE - TWO METRO SQUARE
BLDG. C - SUITE 250 - DALLAS, TX 75234
620-7117 FAX - 620-8219

HUGH STATION
SHELL PIPE LINE CORPORATION
LEA COUNTY, NEW MEXICO

DATE:	SCALE:
MAR 1993	1" ≈ 2000'
PROJECT NO.	FIGURE NO.
15-92567	1



SITE MAP

RED NUMBERS INDICATE
BENZENE, TOTAL BTEX, AND TPH CONCENTRATIONS IN mg/kg (ppm)

0 60'
APPROXIMATE SCALE

CURA INC.
2735 VILLA CREEK DRIVE - TWO METRO SQUARE
BLDG. C - SUITE 250 - DALLAS, TX 75234
620-7117 FAX - 620-8219

HUGH STATION
SHELL PIPE LINE CORPORATION
LEA COUNTY, NEW MEXICO

DATE:	SCALE:
MAR 1993	SEE ABOVE
PROJECT NO.	FIGURE NO.
15-92567	2

APPENDIX B
BORING/WELL LOGS

CRA INC.
2735 VILLA CREEK DRIVE - TWO METRO SQUARE
BLDG. C - SUITE 250 - DALLAS, TX 75234
620-7117 FAX - 620-8219

RECORD OF SUBSURFACE EXPLORATION

Project No.: 15-92567
Project: HUGH STATION
LEA COUNTY, NEW MEXICO
-
Drilling Co: HI PLAINS DRILLING
Driller: B.S.
Drilling Method: AIR ROTARY

Well/Boring #: B-1
Depth of Boring: 7 FEET
Depth of Well: -
Length of Screen: -
Length of Casing: -
Logged By: F.W.R.

Date Drilled: 12/09/92
Diameter of Boring: 5 1/8 INCHES
Diameter of Screen: -
Diameter of Casing: -
Slot Size: -
Well Material: GROUT

DEPTH FEET	SOIL DESCRIPTION	SAMPLE NUMBER	SAMPLE TYPE	OVA (PPM)	WELL DESIGN	REMARKS
0	Pink-brown silty calcareous SAND (SM) (CALICHE)					
2.5		1	SS	<1	■	BENZENE <0.001 mg/kg BTEX=0.001 mg/kg TPH=16 mg/kg
5.0		2	SS	<1	■	BENZENE <0.001 mg/kg BTEX=0.218 mg/kg TPH=16 mg/kg
7.5	Bottom of boring @ 7.0 feet					
10.0						
12.5						
15.0						
17.5						
20.0						
22.5						
25.0						
27.5						
30.0						

SS-Driven Split Spoon
ST-Pressed Shelby Tube
CA-Continuous Flight Auger
RC-Rock Core
THD-Texas Highway Department Cone
CT-5' Continuous Sampler

ABBREVIATIONS AND SYMBOLS

HSA-Hollow Stem Augers
CFA-Continuous Flight Augers
DC-Driving Casing
MD-Mud Drilling

WATER LEVEL
▽ At Completion
▼ After Hours
● Water on Rods

■ Sample submitted to lab
Bottom Cap
Sand Pack
Bentonite Seal
Factory-Slotted Well Screen
Well Casing
Voloclay Grout Seal

CRA INC.
2735 VILLA CREEK DRIVE - TWO METRO SQUARE
BLDG. C - SUITE 250 - DALLAS, TX 75234
620-7117 FAX - 620-8219

RECORD OF SUBSURFACE EXPLORATION

Project No.: 15-92567
Project: HUGH STATION
LEA COUNTY, NEW MEXICO
-
Drilling Co: HI PLAINS DRILLING
Driller: B.S.
Drilling Method: AIR ROTARY

Well/Boring #: B-2
Depth of Boring: 7 FEET
Depth of Well: -
Length of Screen: -
Length of Casing: -
Logged By: F.W.R.

Date Drilled: 12/09/92
Diameter of Boring: 5 1/8 INCHES
Diameter of Screen: -
Diameter of Casing: -
Slot Size: -
Well Material: GROUT

DEPTH FEET	SOIL DESCRIPTION	SAMPLE NUMBER	SAMPLE TYPE	OVA (PPM)	WELL DESIGN	REMARKS
0	Brown silty SAND (SM)					
2.5	Light brown silty SAND (SM)	1	SS	6	■	BENZENE <0.001 mg/kg BTEX=0.029 mg/kg TPH=4,300 mg/kg
5.0		2	SS	<1	■	BENZENE <0.001 mg/kg BTEX=0.007 mg/kg TPH=14 mg/kg
7.5	Bottom of boring @ 7.0 feet					
10.0						
12.5						
15.0						
17.5						
20.0						
22.5						
25.0						
27.5						
30.0						

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● Water on Rods

■ Sample submitted to lab
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Factory-Slotted Well Screen
Sand Pack
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2735 VILLA CREEK DRIVE - TWO METRO SQUARE
BLDG. C - SUITE 250 - DALLAS, TX 75234
620-7117 FAX - 620-8219

RECORD OF SUBSURFACE EXPLORATION

Project No.: 15-92567
Project: HUGH STATION
LEA COUNTY, NEW MEXICO
-
Drilling Co: HI PLAINS DRILLING
Driller: B.S.
Drilling Method: AIR ROTARY

Well/Boring #: B-3
Depth of Boring: 12 FEET
Depth of Well: -
Length of Screen: -
Length of Casing: -
Logged By: F.W.R.

Date Drilled: 12/09/92
Diameter of Boring: 5 1/8 INCHES
Diameter of Screen: -
Diameter of Casing: -
Slot Size: -
Well Material: GROUT

DEPTH FEET	SOIL DESCRIPTION	SAMPLE NUMBER	SAMPLE TYPE	OVA (PPM)	WELL DESIGN	REMARKS
0	Dark brown silty SAND (SM)					
2.5	Brown pink silty SAND (SM)	1	SS	5	■	BENZENE <0.001 mg/kg BTEX=0.009 mg/kg TPH=15 mg/kg
5.0	Buff-pink calcareous SAND (caliche)	2	SS	1		
7.5						
10.0		3	SS	<1	■	BENZENE <0.001 mg/kg BTEX=0.005 mg/kg TPH=13 mg/kg
12.5	Bottom of boring @ 12.0 feet					
15.0						
17.5						
20.0						
22.5						
25.0						
27.5						
30.0						

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▼ After Hours
● Water on Rods

■ Sample submitted to lab
Bottom Cap
Sand Pack
Bentonite Seal
Factory-Slotted Well Screen
Well Casing
Voloclay Grout Seal

CRA INC.
2735 VILLA CREEK DRIVE - TWO METRO SQUARE
BLDG C - SUITE 250 - DALLAS, TX 75234
620-7117 FAX - 620-8219

RECORD OF SUBSURFACE EXPLORATION

Project No.: 15-92567
Project: HUGH STATION
LEA COUNTY, NEW MEXICO
-
Drilling Co: HI PLAINS DRILLING
Driller: B.S.
Drilling Method: AIR ROTARY

Well/Boring #: B-4
Depth of Boring: 12 FEET
Depth of Well: -
Length of Screen: -
Length of Casing: -
Logged By: F.W.R.

Date Drilled: 12/09/92
Diameter of Boring: 5 1/8 INCHES
Diameter of Screen: -
Diameter of Casing: -
Slot Size: -
Well Material: GROUT

DEPTH FEET	SOIL DESCRIPTION	SAMPLE NUMBER	SAMPLE TYPE	OVA (PPM)	WELL DESIGN	REMARKS
0	Dark brown silty SAND (SM) hydrocarbon stained					
2.5	Gray silty CLAY (ML)	1	SS	31	■	BENZENE <0.001 mg/kg BTEX=1.55 mg/kg TPH=3,300 mg/kg
5.0	Pink-white calcareous SAND (caliche)	2	SS	5		
7.5						
10.0		3	SS	>1	■	BENZENE <0.001 mg/kg BTEX=0.004 mg/kg TPH=15 mg/kg
12.5	Bottom of boring @ 12.0 feet					
15.0						
17.5						
20.0						
22.5						
25.0						
27.5						
30.0						

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BLDG. C - SUITE 250 - DALLAS, TX 75234
620-7117 FAX - 620-8219

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Project No.: 15-92567
Project: HUGH STATION
LEA COUNTY, NEW MEXICO
-
Drilling Co: HI PLAINS DRILLING
Driller: B.S.
Drilling Method: AIR ROTARY

Well/Boring #: B-5
Depth of Boring: 12 FEET
Depth of Well: -
Length of Screen: -
Length of Casing: -
Logged By: F.W.R.

Date Drilled: 02/04/93
Diameter of Boring: 5 1/8 INCHES
Diameter of Screen: -
Diameter of Casing: -
Slot Size: -
Well Material: GROUT

DEPTH FEET	SOIL DESCRIPTION	SAMPLE NUMBER	SAMPLE TYPE	OVA (PPM)	WELL DESIGN	REMARKS
0	Brown silty fine-grained SAND (SM)					
2.5		1	SS	<1	■	BENZENE <0.001 mg/kg BTEX <0.001 mg/kg TPH=30 mg/kg
5.0	Buff-pink calcareous SAND (caliche)	2	SS	<1		
7.5						
10.0		3	SS	<1	■	BENZENE <0.001 mg/kg BTEX <0.001 mg/kg TPH=30 mg/kg
12.5	Bottom of boring @ 12.0 feet					
15.0						
17.5						
20.0						
22.5						
25.0						
27.5						
30.0						

SS-Driven Split Spoon
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WATER LEVEL
▽ At Completion
▼ After Hours
● Water on Rods

■ Sample submitted to lab
Bottom Cap
Sand Pack
Bentonite Seal
Factory-Slotted Well Screen
Well Casing
Voloclay Grout Seal

CRA INC.
2735 VILLA CREEK DRIVE - TWO METRO SQUARE
BLDG. C - SUITE 250 - DALLAS, TX 75234
620-7117 FAX - 620-8219

RECORD OF SUBSURFACE EXPLORATION

Project No.: 15-92567
Project: HUGH STATION
LEA COUNTY, NEW MEXICO
-
Drilling Co: HI PLAINS DRILLING
Driller: B.S.
Drilling Method: AIR ROTARY

Well/Boring #: B-6
Depth of Boring: 12 FEET
Depth of Well: -
Length of Screen: -
Length of Casing: -
Logged By: F.W.R.

Date Drilled: 02/04/93
Diameter of Boring: 5 1/8 INCHES
Diameter of Screen: -
Diameter of Casing: -
Slot Size: -
Well Material: GROUT

DEPTH FEET	SOIL DESCRIPTION	SAMPLE NUMBER	SAMPLE TYPE	OVA (PPM)	WELL DESIGN	REMARKS
0	Brown silty fine-grained SAND (SM)					
2.5		1	SS	1	■	BENZENE <0.001 mg/kg BTEX <0.001 mg/kg TPH=30 mg/kg
5.0	Buff-pink calcareous SAND (caliche)	2	SS	<1		
7.5						
10.0		3	SS	<1	■	BENZENE <0.001 mg/kg BTEX <0.001 mg/kg TPH=20 mg/kg
12.5	Bottom of boring @ 12.0 feet					
15.0						
17.5						
20.0						
22.5						
25.0						
27.5						
30.0						

ABBREVIATIONS AND SYMBOLS

SS-Driven Split Spoon
ST-Pressed Shelby Tube
CA-Continuous Flight Auger
RC-Rock Core
THD-Texas Highway Department Cone
CT-5' Continuous Sampler

HSA-Hollow Stem Augers
CFA-Continuous Flight Augers
DC-Driving Casing
MD-Mud Drilling

WATER LEVEL
▽ At Completion
▼ After Hours
● Water on Rods

■ Sample submitted to lab
Bottom Cap
Sand Pack
Bentonite Seal
Factory-Slotted Well Screen
Well Casing
Voloclay Grout Seal

CURA INC.
2735 VILLA CREEK DRIVE - TWO METRO SQUARE
BLDG. C - SUITE 250 - DALLAS, TX 75234
620-7117 FAX - 620-8219

RECORD OF SUBSURFACE EXPLORATION

Project No.: 15-92567
Project: HUGH STATION
LEA COUNTY, NEW MEXICO
-
Drilling Co: HI PLAINS DRILLING
Driller: B.S.
Drilling Method: AIR ROTARY

Well/Boring #: B-7
Depth of Boring: 17 FEET
Depth of Well: -
Length of Screen: -
Length of Casing: -
Logged By: F.W.R.

Date Drilled: 02/04/93
Diameter of Boring: 5 1/8 INCHES
Diameter of Screen: -
Diameter of Casing: -
Slot Size: -
Well Material: GROUT

DEPTH FEET	SOIL DESCRIPTION	SAMPLE NUMBER	SAMPLE TYPE	OVA (PPM)	WELL DESIGN	REMARKS
0	Brown silty fine-grained SAND (SM)					
2.5		1	SS	<1	■	BENZENE <0.001 mg/kg BTEX <0.001 mg/kg TPH=20 mg/kg
5.0		2	SS	<1		
7.5	Gray & pink mottled silty calcareous SAND (caliche)					
10.0		3	SS	<1		
12.5						
15.0	Red & white mottled calcareous SAND (caliche)	4	SS	<1	■	BENZENE <0.001 mg/kg BTEX 0.002 mg/kg TPH=30 mg/kg
17.5	Bottom of boring @ 17.0 feet					
20.0						
22.5						
25.0						
27.5						
30.0						

SS-Driven Split Spoon
ST-Pressed Shelby Tube
CA-Continuous Flight Auger
RC-Rock Core
THD-Texas Highway Department Cone
CT-5' Continuous Sampler

ABBREVIATIONS AND SYMBOLS

HSA-Hollow Stem Augers
CFA-Continuous Flight Augers
DC-Driving Casing
MD-Mud Drilling

WATER LEVEL
▽ At Completion
▼ After Hours
● Water on Rods

■ Sample submitted to lab
Bottom Cap
Factory-Slotted Well Screen
Sand Pack
Well Casing
Bentonite Seal
Voloclay Grout Seal

CURA INC.
2735 VILLA CREEK DRIVE - TWO METRO SQUARE
BLDG. C - SUITE 250 - DALLAS, TX 75234
620-7117 FAX - 620-8219

RECORD OF SUBSURFACE EXPLORATION

Project No.: 15-92567
Project: HUGH STATION
LEA COUNTY, NEW MEXICO
-
Drilling Co: HI PLAINS DRILLING
Driller: B.S.
Drilling Method: AIR ROTARY

Well/Boring #: B-8
Depth of Boring: 17 FEET
Depth of Well: -
Length of Screen: -
Length of Casing: -
Logged By: F.W.R.

Date Drilled: 02/04/93
Diameter of Boring: 5 1/8 INCHES
Diameter of Screen: -
Diameter of Casing: -
Slot Size: -
Well Material: GROUT

DEPTH FEET	SOIL DESCRIPTION	SAMPLE NUMBER	SAMPLE TYPE	OVA (PPM)	WELL DESIGN	REMARKS
0	Brown silty fine-grained SAND (SM)					
2.5		1	SS	<1	■	BENZENE <0.001 mg/kg BTEX <0.001 mg/kg TPH=280 mg/kg
5.0		2	SS	2		
7.5	Gray & pink mottled silty calcareous SAND (caliche)					
10.0		3	SS	<1		
12.5						
15.0	Dark red fine-grained SAND slightly calcareous (SM)	4	SS	<1	■	BENZENE <0.001 mg/kg BTEX <0.001 mg/kg TPH=20 mg/kg
17.5	Bottom of boring @ 17.0 feet					
20.0						
22.5						
25.0						
27.5						
30.0						

SS-Driven Split Spoon
ST-Pressed Shelby Tube
CA-Continuous Flight Auger
RC-Rock Core
THD-Texas Highway Department Cone
CT-5' Continuous Sampler

ABBREVIATIONS AND SYMBOLS

HSA-Hollow Stem Augers
CFA-Continuous Flight Augers
DC-Driving Casing
MD-Mud Drilling

WATER LEVEL
▽ At Completion
▼ After Hours
● Water on Rods

■ Sample submitted to lab
Bottom Cap
Sand Pack
Bentonite Seal
Factory-Slotted Well Screen
Well Casing
Voloclay Grout Seal

APPENDIX C

ANALYTICAL RESULTS

SPL, INC.

REPORT APPROVAL SHEET

WORK ORDER NUMBER: 93-02-193

Approved for release by:

for _____ Date: 2/12/93
S. Sample, Laboratory Director

_____ Date: 2/12/93
Edward Fry, Project Management

****SUMMARY REPORT*****

02/12/93

Company: Shell Pipe Line Corporation
Site: Lea County. New Mexico
Project No: 15-92567.143
Project: Hugh Station

ANALYTICAL DATA
NOTE: ND - Not Detected

SPL ID	CLIENT ID	MATRIX	BENZENE	TOLUENE	ETHYLBENZ.	XYLENE	TPH-IR	TPH-GC	LEAD	MTBE
9302193-01	B-5 (1-3')	SOIL	NDµg/Kg	NDµg/Kg	NDµg/Kg	NDµg/Kg	30mg/Kg			
9302193-02	B-5 (10-12	SOIL	NDµg/Kg	NDµg/Kg	NDµg/Kg	NDµg/Kg	30mg/Kg			
9302193-03	B-6 (1-3')	SOIL	NDµg/Kg	NDµg/Kg	NDµg/Kg	NDµg/Kg	30mg/Kg			
9302193-04	B-6 (10-12	SOIL	NDµg/Kg	NDµg/Kg	NDµg/Kg	NDµg/Kg	20mg/Kg			
9302193-05	B-7 (1-3')	SOIL	NDµg/Kg	NDµg/Kg	NDµg/Kg	NDµg/Kg	20mg/Kg			
9302193-06	B-7 (15-17	SOIL	NDµg/Kg	NDµg/Kg	NDµg/Kg	2µg/Kg	30mg/Kg			
9302193-07	B-8 (5-7')	SOIL	NDµg/Kg	NDµg/Kg	NDµg/Kg	1µg/Kg	280mg/Kg			
9302193-08	B-8 (5-7')	SOIL	NDµg/Kg	NDµg/Kg	NDµg/Kg	1µg/Kg	270mg/Kg			
9302193-09	B-8 (15-17	SOIL	NDµg/Kg	NDµg/Kg	NDµg/Kg	NDµg/Kg	20mg/Kg			
9302193-10	B-9 (1-3')	SOIL	NDµg/Kg	NDµg/Kg	NDµg/Kg	1µg/Kg	20mg/Kg			

BTEX - METHOD 5030/8020 ***
TPH-IR - METHOD Mod. 418.1

Shari L. Grice

SPL, Inc., - Shari L. Grice

****SUMMARY REPORT*****

02/12/93

Company: Shell Pipe Line Corporation
Site: Lea County. New Mexico
Project No: 15-92567.143
Project: Hugh Station

ANALYTICAL DATA
NOTE: ND - Not Detected

SPL ID	CLIENT ID	MATRIX	BENZENE	TOLUENE	ETHYLBENZ.	XYLENE	TPH-IR	TPH-GC	LEAD	MTBE
9302193-11	B-9 (10-12	SOIL	NDµg/Kg	NDµg/Kg	NDµg/Kg	1µg/Kg	NDmg/Kg			

Shari L. Grice

SPL, Inc., - Shari L. Grice

SPL®

Certificate of Analysis No. 9302193-01

Shell Pipe Line Corporation
P.O. Box 2099
Houston, TX 77252-2099
ATTN: John Hite

P.O.# MESA-1312-HOE
DATE: 02/12/93

PROJECT: Hugh Station
SITE: Lea County. New Mexico
SAMPLED BY: CURA
SAMPLE ID: B-5 (1-3')

PROJECT NO: 15-92567.143
MATRIX: SOIL
DATE SAMPLED: 02/04/93 15:50:00
DATE RECEIVED: 02/09/93

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	0.0010 P	mg/Kg
ETHYLBENZENE	ND	0.0010 P	mg/Kg
TOLUENE	ND	0.0010 P	mg/Kg
TOTAL XYLENE	ND	0.0010 P	mg/Kg
TOTAL BTEX	ND		mg/Kg
METHOD 5030/8020 ***			
Analyzed by: LT			
Date: 02/10/93			
Petroleum extractables	30	10	mg/Kg
METHOD Mod. 418.1			
Analyzed by: LJ			
Date: 02/11/93			

ND - Not detected. (P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 17th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

Shari L. Grice

SPL, Inc., - Shari L. Grice

SPL®

Certificate of Analysis No. 9302193-02

Shell Pipe Line Corporation
P.O. Box 2099
Houston, TX 77252-2099
ATTN: John Hite

P.O.# MESA-1312-HOE
DATE: 02/12/93

PROJECT: Hugh Station
SITE: Lea County. New Mexico
SAMPLED BY: CURA
SAMPLE ID: B-5 (10-12')

PROJECT NO: 15-92567.143
MATRIX: SOIL
DATE SAMPLED: 02/04/93 16:00:00
DATE RECEIVED: 02/09/93

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	0.0010 P	mg/Kg
ETHYLBENZENE	ND	0.0010 P	mg/Kg
TOLUENE	ND	0.0010 P	mg/Kg
TOTAL XYLENE	ND	0.0010 P	mg/Kg
TOTAL BTEX	ND		mg/Kg
METHOD 5030/8020 ***			
Analyzed by: LT			
Date: 02/10/93			
Petroleum extractables	30	10	mg/Kg
METHOD Mod. 418.1			
Analyzed by: LJ			
Date: 02/11/93			

ND - Not detected. (P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 17th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

Shari L. Grice

SPL, Inc., - Shari L. Grice

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Certificate of Analysis No. 9302193-03

Shell Pipe Line Corporation
P.O. Box 2099
Houston, TX 77252-2099
ATTN: John Hite

P.O.# MESA-1312-HOE
DATE: 02/12/93

PROJECT: Hugh Station
SITE: Lea County. New Mexico
SAMPLED BY: CURA
SAMPLE ID: B-6 (1-3')

PROJECT NO: 15-92567.143
MATRIX: SOIL
DATE SAMPLED: 02/04/93 16:05:00
DATE RECEIVED: 02/09/93

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	0.0010 P	mg/Kg
ETHYLBENZENE	ND	0.0010 P	mg/Kg
TOLUENE	ND	0.0010 P	mg/Kg
TOTAL XYLENE	ND	0.0010 P	mg/Kg
TOTAL BTEX	ND		mg/Kg
METHOD 5030/8020 ***			
Analyzed by: LT			
Date: 02/10/93			
Petroleum extractables	30	10	mg/Kg
METHOD Mod. 418.1			
Analyzed by: LJ			
Date: 02/11/93			

ND - Not detected. (P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 17th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

Shari L. Grice

SPL, Inc., - Shari L. Grice

Certificate of Analysis No. 9302193-04

Shell Pipe Line Corporation
P.O. Box 2099
Houston, TX 77252-2099
ATTN: John Hite

P.O.# MESA-1312-HOE
DATE: 02/12/93

PROJECT: Hugh Station
SITE: Lea County. New Mexico
SAMPLED BY: CURA
SAMPLE ID: B-6 (10-12')

PROJECT NO: 15-92567.143
MATRIX: SOIL
DATE SAMPLED: 02/04/93 16:12:00
DATE RECEIVED: 02/09/93

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	0.0010 P	mg/Kg
ETHYLBENZENE	ND	0.0010 P	mg/Kg
TOLUENE	ND	0.0010 P	mg/Kg
TOTAL XYLENE	ND	0.0010 P	mg/Kg
TOTAL BTEX	ND		mg/Kg
METHOD 5030/8020 ***			
Analyzed by: LT			
Date: 02/10/93			
Petroleum extractables	20	10	mg/Kg
METHOD Mod. 418.1			
Analyzed by: LJ			
Date: 02/11/93			

ND - Not detected. (P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 17th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

Shari L. Grice

SPL, Inc., - Shari L. Grice

SPL®

Certificate of Analysis No. 9302193-05

Shell Pipe Line Corporation
P.O. Box 2099
Houston, TX 77252-2099
ATTN: John Hite

P.O.# MESA-1312-HOE
DATE: 02/12/93

PROJECT: Hugh Station
SITE: Lea County. New Mexico
SAMPLED BY: CURA
SAMPLE ID: B-7 (1-3')

PROJECT NO: 15-92567.143
MATRIX: SOIL
DATE SAMPLED: 02/04/93 16:20:00
DATE RECEIVED: 02/09/93

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	0.0010 P	mg/Kg
ETHYLBENZENE	ND	0.0010 P	mg/Kg
TOLUENE	ND	0.0010 P	mg/Kg
TOTAL XYLENE	ND	0.0010 P	mg/Kg
TOTAL BTEX	ND		mg/Kg
METHOD 5030/8020 ***			
Analyzed by: LT			
Date: 02/10/93			
Petroleum extractables	20	10	mg/Kg
METHOD Mod. 418.1			
Analyzed by: LJ			
Date: 02/11/93			

ND - Not detected. (P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 17th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

Shari L. Grice

SPL, Inc., - Shari L. Grice

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Certificate of Analysis No. 9302193-06

Shell Pipe Line Corporation
P.O. Box 2099
Houston, TX 77252-2099
ATTN: John Hite

P.O.# MESA-1312-HOE
DATE: 02/12/93

PROJECT: Hugh Station
SITE: Lea County. New Mexico
SAMPLED BY: CURA
SAMPLE ID: B-7 (15-17')

PROJECT NO: 15-92567.143
MATRIX: SOIL
DATE SAMPLED: 02/04/93 16:30:00
DATE RECEIVED: 02/09/93

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	0.0010 P	mg/Kg
ETHYLBENZENE	ND	0.0010 P	mg/Kg
TOLUENE	ND	0.0010 P	mg/Kg
TOTAL XYLENE	0.0020	0.0010 P	mg/Kg
TOTAL BTEX	0.002		mg/Kg
METHOD 5030/8020 ***			
Analyzed by: LT			
Date: 02/11/93			
Petroleum extractables	30	10	mg/Kg
METHOD Mod. 418.1			
Analyzed by: LJ			
Date: 02/11/93			

ND - Not detected. (P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 17th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

Shari L. Grice

SPL, Inc., - Shari L. Grice

Certificate of Analysis No. 9302193-07

Shell Pipe Line Corporation
P.O. Box 2099
Houston, TX 77252-2099
ATTN: John Hite

P.O.# MESA-1312-HOE
DATE: 02/12/93

PROJECT: Hugh Station
SITE: Lea County. New Mexico
SAMPLED BY: CURA
SAMPLE ID: B-8 (5-7')

PROJECT NO: 15-92567.143
MATRIX: SOIL
DATE SAMPLED: 02/04/93 16:40:00
DATE RECEIVED: 02/09/93

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	0.0010 P	mg/Kg
ETHYLBENZENE	ND	0.0010 P	mg/Kg
TOLUENE	ND	0.0010 P	mg/Kg
TOTAL XYLENE	0.0010	0.0010 P	mg/Kg
TOTAL BTEX	0.001		mg/Kg
METHOD 5030/8020 ***			
Analyzed by: LT			
Date: 02/11/93			
Petroleum extractables	280	10	mg/Kg
METHOD Mod. 418.1			
Analyzed by: LJ			
Date: 02/11/93			

ND - Not detected. (P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 17th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

Shari L. Grice

SPL, Inc., - Shari L. Grice

Certificate of Analysis No. 9302193-08

Shell Pipe Line Corporation
P.O. Box 2099
Houston, TX 77252-2099
ATTN: John Hite

P.O.# MESA-1312-HOE
DATE: 02/12/93

PROJECT: Hugh Station
SITE: Lea County. New Mexico
SAMPLED BY: CURA
SAMPLE ID: B-8 (5-7') DUP

PROJECT NO: 15-92567.143
MATRIX: SOIL
DATE SAMPLED: 02/04/93 16:40:00
DATE RECEIVED: 02/09/93

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	0.0010 P	mg/Kg
ETHYLBENZENE	ND	0.0010 P	mg/Kg
TOLUENE	ND	0.0010 P	mg/Kg
TOTAL XYLENE	0.0010	0.0010 P	mg/Kg
TOTAL BTEX	0.001		mg/Kg
METHOD 5030/8020 ***			
Analyzed by: LT			
Date: 02/11/93			
Petroleum extractables	270	10	mg/Kg
METHOD Mod. 418.1			
Analyzed by: LJ			
Date: 02/11/93			

ND - Not detected. (P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 17th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

Shari L. Grice

SPL, Inc., - Shari L. Grice

Certificate of Analysis No. 9302193-09

Shell Pipe Line Corporation
P.O. Box 2099
Houston, TX 77252-2099
ATTN: John Hite

P.O.# MESA-1312-HOE
DATE: 02/12/93

PROJECT: Hugh Station
SITE: Lea County. New Mexico
SAMPLED BY: CURA
SAMPLE ID: B-8 (15-17')

PROJECT NO: 15-92567.143
MATRIX: SOIL
DATE SAMPLED: 02/04/93 16:52:00
DATE RECEIVED: 02/09/93

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	0.0010 P	mg/Kg
ETHYLBENZENE	ND	0.0010 P	mg/Kg
TOLUENE	ND	0.0010 P	mg/Kg
TOTAL XYLENE	ND	0.0010 P	mg/Kg
TOTAL BTEX	ND		mg/Kg
METHOD 5030/8020 ***			
Analyzed by: LT			
Date: 02/11/93			
Petroleum extractables	20	10	mg/Kg
METHOD Mod. 418.1			
Analyzed by: LJ			
Date: 02/11/93			

ND - Not detected. (P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 17th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

Shari L. Grice

SPL, Inc., - Shari L. Grice

Certificate of Analysis No. 9302193-10

Shell Pipe Line Corporation
P.O. Box 2099
Houston, TX 77252-2099
ATTN: John Hite

P.O.# MESA-1312-HOE
DATE: 02/12/93

PROJECT: Hugh Station
SITE: Lea County. New Mexico
SAMPLED BY: CURA
SAMPLE ID: B-9 (1-3')

PROJECT NO: 15-92567.143
MATRIX: SOIL
DATE SAMPLED: 02/04/93 16:58:00
DATE RECEIVED: 02/09/93

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	0.0010 P	mg/Kg
ETHYLBENZENE	ND	0.0010 P	mg/Kg
TOLUENE	ND	0.0010 P	mg/Kg
TOTAL XYLENE	0.0010	0.0010 P	mg/Kg
TOTAL BTEX	0.001		mg/Kg
METHOD 5030/8020 ***			
Analyzed by: LT			
Date: 02/11/93			
Petroleum extractables	20	10	mg/Kg
METHOD Mod. 418.1			
Analyzed by: LJ			
Date: 02/11/93			

ND - Not detected. (P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 17th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

Shari L. Grice

SPL, Inc., - Shari L. Grice

SPL®

Certificate of Analysis No. 9302193-11

Shell Pipe Line Corporation
P.O. Box 2099
Houston, TX 77252-2099
ATTN: John Hite

P.O.# MESA-1312-HOE
DATE: 02/12/93

PROJECT: Hugh Station
SITE: Lea County. New Mexico
SAMPLED BY: CURA
SAMPLE ID: B-9 (10-12')

PROJECT NO: 15-92567.143
MATRIX: SOIL
DATE SAMPLED: 02/04/93 17:05:00
DATE RECEIVED: 02/09/93

ANALYTICAL DATA

PARAMETER	RESULTS	DETECTION LIMIT	UNITS
BENZENE	ND	0.0010 P	mg/Kg
ETHYLBENZENE	ND	0.0010 P	mg/Kg
TOLUENE	ND	0.0010 P	mg/Kg
TOTAL XYLENE	0.0010	0.0010 P	mg/Kg
TOTAL BTEX	0.001		mg/Kg
METHOD 5030/8020 ***			
Analyzed by: LT			
Date: 02/11/93			
Petroleum extractables	ND	10	mg/Kg
METHOD Mod. 418.1			
Analyzed by: LJ			
Date: 02/11/93			

ND - Not detected. (P) - Practical Quantitation Limit

Notes: *Ref: Methods for Chemical Analysis of Water and Wastes, 1983, EPA
**Ref: Standard Methods for Examination of Water & Wastewater, 17th ed.
***Ref: Test Methods for Evaluating Solid Waste, EPA SW846, 3rd Ed.

QUALITY ASSURANCE: These analyses are performed in accordance with EPA guidelines for quality assurance.

Shari L. Grice

SPL, Inc., - Shari L. Grice

** SPL Quality Control Report **
BTEX MATRIX SPIKE/MATRIX SPIKE DUPLICATE
Method 8020/602

SPL Sample ID: 9302107-05A **Reported on:** 02/12/93
Matrix: Soil **Analyzed on:** 02/10/93

This sample was randomly selected for use in the SPL quality control program. One in twenty samples is fortified, in duplicate, with a known concentration of the substance being analyzed.
The results are as follows:

---- **S P I K E A N A L Y S I S** -----

Compound	Blank Value	Spike Added µg/Kg	Original Sample Concentration µg/Kg	MS Concentration µg/Kg	MS % Rec#	QC Limits Range
BENZENE	ND	20	ND	20	100	39 - 150 %
TOLUENE	ND	20	ND	20	100	46 - 148 %
ETHYL_BENZENE	ND	20	ND	22	110	32 - 160 %
O XYLENE	ND	20	ND	23	115	32 - 160 %
M AND P XYLENE	ND	40	ND	50	125	32 - 160 %

---- **S P I K E D U P L I C A T E A N A L Y S I S** -----

Compound	Spike Added µg/Kg	MSD Concentration µg/Kg	MSD % Rec#	% RPD	RPD Limit	QC Rec Range
BENZENE	20	24	120	18	20	39 - 150 %
TOLUENE	20	24	120	18	20	46 - 148 %
ETHYL_BENZENE	20	24	120	9	20	32 - 160 %
O XYLENE	20	25	125	8	20	32 - 160 %
M AND P XYLENE	40	57	142	13	20	32 - 160 %

VARE930210120900

Cynthia Schreiner, QC Officer

** SPL Quality Control Report **
BTEX MATRIX SPIKE/MATRIX SPIKE DUPLICATE
Method 8020/602

SPL Sample ID: 9302190-20A **Reported on:** 02/12/93
Matrix: Soil **Analyzed on:** 02/11/93

This sample was randomly selected for use in the SPL quality control program. One in twenty samples is fortified, in duplicate, with a known concentration of the substance being analyzed.
The results are as follows:

---- **SPIKE ANALYSIS** -----

Compound	Blank Value	Spike Added µg/Kg	Original Sample Concentration µg/Kg	MS Concentration µg/Kg	MS % Rec#	QC Limits Range
BENZENE	ND	20	ND	21	105	39 - 150 %
TOLUENE	ND	20	ND	19	95	46 - 148 %
ETHYL_BENZENE	ND	20	ND	19	95	32 - 160 %
O XYLENE	ND	20	9	20	55	32 - 160 %
M AND P XYLENE	ND	40	ND	41	102	32 - 160 %

---- **SPIKE DUPLICATE ANALYSIS** -----

Compound	Spike Added µg/Kg	MSD Concentration µg/Kg	MSD % Rec#	% RPD	RPD Limit	QC Rec Range
BENZENE	20	24	120	13	20	39 - 150 %
TOLUENE	20	22	110	15	20	46 - 148 %
ETHYL_BENZENE	20	22	110	15	20	32 - 160 %
O XYLENE	20	21	60	9	20	32 - 160 %
M AND P XYLENE	40	44	110	8	20	32 - 160 %

VARE930211053800

Cynthia Schreiner, QC Officer

** SPL QUALITY CONTROL REPORT **
TOTAL PETROLEUM HYDROCARBONS [TPH]

SPL sample Id: 9302193-10B
Matrix: SOIL

Reported on: 02/12/93
Analyzed on: 02/11/93

This sample was randomly selected for use in the SPL quality control program. One in ten samples is fortified with a known concentration of the substance being analyzed and one in ten samples is analyzed in duplicate. The result are as follows:

-- **SPIKE ANALYSIS** --

Sample Id	Blank Value	Spike Added mg/L	Original Sample Concentration mg/Kg	MS Concentration mg/Kg	MS % Rec
9302193-10B	ND	357	15	346	97

-- **SPIKE DUPLICATE ANALYSIS** --

Sample Id	Spike Added mg/L	MSD Concentration mg/Kg	MSD % Rec	% RPD
9302193-10B	357	346	97	0

SPL, Incorporated

Cynthia Schreiner

Cynthia Schreiner, QC Officer

9302193 687 2/10/93 FK

SHELL OIL COMPANY
RETAIL ENVIRONMENTAL ENGINEERING

CHAIN OF CUSTODY RECORD NO. 04933

Date: 2-7-93
Page 1 of 1

SHELL PIPE LINE COMP

SITE ADDRESS: Hugh STATION
Lea County, New Mexico

WIC #: PROJ # 15-92567.143

CONSULTANT NAME & ADDRESS: CURA Inc.
3001 N. Big Spring, Ste 101, Midland, TX 79705

CONSULTANT CONTACT: F. Wesley Root

PHONE: 915-570-8408 FAX: 915-570-8409

SAMPLED BY: F. Wesley Root

CHECK ONE BOX ONLY CT/DT

- QUARTERLY MONITORING ☐ 5461
- SITE INVESTIGATION ☒ 5441
- SOIL FOR DISPOSAL ☐ 5442
- WATER FOR DISPOSAL ☐ 5443
- AIR SAMPLER - SYS O+M ☐ 5452
- WATER SAMPLE - SYS O+M ☐ 5453
- OTHER ☐

SAMPLE I.D.	DATE	TIME	COMP.	GRAB	MATRIX: H2O	SOIL	AIR	SLUDGE	OTHER	METHOD PRESERVED: HCl	HNO3	H2SO4	NONE	OTHER: ICE	NO. OF CONTAINERS	CONTAINER SIZE	BTEX 602 ☐ / 8020 ☒ WITH MTBE ☐	BTEX/GAS HYDROCARBONS PID/FID ☐ WITH MTBE	VOL 624/PPL ☐	8240/TAL ☐	NBS (+15) ☐	PNA/PAH 8310 ☐	8100 ☐	610 ☐	SEMI - VOL 625/PPL ☐	8270/TAL ☐	NBS (+25) ☐	TPH/IR 418.1 ☒	SM503 ☐ ☐ ☐ ☐	TPH/GC 8015 Mod. GAS ☐	8015 Mod DIESEL ☐	TCLP METALS ☐ VOL ☐ SEMI-VOL ☐ PEST ☐ HERB ☐	EP TOX METALS ☐ PESTICIDES ☐ HERBICIDES ☐	REACTIVITY ☐ CORROSIVITY ☐ IGNITABILITY ☐	OTHER			REMARKS
B-5 (1-3')	2-4-93	15:50		X		X								X	1	4oz	X											X								
B-5 (10-12')	2-4-93	16:00		X		X								X	1	4oz	X											X								
B-6 (1-3')	2-4-93	16:05		X		X								X	1	4oz	X											X								
B-6 (10-12')	2-4-93	16:12		X		X								X	1	4oz	X											X								
B-7 (1-3')	2-4-93	16:20		X		X								X	1	4oz	X											X								
B-7 (15-12')	2-4-93	16:30		X		X								X	1	4oz	X											X								
B-8 (5-7')	2-4-93	16:40		X		X								X	2	4oz	X											X								Field Duplicate
B-8 (15-17')	2-4-93	16:52		X		X								X	1	4oz	X											X								
B-9 (1-3')	2-4-93	16:58		X		X								X	1	4oz	X											X								
B-9 (10-12')	2-4-93	17:05		X		X								X	1	4oz	X											X								

RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
Frank Wesley Root	2-8-93	5:00			
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME
RELINQUISHED BY: (SIGNATURE)	DATE	TIME	RECEIVED BY: (SIGNATURE)	DATE	TIME

BILL NO.:
LABORATORY:
SHELL CONTACT: Ray Thompson PHONE: 7132418636 FAX: 7132411124

TURN AROUND TIME (CHECK ONE)
7 DAYS ☒ (NORMAL) 14 DAYS ☐
48 HOURS ☐ Ice at 1°C OTHER ☐

THE LABORATORY MUST PROVIDE A COPY OF THIS CHAIN OF CUSTODY WITH INVOICE AND RESULTS

DISTRIBUTION: PINK Sampling Coordinator - WHITE & YELLOW Accompanies Shipment - WHITE Returned with Report

SPL HOUSTON ENVIRONMENTAL LABORATORY

SAMPLE LOGIN CHECKLIST

DATE: 2/9/93 TIME: 12:30 CLIENT NO. CURASHLAPE
LOT NO. _____ CONTRACT NO. _____

CLIENT SAMPLE NOS. _____
9302193

SPL SAMPLE NOS.: _____

		YES	NO
1.	Is a Chain-of-Custody form present?	✓	
2.	Is the COC properly completed?	✓	
	If no, describe what is incomplete:		
	If no, has the client been contacted about it? (Attach subsequent documentation from client about the situation)		
3.	Is airbill/packing list/bill of lading with shipment? If yes, ID#: FEDEX # 154891319 2	✓	
4.	Is a USEPA Traffic Report present?		✓
5.	Is a USEPA SAS Packing List present?		✓
6.	Are custody seals present on the package?	✓	✓ MW
	If yes, were they intact upon receipt?	✓	
7.	Are all samples tagged or labeled?	✓	
	Do the sample tags/labels match the COC?	✓	
	If no, has the client been contacted about it? (Attach subsequent documentation from client about the situation)		
8.	Do all shipping documents agree? If no, describe what is in nonconformity:	✓	

9. Condition/temperature of shipping container: good 1°C
10. Condition/temperature of sample bottles: intact
11. Sample Disposal?: SPL disposal ✓ Return to client _____

NOTES (reference item number if applicable): _____

ATTEST: _____ DATE: _____
DELIVERED FOR RESOLUTION: REC'D _____ DATE: _____
RESOLVED: _____ DATE: _____

8.0 QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

8.1 SAMPLING PROCEDURES

A strict Quality Assurance Plan was incorporated throughout all phases of the drilling and sampling operations. The sampling and drilling equipment was decontaminated by a high-pressure steam cleaner before the start of sampling operations and between the borings. The soil samples were collected with decontaminated stainless steel sampling trowels. The sampling equipment was cleaned between sample collections to eliminate the potential of cross-contamination between sampling stations. Groundwater samples were obtained with new disposable bailers after each monitor well was purged.

The soil and water samples were placed in glass jars and sample vials with teflon-lined lids and preserved at 4°C with zero head space in accordance with EPA requirements (EPA 600/4-82-029). A chain-of-custody (COC) that documents sample collection times and delivery times to the laboratory was completed for each set of samples. The COCs are included with the analytical results in the Appendices. Analyses were performed using EPA-recommended analytical methods on all samples.

CURA maintains the highest quality assurance standards with direct supervision of operations (sample handling and storage). Drilling operations were conducted using a licensed water well driller. CURA provides management oversight for laboratory procedures and analytical results and uses laboratories that maintain strict quality control, i.e., equipment calibration and standardization, EPA-recommended analytical methods, preparing spiked samples, and complete chains-of-custody.

9.0 SITE SAFETY PLAN

The sampling operations were performed at level D personal protection. All CURA personnel involved in on-site activities have completed the Hazardous Waste Field Operation training course (OSHA 29 CFR 1910.120). Applicable safety equipment was available on site to CURA personnel.

SITE SAFETY PLAN

Site Name: SPLC - Hugh Station

Site Address: 3.5 miles south-southeast of Eunice in Lea County, New Mexico

Site Owner: Shell Pipe Line Corporation

Contacts: John B. Hite (713) 241-1001

Work Description: Environmental site assessment activities: soil borings, soil sampling, and site mapping.

Proposed Date of Work: February 4, 1993

Work Team: Team Leader - F. Wesley Root (CURA, Inc.)

Site Safety Officer - F. Wesley Root (CURA, Inc.)

Team Member - Leon Moore (Shell Pipe Line Corporation)

Team Member - Barry Simmons (Hi-Plains Drilling Company)

Team Member - Freddy Tovar (Hi-Plains Drilling Company)

Plan prepared by: Greg C. Walterscheid, R.E.M.

Reviewed by: Richard Wilson, Ph.D.

EMERGENCY INFORMATION

Site Name: SPLC - Hugh Station

Site Address: 3.5 miles south-southeast of Eunice in Lea County, New Mexico

Site Owner: Shell Pipe Line Corporation

Telephone Numbers:

Ambulance Service: 911

Hospital: Lea Regional Hospital 505-392-6581

Norte Vista Medical Center 505-392-5571

Poison Control Center: 911

Police: 505-394-2112

Fire Department: 505-394-2111

Emergency Contacts

Company Health and Safety Officer: Dr. Richard Wilson
Work: (214) 620-7117
Home: (214) 241-5803

Project Manager: Greg C. Walterscheid

Work: 1-800-486-7117
Mobile Phone: 1-214-202-9320
Pager: 1-214-807-8154
Home: 1-214-317-0518

10.0 REFERENCES

Code of Federal Regulations, Title 40 §§ 280 and 281.

Dinwiddie, G. A., 1963. Municipal Water Supplies and Uses, Southeastern New Mexico. Technical Report 29A. New Mexico State Engineer, Santa Fe, New Mexico.

Groat, C. G., 1976. Geologic Atlas of Texas (Hobbs Sheet). Bureau of Economic Geology, The University of Texas at Austin. Austin, Texas.

Oil Conservation Division, Memorandum, December 21, 1992. Final Draft OCD Surface Impoundment Closure Guidelines. Energy, Minerals and Resources Department, Santa Fe, New Mexico.

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Nicholson, Alexander, Jr., 1961. Geology and Ground-Water Conditions in Southern Lea County, New Mexico. United States Geological Survey, Ground-Water Report 6. New Mexico Bureau of Mines and Mineral Resources, Campus Station, Socorro, New Mexico.

Turner, M.T., et al., 1974. Soil Survey of Lea County, New Mexico. United States Department of Agriculture Soil Conservation Service, in cooperation with the New Mexico Agricultural Experiment Station. U.S. Publishing Office: Washington, D.C.

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