1R - 452

REPORTS

DATE:

5/18/2005

MAXIM TECHNOLOGIES INC
A MAXIM GROUP COMPANY

1703W. Industrial Ave.
Midland, Texas 79701
(432) 686-8081

May 18, 2005

Mr. Paul Sheeley
New Mexico Oil Conservation Division
1625 N. French Drive
Hobbs, New Mexico 88240

RE: ConocoPhillips Flowline 87
Findings Report
Sec 22, T17S, R32E

Certified Mail
7003 1680 0006 6284 0528

Dear Mr. Sheeley:

Enclosed is a compact disc containing the subject report, and tables, figures and appendices.

Based on the information provided in the report, Maxim requests NMOCD's approval on the recommended remediation action. ConocoPhillips has directed Maxim to commence work on this project immediately following receipt of your notification to proceed. If you have any questions concerning this request please call Mr. Neal Goates (832-379-6427) or me.

Sincerely,

MAXIM TECHNOLOGIES

Charles Durrett
Office Manager

Cc: Mr. Neal Goates, ConocoPhillips (w/o Attachments)
Mr. Ken Andersen, ConocoPhillips (w/o Attachments)
Mr. Chris Williams, NMOCD District I (w/o Attachments)

MAXIM TECHNOLOGIES

1703W. Industrial Ave.
Midland, Texas 79701
(432) 686-8081

April 27, 2005

Mr. Paul Sheeley
New Mexico Oil Conservation Division
1625 N. French Drive
Hobbs, New Mexico 88240

RE: ConocoPhillips Flowline 87
Findings Report
Sec 22, T17S, R32E

Dear Mr. Sheeley:

At the request of ConocoPhillips, Maxim Technologies (Maxim) submits this findings report for the ConocoPhillips Flowline 87 historic release site (site). This work is in support of ConocoPhillips efforts to voluntarily restore areas that may have been damaged by historic work practices in the Maljamar Unit located in Lea County. The site is located below the Mescalero Ridge, approximately 0.9 miles east of the ConocoPhillips MCA Unit office in Lea County, New Mexico (Figure 1; 32° 48.969N, 103° 45.252W). The U.S. Bureau of Land Management (BLM) is the land administrator.

EXPOSURE PATHWAY ANALYSIS

As per the subsurface site assessment characterization protocol outlined in New Mexico Oil Conservation Division's (NMOCD) "*Guidelines for Remediation of Leaks, Spills and Releases,*" dated August 13, 1993 and information provided in this report the site is assigned the following score:

Criteria		Ranking Score
Depth to groundwater	>100 feet	0
Distance from water source	>1000 feet	0
Distance from domestic water source	>200 feet	0
Distance from surface water body	>200 feet	0
Total Ranking Score		0

The remediation action level for a ranking score of 0 is 10 parts per million (ppm) for benzene, 50 ppm for total benzene, toluene, ethylbenzene and total xylenes (BTEX), and 5,000 ppm for total petroleum hydrocarbons (TPH).

SCOPE OF WORK

At the request of ConocoPhillips, Maxim initiated a sub-surface investigation of the historic flowline release site. Maxim advanced three soil borings using a truck mounted air rotary drilling unit at Flowline 87 to find a chloride clean boundary (< 250 ppm). The objective was to find a "clean boundary" in the vertical extent. During the boring process petroleum hydrocarbons were encountered and were also described. The lateral extent of the affected area was defined by the vegetation edge (Figure 2).

The soil samples were chloride field screened using a procedure developed by a U.S. Environmental Protection Agency funded Integrated Petroleum Environmental Consortium brine spill test kit[1]. A photo-ionization detector (PID) was used to detect the presence of volatile organic compound (VOC) vapors in the sample headspace. The borings were logged so that observations concerning soil types, lithologic changes, and the environmental condition of the encountered soils were noted (Appendix A).

Soil samples were taken at 2 foot intervals from 0-10 feet below ground surface (fbgs) and 5 foot intervals at depths > 10 fbgs, and field screened using a chloride field test kit to find the vertical chloride clean boundary (< 250 ppm). Final PID readings were used as final confirmation of bottom residual for a total BTEX reading of 100 ppm or less. Two soil samples from each boring were retained and submitted to the laboratory for analyses. The sampling interval was based on chloride test kit analysis, PID measurement and on the judgment of the field geologist. The soil sample with the highest chloride concentration and/or PID measurement and the sample from the boring total depth were retained for chemical analysis.

Soil samples were placed into laboratory-supplied glass sample jars sealed with Teflon-lined lids, and placed on ice in a cooler for transportation under chain-of-custody to an approved analytical laboratory for analysis for both gasoline (GRO) and diesel range (DRO) hydrocarbons by Method 8015B, BTEX by Method 8260B, percent moisture by Method 160.3, and chloride by Method 300.0A.

All soil cuttings generated by soil boring activities were placed inside the existing affected area.

FINDINGS

Flowline 87 is located in the Querecho Plains of eastern New Mexico. This area generally consists of a thin cover of Quaternary sand dunes overlying the undivided Triassic Upper Chinle Group. The soil consists of well-drained sand and sandy clay loam. Typically, the surface layer is reddish-brown loamy fine sand. It is underlain by red light sandy clay. Below this is white moderately to well-indurated caliche. Underlying the caliche is dark reddish shales and

[1] U.S. Environmental Protection Agency Grant No. R827015-01-1. IPEC Guidelines for Remediation of Small Brine Spills, January 12, 2004. Univ. of Tulsa, OK.

thin sandstones of the undivided Triassic Upper Chinle Group. The Upper Chinle Group consists of silty shale, thin bedded to massive, purplish red to reddish brown with greenish reduction spots. The Group is interbedded with thin beds of fine-grained sandstone with chert pebble gravel.

Soil borings advanced during the investigation at Line 87 encountered moist reddish brown very fine grained loose silty sands from the surface to a depth of approximately 21 to 25 fbgs (Appendix A). These overlying dune sands contained a two-foot thick interbedded caliche layer at a depth of approximately 9 to 17 fbgs. Underlying the upper sands were dry reddish yellow to dark red massive very stiff silty clays. The clays exhibited occasional platy cleavage, traces of mica and crumbly texture (the Red Beds) from approximately 50 fbgs to the maximum boring depth of 68 fbgs.

No information is available from either the New Mexico Office of State Engineer's database or from the United States Geological Survey's *Groundwater Levels for the Nation*, for groundwater in the vicinity of Flowline 87. A one to two-foot thick zone of very moist sand was encountered at the sand-clay contact at approximately 21 – 22 fbgs in soil borings SB-1 and SB-3. However, free liquid was not found in any of the borings.

There are no playas immediately apparent upon inspection of area around the site.

Flowline 87 is found in the Sandhill region of Lea County, New Mexico. Topography in the area around the site is characterized as undulating sand dunes and sandy hummocks. Vegetation is characterized by a mixture of grasses and shrubs with a variety of forbs occurring on an annual basis depending on the level of precipitation, which is between 10- to 12-inches per year on average. Land use in this rural area is primarily livestock grazing and oil / gas production. Secondary, unpaved roads provide access and are associated with oil and gas development.

A summary of subsurface soil conditions is presented in Tables 1 and 2 and on boring logs (Appendix A). A complete analytical report is presented in Appendix B.

Field screening data for chloride and volatile organics (Table 1) were used to define the vertical extent of affected soil. The lateral extent of the affected area was defined by the vegetation edge (Figure 2).

Chloride concentrations in the soils were reported at detectable concentrations in samples collected from all three borings (Appendix A). Surface and near-surface soil (0-10 fbgs) was found to be below 200 ppm when field screened for chloride concentrations (Table 1). Boring SB-1 was extended into the Red Beds to a depth of 68 fbgs to describe chloride concentrations at depth. Chloride concentrations in SB-1 ranged from > 2500 mg/kg at sampling interval 30-32 fbgs to 0 mg/kg at sampling interval 0.0.5 fbgs. The bottom (total depth) chloride concentration in SB-1 was 250 mg/kg at 68 fbgs. Laboratory analysis indicated chloride concentrations at depths greater than 10 fbgs were found in:

- SB-1, 2,330 milligrams per kilometer (mg/kg) at 30-32 fbgs,
- SB-2, 3,510 and 2,130 mg/km at 20-22 and 23-25 fbgs, respectively, and
- SB-3, 1,910 mg/kg at 23-25 fbgs.

PID readings in the site soils are presented in Table 1 and recorded on field logs (Appendix A). All sampling locations had measurable concentrations of VOCs above non-detect using the PID. However, only SB-1 and -3 had readings above (>) 100 parts per million (ppm). PID readings > 100 ppm were recorded at SB-1 down to 17 fbgs while SB-3 had recorded readings > 100 ppm down to 2 fbgs.

The concentrations of TPH constituents were present in all borings (Table 2). Only boring SB-1 had TPH concentrations above the regulatory action level of 5,000 mg/kg. DRO concentrations ranged from 9,100 mg/kg at 4-6 fbgs sampling interval to 230 mg/kg at 20-22 fbgs sample interval in SB-1. Also in boring SB-1, a GRO concentration of 564 mg/kg was found in the 4-6 fbgs sampling interval.

BTEX data are presented in Table 2. BTEX was detected in all borings below regulatory action levels.

CONCLUSIONS

According to laboratory analysis of soils collected during this investigation, the petroleum hydrocarbons were reported in all three borings. Free liquid was not observed in any of the borings. Based on the risk-based ranking criteria presented in the NMOCD *Guidelines for Remediation of Leaks, Spills and Releases*, and groundwater information gathered in this investigation, a total ranking score of 0 is applicable for the site. Therefore, the site-specific remediation levels through laboratory analysis are 5,000 mg/kg for TPH, 50 mg/kg for BTEX and 10 mg/kg for benzene. Based on the results presented in Table 2, the impacts to soil within the area sampled are above the NMOCD action level for TPH only in boring SB-1.

RECOMMENDATIONS

Maxim recommends the following actions to be taken at Flowline 87:

- Soil in the area of SB-1 will be excavated to remove the most highly impacted soils. This soil will be hauled to a State approved disposal facility.

- The excavated area will be TPH field screened using a PetroFLAG System to determine when petroleum hydrocarbon affected soil has been successfully removed (USEPA,

2001[2]). Aliquot soil samples will be collected in a "W" pattern, composited into one sample for each sidewall and floor, and field analyzed using a PID and PetroFLAG to determine that remediation levels have been achieved. Companion composite samples will also be submitted at a laboratory for TPH (DRO, GRO) confirmation that hydrocarbons have been removed. [NOTE: The PetroFLAG System is a field measurement device capable of providing quantitative TPH measurement results based on emulsion turbidimetry. The U.S Environmental Protection Agency (2001) evaluated the system and found it to exhibit the following desirable field measurement device characteristics: 1. good precision, 2. lack of sensitivity to interferents that are not petroleum hydrocarbons, 3, low measurement costs, and 4. ease of use. Based on action level conclusions and statistical correlations, USEPA found the results compared well with those of the reference method (8015B GRO, DRO); however, the device exhibited a high bias.]

- The excavated area will be backfilled with clean material of similar soil type.

- Maxim will supervise and direct all subcontractor activities, and following the construction activities, prepare a report describing and documenting what was done for closure activities at the site, including a site map. This report on activities and results will be submitted for NMOCD's review and ultimate closure of this voluntary remediation.

Based on the above information, Maxim requests NMOCD's approval on the recommended remediation action. ConocoPhillips has directed Maxim to commence work on this project immediately following receipt of your notification to proceed. If you have any questions concerning this request please call Mr. Neal Goates (832-379-6427) or me.

Sincerely,

MAXIM TECHNOLOGIES

Charles Durrett

Digitally signed by Charles Durrett
DN: CN = Charles Durrett, C = US, O = Maxim Technologies, Inc.
Date: 2005.04.27 07:42:02 -05'00'

Charles Durrett
Office Manager

Cc: Mr. Neal Goates, ConocoPhillips
Mr. Ken Andersen, ConocoPhillips
Mr. Paul Evans US Bureau of Land Management
Mr. Chris Williams, NMOCD District I

[2] U.S. Environmental Protection Agency, 2001. Innovative Technology Verification Report, Dexsil Corporation PetroFLAG™ System. Prepared by Tetra Tech EM Inc. for USEPA National Exposure Research Laboratory Office of Research and Development. EPA/R-01/092.

Table 1
ConocoPhillips
MCA Flowline 87 Soil Field Analysis
March 28-30, 2005

Sample Depth (ft)	VOC Reading (ppm) By Location			Field Chloride Concentration (mg/kg) By Location		
	SB-1	SB-2	SB-3	SB-1	SB-2	SB-3
0-0.5	113	68	166	0	25	0
0.5-2	229	32	180	10	50	50
2-4	409	10.4	77	75	25	75
4-6	425	48.3	81.2	75	150	25
6-8	285	1.8	3.9	20	100	50
8-10	236	0.8	1.3	20	150	25
10-15	95.5			225		
15-17	112	0.4	4.3	300	1750	75
17-20	13.6			800		
20-22	37.2	1.2	8.5	1500	>2500	500

ppm = parts per million VOC = Volatile Organic Compounds

mg/kg = milligrams per kilogram

> = greater than

Table 2
ConocoPhillips
MCA Flowline 87 Soil Lab Analysis
March 28-30, 2005

Boring No.	Sample Interval	VOC (ppm)	Field Chlorides (ppm)	Parameter (mg/kg)							
				DRO	GRO	Benzene	Ethylbenzene	Toluene	Total Xylenes	Chloride	% Moisture
SB-1	4 - 6'	425	75	9100	564	0.012	0.016	0.014	0.049	*	8.49
	20 - 22'	37.2	1500	230	1.04	0.001	0.002	0.002	0.005	*	14.20
	30 - 32'	3.8	>2500	*	*	*	*	*	*	2330	19.00
	63 - 68'	11.3	250	*	*	*	*	*	*	100	9.86
SB-2	4 - 6'	48.3	150	21	1.21	0.001	0.001	0.001	0.005	*	6.77
	20 - 22'	1.2	>2500	*	*	*	*	*	*	3510	13.90
	23 - 25'	0.6	1000	15	0.05	0.001	0.002	0.002	0.005	2130	15.20
SB-3	0.5 - 2'	180	50	640	5.24	0.001	0.002	0.002	0.005	*	15.20
	20 - 22'	8.5	500	*	*	*	*	*	*	149	13.20
	23 - 25'	2.3	1250	1.5	0.05	0.001	0.002	0.002	0.005	1910	15.10

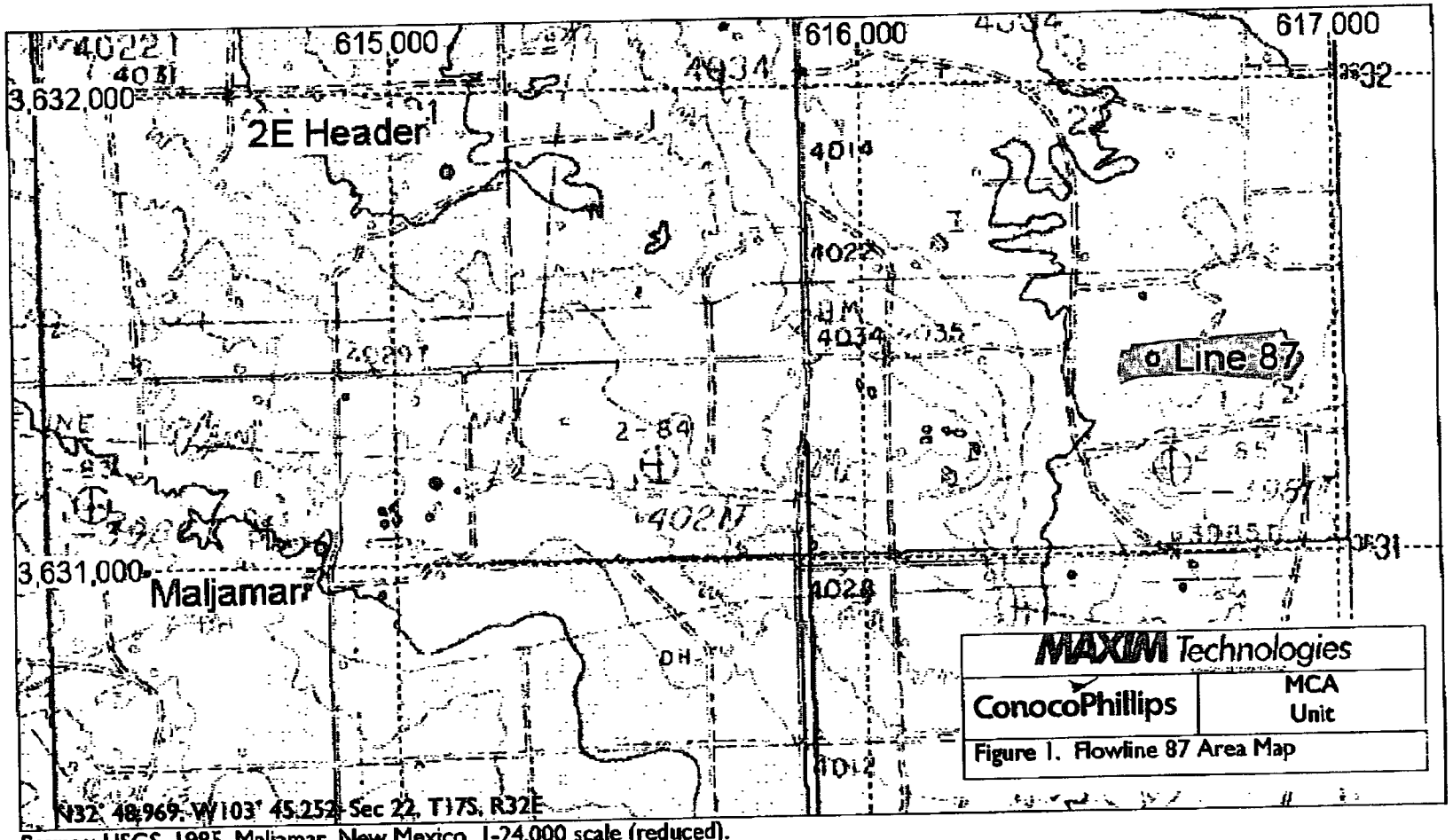
mg/kg = milligrams per kilogram

ppm = parts per million

% = percent

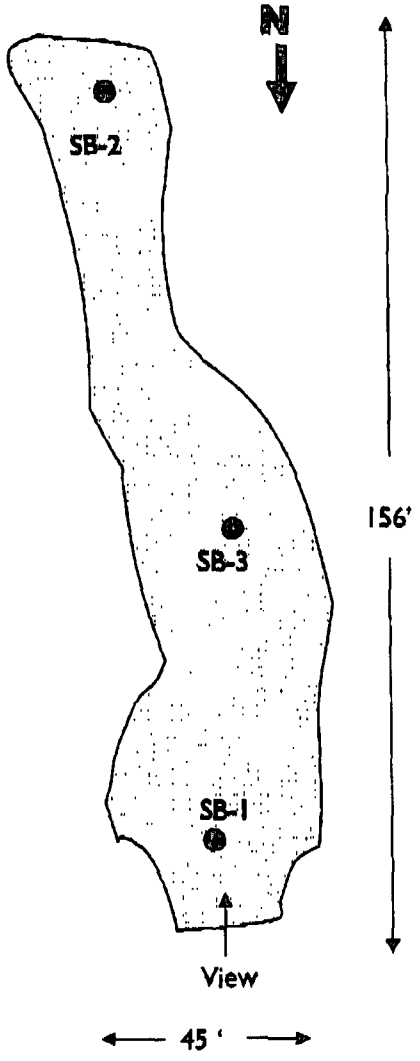
VOC Volatile Organic Compounds

* Samples analyzed only at highest field test and bottom depth readings



Source: USGS, 1985. Maljamar, New Mexico. 1-24,000 scale (reduced).

ConocoPhillips MCA Flowline 87



View: Due south

MAXIM Technologies	
ConocoPhillips	MCA Unit
Figure 2. Flowline 87 Historic Release Area	

Soil Boring/Monitoring Well Log

Client ConocoPhillips
Location Flowline 87
Boring/Well No. SB-1
Surface Elevation N/A
Dates Drilled 03-29-05 - 03-30-05
Logged By Greg W. Pope
Weather Warm, clear with strong wind

Project No. 5640009
Driller Layne Scarborough
Drilling Co. Scarborough Drlg
Boring Dia. 5.25 in.
Fluids used Air
Depth to Water N/A

Site Map

Description	Interval	PID	Chlorides
Sand, silty (SM), yellowish red (5YR 5/6), v. fine grained, v. moist, loose, discolored dk. grey - black, strong hydrocarbon odor. PetroFlag - >35,000	0 - 0.5	113	0
	0.5 - 2	229	10
	2 - 4	409	75
	4 - 6	425	75
at 7 feet, no discoloration	6 - 8	285	20
	8 - 10	236	20
	10 - 15	95.5	225
	15 - 17	112	300
Caliche, clayey, sl. sandy, lt.yel/brn - v. pale brn (10YR 6/4-6/2), moist, soft-firm, sl. plastic in part, v. fine sand, hydrocarbon odor.	17 - 20	13.8	800
Sand, silty (SM), moist, v. fine, pale brown (10YR 6/3), loose, sl. odor, calcareous.	20 - 22	37.2	1500
	22 - 25	10.2	1600
Clay, silty (CL), red (10R 4/6), dry, crumbly, massive, trace black organics, trace v. fine sand, moderately plastic, mod. calcareous, v. stiff.	25 - 27	11.5	2200
	27 - 30	7.4	900
	30 - 32	3.8	>2500
	32 - 35	18.9	1300
at 37 feet, clay becomes weak red (10YR 4/6), v. crumbly, some grey mottling, v. dry.	35 - 37	1.9	250

MAXIM Technologies

Soil Boring/Monitoring Well Log

Client ConocoPhillips
Location Flowline 87
Boring/Well No. SB-1
Surface Elevation N/A
Dates Drilled 03-29-05 - 03-30-05
Logged By Greg W. Pope
Weather Warm, clear with strong wind

Project No. 5640009
Driller Layne Scarborough
Drilling Co. Scarborough Drlg
Boring Dia. 5.25 in.
Fluids used Air
Depth to Water N/A

Site Map

Description	Interval	PID	Graphic	Chlorides
	37 - 42	5.0		1000
	42 - 43	7.2		1300
Clay (CL), dk. red (2.5YR 4/6), dry, very stiff, platy, massive, trace grey mottling, some silt, non-calcareous, slight hydrocarbon odor.				
	43 - 48	16.8		1400
at 49 feet, trace mica.				
	48 - 53			1250
at 54 feet, increase to occasional mica.				
	53 - 58			500
at 63 feet, decrease to trace mica.	58 - 63	10.1		275
	63 - 68	11.3		250
T.D. @ 68 feet, no groundwater. Backfill with bentonite pellets.				

MAXIM Technologies

Soil Boring/Monitoring Well Log

Client ConocoPhillips
Location Flowline 87
Boring/Well No. SB-2
Surface Elevation N/A
Dates Drilled 03-30-05
Logged By Jason M. Graham
Weather Warm, clear with strong wind

Project No. 5640009
Driller Layne Scarborough
Drilling Co. Scarborough Drlg
Boring Dia. 5.25 in.
Fluids used Air
Depth to Water N/A

Site Map

Description	Interval	PID	Graphic	Chlorides
	0 - 0.5	68		25
	0.5 - 2	32		50
	2 - 4	10.4		25
Sand, silty (SM), no odor, soft-firm, yellowish-brown (10YR 5/6), moist, caliche bed.	4 - 6	48		150
	6 - 8	1.8		100
Sand, w/ caliche, (SM), moist, soft, brownish-yellow (10 YR 6/6), soft-firm.	8 - 10	0.8		150
Sand (SW), very pale brown (10YR 7/3), no odor, soft-firm, moist.	15 - 17	0.4		1750
Clay w/ caliche stringers, silty (CL), black organics, yellowish-red (5YR 5/6), no odor, sl. moist.	20 - 22	1.2		>2500
Clay, silty (CL), red (10R 4/6), dry, crumbly, massive, v. stiff, trace organics.	23 - 25	0.6		1000
T.D @ 25 feet, no groundwater. Backfill with bentonite pellets.				

MAXIM Technologies

Soil Boring/Monitoring Well Log

Client ConocoPhillips
Location Flowline 87
Boring/Well No. SB-3
Surface Elevation N/A
Dates Drilled 03-30-2005
Logged By Jason M. Graham
Weather Cool, Sunny and variable wind

Project No. 5640009
Driller Layne Scarborough
Drilling Co. Scarborough Drlg.
Boring Dia. 5.25 in.
Fluids used Air
Depth to Water N/A

Site Map

Description	Interval	PID	Graphic	Chlorides
	0 - 0.5	166		0
	0.5 - 2	180		50
	2 - 4	77		75
Sand, silty (SM), no odor, soft-firm, moist, reddish yellow (7.5YR 6/6).	4 - 6	81.2		25
	6 - 8	3.9		50
Sand, silty (SM), no odor, soft-firm, moist, brownish yellow (10YR 6/6).	8 - 10	1.3		25
Sand, silty (SW), loose, moist, no odor, very pale brown (10YR 7/3).	15 - 17	4.3		75
Wet - moist above contact.				
Clay, sl. sandy (CL), reddish yellow (7.5YR 6/8), soft-firm, sl. plastic in part.	20 - 22	8.5		500
Clay (CL), tr. yellowish grey mottling, dry, very stiff, massive, weak red (10R 4/4).	23 - 25	2.3		1250
T.D. @ 25 feet, no groundwater. Backfill with bentonite pellets.				

MAXIM Technologies

Page 1 of 1