GW - 1

WORK PLANS

2004

GIANT
REFINING COMPANY

2004 DEC 3 PM 12 48

November 24, 2004

Mr. Wayne Price
New Mexico Oil Conservation Division
1220 S. Saint Francis Drive
Santa Fe, New Mexico 87505

Re: Giant Bloomfield Refinery – River Terrace Sheet Pile Area

Dear Mr. Price:

As a follow up to our letter dated October 27, 2004, Giant is submitting this letter report summarizing the field investigation performed in the river terrace sheet-pile area at the Bloomfield facility.

The purpose of the investigation was to 1) install two new monitoring wells at the river terrace to supplement the two existing piezometers currently used for water quality monitoring and 2) evaluate the presence and extent of fuel hydrocarbons in groundwater on the refinery side of the sheet-pile barrier. The investigation resulted from Giant's meeting with NMOCD in Santa Fe, New Mexico on October 18, 2004.

Field Investigation Activities

The investigation involved the installation of eight temporary well points (TP-1 through TP-8) and two permanent wells (MW-48 and MW-49). Precision Engineering from Las Cruces, New Mexico installed the well points and monitoring wells on October 27 and October 28, 2004 using a hollow-stem auger drill rig. The location of the eight well points and the two wells are shown on Figure 1. Logs of the well points and monitoring wells are attached in Appendix A.

The well points were constructed using two-inch diameter hand-slotted PVC casing placed approximately five feet below the water table. The two monitoring wells were constructed with four-inch diameter PVC well casing and ten feet of 0.020-inch machine slotted screen. All the well screens intersect the water table.

Soil samples were collected from Wells MW-48 and MW-49 and were submitted to Hall Environmental Analysis Laboratory for analysis for the following parameters:

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505-632-8013
FAX
505-632-3911

50 ROAD 4990
P.O. BOX 159
BLOOMFIELD
NEW MEXICO
87413

- Total Petroleum Hydrocarbons - Diesel and Motor Oil Range Organics (DRO & MRO) by EPA Modified Method 8015B,
- Total Petroleum Hydrocarbons - Gasoline Range Organics (GRO) by EPA Modified Method 8015B, and
- Volatile Organic Compounds by EPA Method 8260B.

Following the installation and development of the well points and wells, Giant collected groundwater samples from them on October 28 and November 1, 2004. The samples were submitted to Hall Environmental Analysis Laboratory for analysis. Groundwater samples collected from the temporary well points were analyzed for the following parameters:

- Total Petroleum Hydrocarbons - Diesel and Motor Oil Range Organics (DRO & MRO) by EPA Modified Method 8015B
- Total Petroleum Hydrocarbons - Gasoline Range Organics (GRO) by EPA Modified Method 8015B
- Volatile Organic Compounds by EPA Method 8021B

Groundwater samples collected from MW-48 and MW-49 were analyzed for the following parameters:

- Total Petroleum Hydrocarbons - Diesel and Motor Oil Range Organics (DRO & MRO) by EPA Modified Method 8015B
- Total Petroleum Hydrocarbons - Gasoline Range Organics (GRO) by EPA Modified Method 8015B
- Volatile Organic Compounds by EPA Method 8260B
- Anions (Fluoride, Chloride, Nitrite, Nitrate, Phosphorus, Sulfate) by EPA Method 300.0
- Polynuclear Aromatic Hydrocarbons by EPA Method 8310
- Specific Conductance by EPA Method 120.1
- Mercury by EPA Method 7470
- Dissolved Metals by EPA Method 6010C
- Total Recoverable Metals by EPA Method 6010C
- pH by EPA Method 150.1
- Total Dissolved Solids by EPA Method 160.1

A summary of the fuel hydrocarbon results from each well are presented on Figure 2. All soil and groundwater analytical results obtained from this investigation are presented in Table 1.

Preliminary Data Review

On the refinery side of the sheet-pile barrier, the groundwater sampling results indicate fuel hydrocarbon contamination extends from the barrier to the east to temporary well point TP-4. Fuel hydrocarbons were also reported in well point TP-3, the farthest east well point. but the concentrations were low compared to the results closer to the barrier. For example, benzene was detected in TP-3, but the concentration was below 5 ug/L. The highest BTEX concentrations were reported near the barrier in TP-1, TP-8, and MW-48.

Comparing the groundwater sampling results from well MW-49 (river side of barrier) to those from MW-48, fuel hydrocarbons were reported to be significantly lower on the river side of the barrier. For example, the benzene and toluene concentrations in MW-49 were reported below the laboratory detection limit of 10 ug/L. Ethylbenzene and xylenes were detected, but were reported at concentrations approximately two orders of magnitude less than reported in well MW-48. These data indicate the sheet-pile wall is acting as a significant barrier against fuel hydrocarbon migration to the river.

Low concentrations of diesel and gasoline-range organics were reported in the soil samples taken from monitoring wells MW-48 and MW-49. The depth of occurrence appears to be similar in both locations, suggesting the existence of these hydrocarbons in the soil predates the barrier installation. The concentrations reported in the soil samples from MW-49 (river side of barrier) are generally one-half those reported from MW-48.

Proposed Additional Activities

Based on the results of this investigation, we recommend the following activities:

1) Conduct a 24-hour aquifer test on well MW-48 to evaluate aquifer properties. Monitor drawdown in the monitoring wells MW-48 and MW-49, and selected well points surrounding MW-48. Collect groundwater samples in MW-48 and MW-49 during the test.
2) Complete a capture zone analysis and estimate the number of extraction wells and related pumping rates that would be needed to control the impacted groundwater on the refinery side of the barrier and further mitigate migration of hydrocarbons to the San Juan River. The effectiveness of implementing a pumping approach will then be evaluated as part of a feasibility study of alternatives.
3) It appears the extent of groundwater impacts has not been fully delineated along the San Juan River upstream of the barrier and east of TP-3. As such, install additional temporary well points in these locations
4) Sample wells MW-48 and MW-49 on a monthly schedule to evaluate water quality trends. The wells will be sampled for TPH (GRO), BTEX, and PAHs.
5) Conduct a feasibility study to evaluate alternatives for reducing fuel hydrocarbon concentrations in the shallow aquifer beneath the river terrace.
6) Submit the feasibility study to NMOCD for approval.

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6) Submit the feasibility study to NMOCD for approval.

Giant anticipates the aquifer test will be performed in early December 2004. Following analysis of the data obtained, the feasibility study will be conducted to identify an approach to reduce the concentrations of fuel hydrocarbons on the refinery side of the barrier and further mitigate fuel hydrocarbon migration to the river. Giant anticipates submitting a feasibility study report, which will include the aquifer test results, to NMOCD by mid-January 2005. Installation of the additional temporary well points will occur in parallel with the feasibility study, and the results of that work will be reported to NMOCD within two weeks of receiving laboratory results.

If you have any questions in this matter, please contact me at 505-632-4171.

Sincerely,

GIANT REFINING COMPANY

James R. Schmaltz
Environmental Manager

Cc: Denny Foust - OCD Aztec Office
Hope Monzeglio/Dave Cobrain – NMED Hazardous Waste Bureau
Bob Wilkinson – EPA
Ed Riege
Chad King

Giant Bloomfield Refinery

Figure 1: River Terrace Barrier Sampling Locations

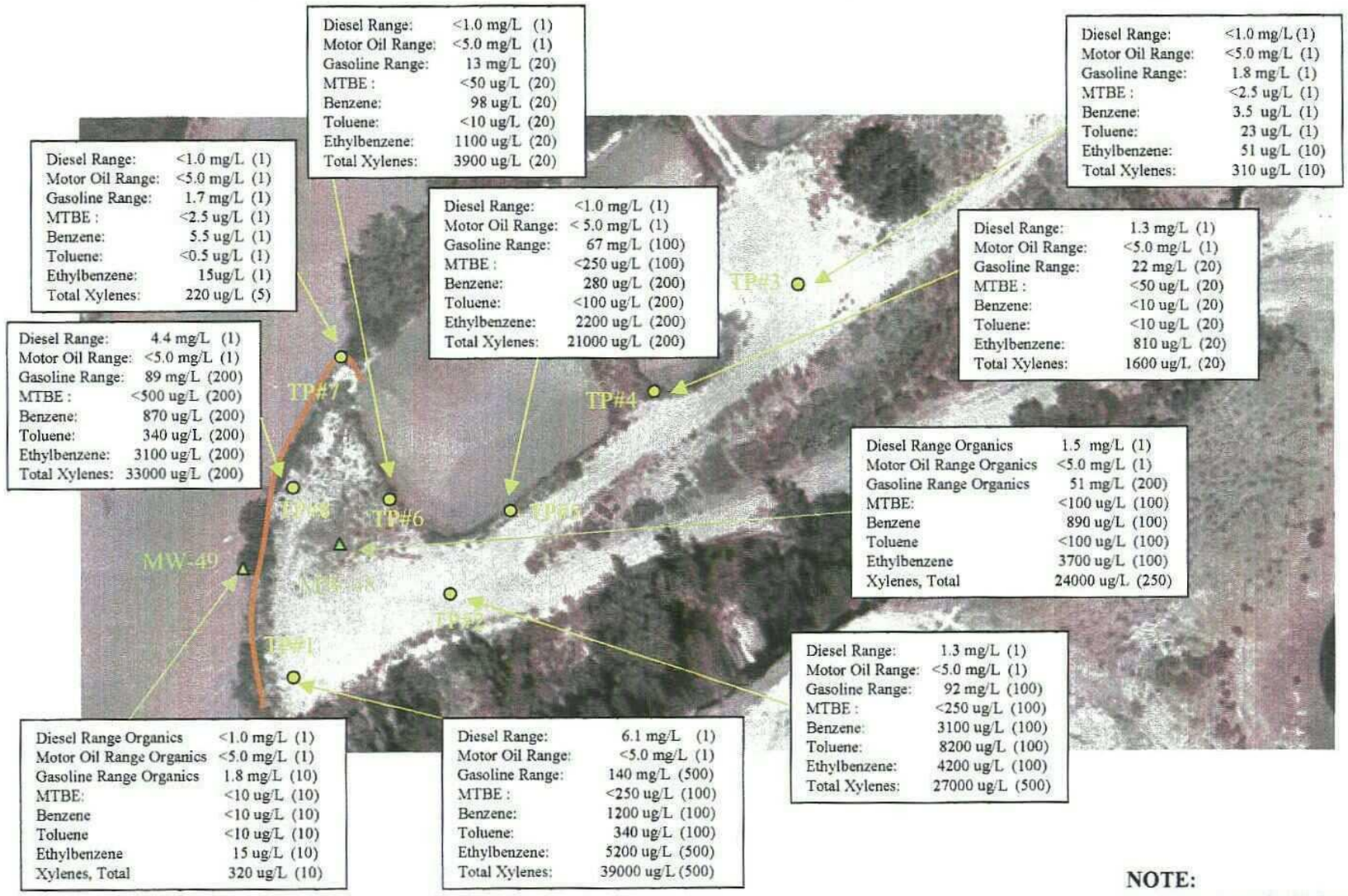
△ = Monitoring Well Location

○ = Temporary Well Point Location

— = Existing Barrier Alignment

Giant Bloomfield Refinery

Figure 2: River Terrace Groundwater Sample Results – Fuel Hydrocarbons



NOTE:
(#) = Number of Dilutions

Giant Refinery

	GROUNDWATER ANALYTICAL RESULTS																				SOIL ANALYTICAL RESULTS											
	MW-49 (River Side)		MW-48 (Plant Side)		TP#1		TP#2		TP#3		TP#4		TP#5		TP#6		TP#7		TP#8		MW-48 (5' - 6.5') (1)		MW-48 (10' - 11.5') (1)		MW-48 (Total Depth) (1)		MW-49 (5' - 6.5') (1)		MW-49 (10'-11.5') (1)		MW-49 (15'-116.5') (1)	
	Collected 11/1/04	DF	Collected 11/1/04	DF	10/28/2004	DF	10/28/2004	DF	10/28/2004	DF	10/28/2004	DF	10/28/2004	DF	10/28/2004	DF	10/28/2004	DF	10/28/2004	DF	Collected 11/1/04	DF	Collected 11/1/0[illegible]	DF	Collected 11/1/04	DF	Collected 10/28/04	DF	Collected 10/28/04	DF	Collected 10/28/04	DF
EPA METHOD 30[illegible]: ANIONS																																
Fluoride	0.48 mg/L	(1)	[illegible]	(1)	NS —	—	NS —	—	NS [illegible]	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—
Chloride	130 mg/L	(10)	12[illegible] mg/L	(10)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—
Nitrogen, Nitrite (As N)	<0.10 mg/L	(1)	<0.10 mg/L	(1)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—
Nitrogen, Nitrate (As N)	<0.10 mg/L	(1)	<0.10 mg/L	(1)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—
Phosphorus, Orthophosphate (As P)	<0.50 mg/L	(1)	<0.50 mg/L	(1)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—
Sulfate	280 mg/L	(10)	250 mg/L	(10)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—
EPA METHOD 8015B: DIESEL RANGE																																
Diesel Range Organics	<1.0 mg/L	(1)	1.5 mg/L	(1)	6.1 mg/L	(1)	1.3 mg/L	(1)	<1.0 mg/L	(1)	1.3 mg/L	(1)	<1.0 mg/L	(1)	<1.0 mg/L	(1)	<1.0 mg/L	(1)	4.4 mg/L	(1)	140 mg/kg	(1)	<10 mg/kg	(1)	<10 mg/kg	(1)	39 mg/kg	(1)	<10 mg/kg	(1)	<10 mg/kg	(1)
Motor Oil Range Organics	<5.0 mg/L	(1)	<5.0 mg/L	(1)	<5.0 mg/L	(1)	<5.0 mg/L	(1)	<5.0 mg/L	(1)	<5.0 mg/L	(1)	<5.0 mg/L	(1)	<5.0 mg/L	(1)	<5.0 mg/L	(1)	<5.0 mg/L	(1)	<50 mg/kg	(1)	<50 mg/kg	(1)	<50 mg/kg	(1)	<50 mg/kg	(1)	<50 mg/kg	(1)	<50 mg/kg	(1)
EPA METHOD 8015B: GASOLINE RANGE																																
Gasoline Range Organics	1.8 mg/L	(10)	51 mg/L	(200)	140 mg/L	(500)	92 mg/L	(100)	1.8 mg/L	(1)	22 mg/L	(20)	67 mg/L	(100)	13 mg/L	(20)	1.7 mg/L	(1)	89 mg/L	(200)	1500 mg/kg	(50)	55 mg/kg	(2)	20 mg/kg	(2)	550 mg/kg	(5)	110 mg/kg	(1)	<5.0 mg/kg	(1)
EPA METHOD 8021B: VOLATILES																																
Methyl tert-butyl ether (MTBE)	NS —	—	NS —	—	<250 ug/L	(100)	<250 ug/L	(100)	<2.5 ug/L	(1)	<50 ug/L	(20)	<250 ug/L	(100)	<50 ug/L	(20)	<2.5 ug/L	(1)	<500 ug/L	(200)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—
Benzene	NS —	—	NS —	—	1200 ug/L	(100)	3100 ug/L	(100)	3.5 ug/L	(1)	<10 ug/L	(20)	280 ug/L	(200)	98 ug/L	(20)	5.5 ug/L	(1)	870 ug/L	(200)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—
Toluene	NS —	—	NS —	—	340 ug/L	(100)	8200 ug/L	(100)	23 ug/L	(1)	<10 ug/L	(20)	<100 ug/L	(200)	<10 ug/L	(20)	<0.50 ug/L	(1)	340 ug/L	(200)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—
Ethlbenzene	NS —	—	NS —	—	5200 ug/L	(500)	4200 ug/L	(100)	51 ug/L	(10)	810 ug/L	(20)	2200 ug/L	(200)	1100 ug/L	(20)	15 ug/L	(1)	3100 ug/L	(200)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—
Xylenes, Total	NS —	—	NS —	—	39000 ug/L	(500)	27000 ug/L	(500)	310 ug/L	(10)	1600 ug/L	(20)	21000 ug/L	(200)	3900 ug/L	(20)	220 ug/L	(5)	33000 ug/L	(200)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—
EPA METHOD 8260B: VOLATILES																																
Benzene	<10 ug/L	(10)	890 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
Toluene	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
Ethylbenzene	15 ug/L	(10)	3700 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	6.9 mg/kg	(20)	0.7 mg/kg	(1)	0.12 mg/kg	(1)	0.35 mg/kg	(5)	0.13 mg/kg	(1)	<0.05 mg/kg	(1)
Methyl tert-butyl ether (MTBE)	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
1,2,4-Trimethylbenzene	370 ug/L	(10)	7300 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	85 mg/kg	(20)	2.6 mg/kg	(1)	1.1 mg/kg	(1)	42 mg/kg	(20)	9.1 mg/kg	(1)	<0.05 mg/kg	(1)
1,3,5-Trimethylbenzene	72 ug/L	(10)	2000 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	30 mg/kg	(20)	0.75 mg/kg	(1)	0.3 mg/kg	(1)	1.1 mg/kg	(5)	1.1 mg/kg	(1)	<0.05 mg/kg	(1)
1,2-Dichloroethande (EDC)	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
1,2-Dibromoethane (EDB)	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
Naphthalene	39 ug/L	(10)	1300 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	14 mg/kg	(20)	0.24 mg/kg	(1)	0.16 mg/kg	(1)	0.9 mg/kg	(5)	0.45 mg/kg	(1)	<0.10 mg/kg	(1)
1-Methylnaphthalene	<40 ug/L	(10)	<400 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	10 mg/kg	(20)	<0.20 mg/kg	(1)	<0.20 mg/kg	(1)	4.3 mg/kg	(5)	0.62 mg/kg	(1)	<0.20 mg/kg	(1)
2-Methylnaphalene	<40 ug/L	(10)	560 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	18 mg/kg	(20)	0.27 mg/kg	(1)	0.2 mg/kg	(1)	<1.0 mg/kg	(5)	0.49 mg/kg	(1)	<0.20 mg/kg	(1)
Acetone	<100 ug/L	(10)	<1000 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<40 mg/kg	(20)	<0.20 mg/kg	(1)	<0.20 mg/kg	(1)	<10 mg/kg	(5)	<0.20 mg/kg	(1)	<2.0 mg/kg	(1)
Bromobenzene	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
Bromochlormethane	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
Bromodichloromethane	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
Bromoform	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
Bromomethane	<20 ug/L	(10)	<200 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<2.0 mg/kg	(20)	<0.10 mg/kg	(1)	<0.10 mg/kg	(1)	<0.50 mg/kg	(5)	<0.10 mg/kg	(1)	<0.10 mg/kg	(1)
2-Butanone	<100 ug/L	(10)	<1000 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<20 mg/kg	(20)	<1.0 mg/kg	(1)	<1.0 mg/kg	(1)	<5.0 mg/kg	(5)	<1.0 mg/kg	(1)	<1.0 mg/kg	(1)
Carbon disulfide	<100 ug/L	(10)	<1000 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<10 mg/kg	(20)	<0.50 mg/kg	(1)	<0.50 mg/kg	(1)	<2.5 mg/kg	(5)	<0.50 mg/kg	(1)	<0.50 mg/kg	(1)
Carbon Tetrachloride	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<2.0 mg/kg	(20)	<0.10 mg/kg	(1)	<0.10 mg/kg	(1)	<0.5 mg/kg	(5)	<0.10 mg/kg	(1)	<0.10 mg/kg	(1)
Chlorobenzene	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
Chloroethane	<20 ug/L	(10)	<200 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<2.0 mg/kg	(20)	<0.10 mg/kg	(1)	<0.10 mg/kg	(1)	<0.50 mg/kg	(5)	<0.10 mg/kg	(1)	<0.10 mg/kg	(1)
Chloroform	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
Chloromethane	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
2-Chlorotoluene	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
4-Chlorotoluene	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
cis-1,2-DCE	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
cis-1,3-Dichloropropene	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
1,2-Dibromo 3-chloropropane	<20 ug/L	(10)	<200 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<2.0 mg/kg	(20)	<0.10 mg/kg	(1)	<0.10 mg/kg	(1)	<0.50 mg/kg	(5)	<0.10 mg/kg	(1)	<0.10 mg/kg	(1)
Dibromochloromethane	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
Dibromomethane	<20 ug/L	(10)	<200 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<2.0 mg/kg	(20)	<0.10 mg/kg	(1)	<0.10 mg/kg	(1)	<0.50 mg/kg	(5)	<0.10 mg/kg	(1)	<0.10 mg/kg	(1)
1,2-Dichlorobenzene	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
1,3-Dichlorobenzene	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
1,4-Dichlorobenzene	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
Dichlorodifluoromethane	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
1,1-Dichloroethane	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
1,1-Dichloroethene	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
1,2-Dichloropropane	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
1,3-Dichloropropane	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
2,2-Dichloropropane	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
1,1-Dichloropropene	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
Hexachlorobutadiene	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
2-Hexanone	<100 ug/L	(10)	<1000 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<10 mg/kg	(20)	<0.50 mg/kg	(1)	<0.50 mg/kg	(1)	<2.5 mg/kg	(5)	<0.50 mg/kg	(1)	<0.50 mg/kg	(1)
Isopropylbenzene	31 ug/L	(10)	270 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	1.1 mg/kg	(20)	0.089 mg/kg	(1)	<0.05 mg/kg	(1)	1 mg/kg	(5)	0.24 mg/kg	(1)	<0.05 mg/kg	(1)
4-Isopropyltoluene	47 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	1.4 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	4 mg/kg	(5)	1.2 mg/kg	(1)	<0.05 mg/kg	(1)
4-Methyl-2-pentanone	<100 ug/L	(10)	<1000 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<10 mg/kg	(20)	<0.50 mg/kg	(1)	<0.50 mg/kg	(1)	<2.5 mg/kg	(5)	<0.50 mg/kg	(1)	<0.50 mg/kg	(1)
Methylene Chloride	<30 ug/L	(10)	<300 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<3.0 mg/kg	(20)	<0.15 mg/kg	(1)	<0.15 mg/kg	(1)	<0.75 mg/kg	(5)	<0.15 mg/kg	(1)	<0.15 mg/kg	(1)
n-Butylbenzene	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	32 mg/kg	(20)	0.74 mg/kg	(1)	0.43 mg/kg	(1)	4 mg/kg	(5)	2 mg/kg	(1)	<0.05 mg/kg	(1)
n-Propylbenzene	65 ug/L	(10)	700 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	5.9 mg/kg	(20)	0.41 mg/kg	(1)	0.12 mg/kg	(1)	5 mg/kg	(5)	1.2 mg/kg	(1)	<0.05 mg/kg	(1)
sec-Butylbenzene	13 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	2 mg/kg	(20)	0.079 mg/kg	(1)	<0.05 mg/kg	(1)	1.9 mg/kg	(5)	0.34 mg/kg	(1)	<0.05 mg/kg	(1)
Styrene	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
tert-Butylbenzene	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
1,1,1,2-Tetrachloroethane	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
1,1,2,2-Tetrachloroethane	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
Tetrachloroethene (PCE)	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
trans-1,2-DCE	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
trans-1,3-Dichloropropene	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
1,2,3-Trichlorobenzene	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
1,2,4-Trichlorobenzene	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
1,1,1-Trichloroethane	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
1,1,2-Trichloroethane	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
Trichloroethene (TCE)	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
Trichlorofluoromethane	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
1,2,3-Trichloropropane	<20 ug/L	(10)	<200 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<2.0 mg/kg	(20)	<0.10 mg/kg	(1)	<0.10 mg/kg	(1)	<0.50 mg/kg	(5)	<0.10 mg/kg	(1)	<0.10 mg/kg	(1)
Vinyl chloride	<10 ug/L	(10)	<100 ug/L	(100)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	<1.0 mg/kg	(20)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)	<0.25 mg/kg	(5)	<0.05 mg/kg	(1)	<0.05 mg/kg	(1)
Xylenes, Total	320 ug/L	(10)	24000 ug/L	(250)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	110 mg/kg	(20)	4.5 mg/kg	(1)	0.78 mg/kg	(1)	2.4 mg/kg	(5)	2.3 mg/kg	(1)	<0.05 mg/kg	(1)
EPA METHOD 8310: PAHS																																
Naphthalene	6.7 ug/L	(1)	560 ug/L	(1)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—
1-Methylnaphthalene	10 ug/L	(1)	160 ug/L	(1)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—
2-Methylnaphthalene	6 ug/L	(1)	250 ug/L	(1)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—
Acenaphthylene	<2.5 ug/L	(1)	<2.5 ug/L	(1)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—
Acenaphthene	<2.5 ug/L	(1)	<2.5 ug/L	(1)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—
Fluorene	<0.8 ug/L	(1)	1.0 ug/L	(1)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—
Phenanthrene	<0.6 ug/L	(1)	5.9 ug/L	(1)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—
Anthracene	<0.6 ug/L	(1)	<0.60 ug/L	(1)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—
Fluoranthene	<0.3 ug/L	(1)	<0.3 ug/L	(1)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—
Pyrene	<0.3 ug/L	(1)	<0.3 ug/L	(1)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—
Benz(a)anthracene	<0.02 ug/L	(1)	<0.02 ug/L	(1)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—
Chrysene	<0.2 ug/L	(1)	<0.2 ug/L	(1)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—
Benzo(b)fluoranthene	<0.05 ug/L	(1)	<0.05 ug/L	(1)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—
Benzo(k)fluoranthene	<0.02 ug/L	(1)	<0.02 ug/L	(1)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—
Benzo(a)pyrene	<0.02 ug/L	(1)	<0.02 ug/L	(1)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—
Dibenz(a,h)anthracene	<0.04 ug/L	(1)	<0.04 ug/L	(1)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—
Benzo(g,h,i)perylene	<0.03 ug/L	(1)	<0.03 ug/L	(1)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—
Indeno(1,2,3-cd)pyrene	<0.08 ug/L	(1)	<0.08 ug/L	(1)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—
EPA 120.1 SPECIFIC CONDUCTANCE																																
Specific Conductance	1900 umhos/cm	(1)	2700 umhos/cm	(1)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—
EPA METHOD 7470: MERCURY																																
Mercury	0.00034 mg/L	(1)	<0.00020 mg/L	(1)	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—	NS —	—

NOTE: (1) Depth interval from which the sample was collected.

	GROUNDWATER ANALYTICAL RESULTS																				SOIL ANALYTICAL RESULTS									
	MW-49 (River Side) Collected 11/1/04	DF	MW-48 (Plant Side) Collected 11/1/04	DF	TP#1 10/28/2004	DF	TP#2 10/28/2004	DF	TP#3 10/28/2004	DF	TP#4 10/28/2004	DF	TP#5 10/28/2004	DF	TP#6 10/28/2004	DF	TP#7 10/28/2004	DF	TP#8 10/28/2004	DF	MW-48 (5' - 6.5') [1] Collected 11/1/04	DF	MW-48 (10' - 11.5') [1] Collected 11/1/04	DF	MW-48 (Total Depth) [1] Collected 11/1/04	DF	MW-49 (5' - 6.5') [1] Collected 10/28/04	DF	MW-49 (10'-11.5') [1] Collected 10/28/04	DF	MW-49 (15'-116.5') [1] Collected 10/28/04	DF
EPA METHOD 6010C: DISSOLVED METALS																														
Arsenic	<0.02 mg/L	(1)	<0.02 mg/L	(1)	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---
Barium	0.3 mg/L	(1)	0.21 mg/L	(1)	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---
Cadmium	<0.002 mg/L	(1)	<0.002 mg/L	(1)	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---
Chromium	<0.006 mg/L	(1)	<0.006 mg/L	(1)	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---
Copper	<0.006 mg/L	(1)	<0.006 mg/L	(1)	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---
Iron	0.18 mg/L	(1)	0.16 mg/L	(1)	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---
Lead	<0.0050 mg/L	(1)	0.014 mg/L	(1)	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---
Manganese	2.1 mg/L	(1)	0.55 mg/L	(1)	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---
Selenium	<0.05 mg/L	(1)	<0.05 mg/L	(1)	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---
Silver	<0.005 mg/L	(1)	<0.005 mg/L	(1)	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---
Uranium	<0.10 mg/L	(1)	<0.10 mg/L	(1)	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---
Zinc	0.0089 mg/L	(1)	0.026 mg/L	(1)	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---
EPA METHOD 6010C: TOTAL RECOVERABLE METALS																														
Arsenic	<0.02 mg/L	(1)	<0.02 mg/L	(1)	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---
Barrium	0.48 mg/L	(1)	0.32 mg/L	(1)	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---
Cadmium	<0.002 mg/L	(1)	<0.002 mg/L	(1)	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---
Calcium	160 mg/L	(1)	130 mg/L	(1)	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---
Chromium	<0.006 mg/L	(1)	<0.006 mg/L	(1)	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---
Iron	19 mg/L	(10)	19 mg/L	(10)	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---
Lead	0.014 mg/L	(1)	0.023 mg/L	(1)	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---
Magnesium	31 mg/L	(1)	22 mg/L	(1)	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---
Manganese	4.4 mg/L	(1)	2.4 mg/L	(1)	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---
Potassium	7.9 mg/L	(1)	6.9 mg/L	(1)	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---
Selenium	<0.05 mg/L	(1)	<0.05 mg/L	(1)	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---
Silver	<0.005 mg/L	(1)	<0.005 mg/L	(1)	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---
Sodium	330 mg/L	(10)	400 mg/L	(10)	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---
Uranium	<0.10 mg/L	(1)	<0.10 mg/L	(1)	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---
Zinc	0.061 mg/L	(1)	0.056 mg/L	(1)	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---
EPA METHOD 150.1: pH																														
pH	7.73 pH units	(1)	7.88 pH units		NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---
EPA METHOD 160.1: TDS																														
Total Dissolved Solids	1400 mg/L	(1)	1500 mg/L		NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---	NS	---

Giant Refinery

NOTE: (1) Depth interval from which the sample was collected.

Appendix A

Boring Logs

Sheet: 1 of 1
Bore Point: See plan
Water Elevation: 4.6' below ground surface
Boring No.: TP1-1004

Precision Engineering, Inc.
P.O. Box 422
Las Cruces, NM 88004
505-523-7674

File #: 03-122
Site: Bloomfield
Giant Refining
Elevation:
Date: 10/27/2004

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-2		O-*--O*- O-*--O*- O-*--O*- O-*--O*-		**Silt**, sand, very fine to fine, cobbles, gravel, brown, moist				
	2-2.5		*-*--*-*	2.5	**Clay**, sandy, very fine, brown, wet				
	2.5-9.0		*********	5.0	**Sand**, fine to medium, black, damp, water bearing				
				7.5					
				10.0	T.D. 9.0 Placed 2" PVC, 5' hand slotted screen Backfilled with clean cuttings				
				15.0					
				20.0					

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER — LOGGED BY: KM

M:\5127001\Boring Logs\October 2004\[TP1-1004.xls]Sheet1

Sheet: 1 of 1
Bore Point: See plan
Water Elevation: 6.3' below ground surface
Boring No.: TP2-1004

Precision Engineering, Inc.
P.O. Box 422
Las Cruces, NM 88004
505-523-7674

File #: 03-122
Site: Bloomfield
Giant Refining
Elevation:
Date: 10/27/2004

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-2		O-*--O*- O-*--O*- O-*--O*- O-*--O*-		**Silt**, sand, very fine to fine, cobbles, gravel, brown, moist				
	2-2.5		*-*--*-*	2.5	**Clay**, sandy, very fine, brown, wet				
	2.5-9.0		*********	5.0	**Sand**, fine to medium, black, damp, water bearing				
				7.5					
				10.0	T.D. 9.0 Placed 2" PVC, 5' hand slotted screen Backfilled with clean cuttings				
				15.0					
				20.0					

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER — LOGGED BY: KM

M:\5127001\Boring Logs\October 2004\[TP2-1004.xls]Sheet1

Sheet: 1 of 1
Bore Point: See plan
Water Elevation: 5.8' below ground surface
Boring No.: TP3-1004

Precision Engineering, Inc.
P.O. Box 422
Las Cruces, NM 88004
505-523-7674

File #: 03-122
Site: Bloomfield
Giant Refining
Elevation:
Date: 10/28/2004

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-2		O-*--O*- O-*--O*- O-*--O*- O-*--O*-		**Silt**, sand, very fine to fine, cobbles, gravel, brown, moist				
	2-3.5		*--*--*--* *--*--*--* *--*--*--*	2.5	**Clay**, sandy, very fine, brown				
	3.5-13.0		*********	5.0 7.5 10.0	**Sand**, medium to coarse, brown, damp,				
				15.0 20.0	T.D. 13.0 Placed 2" PVC, 5' hand slotted screen Backfilled with clean cuttings				

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER LOGGED BY: KM

M:\5127001\Boring Logs\October 2004\[TP3-1004.xls]Sheet1

Sheet: 1 of 1
Bore Point: See plan
Water Elevation: 5.4' below ground surface
Boring No.: TP4-1004

Precision Engineering, Inc.
P.O. Box 422
Las Cruces, NM 88004
505-523-7674

File #: 03-122
Site: Bloomfield
Giant Refining
Elevation:
Date: 10/28/2004

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-2		O-*--O*- O-*--O*- O-*--O*- O-*--O*-		**Silt**, sand, very fine to fine, cobbles, gravel, brown, moist				
	2-10.0		*-*--*-* *-*--*-* ********* ********* ********* ********* ********* ********* ********* ********* ********* ********* ********* ********* ********* *********	2.5 5.0 7.5 10.0	**Sand**, silty, very fine, gravel to 2", brown black, hydrocarbon odor water bearing				
				15.0 20.0	T.D. 10.0 Placed 2" PVC, 5' hand slotted screen Backfilled with clean cuttings				

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER — LOGGED BY: KM

Sheet: 1 of 1
Bore Point: See plan
Water Elevation: 5.4' below ground surface
Boring No.: TP5-1004

Precision Engineering, Inc.
P.O. Box 422
Las Cruces, NM 88004
505-523-7674

File #: 03-122
Site: Bloomfield
Giant Refining
Elevation:
Date: 10/28/2004

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-2		O-*--O*- O-*--O*- O-*--O*- O-*--O*-		**Silt**, sand, very fine to fine, cobbles, gravel, brown, moist				
	2-10.0		****o**** ****o**** ****o**** ****o**** ****o**** ********* ********* ********* ********* ********* ********* ********* ********* ********* ********* ********* *********	2.5 5.0 7.5 10.0	**Sand**, silty, very fine, gravel to 2", brown sand, coarse, black Hydrocarbon odor water bearing				
				15.0 20.0	T.D. 10.0 Placed 2" PVC, 5' hand slotted screen Backfilled with clean cuttings				

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER LOGGED BY: KM

M:\5127001\Boring Logs\October 2004\[TP5-1004.xls]Sheet1

Sheet: 1 of 1
Bore Point: See plan
Water Elevation: 4.8' below ground surface
Boring No.: TP6-1004

Precision Engineering, Inc.
P.O. Box 422
Las Cruces, NM 88004
505-523-7674

File #: 03-122
Site: Bloomfield
Giant Refining
Elevation:
Date: 10/28/2004

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-1		O-*--O*- O-*--O*-		**Silt**, sand, very fine to fine, cobbles, gravel, brown, moist				
	1-10.0		****O**** ****O**** ****O**** ****O**** ****O**** ****O**** ********* ********* ********* ********* ********* ********* ********* ********* ********* ********* ********* *********	2.5 5.0 7.5 10.0	**Sand**, silty, very fine, cobbly, brown sand, coarse, black Hydrocarbon odor				
				15.0 20.0	T.D. 10.0 Placed 2" PVC, 5' machine slotted screen Backfilled with clean cuttings				

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER — LOGGED BY: KM

M:\5127001\Boring Logs\October 2004\[TP6-1004.xls]Sheet1

Sheet: 1 of 1
Bore Point: See plan
Water Elevation: 5.7' below ground surface
Boring No.: TP7-1004

Precision Engineering, Inc.
P.O. Box 422
Las Cruces, NM 88004
505-523-7674

File #: 03-122
Site: Bloomfield
Giant Refining
Elevation:
Date: 10/28/2004

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-2		O-*--O*- O-*--O*- O-*--O*- O-*--O*-		**Silt**, sand, very fine to fine, cobbles, gravel, brown, moist				
	2-5.0		*-*--o-* *-*--o-* *-*--o-* *-*--o-* *-*--o-* *-*--o-*	2.5 5.0	**Sand**, silty, very fine, cobbly, brown				
	5-10.0		********* ********* ********* ********* ********* ********* ********* ********* ********* *********	7.5 10.0	**Sand**, fine to medium, dark brown, moist slight hydrocarbon odor, black				
				15.0 20.0	T.D. 10.0 Placed 2" PVC, 5' hand slotted screen Backfilled with clean cuttings				

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER LOGGED BY: KM

M:\5127001\Boring Logs\October 2004\[TP7-1004.xls]Sheet1

Sheet: 1 of 1
Bore Point: See plan
Water Elevation: 4.6' below ground surface
Boring No.: TP8-1004

Precision Engineering, Inc.
P.O. Box 422
Las Cruces, NM 88004
505-523-7674

File #: 03-122
Site: Bloomfield
Giant Refining
Elevation:
Date: 10/28/2004

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-1		O-*--O*- O-*--O*-		**Silt**, sand, very fine to fine, cobbles, gravel, brown, moist				
	1-3.5		****O**** ****O**** ****O**** ****O**** ****O****	2.5	**Sand**, silty, very fine, cobbly, brown				
	3.5-10.0		********* ********* ********* ********* ********* ********* ********* ********* ********* ********* ********* *********	5.0 7.5 10.0	**Sand**, silty, fine to medium, cobbly, grey, Hydrocarbon odor, moist, black				
				15.0 20.0	T.D. 10.0 Placed 2" PVC, 5' machine, slotted screen Backfilled with clean cuttings				

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER — LOGGED BY: KM

M:\5127001\Boring Logs\October 2004\[TP8-1004.xls]Sheet1

Sheet: 1 of 1
Bore Point: See plan
Water Elevation: 7.70
Boring No.: MW-48

Precision Engineering, Inc.
P.O. Box 422
Las Cruces, NM 88004
505-523-7674

File #: 03-122
Site: Bloomfield
Giant Refining
Elevation:
Date: 10/28/2004

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-1		*-**-*-* *-*O-*-*		**Silt**, sand, very fine to fine, brown, damp, a few cobbles				
	1-15.0		*-*o-*-* *-*o-*-*		**Sand**, silty, very fine to fine, brown, damp, gravelly				
	2.0		*-*o-*-* *-*o-*-* *-*o-*-* *-*o-*-* ********	2.5	Black with hydrocarbon odor medium to coarse sand				
			******** ******** ******** ******** ******** ********	5.0 7.5					
			******** ******** ******** ******** ***o**** ***o**** ***o**** ***o**** ***o**** ***o**** ***o**** ***o**** ***o****	10.0 15.0	water bearing some gravel				
				20.0	T.D. 15.0 Bottom of well 15' Placed 4" PVC, 10' factory slotted .020" screen Sanded with 8-12 Silica Sand to 3' bgs Bentonite Plug to 1' bgs				

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER LOGGED BY: KM

M:\5127001\Boring Logs\October 2004\[MW48.xls]Sheet1

Sheet: 1 of 1
Bore Point: See plan
Water Elevation: 9.00
Boring No.: MW49

Precision Engineering, Inc.
P.O. Box 422
Las Cruces, NM 88004
505-523-7674

File #: 03-122
Site: Bloomfield
Giant Refining
Elevation:
Date: 10/28/2004

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-3		*O*-*-O *O*-*-O *O*-*-O *O*-*-O *O*-*-O *O*-*-O	2.5	**Cobbles**, sand, very fine to fine, gravel, brown, damp, cobbles				
	3-15.0		*-*o-*-* *-*o-*-* ******** ******** ******** ******** ******** **O**O* **O**O* **O**O* ******** ******** ******** ******** ******** ******** ******** ******** ******** ******** ******** ******** ********	5.0 7.5 10.0 15.0	**Sand**, silty, very fine to fine, brown, moist, fine to medium sand Black with hydrocarbon odor, wet some cobbles water bearing medium to coarse sand, grey				
				20.0	T.D. 15.0 Bottom of well 14' Placed 4" PVC, 10' factory slotted .020" screen Sanded with 8-12 Silica Sand to 2' bgs Bentonite Plug to gs				

SIZE & TYPE OF BORING: 4 1/4" ID HOLLOW STEMMED AUGER LOGGED BY: KM

M:\5127001\Boring Logs\October 2004\[MW49.xls]Sheet1