GW - 55

REPORTS

YEAR(S):

1991

METRIC
Corporation

SHALLOW SUBSURFACE INVESTIGATION
AT YATES GAS TREATING PLANT
(ATOKA 4)
EDDY COUNTY, NEW MEXICO

PREPARED FOR

TRANSWESTERN PIPELINE COMPANY
ROSWELL, NEW MEXICO

PREPARED BY

METRIC CORPORATION
ALBUQUERQUE, NEW MEXICO

NOVEMBER 1991

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SHALLOW SUBSURFACE INVESTIGATION AT YATES GAS TREATING PLANT (ATOKA4) EDDY COUNTY, NEW MEXICO

Summary

During August 1991, METRIC Corporation assisted Transwestern Pipeline Company in conducting soil borings and assessment of the presence of organic constituents at the Yates Gas Treating Plant. Borehole samplings were conducted at the H_2S evaporation pond, pipeline liquids tank, and amine plant. Based upon the sampling results, no benzene, toluene, ethylbenzene, and xylenes (BTEX) were found to be present at sample intervals. Results of total recoverable petroleum hydrocarbons (TRPH) for the above sites, indicate all concentrations to be below 100 ppm. TRPH results for the amine plant samples were all at levels well below 100 ppm. Analysis of samples for the pipeline liquids tank borehole indicate hits for BTEX compounds. A toxicity characteristic for benzene in the shallow sample and at the 23-foot depth is also indicated. TRPH concentrations are above 100 ppm at shallow and 23-foot depths.

SHALLOW SUBSURFACE INVESTIGATION
AT YATES GAS TREATING PLANT
(ATOKA 4)
EDDY COUNTY, NEW MEXICO

Introduction

During August 1991, METRIC Corporation assisted Transwestern Pipeline Company in conducting soil borings and assessment of the presence of organic constituents the Yates Gas Treating Plant. Results of this subsurface investigation are presented in this report.

The gas treating plant is located approximately 8 miles southwest of Artesia, New Mexico. Initially, five sites at the plant were considered for evaluation as follows:

H_2S Evaporation Pond,
Pipeline Liquids Tank
Amine Plant,
Southeast Pit.

These sites are regulated under the environment jurisdiction of the Oil Conservation Division for the State of New Mexico and as such are exempt from hazardous waste regulations under the Resource Conservation and Recovery Act (RCRA) Subtitle C. Eight boreholes were developed on plant property at the three investigation sites. Borehole locations are indicated on PLATE 1.

Borehole Sampling and Analytical Field Screening

Borehole drilling at the Yates Plant was provided for the investigation by METRIC Corporation using a CME-55 auger drilling rig equipped with 3 1/4-inch hollow stem augers and a CME

continuous sampling system. Augers and continuous samplers were steam cleaned to eliminate contamination within a borehole and potential cross contamination among boreholes.

Drilling was generally conducted to the depth of an underlying impermeable layer, such as caliche, clay, or rock. Soil cores withdrawn using the continuous sampler were scanned with a portable organic vapor analyzer (OVA) in order to guide sample selection. Samples were collected in 8 oz. jars, placed on ice, and accompanied with a properly completed chain of custody form and shipped by Federal Express overnight delivery to Assaigai Laboratories in Albuquerque, New Mexico. Analyses performed are indicated on TABLE 1 for boreholes sampled. Borehole sample logs are provided in APPENDIX A.

Analytical Results

The analyses performed for the August 1991 sampling at the Yates Plant, as outlined in TABLE 1, are presented in TABLES 2 and 3 for, 1) toxicity characteristic leaching procedure (TCLP) for benzene, 2) benzene, toluene, ethylbenzene, and xylenes (BTEX), and 3) total recoverable petroleum hydrocarbons (TRPH). Laboratory reports are provided in APPENDIX B.

At the H_2S evaporation pond site, no BTEX compounds were detected at sample intervals. TCLP for benzene did not produce a result above the detection limit. Results of TRPH concentrations were determined to be below 100 ppm.

TRPH results for the amine plant samples were all at levels well below 100 ppm. Analysis of samples for the pipeline liquids tank borehole (BH-5) indicates hits for BTEX compounds. At the 35-foot level, toluene, ethylbenzene and xylenes concentrations were 0.42, 0.11 and 0.48 ppm, respectively. The 23-foot level

TABLE 1

LABORATORY ANALYSES PERFORMED ON
SUBSURFACE SOIL SAMPLES, YATES GAS TREATING PLANT

SAMPLE NUMBER	TCLP BENZENE	BTEX	TOTAL RECOVERABLE PETROLEUM HYDROCARBONS 418.1
<u>H_2S Evaporation Pond</u>			
BH-1, 13.0 - 13.5	X	X	X
BH-1, 19.0 - 19.5	X	X	X
BH-1, 20.2 - 20.4	X	X	X
BH-1, 23.6 - 24.0	X	X	X
BH-1, 25.9 - 26.3	X	X	X
BH-1, 33.0 - 34.3	X	X	X
BH-4, 20.2 - 20.9	X	X	X
BH-6, 19.5 - 20.1	X	X	X
BH-7, 2.7 - 3.1	X	X	X
BH-7, 19.5 - 19.7	X	X	X
BH-8, 9.3 - 9.7	X	X	X
BH-8, 19.7 - 19.9	X	X	X
<u>Amine Plant</u>			
BH-2, 2.6 - 7.6			X
BH-2, 13.8 - 14.2			X
BH-3, 0.0 - 1.4			X
<u>Pipeline Liquids Storage Tank</u>			
BH-5, 0.0 - 7.4	X	X	X
BH-5, 23.0 - 23.8	X	X	X
BH-5, 35.0 - 35.6	X	X	X

TABLE 2

SUMMARY OF ANALYTICAL RESULTS FOR TCLP (BENZENE), BTEX, AND TOTAL RECOVERABLE PETROLEUM HYDROCARBONS AT H_2S EVAPORATION POND
YATES GAS TREATING PLANT

PARAMETER	SAMPLE NUMBER					
	BH-1 13.0'-13.5'	BH-1 19.0'-19.5'	BH-1 20.2'-20.4'	BH-1 23.6'-24.0'	BH-1 25.9'-26.3'	BH-4 20.2'-20.9'
TCLP (Benzene)	BDL	BDL	BDL	BDL	BDL	BDL
BTEX						
Benzene	BDL	BDL	BDL	BDL	BDL	BDL
Toluene	BDL	BDL	BDL	BDL	BDL	BDL
EthylBenzene	BDL	BDL	BDL	BDL	BDL	BDL
Xylenes	BDL	BDL	BDL	BDL	BDL	BDL
Total Recoverable Petroleum Hydrocarbons	BDL	BDL	8	8	BDL	8

PARAMETER	SAMPLE NUMBER					
	BH-4 33.0'-34.3'	BH-6 19.5'-20.1'	BH-7 2.7'-3.1'	BH-7 19.5'-19.7'	BH-8 9.3'-9.7'	BH-8 19.7'-19.9'
TCLP (Benzene)	BDL	BDL	BDL	BDL	BDL	BDL
BTEX						
Benzene	BDL	BDL	BDL	BDL	BDL	BDL
Toluene	BDL	BDL	BDL	BDL	BDL	BDL
EthylBenzene	BDL	BDL	BDL	BDL	BDL	BDL
Xylenes	BDL	BDL	BDL	BDL	BDL	BDL
Total Recoverable Petroleum Hydrocarbons	8	20	BDL	8	BDL	92

BDL = below detection limit of 0.005 mg/l for TCLP (Benzene), 0.1 mg/kg for BTEX, and 5.0 mg/kg for TRPH.

TABLE 3

SUMMARY OF ANALYTICAL RESULTS FOR TCLP (BENZENE), BTEX, AND TOTAL RECOVERABLE PETROLEUM HYDROCARBONS AT AMINE PLANT AND H_2S TANK
YATES GAS TREATING PLANT

PARAMETER	SAMPLE NUMBER					
	AMINE PLANT			PIPELINE LIQUIDS STORAGE TANK		
	BH-2 2.6'-7.6'	BH-2 13.8-14.2'	BH-3 0-1.4 and 2.6-7.6 Composite	BH-5 0-7.4'	BH-5 23.0'-23.8'	BH-5 35.0'-35.6'
TCLP (Benzene)	*	*	*	0.93	0.46	BDL
BTEX						
Benzene	*	*	*	8	16	BDL
Toluene	*	*	*	36	41	0.42
EthylBenzene	*	*	*	11	19	0.11
Xylenes	*	*	*	380	54	0.48
Total Recoverable Petroleum Hydrocarbons	16	12	8	200	5600	16

* No analysis conducted.

BDL = below detection limit of 0.1 mg/kg.

indicated benzene at 16 ppm, toluene at 41 ppm, ethylbenzene at 19 ppm, and xylenes at 54 ppm. The shallow depth (0'-7.4') at BH-5 indicated respective concentrations of benzene, toluene, ethylbenzene, and xylenes at 8 ppm, 36 ppm, 11 ppm, and 380 ppm. A toxicity characteristic for benzene in the 0 to 7.4' depth sample and in the 23-foot depth sample is indicated at concentrations of 0.93 ppm and 0.46 ppm, respectively. TRPH concentrations are 200 ppm at 0 to 7.4', 5600 ppm at 23 feet, and 16 ppm at 35 feet.

Investigation Results

Based on the August 1991 borehole data, flame ionization detector (OVA) data, and analytical results of borehole sampling, approximations of the resultant organic constituents are made. Borehole data is diagrammatically presented in PLATE 2. Relative borehole elevations are indicated, as well as OVA readings in ppm for volatile constituents detected during continuous sample recovery, and analytical results for total recoverable petroleum hydrocarbons (TRPH).

Conferrals with plant personnel indicated the southeast pit was historically used as a borrow pit and not as a disposal pit. A reconnaissance of the pit site did not indicate evidence of hydrocarbon disposal or other use.

Based on the borehole analytical data, TRPH values around the perimeter of the H_2S evaporation pond. The highest level detected was 92 ppm at 26-foot depth near the northwest corner of the pond (BH-8).

In the amine plant vicinity, TRPH values were determined to be less than 100 ppm with these values significantly decreasing with depth.

The single borehole (BH-5) at the pipeline liquids tank indicates hits for BTEX and TRPH constituents, as well at TCLP (Benzene), for three depth intervals as previously described under Analytical Results. However, concentrations generally peak for BTEX and TRPH constituents at the 23-foot depth and decrease considerably to the 35-foot depth.

APPENDIX A
BOREHOLE SAMPLE LOGS

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SAMPLE LOG

Borehole Number BH-1 **Borehole Location** _____

Property Owner Transwestern Pipeline Company

Sample Logger Don Briggs, METRIC Corporation

Driller METRIC Corporation

Drilling Medium Hollow Stem Auger

Date of Completion 8-13-91 **Ground Elev.** _____

Depth (feet)	Thickness (feet)	Stratigraphic Description
0 - 2.4	2.4	Brown silty sand with caliche
2.4 - 2.9	0.5	No recovery
2.9 - 3.5	0.6	Brown silty clay sand
3.5 - 5.0	1.5	Tan silty sand with caliche
5.0 - 6.3	1.3	Caliche
6.3 - 7.0	0.7	Dark brown silty clay sand with gravel
7.0 - 7.9	0.9	No recovery
7.9 - 9.2	1.3	Tan silty clay sand with gravel
9.2 - 10.4	1.2	Tan silty sand with large gravel
10.4 - 12.9	2.5	No recovery
12.9 - 15.5	2.6	Tan silty sand with caliche and large gravel
15.5 - 17.9	2.4	No recovery
17.9 - 20.3	2.4	Tan silty sand with caliche and cemented gravel
20.3 - 22.9	2.6	No recovery
22.9 - 23.6	0.7	Tan silty sand with gravel and caliche
23.6 - 24.0	0.4	Grey silty sand with gravel
24.0 - 24.2	0.2	Red clay
24.2 - 25.0	0.8	Pink cemented sand with gravel
25.0 - 26.3	1.3	White caliche

METRIC
Corporation

SAMPLE LOG

Borehole Number BH-2 **Borehole Location** _____

Property Owner Transwestern Pipeline Company

Sample Logger Don Briggs, METRIC Corporation

Driller METRIC Corporation

Drilling Medium Hollw Stem Auger

Date of Completion 8-13-91 **Ground Elev.** _____

Depth (feet)	Thickness (feet)	Stratigraphic Description
0 - 2.6	2.6	Dark brown silty sand with black layers
2.6 - 3.6	1.0	Black silty sand with gravel
3.6 - 5.3	1.7	Brown silty sand with gravel
5.3 - 6.2	0.9	White caliche with gravel
6.2 - 7.6	1.4	No recovery
7.6 - 9.0	1.4	Grey silty sand with gravel
9.0 - 12.6	3.6	No recovery
12.6 - 13.5	0.9	Grey silty sand with gravel
13.5 - 14.3	0.8	Green silty sand with black layers
14.3 - 14.8	0.5	Light grey caliche with pink silty lenses (½" thick)
14.8 - 17.6	2.8	No recovery
17.6 - 18.6	1.0	Tan sand with gravel
18.6 - 19.7	1.1	Light brown cemented silty sand
19.7 - 20.4	0.7	Rock

METRIC
Corporation

SAMPLE LOG

Borehole Number BH-3 **Borehole Location** _____

Property Owner Transwestern Pipeline Company

Sample Logger Don Briggs, METRIC Corporation

Driller METRIC Corporation

Drilling Medium Hollow Stem Auger

Date of Completion 8-13-91 **Ground Elev.** _____

Depth (feet)	Thickness (feet)	Stratigraphic Description
0 - 1.4	1.4	Brown silty sand
1.4 - 2.6	1.2	No recovery
2.6 - 7.3	4.7	Tan silty clay sand
7.3 - 7.6	0.3	White caliche

METRIC
Corporation

SAMPLE LOG

Borehole Number BH-4 **Borehole Location** _____

Property Owner Transwestern Pipeline Company

Sample Logger Don Briggs, METRIC Corporation

Driller METRIC Corporation

Drilling Medium Hollow Stem Auger

Date of Completion 9-14-91 **Ground Elev.** _____

Depth (feet)	Thickness (feet)	Stratigraphic Description
0 - 2.8	2.8	Light brown fine silty sand
2.8 - 3.4	0.6	Light brown fine silty sand
3.4 - 5.6	2.2	Tan fine silty sand
5.6 - 7.2	1.6	Tan silty clay sand
7.2 - 7.8	0.6	No recovery
7.8 - 9.1	1.3	Tan silty clay sand
9.1 - 10.1	1.0	Brown silty sand
10.1 - 10.5	0.4	Brown silty clay sand
10.5 - 11.5	1.0	Tan silty clay sand with gravel
11.5 - 12.8	1.3	No recovery
12.8 - 13.8	1.0	Tan silty sand with gravel
13.8 - 14.6	0.8	White caliche with gravel
14.6 - 17.8	3.2	No recovery
17.8 - 18.3	0.5	Cemented gravel
18.3 - 21.5	3.2	Caliche with gravel
21.5 - 23.8	2.3	Caliche with gravel
23.8 - 27.8	4.0	No recovery
27.8 - 28.1	0.3	Red clay

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SAMPLE LOG
Continued

Borehole Number BH-4 Borehole Location _____

(Continued from Previous Page)

Depth (feet)	Thickness (feet)	Stratigraphic Description
28.1 - 30.0	1.9	Caliche with gravel
30.0 - 32.8	2.8	No recovery
32.8 - 34.5	1.7	Caliche with red clay lenses

METRIC
Corporation

SAMPLE LOG

Borehole Number BH-5 **Borehole Location** _____

Property Owner Transwestern Pipeline Company

Sample Logger Don Briggs, METRIC Corporation

Driller METRIC Corporation

Drilling Medium Hollow Stem Auger

Date of Completion 8-15-91 **Ground Elev.** _____

Depth (feet)	Thickness (feet)	Stratigraphic Description
0 - 1.3	1.3	Brown silty sand
1.3 - 2.4	1.1	Black silty sand
2.4 - 3.8	1.4	Black silty sand
3.8 - 5.0	1.2	Black silty sand with caliche
5.0 - 7.4	2.4	No recovery
7.4 - 9.9	2.5	Grey silty clay sand with caliche
9.9 - 10.3	0.4	Caliche
10.3 - 12.4	2.1	No recovery
12.4 - 20.4	8.0	Soft caliche
20.4 - 22.4	2.0	No recovery
22.4 - 23.8	1.4	Brown cemented silty sand
23.8 - 24.5	0.7	Hard caliche cemented with gravel
24.5 - 28.4	3.9	No recovery
28.4 - 29.8	1.4	Hard caliche
29.8 - 33.4	3.6	No recovery
33.4 - 35.6	2.2	Hard caliche

METRIC
Corporation

SAMPLE LOG

Borehole Number BH-6 **Borehole Location** _____

Property Owner Transwestern Pipeline Company

Sample Logger Don Briggs, METRIC Corporation

Driller METRIC Corporation

Drilling Medium Hollow Stem Auger

Date of Completion 8-15-91 **Ground Elev.** _____

Depth (feet)	Thickness (feet)	Stratigraphic Description
0 - 1.2	1.2	Brown silty sand
1.2 - 2.2	1.0	Tan silty sand
2.2 - 6.0	3.8	Tan silty sand
6.0 - 7.7	1.7	No recovery
7.7 - 8.9	1.2	Tan silty sand with caliche
8.9 - 12.2	3.3	Caliche with gravel
12.2 - 14.9	2.7	Caliche with gravel
14.9 - 17.7	2.8	No recovery
17.7 - 20.1	2.4	Caliche
20.1 - 22.7	2.6	No recovery
22.7 - 24.3	1.6	Caliche

METRIC
Corporation

SAMPLE LOG

Borehole Number BH-7 **Borehole Location** _____

Property Owner Transwestern Pipeline Company

Sample Logger Don Briggs, METRIC Corporation

Driller METRIC Corporation

Drilling Medium Hollow Stem Auger

Date of Completion 8-16-91 **Ground Elev.** _____

Depth (feet)	Thickness (feet)	Stratigraphic Description
0 - 2.7	2.7	Tan silty sand
2.7 - 4.6	1.9	Tan silty sand
4.6 - 6.8	2.2	Tan silty clay sand
6.8 - 7.7	0.9	No recovery
7.7 - 9.7	2.0	Tan silty clay sand with caliche
9.7 - 11.3	1.6	Caliche
11.3 - 12.7	1.4	No recovery
12.7 - 13.7	1.0	Caliche with rocks
13.7 - 17.7	4.0	No recovery
17.7 - 19.7	2.0	Caliche

METRIC
Corporation

SAMPLE LOG

Borehole Number BH-8 **Borehole Location** _____

Property Owner Transwestern Pipeline Company

Sample Logger Don Briggs, METRIC Corporation

Driller METRIC Corporation

Drilling Medium Hollow Stem Auger

Date of Completion 8-16-91 **Ground Elev.** _____

Depth (feet)	Thickness (feet)	Stratigraphic Description
0 - 2.7	2.7	Tan silty sand
2.7 - 4.1	1.4	Tan silty sand
4.1 - 6.3	2.2	Tan silty clay sand with caliche
6.3 - 7.7	1.4	No recovery
7.7 - 8.3	0.6	Tan silty clay sand with caliche
8.3 - 10.3	2.0	Soft caliche with gravel
10.3 - 12.7	2.4	No recovery
12.7 - 13.5	0.8	Caliche with gravel
13.5 - 14.8	1.3	Tan sand
14.8 - 15.4	0.6	Caliche
15.4 - 17.7	2.3	No recovery
17.7 - 19.9	2.2	Caliche

APPENDIX B

LABORATORY REPORTS FOR BOREHOLE SAMPLING

Assaigai Analytical Labs
7300 Jefferson NE
Albuquerque, NM 87109

Attn: SYED RIZVI
Phone: (505)345-8964

ENRON/TRANSWESTERN PIPELINE
6381 N. MAIN STREET
P.O. BOX 1717
ROSWELL, NM 88202-1717
Attn: LARRY CAMPBELL
Invoice Number: 911716

Order #: 91-08-151
Date: 08/29/91 10:54
Work ID: YATES PLANT 7996
Date Received: 08/15/91
Date Completed: 08/29/91

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	BH1 13.0 - 13.5	02	BH1 19.0 - 19.5
03	BH1 20.2 - 20.4	04	BH1 23.6 - 24.0
05	BH1 25.9 - 26.3	06	BH2 2.6 - 7.6
07	BH2 13.8 - 14.2	08	BH3 0-1.4 & 2.6-7.6 COMPOS

QUESTIONS ABOUT THIS REPORT SHOULD BE ADDRESSED TO:
LABORATORY OPERATIONS MANAGER/ASSAIGAI ANALYTICAL
7300 JEFFERSON N.E.,ALBUQUERQUE,N.M. 87109

Certified By
SYED N. RIZVI

TEST RESULTS BY SAMPLE

Sample: 01A BH1 13.0 - 13.5 Collected: 08/12/91 16:58

Test Description	Result	Limit	Units	Analyzed	By
BENZENE (TCLP)	<0.02	0.02	MG/L	08/26/91	SS
BENZENE,TOLUENE,EBENZ,XYLE		0.1			
BENZENE	<0.1	0.1	MG/KG	08/23/91	DD
TOLUENE	<0.1	0.1	MG/KG	08/23/91	DD
ETHYL BENZENE	<0.1	0.1	MG/KG	08/23/91	DD
XYLENES	<0.1	0.1	MG/KG	08/23/91	DD
TOTAL REC PET HYDROCARBONS	<5.0	5.0	MG/KG	08/26/91	PV

Sample: 02A BH1 19.0 - 19.5 Collected: 08/12/91

Test Description	Result	Limit	Units	Analyzed	By
BENZENE (TCLP)	<0.02	0.02	MG/L	08/26/91	SS
BENZENE,TOLUENE,EBENZ,XYLE		0.1			
BENZENE	<0.1	0.1	MG/KG	08/23/91	DD
TOLUENE	<0.1	0.1	MG/KG	08/23/91	DD
ETHYL BENZENE	<0.1	0.1	MG/KG	08/23/91	DD
XYLENES	<0.1	0.1	MG/KG	08/23/91	DD
TOTAL REC PET HYDROCARBONS	<5.0	5.0	MG/KG	08/26/91	PV

Sample: 03A BH1 20.2 - 20.4 **Collected: 08/13/91 11:40**

Test Description	Result	Limit	Units	Analyzed	By
BENZENE (TCLP)	<0.02	0.02	MG/L	08/26/91	SS
BENZENE,TOLUENE,EBENZ,XYLE		0.1			
BENZENE	<0.1	0.1	MG/KG	08/23/91	DD
TOLUENE	<0.1	0.1	MG/KG	08/23/91	DD
ETHYL BENZENE	<0.1	0.1	MG/KG	08/23/91	DD
XYLENES	<0.1	0.1	MG/KG	08/23/91	DD
TOTAL REC PET HYDROCARBONS	8.0	5.0	MG/KG	08/26/91	PV

Sample: 04A BH1 23.6 - 24.0 **Collected: 08/13/91 08:53**

Test Description	Result	Limit	Units	Analyzed	By
BENZENE (TCLP)	<0.02	0.02	MG/L	08/26/91	SS
BENZENE,TOLUENE,EBENZ,XYLE		0.1			
BENZENE	<0.1	0.1	MG/KG	08/23/91	DD
TOLUENE	<0.1	0.1	MG/KG	08/23/91	DD
ETHYL BENZENE	<0.1	0.1	MG/KG	08/23/91	DD
XYLENES	<0.1	0.1	MG/KG	08/23/91	DD
TOTAL REC PET HYDROCARBONS	8.0	5.0	MG/KG	08/26/91	PV

Sample: 05A BH1 25.9 - 26.3 Collected: 08/13/91 08:59

Test Description	Result	Limit	Units	Analyzed	By
BENZENE (TCLP)	<0.02	0.02	MG/L	08/26/91	SS
BENZENE,TOLUENE,EBENZ,XYLE		0.1			
BENZENE	<0.1	0.1	MG/KG	08/23/91	DD
TOLUENE	<0.1	0.1	MG/KG	08/23/91	DD
ETHYL BENZENE	<0.1	0.1	MG/KG	08/23/91	DD
XYLENES	<0.1	0.1	MG/KG	08/23/91	DD
TOTAL REC PET HYDROCARBONS	<5.0	5.0	MG/KG	08/28/91	PV

Sample: 06A BH2 2.6 - 7.6 Collected: 08/13/91 09:59

Test Description	Result	Limit	Units	Analyzed	By
TOTAL REC PET HYDROCARBONS	16	5.0	MG/KG	08/26/91	PV

Sample: 07A BH2 13.8 - 14.2 Collected: 08/13/91 10:33

Test Description	Result	Limit	Units	Analyzed	By
TOTAL REC PET HYDROCARBONS	12	5.0	MG/KG	08/26/91	PV

Order # 91-08-151 **Assaigai Analytical Labs** **Page 6**
08/29/91 10:54

Sample: 08A BH3 0-1.4 & 2.6-7.6 COMPOS Collected: 08/13/91 16:25

Test Description	Result	Limit	Units	Analyzed	By
TOTAL REC PET HYDROCARBONS	8.0	5.0	MG/KG	08/26/91	PV

REGULAR TEST RESULTS BY TEST

BENZENE (TCLP) **Minimum: 0.02** **Maximum: 100**
Method: EPA 602

Sample	Sample Description	Result	Units	Extracted	Analyzed	By
01A	BH1 13.0 - 13.5	<0.02	MG/L	08/19/91	08/26/91	SS
02A	BH1 19.0 - 19.5	<0.02	MG/L	08/19/91	08/26/91	SS
03A	BH1 20.2 - 20.4	<0.02	MG/L	08/19/91	08/26/91	SS
04A	BH1 23.6 - 24.0	<0.02	MG/L	08/19/91	08/26/91	SS
05A	BH1 25.9 - 26.3	<0.02	MG/L	08/19/91	08/26/91	SS

TOTAL REC PET HYDROCARBONS **Minimum: 5.0** **Maximum: 100**
Method: EPA 418.1

Sample	Sample Description	Result	Units	Extracted	Analyzed	By
01A	BH1 13.0 - 13.5	<5.0	MG/KG	08/26/91	08/26/91	PV
02A	BH1 19.0 - 19.5	<5.0	MG/KG	08/26/91	08/26/91	PV
03A	BH1 20.2 - 20.4	8.0	MG/KG	08/26/91	08/26/91	PV
04A	BH1 23.6 - 24.0	8.0	MG/KG	08/26/91	08/26/91	PV
05A	BH1 25.9 - 26.3	<5.0	MG/KG	08/28/91	08/28/91	PV
06A	BH2 2.6 - 7.6	16	MG/KG	08/26/91	08/26/91	PV
07A	BH2 13.8 - 14.2	12	MG/KG	08/26/91	08/26/91	PV
08A	BH3 0-1.4 & 2.6-7.6 COMPOS	8.0	MG/KG	08/26/91	08/26/91	PV

TEST METHODOLOGIES

USEPA METHOD # 602

USEPA METHOD # 602/8020

TRPH: USEPA METHOD # 418.1

ASSAIGAI ANALYTICAL LABORATORIES

WORK ORDER
7996

☐ HAZARDOUS ☐ NON-HAZARDOUS	DATE RECEIVED 8/15/91	ESTIMATED COST
CUSTOMER P.O. NUMBER	TIME RECEIVED 8:45	DUE DATE 8/29/91

ACCOUNT INFORMATION

CUSTOMER'S NAME	CONTACT
ADDRESS	PHONE NUMBER
CITY / STATE / ZIP	

PARTY RESPONSIBLE FOR PAYMENT IF OTHER THAN ABOVE

NAME	CONTACT
ADDRESS	PHONE NUMBER
CITY / STATE / ZIP	

SPECIAL BILLING INSTRUCTIONS

ACCOUNT STATUS

PAYMENT REC'D. ____
OPEN ACCOUNT ____
CASH ____
CHECK NUMBER ____

SAMPLE INFORMATION

TYPE OF SAMPLE	NO. OF SAMPLES	*TURN AROUND TIME	SAMPLE IDENTIFICATION AND / OR SAMPLE SITE
☐ WATER ☐ SOIL ☐ OIL ☐ SLUDGE ☐ OTHER	8 NO. OF CONTAINERS 8	☒ REGULAR (10 WKG DAYS) ☐ RUSH (3 DAYS) ☐ EMERGENCY (STAT) *(SUBJECT TO WORK LOG)	Water Plant

SAMPLE DELIVERED BY ____ SIGNATURE ____ DATE 8/15/91

ANALYSIS REQUEST

WORK DESCRIPTION ____

SPECIAL INSTRUCTIONS ____

BILLING: ☐ PICKUP ☐ MAIL

LOGGED IN BY

7300 Jefferson NE • Albuquerque, New Mexico 87109 • (505) 345-8964 • FAX (505) 345-7259

CUSTOMER

TRANSWESTERN PIPELINE COMPANY

CHAIN OF CUSTODY

District: ROSWELL Date: 8-14-91

Sample Location Valve or Receiver No.	Vol. Collect. During Flush	Sampler
YATES PLANT		MEIRIS

SAMPLE ID NUMBER	SOLVENT USED	SAMPLE ICED	ANALYSES REQUESTED
YATES BH 1 13.0-13.5		YES	TRPH - BTEX - TCLP BENZENE
YATES BH 1 19.0-19.5		YES	TRPH - BTEX - TCLP BENZENE
YATES BH 1 24.2-24.4		YES	TRPH - BTEX - TCLP BENZENE
YATES BH 1 23.6-24.0		YES	TRPH - BTEX - TCLP BENZENE
YATES BH 1 25.9-26.3		YES	TRPH - BTEX - TCLP BENZENE
YATES BH 2 2.6-26		YES	TRPH
YATES BH 2 13.8-14.2		YES	TRPH
YATES BH 3 0-1.4 2.6-2.6		YES	TRPH

Relinquished By EARL CHANLEY - TWPL Date 8-14-91
Relinquished To FED-X Date 8-14-91

Relinquished By _____ Date _____
Relinquished To _____ Date _____

Relinquished By _____ Date _____
Relinquished To _____ Date _____

Relinquished By _____ Date _____
Relinquished By _____ Date _____

Laboratory: Assaigai
Received: _____ Date 8/16/91

SEND RESULTS TO: LARRY CAMPBELL (505-625-8022)
P.O. BOX 1717
ROSWELL, N.M. 88202-1717

Assaigai Analytical Labs
7300 Jefferson NE
Albuquerque, NM 87109

Attn: SYED RIZVI
Phone: (505)345-8964

ENRON/TRANSWESTERN PIPELINE
6381 N. MAIN STREET
P.O. BOX 1717
ROSWELL, NM 88202-1717
Attn: LARRY CAMPBELL
Invoice Number: 911719

Order #: 91-08-163
Date: 08/29/91 11:22
Work ID: YATES PLANT 8008
Date Received: 08/16/91
Date Completed: 08/29/91

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	YATES BH-1 33.0 - 34.3	02	YATES - BH-5 0 - 7.4
03	YATES BH-5 23.0 - 23.8	04	YATES B-5 35.0 - 35.6
05	YATES BH-4 20.2 - 20.9	06	YATES BH-6 19.5 - 20.1

TEST RESULTS BY SAMPLE

Sample: 01A YATES BH-~~1~~ 4 33.0 - 34.3 Collected: 08/14/91 16:42

Test Description	Result	Limit	Units	Analyzed	By
BENZENE (TCLP)	<0.001	0.001	MG/L	08/29/91	DD
BENZENE,TOLUENE,EBENZ,XYLE		0.1			
BENZENE	<0.1	0.1	MG/KG	08/23/91	DD
TOLUENE	<0.1	0.1	MG/KG	08/23/91	DD
ETHYL BENZENE	<0.1	0.1	MG/KG	08/23/91	DD
XYLENES	<0.1	0.1	MG/KG	08/23/91	DD
TOTAL REC PET HYDROCARBONS	8.0	5.0	MG/KG	08/26/91	PV

Sample: 02A YATES - BH-5 0 - 7.4 Collected: 08/14/91 17:40

Test Description	Result	Limit	Units	Analyzed	By
BENZENE (TCLP)	0.93	0.001	MG/L	08/25/91	SS
BENZENE,TOLUENE,EBENZ,XYLE		0.1			
BENZENE	8.0	0.1	MG/KG	08/23/91	DD
TOLUENE	36	0.1	MG/KG	08/23/91	DD
ETHYL BENZENE	11	0.1	MG/KG	08/23/91	DD
XYLENES	380	0.1	MG/KG	08/23/91	DD
TOTAL REC PET HYDROCARBONS	200	5.0	MG/KG	08/26/91	PV

Sample: 03A YATES BH-5 23.0 - 23.8 Collected: 08/15/91 08:20

Test Description	Result	Limit	Units	Analyzed	By
BENZENE (TCLP)	0.46	0.001	MG/L	08/22/91	SR
BENZENE,TOLUENE,EBENZ,XYLE		0.1			
BENZENE	16	0.1	MG/KG	08/23/91	DD
TOLUENE	41	0.1	MG/KG	08/23/91	DD
ETHYL BENZENE	19	0.1	MG/KG	08/23/91	DD
XYLENES	54	0.1	MG/KG	08/23/91	DD
TOTAL REC PET HYDROCARBONS	5600	5.0	MG/KG	08/26/91	PV

Sample: 04A YATES B-5 35.0 - 35.6 Collected: 08/15/91 10:20

Test Description	Result	Limit	Units	Analyzed	By
BENZENE (TCLP)	<0.001	0.001	MG/L	08/22/91	SR
BENZENE,TOLUENE,EBENZ,XYLE		0.1			
BENZENE	<0.1	0.1	MG/KG	08/23/91	DD
TOLUENE	0.42	0.1	MG/KG	08/23/91	DD
ETHYL BENZENE	0.11	0.1	MG/KG	08/23/91	DD
XYLENES	0.48	0.1	MG/KG	08/23/91	DD
TOTAL REC PET HYDROCARBONS	16	5.0	MG/KG	08/26/91	PV

Sample: 05A YATES BH-4 20.2 - 20.9 Collected: 08/14/91 09:40

Test Description	Result	Limit	Units	Analyzed	By
BENZENE (TCLP)	<0.001	0.001	MG/L	08/22/91	SR
BENZENE,TOLUENE,EBENZ,XYLE		0.1			
BENZENE	<0.1	0.1	MG/KG	08/23/91	DD
TOLUENE	<0.1	0.1	MG/KG	08/23/91	DD
ETHYL BENZENE	<0.1	0.1	MG/KG	08/23/91	DD
XYLENES	<0.1	0.1	MG/KG	08/23/91	DD
TOTAL REC PET HYDROCARBONS	8.0	5.0	MG/KG	08/26/91	PV

Sample: 06A YATES BH-6 19.5 - 20.1 Collected: 08/15/91 13:50

Test Description	Result	Limit	Units	Analyzed	By
BENZENE (TCLP)	<0.001	0.001	MG/L	08/22/91	SR
BENZENE,TOLUENE,EBENZ,XYLE		0.1			
BENZENE	<0.1	0.1	MG/KG	08/28/91	DD
TOLUENE	<0.1	0.1	MG/KG	08/28/91	DD
ETHYL BENZENE	<0.1	0.1	MG/KG	08/28/91	DD
XYLENES	<0.1	0.1	MG/KG	08/28/91	DD
TOTAL REC PET HYDROCARBONS	20	5.0	MG/KG	08/26/91	PV

REGULAR TEST RESULTS BY TEST

BENZENE (TCLP) **Minimum: 0.001** **Maximum: 100**
Method: EPA 602

Sample	Sample Description	Result	Units	Extracted	Analyzed	By
01A	YATES BH-1 33.0 - 34.3	<0.001	MG/L	08/20/91	08/29/91	DD
02A	YATES - BH-5 0 - 7.4	0.93	MG/L	08/20/91	08/25/91	SS
03A	YATES BH-5 23.0 - 23.8	0.46	MG/L	08/20/91	08/22/91	SR
04A	YATES B-5 35.0 - 35.6	<0.001	MG/L	08/20/91	08/22/91	SR
05A	YATES BH-4 20.2 - 20.9	<0.001	MG/L	08/20/91	08/22/91	SR
06A	YATES BH-6 19.5 - 20.1	<0.001	MG/L	08/20/91	08/22/91	SR

TOTAL REC PET HYDROCARBONS **Minimum: 5.0** **Maximum: 100**
Method: EPA 418.1

Sample	Sample Description	Result	Units	Extracted	Analyzed	By
01A	YATES BH-1 33.0 - 34.3	8.0	MG/KG	08/26/91	08/26/91	PV
02A	YATES - BH-5 0 - 7.4	200	MG/KG	08/26/91	08/26/91	PV
03A	YATES BH-5 23.0 - 23.8	5600	MG/KG	08/26/91	08/26/91	PV
04A	YATES B-5 35.0 - 35.6	16	MG/KG	08/26/91	08/26/91	PV
05A	YATES BH-4 20.2 - 20.9	8.0	MG/KG	08/26/91	08/26/91	PV
06A	YATES BH-6 19.5 - 20.1	20	MG/KG	08/26/91	08/26/91	PV

TEST METHODOLOGIES

USEPA METHOD # 602

USEPA METHOD # 602/8020

TRPH: USEPA METHOD # 418.1

TRANSWESTERN PIPELINE COMPANY

CHAIN OF CUSTODY

District: ROSWELL   Date: 8-15-91

Sample Location Valve or Receiver No.	Vol. Collect. During Flush	Sampler
YATES PLT		MUTRIC

	SAMPLE ID NUMBER	SOLVENT USED	SAMPLE ICED	ANALYSES REQUESTED
8/14 @ 2:42	YATES BH-1 33.0-34.3		YES	TRPH - BTEX - TCLP BENZENE
8/14 @ 3:40	" BH-5 0-7.4		"	" " " "
8/15 @ 8:20	" BH-5 23.0-23.8		"	" " " "
8/15 @ 10:20	" BH-5 35.0-35.6		"	" " " "
8/14 @ 4:40	" BH-4 20.2-20.9		"	" " " "
8/15 @ 1:50	" BH-6 19.5-20.1		"	" " " "

Relinquished By [signature] Date 8-15-91
Relinquished To [illegible] FED-X Date 8-15-91

Relinquished By ______ Date ______
Relinquished To ______ Date ______

Relinquished By ______ Date ______
Relinquished To ______ Date ______

Relinquished By ______ Date ______
Relinquished By ______ Date ______

Laboratory: ______
Received: ______ Date ______

SEND RESULTS TO: LARRY CAMPBELL (505-625-8022)
P.O. BOX 1717
ROSWELL, N.M. 88202-1717

ASSAIGAI ANALYTICAL LABORATORIES

WORK ORDER
8008

☐ HAZARDOUS ☐ NON-HAZARDOUS	DATE RECEIVED 8/16/91	ESTIMATED COST
CUSTOMER P.O. NUMBER	TIME RECEIVED	DUE DATE 8/30/91

ACCOUNT INFORMATION

CUSTOMER'S NAME Enron / Transwestern Pipeline	CONTACT Larry Campbell
ADDRESS	PHONE NUMBER 625-8022
CITY / STATE / ZIP	

PARTY RESPONSIBLE FOR PAYMENT IF OTHER THAN ABOVE

NAME	CONTACT
ADDRESS	PHONE NUMBER
CITY / STATE / ZIP	

SPECIAL BILLING INSTRUCTIONS

ACCOUNT STATUS

- PAYMENT REC'D.
- OPEN ACCOUNT XX
- CASH
- CHECK NUMBER

SAMPLE INFORMATION

TYPE OF SAMPLE	NO. OF SAMPLES	*TURN AROUND TIME	SAMPLE IDENTIFICATION AND / OR SAMPLE SITE
☐ WATER ☒ SOIL ☐ OIL ☐ SLUDGE ☐ OTHER	#6 NO. OF CONTAINERS #6	☒ REGULAR (10 WKG DAYS) ☐ RUSH (3 DAYS) ☐ EMERGENCY (STAT) *(SUBJECT TO WORK LOG)	Jal Plant

SAMPLE DELIVERED BY Fed X   SIGNATURE   DATE 8/16/91

ANALYSIS REQUEST

WORK DESCRIPTION

TPH, BTEX, TCLP

SPECIAL INSTRUCTIONS

BILLING: ☐ PICKUP ☐ MAIL   LOGGED IN BY [signature]

7300 Jefferson NE • Albuquerque, New Mexico 87109 • (505) 345-8964 • FAX (505) 345-7259

CUSTOMER

Assaigai Analytical Labs
7300 Jefferson NE
Albuquerque, NM 87109

Attn: SYED RIZVI
Phone: (505)345-8964

ENRON/TRANSWESTERN PIPELINE
6381 N. MAIN STREET
P.O. BOX 1717
ROSWELL, NM 88202-1717
Attn: LARRY CAMPBELL
Invoice Number: 911839

Order #: 91-08-254
Date: 09/10/91 15:15
Work ID: YATES PLANT 8073
Date Received: 08/23/91
Date Completed: 09/10/91

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	BH-7 2.7 - 3.1	02	BH-8 9.3 - 9.7
03	BH-7 19.5 - 19.7	04	BH-8 19.7 - 19.9

QUESTIONS ABOUT THIS REPORT SHOULD BE ADDRESSED TO:
LABORATORY OPERATIONS MANAGER/ASSAIGAI ANALYTICAL
7300 JEFFERSON N.E.,ALBUQUERQUE,N.M. 87109

Syed Rizvi
Certified By
SYED N. RIZVI

REGULAR TEST RESULTS BY TEST

BENZENE (TCLP) **Minimum: 0.005** **Maximum: 100**
Method: EPA 602

Sample	Sample Description	Result	Units	Extracted	Analyzed	By
01A	BH-7 2.7 - 3.1	<0.005	MG/L	08/25/91	09/04/91	DD
02A	BH-8 9.3 - 9.7	<0.005	MG/L	08/25/91	09/04/91	DD
03A	BH-7 19.5 - 19.7	<0.005	MG/L	08/25/91	09/04/91	DD
04A	BH-8 19.7 - 19.9	<0.005	MG/L	08/26/91	09/04/91	DD

TOTAL REC PET HYDROCARBONS **Minimum: 5.0** **Maximum: 100**
Method: EPA 418.1

Sample	Sample Description	Result	Units	Extracted	Analyzed	By
01A	BH-7 2.7 - 3.1	<5.0	MG/KG	09/09/91	09/09/91	PV
02A	BH-8 9.3 - 9.7	<5.0	MG/KG	09/09/91	09/09/91	PV
03A	BH-7 19.5 - 19.7	8.0	MG/KG	09/09/91	09/09/91	PV
04A	BH-8 19.7 - 19.9	92	MG/KG	09/09/91	09/09/91	PV

TEST METHODOLOGIES

BENZENE: USEPA METHOD # 602

BENZENE, TOLUENE, ETHYLBENZENE, XYLENES: USEPA METHOD # 602/8020

TRPH: USEPA METHOD # 418.1

ASSAIGAI ANALYTICAL LABORATORIES

WORK ORDER 8073

☐ HAZARDOUS ☐ NON-HAZARDOUS	DATE RECEIVED 8/23/91	ESTIMATED COST
CUSTOMER P.O. NUMBER	TIME RECEIVED 9:00	DUE DATE 9/9/91

ACCOUNT INFORMATION

CUSTOMER'S NAME Chron / Transwestern	CONTACT Lou Campbell
ADDRESS	PHONE NUMBER 505-8022
CITY / STATE / ZIP	

PARTY RESPONSIBLE FOR PAYMENT IF OTHER THAN ABOVE

NAME	CONTACT
ADDRESS	PHONE NUMBER
CITY / STATE / ZIP	

ACCOUNT STATUS

PAYMENT REC'D. ____
OPEN ACCOUNT ✓
CASH ____
CHECK NUMBER ____

SPECIAL BILLING INSTRUCTIONS

SAMPLE INFORMATION

TYPE OF SAMPLE	NO. OF SAMPLES	*TURN AROUND TIME	SAMPLE IDENTIFICATION AND / OR SAMPLE SITE
☐ WATER ☒ SOIL ☐ OIL ☐ SLUDGE ☐ OTHER	4 NO. OF CONTAINERS 4	☒ REGULAR (10 WKG DAYS) ☐ RUSH (3 DAYS) ☐ EMERGENCY (STAT) *(SUBJECT TO WORK LOG)	Gate. Plant

SAMPLE DELIVERED BY Tod X SIGNATURE DATE 8/23/91

ANALYSIS REQUEST

WORK DESCRIPTION

TRPH, BTEX, TCLP-Benzene, TCLP-2

SPECIAL INSTRUCTIONS

BILLING: ☐ PICKUP ☐ MAIL

LOGGED IN BY CR

7300 Jefferson NE • Albuquerque, New Mexico 87109 • (505) 345-8964 • FAX (505) 345-7259

CUSTOMER

TRANSWESTERN PIPELINE COMPANY

CHAIN OF CUSTODY

District: ROSWELL Date: 8-22-91

Sample Location Valve or Receiver No.	Vol. Collect. During Flush	Sampler
YATES PLT		METRIC

SAMPLE ID NUMBER	SOLVENT USED	SAMPLE ICED	ANALYSES REQUESTED
BH 7 2.7-3.1		YES	TRPH - BTEX - TCLP, BENZENE
BH 8 9.3-9.7		YES	" " "
BH 9 19.5-19.7		YES	" " "
BH 8 19.7-19.9		YES	" " "

Relinquished By EARL CHANLEY Date 8-22-91
Relinquished To FED-X Date 8-22-91

Relinquished By _____ Date _____
Relinquished To _____ Date _____

Relinquished By _____ Date _____
Relinquished To _____ Date _____

Relinquished By _____ Date _____
Relinquished By _____ Date _____

Laboratory: ASSAIGAI
Received: _____ Date 8/23/91

E.2+00 E.4+00 E.6+00 E.8+00 E.10+00 E.12+00 E.14+00 E.16+00

N.8+00

N.6+00

N.4+00

N.2+00

N.0+00

EVAPORATION POND

BH-8 BH-4 BH-1 BH-6 BH-7

⊗ FLARE STACK

TRASH PIT

COMPRESSOR BUILDING

CONTROL ROOM

PIPELINE LIQUIDS TANK

BH-5

AMINE PLANT AREA

BH-3 BH-2

SOUTHEAST PIT

METRIC Corporation

BOREHOLE LOCATIONS

YATES GAS TREATING PLANT
EDDY COUNTY, NEW MEXICO

TRANSWESTERN PIPELINE COMPANY

Date 10/11/91

PLATE 1

Phone (505) 623-2761
FAX (505) 625-8060

Transwestern Pipeline Company
TECHNICAL OPERATIONS
P. O. Box 1717 • Roswell, New Mexico 88202-1717

November 22, 1991

Mr. Roger Anderson
Oil Conservation Division
P.O. Box 2088
Santa Fe, New Mexico 87504

Re: Yates Plant Remediation

Dear Mr. Anderson:

In November, of this year, Transwestern Pipeline Company submitted to your agency, a copy of a report entitled, "Shallow Subsurface Investigation at the Yates Gas Treating Plant (Atoka 4) Eddy County, New Mexico". This report describes the results of an investigation performed to locate potential areas of hydrocarbon contamination. One area in particular, was identified, as a site where hydrocarbons had been released into the subsurface soil environment. This location has been identified as the pipeline liquids storage tank area. The tank has been removed, and Transwestern is planning to initiate remediation activities of this location.

Transwestern Pipeline Company requests approval form the Oil Conservation Division (OCD) to construct and operate a passive soil venting operation to enhance removal of the hydrocarbons present in subsurface soils. this system will consist of strategically locating and installing three (3) four inch wells completed vertically into the zone of contamination. A 6 inch turbine ventilator will be secured onto the top of each well.

This system is designed to operate passively by allowing the volatilized hydrocarbons to enter through the well screen and vent to the atmosphere. During windy periods, the venting system will be especially efficient by creating a negative pressure to increase movement of hydrocarbons from the contaminated soils to the atmosphere, following a path of leased resistance.

Transwestern proposes this technology due to the depth at which the hydrocarbons are present in the soil (approximately 35 feet). This technology is well suited to allow natural removal of the volatile contamination from the soil and not create an economic burden on the Company by excavating and transporting the soils to an OCD approved landfarm.

Pending completion of the venting well installation, Transwestern will submit to the OCD a report describing activities associated with this project. Your favorable consideration in this request will be greatly appreciated.

Sincerely,

Larry Campbell

Larry Campbell
Division Environmental Specialist

file

Verbal approval

METRIC
Corporation

PIPELINE LIQUIDS TANK SOIL GAS VENTING SYSTEM AT THE YATES COMPRESSOR AND GAS TREATING PLANT EDDY COUNTY, NEW MEXICO

PREPARED FOR

TRANSWESTERN PIPELINE COMPANY
ROSWELL, NEW MEXICO

PREPARED BY

METRIC CORPORATION
ALBUQUERQUE, NEW MEXICO

DECEMBER 1991

PIPELINE LIQUIDS TANK SOIL GAS VENTING SYSTEM AT THE YATES COMPRESSOR AND GAS TREATING PLANT EDDY COUNTY, NEW MEXICO

PREPARED FOR

TRANSWESTERN PIPELINE COMPANY
ROSWELL, NEW MEXICO

PREPARED BY

METRIC CORPORATION
ALBUQUERQUE, NEW MEXICO

DECEMBER 1991

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PIPELINE LIQUIDS TANK SOIL GAS VENTING SYSTEM AT THE YATES COMPRESSOR AND GAS TREATING PLANT EDDY COUNTY, NEW MEXICO

Summary

During August 1991, METRIC Corporation conducted an assessment of the presence of organic constituents in soils at the Yates Gas Treating Plant by soil boring and laboratory analysis of samples. In conferral with the New Mexico Oil Conservation Division (OCD) regarding results of the investigation, Transwestern Pipeline Company and the OCD agreed on installation of a gas venting system to remediate subsurface soil conditions.

The METRIC investigation report documents the drilling of 9 boreholes (BH-1 through BH-9), and analysis of samples. Of five additional boreholes drilled in the area of the pipeline liquids tank (BH-10 through BH-14), hits at BH-10 for BTEX (28.0' - 28.5' depth interval) and a hit above 100 mg/kg for TRPH at that interval were indicated. Three venting wells were installed within the estimated extent of organic constituent presence, and completed to the depth of rig refusal at a restricted stratum.

PIPELINE LIQUIDS TANK SOIL GAS VENTING SYSTEM AT THE YATES COMPRESSOR AND GAS TREATING PLANT EDDY COUNTY, NEW MEXICO

Introduction

A one day meeting was held on October 24, 1991 with the Oil Conservation Division (OCD) and Transwestern personnel to discuss the results of a subsurface investigation performed by METRIC Corporation in August 1991 for the Yates Plant. After a review of that report, it was agreed to by Transwestern Pipeline Company and the OCD that a soil gas venting system would be installed to remediate the subsurface soils underlying the pipeline liquids tank area.

Five boreholes were developed to estimate the horizontal and vertical extent of organic constituents at the tank site. Three additional boreholes were developed and completed as soil gas venting wells. A total of four venting wells were completed.

Borehole Sampling and Analytical Field Screening

Borehole drilling at the Yates Plant was provided for the investigation by METRIC Corporation using a CME-55 auger drilling rig equipped with 3 1/4-inch hollow stem augers and a CME continuous sampling system. Augers and continuous samplers were steam cleaned to eliminate contamination within a borehole and potential cross contamination among boreholes.

Drilling was generally conducted to rig refusal at the depth of an underlying caliche, or pink conglomerate layer. Boreholes were plugged using a 2% bentonite/cement mixture or redi-mix concrete. The plugging material was poured slowly into the boreholes from the top. Soil cores withdrawn using the analyzer (OVA), which is a flame ionization detector, in order to guide

TABLE 1

SUMMARY OF ANALYTICAL RESULTS FOR SELECTED AROMATIC VOLATILE ORGANICS AND TOTAL RECOVERABLE PETROLEUM HYDROCARBONS

		PARAMETER (MG/KG)				
						418.1
Borehole Number	Sample Depth	Benzene	Toluene	Ethyl Benzene	Xylenes	TRPH
YBH-10	28.0-28.5	1.5	7.9	3.6	13	360
YBH-11	30.3-30.7	BDL	BDL	BDL	BDL	BDL
YBH-12	18.0-19.0	BDL	BDL	BDL	BDL	12
YBH-13	23.0-24.0	BDL	BDL	BDL	BDL	BDL
YBH-14	29.3-29.7	BDL	BDL	BDL	BDL	BDL

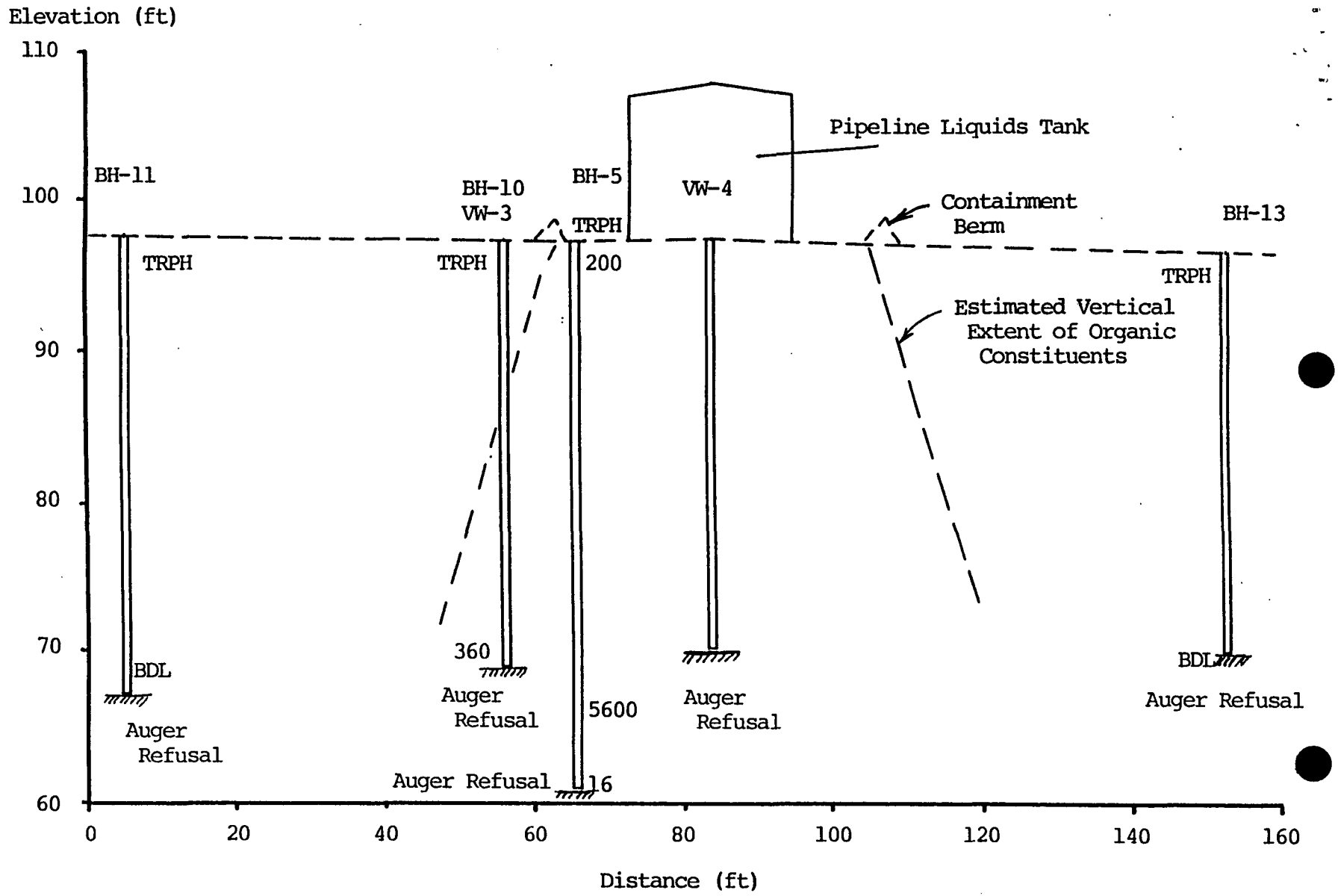


FIGURE 2

Pipeline Liquids Tank Cross Section A-A'

Bibliography

The following bibliographic sources document the methods utilized in performing laboratory analyses for the investigation. Specific laboratory tests performed are indicated in parentheses.

USEPA SW-846 Method #8020 - Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, SW-846, 3rd Edition, 1986. (Test 8020).

USEPA Method #418.1 - Method for Chemical Analysis of Water and Wastes, EPA 600/4-79-020, revised March 1983.

METRIC Corporation, November 1991, Shallow Subsurface Investigation at Yates Gas Treating Plant (ATOKA 4), Eddy County, New Mexico. Consultant report prepared for Transwestern Pipeline Company.

Transwestern Pipeline Company, October 24, 1991, Meeting with New Mexico Oil Conservation Division personnel. Discussion of results of METRIC Corporation shallow subsurface investigation at Yates Gas Treating Plant and plans for a soil gas venting system as a mitigation for subsurface conditions.

APPENDIX A

BOREHOLE SAMPLE LOGS

METRIC
Corporation

SAMPLE LOG

Borehole Number BH-5 **Borehole Location** Yates

Property Owner Transwestern Pipeline Company

Sample Logger Don Briggs, METRIC Corporation

Driller METRIC Corporation

Drilling Medium Hollow Stem Auger

Date of Completion 8-15-91 **Ground Elev.** 97.31' Local

Depth (feet)	Thickness (feet)	Stratigraphic Description
0 - 1.3	1.3	Brown silty sand
1.3 - 2.4	1.1	Black silty sand
2.4 - 3.8	1.4	Black silty sand
3.8 - 5.0	1.2	Black silty sand with caliche
5.0 - 7.4	2.4	No recovery
7.4 - 9.9	2.5	Grey silty clay sand with caliche
9.9 - 10.3	0.4	Caliche
10.3 - 12.4	2.1	No recovery
12.4 - 20.4	8.0	Soft caliche
20.4 - 22.4	2.0	No recovery
22.4 - 23.8	1.4	Brown cemented silty sand
23.8 - 24.5	0.7	Hard caliche cemented with gravel
24.5 - 28.4	3.9	No recovery
28.4 - 29.8	1.4	Hard caliche
29.8 - 33.4	3.6	No recovery
33.4 - 35.6	2.2	Hard caliche

METRIC
Corporation

SAMPLE LOG

Borehole Number YBH-10 **Borehole Location** Yates

Property Owner Transwestern Pipeline Company

Sample Logger Don Briggs, METRIC Corporation

Driller METRIC Corporation

Drilling Medium 3 1/4" ID Hollow Stem Auger

Date of Completion 11/13/91 **Ground Elev.** 97.4' Local

Depth (feet)	Thickness (feet)	Stratigraphic Description
0 - 0.7	0.7	Brown silty sand
0.7 - 1.2	0.5	Light brown silty clay sand
12. - 3.0	1.8	No recovery
3.0 - 7.1	4.1	Tan silty sand
7.1 - 8.0	0.9	Tan silty sand with caliche
8.0 - 8.8	0.8	Tan silty sand with caliche
8.8 - 9.7	0.9	Tan caliche
9.7 - 10.0	0.3	Tan caliche with gravels
10.0 - 13.0	3.0	No recovery
13.0 - 14.3	1.3	Hard caliche
14.3 - 14.8	0.5	Tan silty clay sand
14.8 - 18.0	3.2	No recovery
18.0 - 21.6	3.6	Brown silty clay
21.6 - 21.9	0.3	White caliche
21.9 - 22.4	0.5	Red clay
22.4 - 23.0	0.6	Gray sand

METRIC
Corporation

SAMPLE LOG
Continued

Borehole Number YBH-10 Borehole Location Yates

(Continued from Previous Page)

Depth (feet)	Thickness (feet)	Stratigraphic Description
23.0 - 25.2	2.2	Tan cemented sand
25.2 - 28.0	2.8	No recovery
28.0 - 28.5	0.5	Gray sand
28.5 - 28.6	0.1	Pink conglomerate

METRIC
Corporation

SAMPLE LOG

Borehole Number YBH-11 **Borehole Location** Yates

Property Owner Transwestern Pipeline Company

Sample Logger Don Briggs, METRIC Corporation

Driller METRIC Corporation

Drilling Medium 3 1/1" ID Hollow Stem Auger

Date of Completion 11/13/91 **Ground Elev.** 97.8' Local

Depth (feet)	Thickness (feet)	Stratigraphic Description
0 - 0.5	0.5	Tan silty sand with caliche
0.5 - 2.1	1.6	Brown silty clay
2.1 - 2.4	0.3	Tan silty clay sand
2.4 - 3.0	0.4	No recovery
3.0 - 4.2	1.2	Tan silty clay sand
4.2 - 4.9	0.7	White caliche
4.9 - 8.0	3.1	No recovery
8.0 - 10.1	2.1	White sandy caliche
10.1 - 10.3	0.2	White caliche with gravels
10.3 - 13.0	2.7	No recovery
13.0 - 13.3	0.3	White caliche with gravels
13.3 - 14.8	1.5	Tan sandy caliche
14.8 - 15.4	0.6	Gray coarse sand with gravels
15.4 - 18.0	2.6	No recovery
18.0 - 19.2	1.2	Red clay
19.2 - 19.8	0.6	Tan sand
19.8 - 23.0	3.2	No recovery

METRIC
Corporation

SAMPLE LOG
Continued

Borehole Number YBH-11 Borehole Location Yates

(Continued from Previous Page)

Depth (feet)	Thickness (feet)	Stratigraphic Description
23.0 - 24.0	1.0	Tan silty sand
24.0 - 24.4	0.4	Tan cemented sand
24.4 - 28.0	3.6	No recovery
28.0 - 28.9	0.6	Gray/Green caliche
28.9 - 30.3	1.4	Brown silty sandy clay
30.3 - 30.7	0.4	White coarse sand

METRIC
Corporation

SAMPLE LOG

Borehole Number YBH-12 **Borehole Location** Yates

Property Owner Transwestern Pipeline Company

Sample Logger Don Briggs, METRIC Corporation

Driller METRIC Corporation

Drilling Medium Hollow Stem Auger

Date of Completion 11/13/91 **Ground Elev.** 96.85' Local

Depth (feet)	Thickness (feet)	Stratigraphic Description
0 - 2.4	2.4	Brown silty clay sand
2.4 - 3.0	0.6	Tan sandy caliche
3.0 - 4.2	1.2	No recovery
4.2 - 5.7	1.5	Tan sandy caliche
5.7 - 8.0	2.3	Brown sandy clay
8.0 - 8.4	0.4	Brown sandy clay
8.4 - 9.4	1.0	Brown silty clay sand
9.4 - 10.7	1.3	Tan silty clay sand
10.7 - 13.0	2.3	No recovery
13.0 - 15.0	2.0	Hard caliche
15.0 - 18.0	3.0	No recovery
18.0 - 19.3	1.3	White hard caliche

METRIC
Corporation

SAMPLE LOG

Borehole Number YBH-13 **Borehole Location** Yates

Property Owner Transwestern Pipeline Company

Sample Logger Don Briggs, METRIC Corporation

Driller METRIC Corporation

Drilling Medium Hollow Stem Auger

Date of Completion 11/13/91 **Ground Elev.** 96.42' Local

Depth (feet)	Thickness (feet)	Stratigraphic Description
0 - 3.0	3.0	Brown silty clay sand
3.0 - 8.0	5.0	No recovery
8.0 - 9.6	1.6	Tan silty clay sand
9.6 - 10.9	1.3	Tan silty clay sand with gravel
10.9 - 13.0	2.1	No recovery
13.0 - 13.5	0.5	White hard caliche
13.5 - 16.5	3.0	Tan cemented sand
16.5 - 18.0	1.5	No recovery
18.0 - 19.2	1.2	White caliche
19.2 - 19.9	0.7	Pink conglomerate
19.9 - 23.0	3.9	No recovery
23.0 - 24.1	1.1	White hard caliche

METRIC
Corporation

SAMPLE LOG

Borehole Number YBH-14 **Borehole Location** Yates

Property Owner Transwestern Pipeline Company

Sample Logger Don Briggs, METRIC Corporation

Driller METRIC Corporation

Drilling Medium Hollow Stem Auger

Date of Completion 11/15/91 **Ground Elev.** 97.20' Local

Depth (feet)	Thickness (feet)	Stratigraphic Description
0 - 0.5	0.5	Brown silty sand with gravel
0.5 - 2.8	2.3	Brown silty clay sand
2.8 - 3.0	0.2	No recovery
3.0 - 3.3	0.3	Brown silty clay sand
3.3 - 5.8	2.5	Tan silty sand
5.8 - 8.0	2.2	No recovery
8.0 - 10.5	2.5	Tan sandy caliche
10.5 - 13.0	2.5	No recovery
13.0 - 14.6	1.6	Hard caliche with gravel
14.6 - 23.0	8.4	No recovery
23.0 - 25.7	2.7	Red clay
25.7 - 28.0	2.3	No recovery
28.0 - 29.3	1.3	Red/Brown sandy clay
29.3 - 29.9	0.6	Tan cemented sand

APPENDIX B

LABORATORY RESULTS

Assaigai Analytical Labs
7300 Jefferson NE
Albuquerque, NM 87109

Attn: SYED RIZVI
Phone: (505)345-8964

ENRON/TRANSWESTERN PIPELINE
6381 N. MAIN STREET
P.O. BOX 1717
ROSWELL, NM 88202-1717
Attn: LARRY CAMPBELL
Invoice Number: 912670

Order #: 91-11-156
Date: 11/20/91 14:50
Work ID: ROSWELL DISTRICT 8817
Date Received: 11/18/91
Date Completed: 11/20/91

SAMPLE IDENTIFICATION

Sample Number	Sample Description	Sample Number	Sample Description
01	YBH 10 28.0 - 28.5	02	YBH 11 30.3 - 30.7
03	YBH 12 18.0 - 19.0	04	YBH 13 23.0 - 24.0
05	YBH 14 29.3 - 29.7	06	RBH 10 37.3 - 37.6
07	RBH 11 36.3 - 36.7		

Order # 91-11-156 **Assaigai Analytical Labs** **Page 2**
11/20/91 14:50

QUESTIONS ABOUT THIS REPORT SHOULD BE ADDRESSED TO:
LABORATORY OPERATIONS MANAGER/ASSAIGAI ANALYTICAL
7300 JEFFERSON N.E.,ALBUQUERQUE,N.M. 87109

Syed Rizvi

Certified By
SYED N. RIZVI

TEST RESULTS BY SAMPLE

Sample: 01A YBH 10 28.0 - 28.5 Collected:

Test Description	Result	Limit	Units	Analyzed	By
BENZENE,TOLUENE,EBENZ,XYLE		0.1			
BENZENE	1.5	0.1	MG/KG	11/19/91	DD
TOLUENE	7.9	0.1	MG/KG	11/19/91	DD
ETHYL BENZENE	3.6	0.1	MG/KG	11/19/91	DD
XYLENES	13	0.1	MG/KG	11/19/91	DD
TOTAL REC PET HYDROCARBONS	360	5.0	MG/KG	11/19/91	PV

Sample: 02A YBH 11 30.3 - 30.7 Collected:

Test Description	Result	Limit	Units	Analyzed	By
BENZENE,TOLUENE,EBENZ,XYLE		0.1			
BENZENE	<0.1	0.1	MG/KG	11/19/91	DD
TOLUENE	<0.1	0.1	MG/KG	11/19/91	DD
ETHYL BENZENE	<0.1	0.1	MG/KG	11/19/91	DD
XYLENES	<0.1	0.1	MG/KG	11/19/91	DD
TOTAL REC PET HYDROCARBONS	<5.0	5.0	MG/KG	11/19/91	PV

Order # 91-11-156 **Assaigai Analytical Labs** **Page 4**
11/20/91 14:50

Sample: 03A YBH 12 18.0 - 19.0 **Collected:**

Test Description	Result	Limit	Units	Analyzed	By
BENZENE,TOLUENE,EBENZ,XYLE		0.1			
BENZENE	<0.1	0.1	MG/KG	11/19/91	DD
TOLUENE	<0.1	0.1	MG/KG	11/19/91	DD
ETHYL BENZENE	<0.1	0.1	MG/KG	11/19/91	DD
XYLENES	<0.1	0.1	MG/KG	11/19/91	DD
TOTAL REC PET HYDROCARBONS	12	5.0	MG/KG	11/19/91	PV

Sample: 04A YBH 13 23.0 - 24.0 **Collected:**

Test Description	Result	Limit	Units	Analyzed	By
BENZENE,TOLUENE,EBENZ,XYLE		0.1			
BENZENE	<0.1	0.1	MG/KG	11/19/91	DD
TOLUENE	<0.1	0.1	MG/KG	11/19/91	DD
ETHYL BENZENE	<0.1	0.1	MG/KG	11/19/91	DD
XYLENES	<0.1	0.1	MG/KG	11/19/91	DD
TOTAL REC PET HYDROCARBONS	<5.0	5.0	MG/KG	11/19/91	PV

Sample: 05A YBH 14 29.3 - 29.7 **Collected:**

Test Description	Result	Limit	Units	Analyzed	By
BENZENE,TOLUENE,EBENZ,XYLE		0.1			

Test Description	Result	Limit	Units	Analyzed	By
BENZENE	<0.1	0.1	MG/KG	11/19/91	DD
TOLUENE	<0.1	0.1	MG/KG	11/19/91	DD
ETHYL BENZENE	<0.1	0.1	MG/KG	11/19/91	DD
XYLENES	<0.1	0.1	MG/KG	11/19/91	DD
TOTAL REC PET HYDROCARBONS	<5.0	5.0	MG/KG	11/19/91	PV

Sample: 06A RBH 10 37.3 - 37.6 Collected:

Test Description	Result	Limit	Units	Analyzed	By
BENZENE,TOLUENE,EBENZ,XYLE		0.1			
BENZENE	<0.1	0.1	MG/KG	11/20/91	DD
TOLUENE	<0.1	0.1	MG/KG	11/20/91	DD
ETHYL BENZENE	<0.1	0.1	MG/KG	11/20/91	DD
XYLENES	<0.1	0.1	MG/KG	11/20/91	DD
TOTAL REC PET HYDROCARBONS	<5.0	5.0	MG/KG	11/19/91	PV

Sample: 07A RBH 11 36.3 - 36.7 Collected:

Test Description	Result	Limit	Units	Analyzed	By
BENZENE,TOLUENE,EBENZ,XYLE		0.1			
BENZENE	<0.1	0.1	MG/KG	11/20/91	DD
TOLUENE	<0.1	0.1	MG/KG	11/20/91	DD
ETHYL BENZENE	<0.1	0.1	MG/KG	11/20/91	DD
XYLENES	<0.1	0.1	MG/KG	11/20/91	DD

REGULAR TEST RESULTS BY TEST

TOTAL REC PET HYDROCARBONS **Minimum: 5.0** **Maximum: 100**
Method: EPA 418.1

Sample	Sample Description	Result	Units	Extracted	Analyzed	By
01A	OSBH7 33.5-33.7	<5.0	MG/KG	08/28/91	09/04/91	PV
02A	OSBH7 37.0-37.2	12	MG/KG	08/28/91	09/04/91	PV
03A	OSHB8 4.6-4.9	12	MG/KG	08/28/91	09/04/91	PV
04A	OSBH8 33.9-34.1	<5.0	MG/KG	08/28/91	09/04/91	PV
05A	OSBH8 49.7-49.9	12	MG/KG	08/28/91	09/04/91	PV
06A	OSBH9 4.5-4.9	8.0	MG/KG	08/28/91	09/04/91	PV
07A	OSBH9 32.0-32.5	150	MG/KG	08/28/91	09/04/91	PV
08A	OSBH9 47.5-49.7	8.0	MG/KG	08/28/91	09/04/91	PV

Order # 91-11-156 Assaigai Analytical Labs Page 6
11/20/91 14:50

Test Description	Result	Limit	Units	Analyzed	By
TOTAL REC PET HYDROCARBONS	8.0	5.0	MG/KG	11/19/91	PV

TEST METHODOLOGIES

BENZENE, TOLUENE, ETHYLBENZENE, XYLENES: USEPA METHOD # 602/8020

TOTAL RECOVERABLE PETROLEUM HYDROCARBONS(IN SOIL) = USEPA METHOD # 418.1

ASSAIGAI ANALYTICAL LABORATORIES

WORK ORDER
8817

9111156

☐ HAZARDOUS ☐ NON-HAZARDOUS	DATE RECEIVED 11/15/91	ESTIMATED COST
CUSTOMER P.O. NUMBER	TIME RECEIVED 1:20	DUE DATE

ACCOUNT INFORMATION

CUSTOMER'S NAME Enron / TWPL	CONTACT Lanny C.
ADDRESS	PHONE NUMBER
CITY / STATE / ZIP	

PARTY RESPONSIBLE FOR PAYMENT IF OTHER THAN ABOVE

NAME	CONTACT
ADDRESS	PHONE NUMBER
CITY / STATE / ZIP	

ACCOUNT STATUS

PAYMENT REC'D. ____
OPEN ACCOUNT XX
CASH ____
CHECK NUMBER ____

SPECIAL BILLING INSTRUCTIONS

SAMPLE INFORMATION

TYPE OF SAMPLE	NO. OF SAMPLES	*TURN AROUND TIME	SAMPLE IDENTIFICATION AND / OR SAMPLE SITE
☐ WATER ☒ SOIL ☐ OIL ☐ SLUDGE ☐ OTHER	7 NO. OF CONTAINERS 7	☐ REGULAR (10 WKG DAYS) ☒ RUSH (3 DAYS) ☐ EMERGENCY (STAT) *(SUBJECT TO WORK LOG)	Roswell District

SAMPLE DELIVERED BY ~~X~~ UPS. SIGNATURE DATE 11/15/91

ANALYSIS REQUEST

WORK DESCRIPTION

TRPH. S. BTEX

SPECIAL INSTRUCTIONS

BILLING: ☐ PICKUP ☐ MAIL

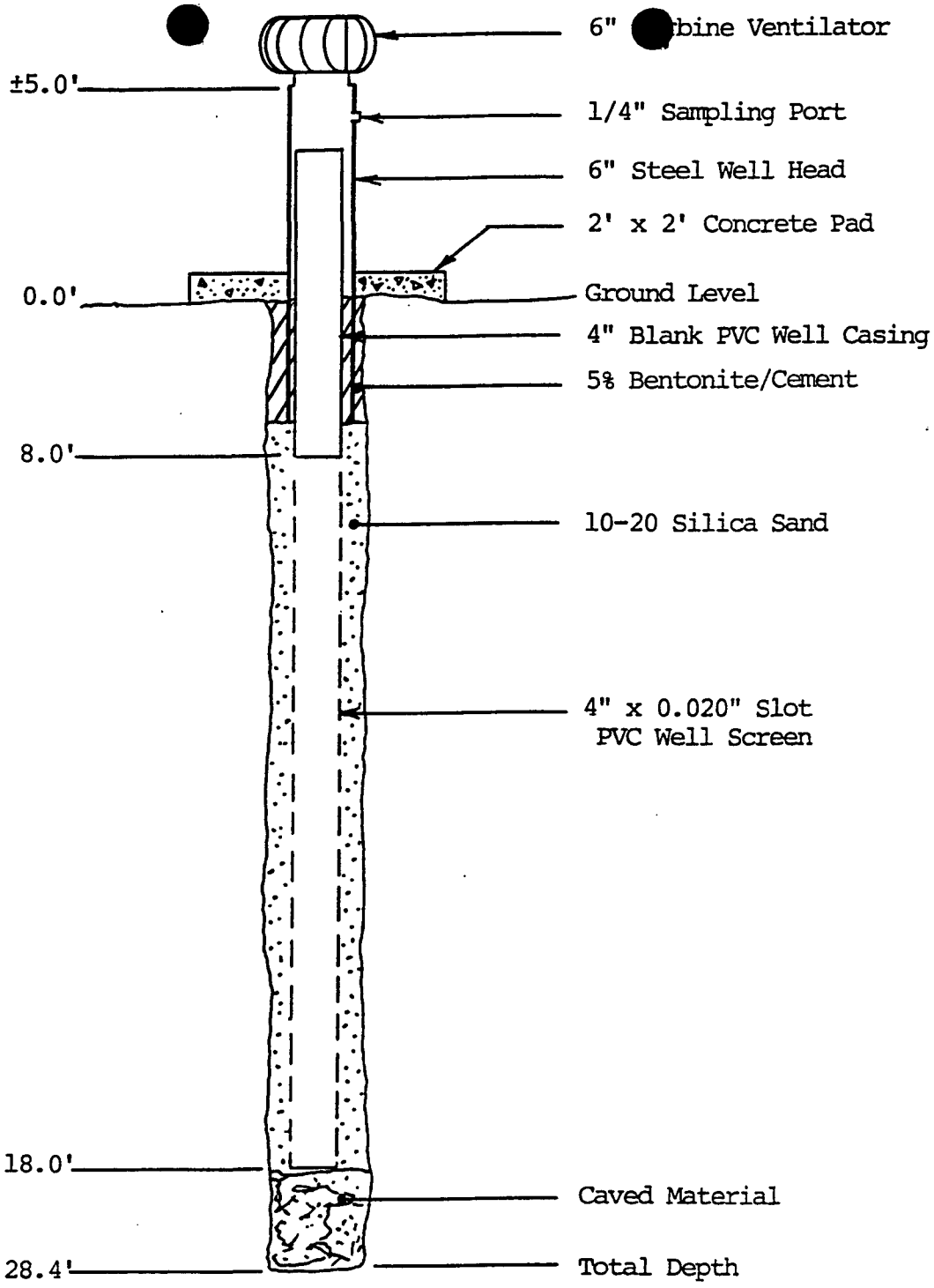
LOGGED IN BY

7300 Jefferson NE • Albuquerque, New Mexico 87109 • (505) 345-8964 • FAX (505) 345-725

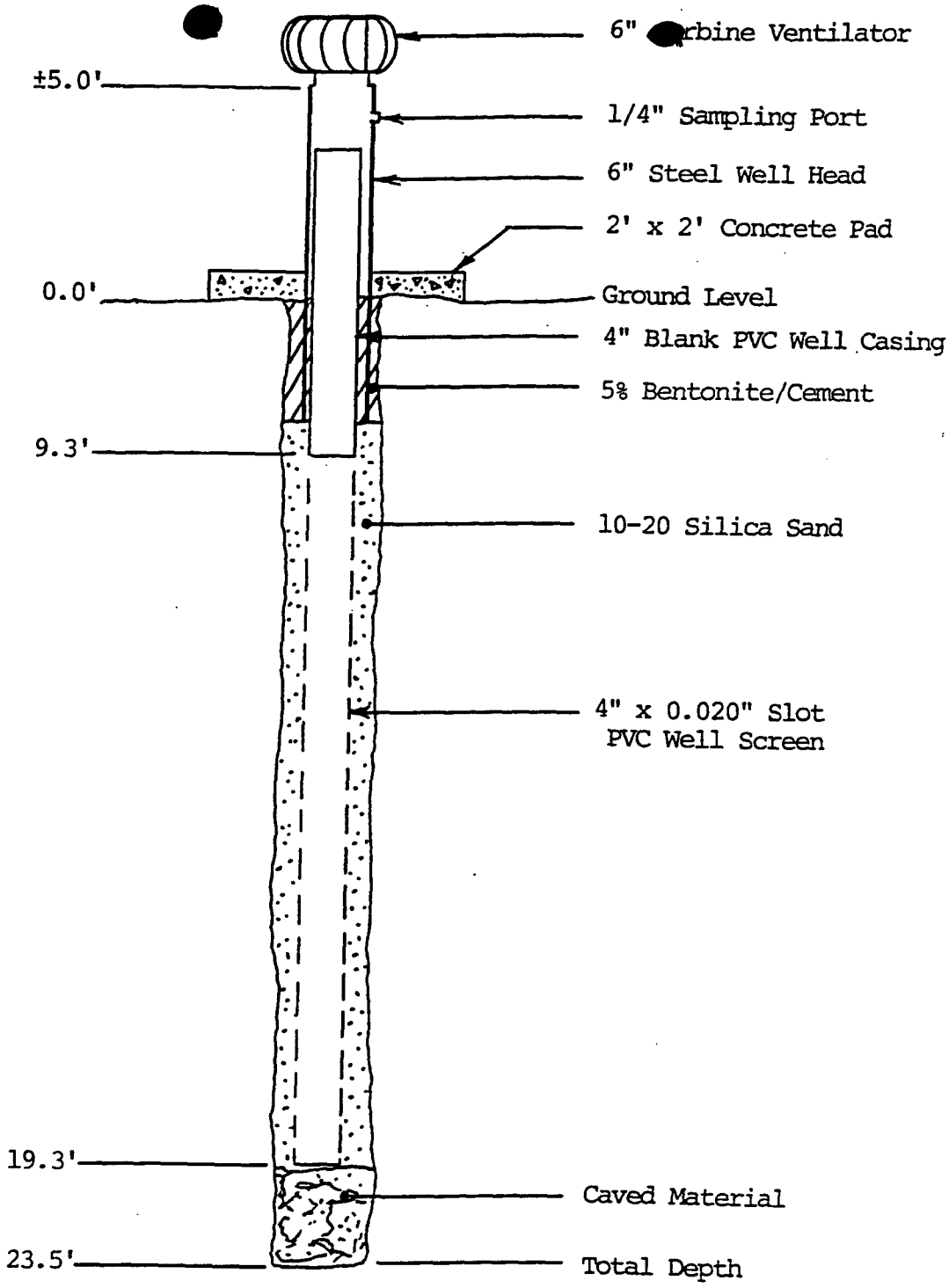
WHITE ORIGINAL YELLOW FILE PINK CUSTOMER

APPENDIX C

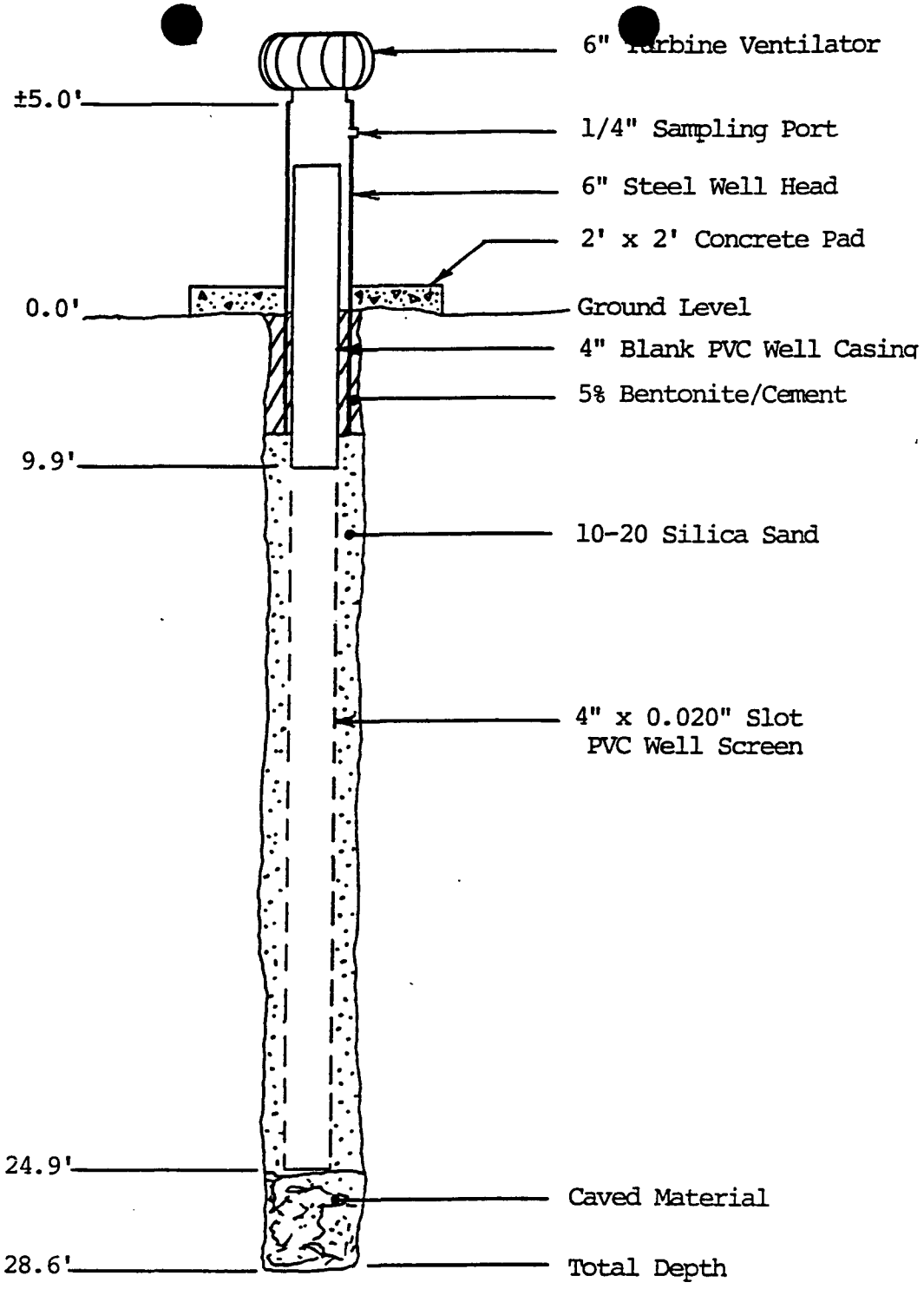
CONSTRUCTION DIAGRAMS



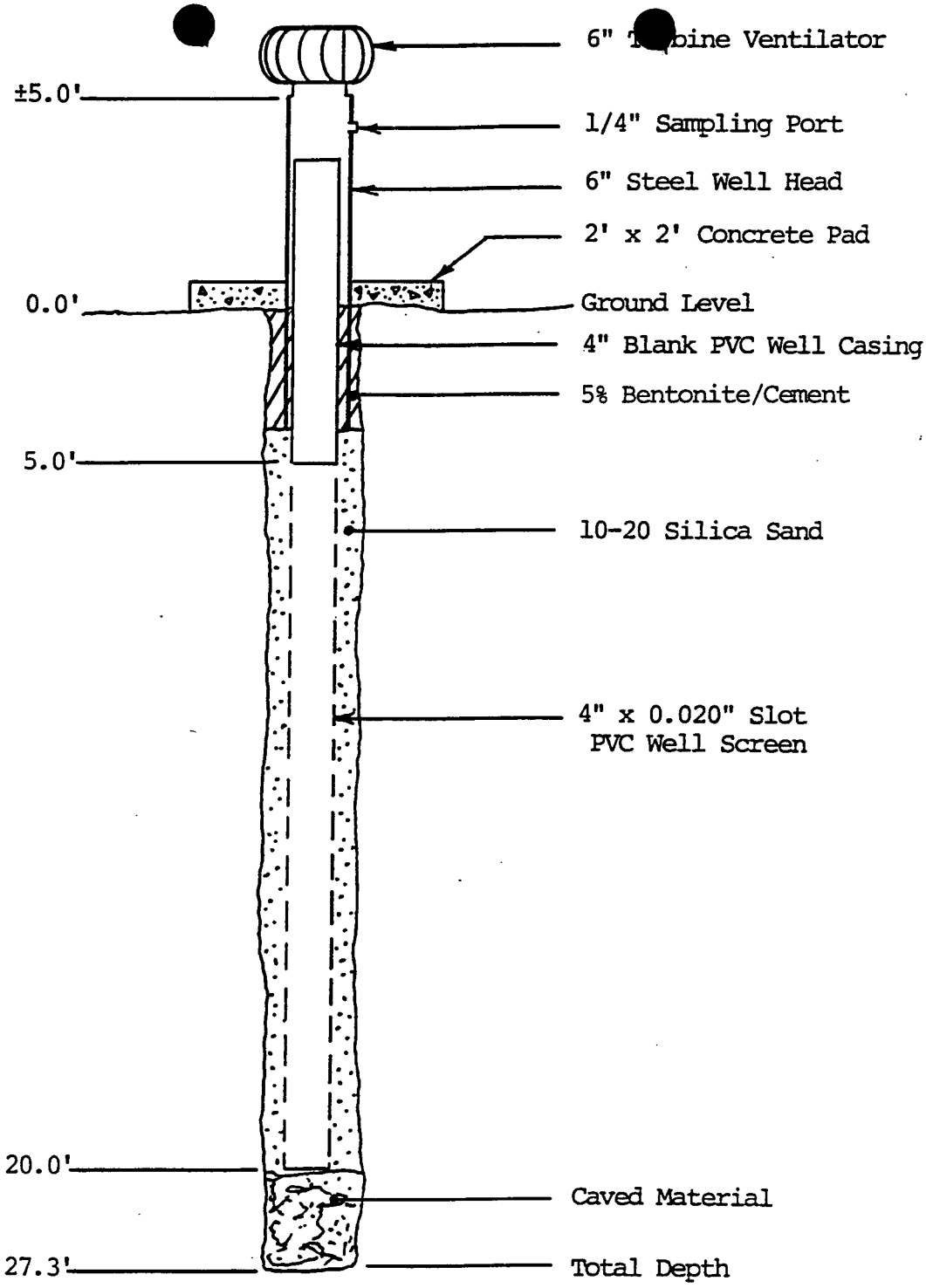
Vent Well
Construction Diagram
VW-1



Vent Well
Construction Diagram
VW-2



Vent Well
Construction Diagram
VW-3



Vent Well
Construction Diagram
VW-4