GW - 1

MONITORING REPORTS

DATE:

2005

2004 GROUNDWATER REMEDIATION AND MONITORING ANNUAL REPORT APRIL 2005 VOLUME I

SAN JUAN REFINING COMPANY
GIANT – BLOOMFIELD REFINERY

GIANT
REFINING COMPANY

April 11, 2005

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New Mexico Oil Conservation Division
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Hazardous Waste Bureau
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RE: Corrective Measures Study and Corrective Measures Implementation (Site Investigation and Abatement Plan)
Groundwater Remediation and Monitoring Annual Report
Giant Refining Company, Bloomfield Refinery
EPA ID# NMD089416416
GW – 001

Dear Wayne and Hope:

Giant Refining Company, Bloomfield Refinery submits the 2004 Annual Groundwater Report as required by NMED and OCD directives. This report summarizes all soil and groundwater monitoring activities that occurred in 2004.

If you have questions or would like to discuss any aspect of the report, please contact me at (505) 632-4171.

Sincerely,

James R. Schmaltz
Environmental Manager
San Juan Refining Company
Bloomfield Refinery

cc: Robert Wilkinson, EPA Region VI
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Section 1.0 Executive Summary

Executive Summary

The primary remediation system in place at Bloomfield is separate phase hydrocarbon (SPH) removal utilizing total fluids pumping. Total fluids pumping is used to bring SPH and hydrocarbon impacted groundwater to the surface for treatment or disposal. In 2004 the total gallons pumped from the recovery wells was 1,168,147 gallons.

In August 2004 recent emergence of active petroleum hydrocarbon seeps were found in two small tributaries (draws) on the north side of the refinery. Hydrocarbon staining had migrated down the draws toward the San Juan River. Upon receiving the Emergency Action Directive, Giant implemented the following tasks. The visually contaminated soils were removed and the vertical and horizontal extent of the contamination was investigated. Daily progress reports were sent to the agencies. Compacted soil barriers were constructed in each tributary to prevent migration into the river. Lined collection and barrier systems were installed at the point of the seeps. The collection points are monitored and pumped for recovery. Giant prepared a Monitoring and Contingency Plan, which stipulated river sampling and monitoring of the draws.

The river was sampled at the mouth of the draws on a monthly basis and analyzed for BTEX/MTBE (8021), TPH (8015 DRO and GRO), WQCC metals, semi-volatiles organics (8270) and general chemistry. After four months of sampling and no evidence of pollutants the sampling frequency will be reduced to quarterly. All analysis results were below the NM WQCC standards. BTEX and MTBE results for September through December were all below detection limits. All draws were inspected every other week for visual hydrocarbon staining starting in August.

Sheet pilings and a bentonite slurry wall are in place along the San Juan River's edge. The sheet pilings extend around the perimeter of the riverbank to the river inlet station. The purpose of the sheet piling and the slurry wall is to prevent any SPH and dissolved-phase hydrocarbons in the groundwater from migrating to the west, into the San Juan River. There are two piezometers located near the river P-4 and P-5 with P-5 located on the riverside of the sheet piling. Piezometers #4 and #5 continue to see benzene, ethyl benzene and xylene levels above the NM WQCC standards.

In October 2004 a field investigation was performed in the river terrace sheet-pile area. The purpose of the investigation was to 1) install two new monitoring wells at the river terrace to supplement P-4 and P-5 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

involved the installation of eight temporary well points (TP-1 through TP-8) and two permanent wells (MW-48 and MW-49).

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.

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 riverside of the barrier. The data indicates the sheet-pile wall is acting as a significant barrier against fuel hydrocarbon migration to the river.

An aquifer (pump) test was performed in December on MW-48. Malcolm Pirnie, an independent environmental engineering firm, was contracted to administer the test. The purpose of the pump test was to obtain aquifer hydraulic properties of the river terrace alluvial aquifer below the refinery.

After running multiple iterations of the capture zone model, Malcolm Pirnie determined that an adequate capture zone could be obtained at a pumping rate of 2 to 5 gpm.

The north collection system consists of recovery tank #37, which collects groundwater from two 8-inch influent lines connected to the perforated sub-drain beneath the Hammond ditch irrigation canal. The water is pumped to a 4 inch steel line beneath the road canal and up the embankment south of the tank, which transport the groundwater to the API separator. The total volume pumped in 2004 was 242,453 gallons.

Groundwater samples were collected in March and August of 2004. The semi-annual monitoring event occurred the first week of March. Annual sampling began August 16, and continued for two weeks.

Since the lining of the Hammond Ditch in 2001, it is no longer a contributor to local groundwater recharge at the site. Prior to the lining of the Hammond Ditch, the infiltration of source water through the shallow zone soils served as a hydraulic curtain for the migration of Phase-Separated Hydrocarbon (PSH) along the north property boundary. Sampling of the monitor wells MW-45 and MW-47 on the outside (river side) of the Hammond Ditch indicate that some BTEX is not being contained by this collection system. BTEX was found above NM WQCC standards in MW#45 and BEX in MW#47 during the March sampling event. This is probably due to the lack of hydraulic curtain from the ditch.

The east outfall is collected into a pipe, which flows, to Tank #38 and then to Tank #33 located just south of the western fresh water pond. Hydrocarbons are

skimmed off the top of the tank into a secondary tank, which is emptied with a vacuum truck and taken to the API separator. The remaining water from Tank #33 is then piped to the fresh water pond. The total gallons pumped in 2004 were 7,088,402 gallons.

In November Giant submitted a voluntary Corrective Measures Plan, which was approved, by OCD and NMED in December. As a corrective measure to mitigate further migration of petroleum hydrocarbons towards the San Juan River and beyond the northern property boundaries of the refinery, Giant committed to the installation of a containment barrier wall (soil-bentonite slurry wall) and fluid collection systems approximately 2,600 feet in length along the north side of the Hammond Ditch and extending from County Road 4990 to a location approximately 200 feet east of the pipeline corridor.

In November Giant submitted a voluntary Corrective Measures Plan, which was approved, by OCD and NMED in December. This is a corrective measure to mitigate further migration of petroleum hydrocarbons towards the San Juan River in the River Terrace Sheet Pile Area.

Section 2.0 Introduction

INTRODUCTION

Owner:	San Juan Refining Company 23733 North Scottsdale Road Scottsdale, Arizona 85255	(parent corporation)
Operator:	Giant Refining Company P.O. Box 159 Bloomfield, New Mexico 87413	(postal address)
	Giant Refining Company #50 Rd 4990 Bloomfield, New Mexico 87413	(physical address)
Facility Name:	Bloomfield Refinery: #50 Rd 4990 Bloomfield, New Mexico 87413	(physical address)
Facility Status	Corrective Action/Compliance	
US EPA ID	NMD089416416	
SIC Code	2911	
Purpose of Groundwater Monitoring:	To evaluate present contamination	
Type of Groundwater Monitoring:	Semi-annual and Annual	

BACKGROUND INFORMATION

SITE LOCATION AND DESCRIPTION

The Bloomfield Refinery is a crude oil refining facility with a crude capacity of 18,000 barrels per day. It is located approximately 1 mile south of Bloomfield, New Mexico, in San Juan County, latitude N36 41' 87", longitude W107 58' 70". It is further located approximately ½ mile east of State Route 550 on Count Road 4990 (a.k.a. Sullivan Road).

The refinery is located on a bluff 120 feet above the south side of the San Juan River. The top of the bluff is relatively flat and is at an elevation of 5,540 feet above sea level. The geological units that comprise the site include, in order of increasing depth, San Juan River Alluvium, Quaternary apron deposits, Aeolian sand and silt, Jackson Lake Terrace, and the Tertiary Nacimiento Formation. An unnamed arroyo flows toward the San Juan River on the southern and western edges of the site. East of the site, a well-defined arroyo cuts a small canyon from the bluff to the San Juan River. Hammond Ditch lies on the bluff between the limit of the Jackson Lake Terrace and the refinery.

Refinery offices are on the western end of the facility, along with warehouse space, maintenance areas, and a storage yard containing used material (e.g., pipes, valves). Petroleum processing units, located in the northwest portion of the refinery, include the crude unit, fluidized cracking unit, catalytic polymerization unit, and hydrodesulfurization unit. The API Separator is located in the northwestern portion of the site. The aeration lagoons are located in the north central section of the refinery.

In the central portion of the site, aboveground storage tanks (AST's) occupy a large percentage of refinery property. South of the refinery and across Sullivan Road are terminals for loading product and off-loading crude, as well as gas storage and hazardous waste storage.

The Refinery owner is San Juan Refining Company (SJRC) and is operated by Giant Refining Company. The historical and current activities conducted at the refinery are petroleum processing, crude and product storage, crude unloading and product loading, waste management (closed and existing facilities), and offices and non-petroleum material storage

HISTORY OF FACILITY MODIFICATIONS AND IMPROVEMENTS

Previous Owner's Activities

Local entrepreneur, Kimball Campbell, constructed the crude topping unit that eventually became the GRC facility in the late 1950s. O.L. Garretson bought the facility in the early 1960s, renamed it Plateau, Inc. and sold it in 1964 to Suburban Propane of New Jersey.

Operationally, the facility has steadily evolved through a series of improvements, modifications and expansions. Suburban upgraded the facility in 1966, increasing the Crude Unit throughput to 4,100 bpcd and adding 1,850 bpcd Reformer and Naphtha Hydrotreater. In 1975, the Crude Unit was expanded to 8,400 bpcd.

In 1979, the Crude Unit was expanded again to 16,800 bpcd (later demonstrated to have a hydraulic capacity in excess of 18,000 bpcd). A Fluidized Catalytic Cracker (FCC) with a nominal capacity of 6,000 bpcd, an Unsaturated Gas Plant and a Treater Unit were also added at that time. The capacity of the Reformer / Hydrotreater was increased to 2,250 bpcd. The FCC was upgraded in 1982 to conform to State and Federal air quality standards.

Bloomfield Refining Activities

Bloomfield Refining Company (BRC) acquired the facility from Suburban Propane (Plateau) on October 31, 1984. BRC made many improvements to facility operations and equipment. These improvements are summarized below.

1986

Relocated the spent caustic tank onto a concrete pad with retaining walls.

1987

Upgraded the Reformer and increased its capacity to 3,600 bpcd, modified the Laboratory and Treater Unit and increased tank storage capacity.

Cleaned up the North and South bone yards.

Decommissioned and dismantled old tanks 6 and 7.

Relocated the API recoverd oil tanks 8 & 9 to concrete pads with concrete retaining walls.

Established a systematic inspection, maintenance and repair program for tanks.

1988

Added a 2,000 bpcd Catalytic Polymerization Unit. Removed the facility's two underground storage tanks and replaced them with aboveground storage tanks.

Completed installation of cathodic protection system for the tank farm and underground piping.

Rebuilt the process area sewer system and added curbed, concrete paving to the unpaved process areas.

1989

Increased Reformer throughput to 4,000 bpcd.

Activated the groundwater hydrocarbon recovery system.

Constructed the first double-lined Evaporation Pond as part of discharge plan improvements.

1990

Constructed the second double-lined Evaporation Pond as part of discharge plan improvements.

Constructed a drum storage shed and converted to bulk chemical usage where possible in order to minimize the use of drummed chemicals.

1991

Revamped the burner fuel sales rack with concrete paving and curbing.

Submitted the permit application for a Class 1 disposal well.

Upgraded the groundwater hydrocarbon recovery system.

1992

Submitted an air quality permit application proposing the installation of a Diesel Hydrodesulferization (HDS) Unit and a Sulfur Recovery Unit (SRU) to comply with new EPA low-sulfur diesel regulations and to decrease air emissions.

1993

Began a program under a consent agreement with the US EPA to conduct interim measures (IM), a RCRA facility investigation (RFI) and a corrective measures study (CMS) addressing groundwater contamination.

Replaced portions of the underground cooling water piping.

Added concrete paving around the API Separator.

Added process units: HDS Unit (2,000 bpcd) and SRU.

Improved (eliminated) storm water runoff to the North.

1994

Completed the Class 1 injection well.

Retrofitted the Aeration Lagoons with two additional liners.

Installed a floating cover for the API Separator.

Closed the clay-lined evaporation ponds and spray evaporation area.

Giant Activities

In 1995, San Juan Refining Company, a wholly owned subsidiary of Giant Industries Arizona, Inc., purchased the Bloomfield Refinery from BRC.

1995

Improved the diking South of the Refinery to further reduce storm water runoff.

Began implementation of additional corrective measures for groundwater cleanup as determined from the CMS.

1998

Converted the former evaporation ponds on the East side of the Refinery to raw water storage ponds.

1999

Installed sheet piling and a bentonite slurry wall adjacent to the San Juan River, North of the process units, in order to intercept a small hydrocarbon seep that had been detected in the area.

2001

Began a program to inoculate the Aeration Lagoons with sludge-consuming micro-organisms.

2002

A concrete liner was installed on the Hammond Ditch. At that time, Giant constructed the Hammond Ditch French Drain Recovery System to address contamination under the ditch.

2003

Converted several monitoring wells into recovery wells to further enhance the continuing ground water remediation efforts. Installed MW #45, #46 & #47 to replace unreliable seeps. Installed East Outfall #1 Recovery System to return impacted water back to the refinery.

2004

Installed MW #48 & MW #49 and 8 temporary piezometers to launch a River Terrace Investigation. Drilled several temporary piezometers on the north side of Hammond Ditch to chart the Naciemento Formation. Initiated the development of a slurry wall that will be constructed on the north side of Hammond Ditch to prevent the spread of hydrocarbons to the San Juan River. Construction will begin in 2005.

Replaced sewer lines in the Treater and FCC.

Section 3.0 Scope of Services

Scope of Services

The semi-annual monitoring event occurred during the first week of March 2004. Groundwater samples were collected from MW #1, MW #12, MW #13, MW #20, MW #32, MW #33, MW #35, MW #37, MW #38, MW #45, MW #47, P #4, P #5, P #6, O/F #2, and O/F #3. Field data (Tables 1 & 3) will verify that MW #6, MW #24, and MW #46 were dry and not sampled. Outfall #1 flows into Tk #38 and is not sampled. P-#6 is a temporary piezometer drilled 25 feet to the east of MW #24. However, P #6 has been destroyed with the construction of the slurry wall. Samples were analyzed for BTEX and MTBE using EPA Method 8021B. Semi-annual results are summarized in Table 4.

Annual sampling began August 16, 2004 and continued for two weeks. During an August 11, 2004 meeting, NMED and OCD requested that Giant sample all monitor and recovery wells that do not contain separate phase hydrocarbon. The following wells were sampled; MW #1, MW #3, MW #7, MW #8, MW #11, MW #12, MW #13, MW #21, MW #26, MW #27, MW #29, MW #30, MW #31, MW #32, MW #33, MW #34, MW #35, MW #36, MW #37, MW #38, MW #39, MW #44, P #4, P #5, O/F #2, O/F #3, RW #3, RW #14, RW #15, MW #16. As per the August meeting, the water was analyzed for BTEX and MTBE, RCRA 8 Metals, WQCC Dissolved Metals, Cations, Anions, and Carbon Dioxide. Results are summarized in Tables 5, 6, 7, & 8. Field data (Tables 2 & 3) will confirm that MW #3 had only enough water to conduct field measurements and sample for BTEX and MTBE. MW #5, MW #6, MW #24, and MW #46 were dry. MW #25, MW #45, MW #47, RW #17, P-#6, Storm water Outfall #2, and the Draw North of MW #45 were sampled for TPH (8015B) to discern fuel fingerprinting. Table 8 summarizes that data.

From August 2004 through December 2004, Bloomfield Refinery conducted San Juan River sampling events per the "Monitoring and Contingency Plan". Samples were analyzed for BTEX/MTBE (8021B), TPH (8015B), WQCC metals(6010C), semi-volatile organics (8270), and general chemistry. Analysis is summarized in Table 13 and sample locations are identified in Figure 11.

Remediation activities took place in August. Impacted soil was removed from several draws north of Hammond Ditch. The top layer was removed and placed in 16 55-gallon drums. The drummed soil was analyzed for BTEX (8021), TPH (8015), TCLP Metals (3050B & 6010B).The rest of the soil was stockpiled at the Hydroblast Pad and near Tank #36. A composite sample of each stockpile site was analyzed for BTEX (8021), TPH (8015), TCLP Metals(3050B & 6010B), and RCI. Table 12 summarizes all results.

The River Terrace Investigation ensued in October with the installation of eight Temporary Piezometers, MW #48, and MW #49. The piezometers were sampled and analyzed for BTEX/MTBE (8021B), and TPH (8015B). During the drilling of Mw #48 and MW #49, soil samples were taken at five-foot intervals and analyzed

for TPH (8015B), and volatile organic compounds (8260). After well development, water samples were grabbed from Mw #48 and MW #49 and analyzed for Volatile Organics (8260B), Polynuclear Aromatic Hydrocarbons (8310), WQCC Metals - Dissolved and Total (6010C), Cations, and Anions. In December, MW #48 and MW #49 were sampled and analyzed for BTEX/MTBE (6021B), TPH (8015B), and Polynuclear Aromatic Hydrocarbons (8310). River Terrace Investigation field data can be found in Table 14, analytical summaries are in Tables 9, 10 & 11, and sample locations are in Figure 10.

Field Data Collection

All facility monitoring wells, recovery wells, and piezometers were gauged in March and August. Recovery well pumps were shut off and removed 24 hours prior to water elevation measurements. MW #45 was converted to recovery well service due to an emergency action in August. The pump was not shut down and MW #45 was not gauged at that time.

All water/product levels were measured to an accuracy of 0.01 foot using a Geotech Interface Meter. After determining water levels, well volumes were calculated.

At least three well volumes were purged from each well prior to sampling. Electrical conductance, pH, and temperature were monitored during purging using an Ultrameter 6P. The wells were considered satisfactorily purged when the pH, E.C., and temperature values did not vary by more than 10 percent for at least three measurements.

Field data and well elevations can be found in Tables 1, 2, 3, & 14.

All purged water was collected in a fifty-five gallon drum and disposed of through the refinery wastewater system.

Section 4.0 Regulatory Criteria / Groundwater Cleanup Standards

TABLE OF NEW MEXICO AND THE U. S. EPA'S GROUNDWATER STANDARDS

PARAMETER	NEW MEXICO (ppm)	EPA MCL (ppm)	EPA MCLG (ppm)	EPA HA (ppm)
General Properties				
non-aqueous phase liquid (NAPL)	NP			
petroleum				
floating product	NP			
undesirable odor (a)	NP			
pH (units) (a)	6 - 9	6.5 - 8.5		
total dissolved solids (TDS) (a)	1000	500		
turbidity		tt		
Biological Contaminants				
giardia lambia	tt	Zero		
legionella	tt	Zero		
total coliform	<5%+	Zero		
viruses	tt	Zero		
Inorganic Contaminants				
aluminum	5.0 (i)	0.05 - 0.2 (a)		
ammonia				30
antimony		0.006	0.006	
arsenic	0.1	0.05	0.05	
asbestos-fibers/liter (longer than 10 um)		7 million	7 million	
barium	1.0	2	2	
beryllium		0.004	0.004	
boron	0.75 (i)			0.06
bromate		0.01 (p)	Zero (p)	
cadmium	0.01	0.005	0.005	
chlorate				0.01

PARAMETER	NEW MEXICO (ppm)	EPA MCL (ppm)	EPA MCLG (ppm)	EPA HA (ppm)
chloride (a)	250	250		0.01
chlorine				1
chlorine dioxide				0.08
chlorite		1.0 (p)	0.08 (p)	
chromium	0.05	0.1	0.1	
cobalt (i)	0.05			
copper		1.3 (al)	1.3	
cyanide	0.2	0.2	0.2	
fluoride	1.6	4.0		
fluoride (a)		2		
iron (a)	1.0	0.3		
lead	0.05	0.015 (al)	Zero	
manganese (a)	0.2	0.05		
mercury	0.002	0.002	0.002	
molybdenum	1.0 (i)			0.05
nickel	0.2 (i)	0.1	0.1	
nitrate - N	10	10	10	
nitrite - N		1	1	
nitrate + nitrite (as N)		10	10	
selenium	0.05	0.05	0.05	
silver	0.05	0.05	0.05	
silver (a)		0.1		
sodium				20
strontium				17
sulfate	600 (a)	250 (a) / 400 (p)	400	
thallium		0.002	0.0005	
vanadium				0.02
zinc (a)	10.0	5		
Radioactive Contaminants				
Gross alpha (pCi/L) *		15	Zero	
Gross beta & photon emitters (mrem/yr) **		4	Zero	

PARAMETER	NEW MEXICO (ppm)	EPA MCL (ppm)	EPA MCLG (ppm)	EPA HA (ppm)
radium 226 (pCi/L)		20 (p)	Zero	
radium 228 (pCi/L)		20 (p)	Zero	
radium 226 + 228 (pCi/L)	30	5	Zero	
radon 222 (pCi/L)		300 (p)	Zero	
uranium	5	0.02 (p)	Zero	
Benzenes				
benzene	0.01	0.005	Zero	
Alkyl Benzenes				
methylbenzene (toluene)	0.75	1 (p) / 0.04 (a)	1	
ethylbenzene	0.75	0.7 (p) / 0.03 (a)	0.7	
dimethyl benzene isomers (xylenes)	0.62	10 (p) / 0.02 (a)	10	
vinylbenzene (styrene)		0.1	0.1	
trimethyl benzene isomers				
propyl benzene isomers				
butyl benzene isomers				
Chlorinated Benzenes				
chlorobenzene	tox	0.1	0.1	
o-dichlorobenzene	tox	0.6	0.6	
m-dichlorobenzene	tox			
p-dichlorobenzene	tox	0.075 (p) / 0.005 (a)	0.075	
1,2,4-trichlorobenzene		0.07	0.07	
1,3,5-trichlorobenzene				0.04
1,2,4,5-tetrachlorobenzene	tox			
pentachlorobenzene	tox			
hexachlorobenzene	tox	0.001	Zero	
Toluenes				
o-chlorotoluene				0.1
p-chlorotoluene				0.1
2,4-dinitrotoluene (2,4-DNT)	tox			

PARAMETER	NEW MEXICO (ppm)	EPA MCL (ppm)	EPA MCLG (ppm)	EPA HA (ppm)
2,4,6-trinitrotoluene (TNT)				0.002
isopropyltoluene				
Nitrogenated Benzenes				
aminobenzene (aniline)				
nitrobenzene	tox			
1,3-dinitrobenzene				0.001
Phenols (hydroxybenzenes)	0.005 (a)			
phenol (carbolic acid)	tox			4
2-chlorophenol				0.04
2,4-dichlorophenol	tox			0.02
2,4-dinitro-o-creosol	tox			
2,4-dimethylphenol				
2-methylphenol				
4-methylphenol				
2-nitrophenol				
dinitrophenols	tox			
2,4,5-trichlorophenol	tox			
2,4,6-trichlorophenol	tox			
2,4,6-trichlorophenol	tox			
pentachlorophenol	tox	0.001 (p) / 0.03 (a)	Zero	
p-cresol				
Polycyclics				
acenapthene				
anthracene	tox			
benz(a)anthracene		0.0001 (p)	Zero	
benzo(a)pyrene	0.0007	0.0002	Zero	
benzo(b)fluoranthene		0.0002 (p)	Zero	
benzo(k)fluoranthene	tox	0.0002 (p)	Zero	
chrysene		0.0002 (p)	Zero	
dibenz(a)anthracene		0.0003 (p)	Zero	
diphenylhydrazine	tox			

PARAMETER	NEW MEXICO (ppm)	EPA MCL (ppm)	EPA MCLG (ppm)	EPA HA (ppm)
fluoranthene	tox			
fluorene	tox			
indeno(1,2,3-c,d)pyrene		0.0004 (p)	Zero	
naphthalene	tox			0.3
naphthalenes ****	0.03			
phenanthrene	tox			
polychlorinated biphenyls (PCBs)	0.001			
PCBs as decachlorobiphenyl		0.0005	Zero	
pyrene	tox			
Methanes				
chloromethane (methyl chloride)	tox			0.003
dichloromethane (methylene chloride)	0.1	0.005	Zero	
trichloromethane (chloroform)	0.1		Zero (p)	
tetrachloromethane (carbon tetrachloride)	0.01	0.005	Zero	
bromomethane (methyl bromide)	tox			0.01
bromochloromethane				0.09
bromodichloromethane	tox		Zero (p)	
chlorodibromomethane			Zero (p)	0.1
tribromomethane (bromoform)	tox		Zero (p)	
trihalomethanes (THMs) ***		0.1/0.08 (p)	Zero	
fluorotrichloromethane (Freon 11)	tox			2
dichlorodifluoromethane (Freon 12)	tox			1
Ethanes				
1,2-dibromoethane (ethylene dibromide, EDB)	0.0001	0.00005	Zero	
1,1-dichloroethane	0.025			
1,2-dichloroethane (ethylene dichloride, EDC)	0.01	0.005	Zero	
1,1,1-trichloroethane (TCA)	0.06	0.2	0.2	
1,1,2-trichloroethane	0.01	0.005	0.003	
1,1,1,2-tetrachloroethane				0.07

PARAMETER	NEW MEXICO (ppm)	EPA MCL (ppm)	EPA MCLG (ppm)	EPA HA (ppm)
1,1,2,2-tetrachloroethane	0.01			
hexachloroethane	tox			
Ethenes (Ethylenes)				
chloroethane (vinyl chloride)	0.001	0.002	Zero	
1,1-dichloroethene	0.005	0.007	0.007	
cis-1,2-dichloroethene	tox	0.07	0.07	
trans-1,2-dichloroethene	tox	0.1	0.1	
trichloroethene (TCE)	0.1	0.005	Zero	
tetrachloroethene (perchloroethylene, PCE)	0.02	0.005	Zero	
Propanes & Propenes				
1,2-dichloropropane (propylene dichloride, PDC)		0.005	Zero	
1,2,3-trichloropropane				0.04
1,2-dibromo-3-chloropropane (DBCP)		0.0002	Zero	
dichloropropenes	tox			
1,3-dichloropropene	tox			0.01
Aldehydes, Ethers, Furans, & Ketones				
acetone				
bis (2-chloroethyl) ether	tox			
bis (2-chloroisopropyl) ether	tox			0.3
bis (chloromethyl) ether	tox			
dibenzofuran				
p-dioxane (diethylene dioxide)				0.568
formaldehyde (methanal)				1
isophorone	tox			0.1
methyl ethyl ketone (MEK, 2-butanone)				0.1
methyl tertiary butyl ether (MTBE)	0.1 (a)			0.04
tetrahydrofuran				

PARAMETER	NEW MEXICO (ppm)	EPA MCL (ppm)	EPA MCLG (ppm)	EPA HA (ppm)
Nitrosamines				
N-nitrosodiethylamine	tox			
N-nitrosodimethylamine (NDMA)	tox			
N-nitrosodibutylamine	tox			
N-nitrosodiphenylamine	tox			
N-nitrosopyrrolidine	tox			
Phthalate Esters				
dibutyl phthalate	tox			
di-2-ethylhexyl phthalate	tox	0.006	Zero	
diethyl phthalate	tox			
dimethyl phthlate	tox			
Explosives				
dinitrophenols	tox			
2,4-dinitrotoluene (2,4-DNT)	tox			
hexahydro-1,3,5-trinitro-s-triazine (RDX)				0.002
HMX				0.4
nitroglycerin (glycerol trinitrate)				0.005
nitroguanidine				0.7
2,4,6-trinitrotoluene (TNT)				0.002
Other Organics				
acrolein	tox			
acrylamide		tt	Zero	
acrylonitrile	tox			0.004
benzidine	tox			
chloral hydrate		tt (p)	0.04 (p)	
chloramine				0.3

PARAMETER	NEW MEXICO (ppm)	EPA MCL (ppm)	EPA MCLG (ppm)	EPA HA (ppm)
dibromoacetonitrile				0.02
dichloroacetic acid				0.003
dichloroacetonitrile				0.006
dichlorobenzidine	tox			
di(2-ethylhexyl)adipate		0.4	0.4	
diisopropyl methylphosphonate				0.6
epichlorohydrin (1-chlor-2,3-epoxypropane)		tt	Zero	
ethylene glycol (1,2-ethanediol)				7
Haloacetic Acids ****		0.06 (p)		
dichloroacetic acid			Zero (p)	
trichloroacetic acid			0.3 (p)	
hexachlorobutadiene	tox			0.001
hexachlorocyclopentadiene	tox	0.05 (p) / 0.008 (a)	0.05	
n-hexane				4.0
Other Pesticides				
acifluorfen				0.1
alachlor		0.002	Zero	
aldicarb		0.003 (p)	0.001	
aldicarb sulfone		0.002 (p)	0.001	
aldicarb sulfoxide		0.004 (p)	0.001	
aldrin	tox			0.001
ametryn				0.06
ammonium sulfamate				2
arsenal (imazapyr)				
atrazine		0.003	0.003	
baygon				0.003
bentazon				0.02
bromacil				0.09
butylate				0.35
carbaryl				0.7
carbofuran		0.04	0.04	

PARAMETER	NEW MEXICO (ppm)	EPA MCL (ppm)	EPA MCLG (ppm)	EPA HA (ppm)
carboxin				0.7
chloramben				0.1
chlordane	tox	0.002	Zero	
chlorothalonil				0.5
chlorpyrifos				0.02
cyanazine				0.01
2,4-D (2,4-dichlorophenoxyacetic acid)		0.07	0.07	
dacthal				4
dalapon		0.2	0.2	
DDT (dichloro diphenyl trichloroethane)	tox			
4,4'-DDD				
4,4'-DDE				
diazinon				0.0006
dicamba				0.2
dieldrin	tox			0.002
dimethrin				2
dinoseb		0.007	0.007	
dioxin		0.00000005	Zero	
diphenamid				0.2
diquat		0.02	0.02	
disulfoton				0.0003
diuron				0.01
endosulfan	tox			
endothall		0.1	0.1	
endrin	tox	0.002	0.002	
ethylene thiourea				0.001
fenamiphos				0.002
fluometuron				0.09
fonofos				0.01
glyphosate		0.7	0.7	
heptachlor	tox	0.0004	Zero	
heptachlor epoxide		0.0002	Zero	
hexazinone				0.2
lindane (gamma-BHC)	tox	0.0002	0.0002	

PARAMETER	NEW MEXICO (ppm)	EPA MCL (ppm)	EPA MCLG (ppm)	EPA HA (ppm)
alpha-BHC	tox			
beta-BHC	tox			
delta-BHC				
malathion				0.2
maleic hydrazide				4
methomyl				0.2
methoxychlor		0.04	0.04	
methyl chlorophenoxyacetic acid (MCPA)				0.011
methyl parathion				0.002
metolachlor				0.1
metribuzin				0.2
oxamyl (vydate)		0.2	0.2	
paraquat				0.03
picloram		0.5	0.5	
prometon				0.1
pronamide				0.05
propachlor				0.09
propazine				0.01
propham				0.1
simazine		0.004	0.004	
2,4,5-T (2,4,5-trichlorophenoxyacetic acid)				0.07
tebuthiuron				0.5
terbacil				0.09
terbufos				0.0009
toxaphene	tox	0.003	Zero	
2,4,5-TP (silvex)		0.05	0.05	
trifluralin				0.005

Abbreviations

al Action Level that, if exceeded, requires water treatment
BHC benzene hexachloride, also called hexachlorocyclohexane
DDD 1,1'-(2,2-dichloroethylidene) -bis/4-chlorobenzene

DDE 1,1'-(2,2-dichloroetheneylidene)-bis/4-chlorobenzene
HA Health Advisory
HMX octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
MCL Maximum Contaminant Level
MCLG Maximum Contaminant Level Goal
mg/L milligrams per liter
mrem/yr millirem per year
mrem ede/yr dose committed over a 50-year period to a "reference man" from an annual intake rate of 2 liters drinking water per day
MTBE methyl tertiary butyl ether, a synonym for 2-methoxy-2-methyl propane (the standard includes other ether-based gasoline additives)
NP the contaminant shall Not be Present
pCi/L picocuries per liter
tox a numerical standard has not been established, but the contaminant is listed in a narrative standard of "toxic pollutant" defined in WQCC regulations
2,4,5-TP 2,4,5-trichlorophenoxpropionic acid
tt Treatment Technique that public water system operators must adhere to instead of a numerical standard
um micrometer
U.S. EPA Uniter States Environmental Protection Agency
WQCC New Mexico Water Quality Control Commission

Footnotes

* The proposed standard excludes radon 222, radium 226 and uranium activity
** This standard excludes radium 228 activity. Units for the existing standard are mrem/yr. U.S. EPA has proposed to change the units to mrem ede/yr.
*** The "THMs" standard applies to the sum of chloroform, dichlorobromomethane, dibromochloromethane, and bromoform.
**** This standard applies to the sum of naphthalene and monomethylnaphthalene isomers.
***** This standard applies to the sum of mono-, di-, and trichloroacetic acids, and mono- and dibromoacetic acids.

Use and Applicability of Standards

All New Mexico standards are adopted by the WQCC except for the MTBE and petroleum (floating product and undesirable odor) standards, which are adopted by the New Mexico Environmental Improvement Board.

U.S. EPA's MCLGs are set at levels that would result in no known or anticipated adverse health effects with an adequate margin of safety. MCLGs do not take treatment costs into considerartion and are not enforceable. Health-based proposed MCLs and final enforceable MCLs are set as close to MCLGs as feasible with use of best technology, treatment techniques and other means.

U.S. EPA's HAs serve as informal technical guidance to assist Federal, State and Local officials responsible for protecting public health when emergency spills or contamination situations occur. They are not to be construed as legally enforceable Federal standards and are subject to change as new information becomes available. All HAs listed are for lifetime exposures except for p-dioxane (10 day) and n-hexane (7 year).

Section 5.0 Groundwater Monitoring Results

Title	Table/Figure	Section
Measured Depth to Groundwater	Tables1 & 2	9.0
Direction of Groundwater Flow	Figures 4 & 5	10.0
Field Water Quality Measurements	Tables 3 & 14	9.0
Comparison to Previous Monitoring	Tables 2, 4 and 14	9.0

Section 6.0 Chemical Analytical Data

Section 7.0 Remediation System Monitoring

Remediation System Monitoring

Summary of System Capabilities and Performance/Monitoring Data/System Failures-Modifications

Total Fluids Pumping

The primary remediation system in place at Bloomfield is separate phase hydrocarbon (SPH) removal utilizing total fluids pumping. Total fluids pumping is used to bring SPH and hydrocarbon impacted groundwater to the surface for treatment or disposal. This is accomplished by pumping wells within the SPH plume. The recovery wells pump SPH and hydrocarbon impacted groundwater to the refinery API separator and through the refinery process wastewater treatment system. Pumping is most effective in saturated zones with high hydraulic conductivities such as those measured at the refinery. Each pump can discharge up to 1.5 to 2 gpm. In 2004 total fluids pumping was accomplished through the use of thirteen recovery wells: RW# 1, 2, 9, 14, 15, 16, 17, 18, 19, 22, 23, 28 and 45.

In 2004, two skimmer pumps RW # 42 & 43 were also used to target the SPH source. Skimmer pumps are triggered into operation by sensors that detect a measurable thickness of the SPH.

In 2004 the total gallons pumped from the recovery wells was 1,168,147 gallons as shown in the Table in Section 7. Over sixty-eight percent of the gallons pumped were from RW-19.

MW-45 was converted to a RW on August 12, 2004 in response to hydrocarbon surfacing in a couple of the draws on the north side of the refinery. The pump from RW #14 was used in RW #45 and RW #14 has not been reactivated.

North Tributaries (draws)

In August 2004 recent emergence of active petroleum hydrocarbon seeps were found in two small tributaries (draws) on the north side of the refinery. Hydrocarbon staining had migrated down the draws toward the San Juan River. Upon receiving the Emergency Action Directive, Giant implemented the following tasks. The visually contaminated soils were removed and the vertical and horizontal extent of the contamination was investigated. Daily progress reports were sent to the agencies. Compacted soil barriers were constructed in each tributary to prevent migration into the river. Lined collection and barrier systems

were installed at the point of the seeps. The collection points are monitored and pumped for recovery.

The top layer of the impacted soil was removed from the draws and placed into sixteen, 55-gallon drums and sampled. The rest of the soil was stockpiled at the Hydro blast Pad and near Tank #36 and sampled. Giant received OCD and NMED approval to dispose of the 16 barrels of hydrocarbon contaminated soil in the San Juan County Landfill. A copy of the waste shipment record can be found on the last page of Section 13. The stockpiled soil was approved for on-site utilization.

In response to these discharges MW-45 was converted into a recovery well in August.

Also Giant prepared a Monitoring and Contingency Plan, which stipulated river sampling and monitoring of the draws. To review the entire Plan refer to Section 16, Tab 9.

The river was sampled at the mouth of the draws on a monthly basis and analyzed for BTEX/MTBE (8021), TPH (8015 DRO and GRO), WQCC metals, semi-volatiles organics (8270) and general chemistry. After four months of sampling and no evidence of pollutants the sampling frequency will be reduced to quarterly. All analysis results were below the NM WQCC standards. BTEX and MTBE results for September through December were all below detection limits. A summary of San Juan River Analytical Data can be found in Section 9, Table 13.

All draws were inspected every other week for visual hydrocarbon staining starting in August.

River Sheet Pilings-Slurry Wall

Sheet pilings and a bentonite slurry wall are in place along the San Juan River's edge. The sheet pilings extend around the perimeter of the riverbank to the river inlet station. The purpose of the sheet piling and the slurry wall is to prevent any SPH and dissolved-phase hydrocarbons in the groundwater from migrating to the west, into the San Juan River. There are two piezometers located near the river P-4 and P-5 with P-5 located on the riverside of the sheet piling.

BTEX, General Chemistry, Dissolved Metals, Total Metals (RCRA 8)
Piezometers #4 and #5 continue to see benzene, ethyl benzene and xylene levels above the NM WQCC standards. General chemistry results indicate all parameters are below the standards except for TDS (P4- 1700 ppm and P5-1400 ppm). Dissolved metals are below the standards for both piezometers except for Fe and Mn, which are just above the respective standard.

In October 2004 a field investigation was performed in the river terrace sheet-pile area. The purpose of the investigation was to 1) install two new monitoring wells at the river terrace to supplement P-4 and P-5 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 involved the installation of eight temporary well points (TP-1 through TP-8) and two permanent wells (MW-48 and MW-49).

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 riverside of the barrier. For example, the November sampling results indicate benzene and toluene concentrations in MW-49 were reported below the laboratory detection limit of 10 ug/L. Ethyl benzene and xylenes were detected, but were reported at concentrations approximately two orders of magnitude less than reported in well MW-48. The December 27, sampling results for MW-48 and MW-49 were very similar to the November 1, sampling results. 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.

Separate phase hydrocarbon (SPH) was not observed during the installation of the two monitoring wells (MW-48 and MW-49) and eight temporary well points (TP-1 through TP-8) in the River Terrace.

An aquifer (pump) test was performed in December on MW-48. Malcolm Pirnie, an independent environmental engineering firm, was contracted to administer the test. The purpose of the pump test was to obtain aquifer hydraulic properties of the river terrace alluvial aquifer below the refinery. To review the complete report refer to Section 16, Tab 10. Data from the aquifer test was utilized from both the pumping and recovery phases. The aquifer test data was used to estimate hydraulic conductivity of the aquifer. The draw down curves for piezometers

located near the barrier wall and the bluff face (TP-1, 2 and-8) show continuous draw down when pumping at 4.7 gpm. As the cone of depression from the pumping well spreads laterally and intercepts the barrier wall and bedrock face, draw down increases in these areas due to their impermeable characteristics. In contrast, the water levels east or up gradient of well MW-48 only slightly declined during the test.

After running multiple iterations of the capture zone model, Malcolm Pirnie determined that an adequate capture zone could be obtained at a pumping rate of 2 to 5 gpm.

Hammond Ditch Recovery System

The north collection system consists of recovery tank #37, which collects groundwater from two 8-inch influent lines connected to the perforated sub-drain beneath the Hammond ditch irrigation canal. The water is pumped to a 4 inch steel line beneath the road canal and up the embankment south of the tank, which transport the groundwater to the API separator. The total volume pumped in 2004 was 242,453 gallons.

Since the lining of the Hammond Ditch in 2001, it is no longer a contributor to local groundwater recharge at the site. Prior to the lining of the Hammond Ditch, the infiltration of source water through the shallow zone soils served as a hydraulic curtain for the migration of Phase-Separated Hydrocarbon (PSH) along the north property boundary. Sampling of the monitor wells MW-45 and MW-47 on the outside (river side) of the Hammond Ditch indicate that some BTEX is not being contained by this collection system. This is probably due to the lack of hydraulic curtain from the ditch.

East Outfall

The east outfall is collected into a pipe, which flows, to Tank #38 and then to Tank #33 located just south of the western fresh water pond. Hydrocarbons are skimmed off the top of the tank into a secondary tank, which is emptied with a vacuum truck and taken to the API separator. The remaining water from Tank #33 is then piped to the fresh water pond. The total gallons pumped in 2004 were 7,088,402 gallons.

In January the meter was freezing and not operating properly. It was replaced and back in service on February 10.

Bloomfield Refinery Recovery Wells

Well #	Date In Service	Flowrate Mar-04	Flowrate Aug-04	Annual Total (gallons)
RW #1	Aug-03	28 gpd	28 gpd	10,220
RW #2	Aug-88	530 gpd	379 gpd	165,892
RW #9	Nov-03	114 gpd	87 god	36,682
RW #14	Aug-90	568 gpd	246 gpd	9,0761 *
RW #15	Aug-90	568 gpd	95 gpd	120,997
RW #16	Aug-90	O/S	189 gpd	51,030
RW #17	Aug-90	381 gpd	114 gpd	90,337
RW #18	Aug-90	O/S	3 gpd	810
RW #19	Aug-90	436 gpd	663 gpd	802,270
RW #22	Nov-03	130 gpd	68 gpd	36,135
RW #23	Jun-03	O/S	49 gpd	13,230
RW #28	May-03	60 gpm	133 gpd	35,222
RW #42	May-00	O/S	O/S	
RW #43	Mar-00	O/S	0.43 gpd	116
RW #45	Aug-04		900 gpw	18,000
			TOTAL =	**1,168,147 GPY**

Mw #45 was put in service as a RW on August 12, 2004. Approxiamatley 900 gallon per week is pumped out of that well. The pump was pulled from RW #14 to use at MW #45. RW #14 was not reactivated.

Recovery Well flows were measured using a 500 ml graduated cylinder. At the time of a pump cycle, the discharge line was disconnected and placed in the graduated cylinder. A measurement was taken over time and then calculated to a gallons per day rate.

TANK #37 METER READING 2004

Date	Time	Hours	Reading	Gallons	Flow Rate(gal/min)
12/31/2003	9:00 AM	504.00	9535.6		
1/13/2004	10:00 AM	313.00	9634.2	4141.2	0.2
4/12/2004	1:30 PM	2212.00	10700.9	44801.4	0.3
5/25/2004	10:00 AM	1032.00	12440.6	73067.4	1.2
7/21/2004	8:00 AM	1368.00	13709.3	53285.4	0.6
8/9/2004	11:00 AM	435.00	13974.9	11155.2	0.4
9/27/2004	10:30 AM	1176.00	14624	27262.2	0.4
10/12/2004	12:30 PM	361.50	15194	23940.0	1.1
1/4/2005	8:00 AM	2011.00	16473.6	53743.2	0.4

Total Volume pumped in 2004 = 242,453 gallons

TANK #38 FLOW 2004
(EAST OUTFALL)

DATE	MTD	DAILY GPM
Jan-04	172,100.00	*
Feb-04	370,398.00	14
Mar-04	647,430.00	15
Apr-04	787,962.00	18
May-04	829,500.00	19
Jun-04	770,448.00	15
Jul-04	742,434.00	15
Aug-04	627,438.00	13
Sep-04	510,003.00	11
Oct-04	564,141.00	10
Nov-05	438,312.00	7
Dec-05	628,236.00	14

Operations reads the meter at midnight every night. Operations Manager compiles the monthly operating summary and the MTD number is from that summary.

* Meter was freezing up and not operating properly. Replaced and back in service 2-10-04

Total Volume Pumped in 2004 = 7,088,402 gallons

Section 8.0 Summary

Summary

Groundwater Monitoring Discussion

Monitor Wells

Groundwater samples were collected in March and August of 2004. In March samples were collected from the following monitor wells: MW1, MW12, MW13, MW20, MW32, MW33, MW35, MW37, MW38, MW45, MW47. In August samples were collected from the following wells: MW1, MW3, MW7, MW8, MW11, MW12, MW13, MW21, MW26, MW27, MW29, MW30, MW31, MW32, MW33, MW34, MW35, MW36, MW37, MW38, MW39 and MW44.

BTEX and MTBE Summary (March 2004 all analysis are in ppm)

Monitor well MW1, MW12, MW32 and MW33 were non detect for all of these parameters. Benzene was detected in MW20 (21), MW45 (1), MW47 (.56) & MW35 (.006). Toluene was only found in MW20 (1.2). Ethylbenzene was detected in MW45 (7.5), MW47 (.9) MW20 (.1) and MW35 (.0061). MTBE was detected in MW20 (95), MW13 (.02), MW38 (.015), MW35 (.011), MW37 (.004). Xylene was detected in MW45 (28), MW47 (7.9), MW20 (.5), MW35 (.0033), MW38 (.0014), MW37 (.0006).

BTEX and MTBE Summary (August 2004 all analysis are in ppm)

Monitor well MW1, MW3, MW7, MW8, MW27, MW32 and MW33 were non detect for all of these parameters. Benzene was detected in MW31 (3.7), MW11 (1.7), MW30 (1.7), MW26 (.74), MW39 (.46), MW21 (.13), MW35 (.0082), MW36 (0009). Toluene was detected in MW31 (.4), MW30 (.37), MW39 (.15) and MW34 (.0039). Ethylbenzene was detected in MW30 (1.9), MW39 (.55), MW26 (.46), MW31 (.32) and MW11 (.064), MW34 (.019), MW21 (.0098), MW35 (.0061), MW37 (.0012, MW38 (.0012). MTBE was detected in MW21 (.028), MW13 (.027), MW35 (.0096), MW36 (.0085), MW38 (.0085), MW44 (.0048), MW29 (.0026), MW37 (.0026). Xylene was detected in most of the wells with the high detected in MW30 (2.5) to a low found in MW37 (.00062).

Groundwater Monitoring Conclusions

Comparison of Results to Cleanup Levels and Historical Groundwater Monitoring and Analytical Data

Monitor Wells

BTEX March

The key area of concern is the BTEX above NM WQCC standards found in MW#45 and the BEX found in MW#47 during the March sampling event. These wells are located on the outside (river side) of the Hammond ditch, indicating that contamination has moved past the Hammond Ditch recovery system.

BTEX August

All wells except for MW20 continue to see decreased levels of BTEX over time. The following wells were less than detection for BTEX: MW1, MW3, MW7, MW8, MW27, MW32 and MW33. None of the wells were above the standard of .75 ppm for toluene. The wells that exceeded the standard of .01 for benzene were: MW11, MW21, MW26, MW30, MW31 and MW39. The year 2004 was the first year that MW21, MW30, MW31 and MW39 were sampled for BTEX. MW20 was the only well to see increased levels of BTEX with the NM WQCC standard of .01 ppm for benzene exceeded at 21 ppm, toluene standard of .75 ppm standard was exceeded (1.2 ppm) and the MTBE level was 95 ppm.

General Chemistry

In the August sampling event all the wells were below the New Mexico WQCC standards for fluoride and nitrogen. The TDS for all the monitor wells sampled except for MW1 and MW29 were above the NM standard. The wells that exceeded the standard for more than one parameter (chloride and sulfate) were MW8, MW13, MW21, MW30, MW31 and MW33.

Dissolved Metals

In the August monitor well sampling event, As, Cd, Ag, and U were all less than detectable and Cr, Cu, and Pb were all found below the NM standards. The only wells to have multiple metals above the standards were MW11, MW21 and MW26 which exceeded for Ba and Mn. MW11 also exceeded the zinc standard of 10 ppm (63 ppm). The following wells exceeded for both Fe and Mn: MW34, MW35, MW36, MW37 and MW38.

Total Metals (RCRA 8)

In the August monitor well sampling event As, Se and Ag were all below detectable levels, and Cd and Hg were below the MCLs in all wells except for MW12 (Cd-.003 ppm) and (Hg- .005ppm). Cr exceeded the MCL in MW8, MW12, MW37, MW38, MW39, MW41 and Pb in MW11, MW12, MW26, MW27, MW39 and MW44. The two wells to exceed the MCL for both Cr and Pb were MW12 and MW39.

Historical comparison could not be made for the monitor well sampling for general chemistry, dissolved metals and total metals as analysis were only started for some wells in 2003 and others in 2004.

Piezometers

BTEX, General Chemistry, Dissolved Metals, Total Metals (RCRA 8)
Piezometers #4 and #5 continue to see benzene, ethylbenzene and xylene levels above the NM WQCC standards. General chemistry results indicate all parameters are below the standards except for TDS (P4- 1700 ppm and P5-1400 ppm). Dissolved metals are below the standards for both piezometers except for Fe and Mn, which are just above the respective standards.

Outfalls

BTEX, General Chemistry, Dissolved Metals, Total Metals (RCRA 8)
Outfalls 2 and 3 were less than detection limits for BTEX and MTBE which is consistent with 2003 results. The general chemistry, dissolved metals and total metals results were all below NM WQCC standards and many were below detection limits.

Recommendations for Future Remedial Action

In November Giant submitted a voluntary Corrective Measures Plan, which was approved, by OCD and NMED in December(Section 16, Tab 11). As a corrective measure to mitigate further migration of petroleum hydrocarbons towards the San Juan River and beyond the northern property boundaries of the refinery, Giant has committed to the installation of a containment barrier wall (soil-bentonite slurry wall) and fluid collection systems approximately 2,600 feet in length along the north side of the Hammond Ditch and extending from County Road 4990 to a location approximately 200 feet east of the pipeline corridor.

Giant will abide by the approval conditions stated by the agencies in their letters The key conditions include:

- Submit the fluid collection system design for approval before actual installation.
- Submit a plan for approval to evaluate the effectiveness of the wall.

In November Giant submitted a voluntary Corrective Measures Plan, which was approved, by OCD and NMED in December (Section 16, Tab12). This is a corrective measure to mitigate further migration of petroleum hydrocarbons towards the San Juan River in the River Terrace Sheet Pile Area.
The key conditions include:

- Provide NMED with a map containing proposed well locations for NMED approval prior to installation
- Submit the results and findings of the 24-hour aquifer test performed on MW-48
- Submit the results of the capture zone analysis

Section 9.0 List of Tables

Groundwater Elevation March 2004 Table1

Date	Well ID	Collar Elevation	Well Casing Height	Total Well Depth	Depth To SPH	Depth To Water	Corrected Groundwater Elevation
3/2/2004	MW-01	5514.08	1.64	21.56	0	17.43	5498.29
3/2/2004	MW-03	5535.05	0.65	36.75	0	36.33	5499.37
3/2/2004	MW-04	5522.03	1.5	30.48	27.24	27.86	5496.17
3/2/2004	MW-05	5545.03	0.33	37.2		DRY	
3/2/2004	MW-06	5549.84	1.19	48		DRY	
3/2/2004	MW-07	5522.87	1.62	62.61	0	27.36	5497.13
3/2/2004	MW-08	5530.49	1.84	35.93	0	32.77	5499.56
3/2/2004	MW-11	5503.41	3.41	22.94	0	11.32	5495.50
3/2/2004	MW-12	5495.87	3.08	14.98	0	11.95	5487.00
3/3/2004	MW-13	5535.62	2.83	52.89	0	40.41	5498.04
3/4/2004	MW-20	5514.92	1.36	27.13	21.05	21.47	5495.15
3/2/2004	MW-21	5518.45	1.27	30.38	22.32	22.35	5497.39
3/4/2004	MW-24	5505.05	1.12	15.14		DRY	
3/4/2004	MW-25	5527.37	3	41.2	32.64	33.61	5497.54
3/2/2004	MW-26	5512.13	2.11	25.11	0	17.32	5496.92
3/2/2004	MW-27	5512.17	2.76	24.42	0	18.71	5496.22
3/2/2004	MW-29	5517.22	2.88	28.62	0	23.32	5496.78
3/3/2005	MW-30	5531.29	1.96	40.13	0	33.96	5499.29
3/4/2004	MW-31	5531.13	1.52	39.16	0	34.13	5498.52
3/2/2004	MW-32	5521.2	0.75	27.51	0	24.98	5496.97
3/2/2004	MW-33	5516.16	1.93	25.51	0	22.38	5495.71
3/2/2004	MW-34	5505.59	2.35	20.96	0	14.5	5493.44
3/2/2004	MW-35	5512.61	3.11	26.45	0	22.98	5492.74
3/2/2004	MW-36	5510.38	2.94	23.26	0	21.23	5492.09
3/2/2004	MW-37	5513.12	2.88	27.58	0	23.94	5492.06
3/2/2004	MW-38	5513	2.82	26.82	0	24.32	5491.50
3/4/2004	MW-39	5515.86	2.1	38.34	0	24.45	5493.51
3/4/2004	MW-40	5524.13	0	30.07	29.05	29.95	5494.90
3/4/2004	MW-41	5523.9	0	31.62	27.3	28.41	5496.38
3/3/2004	MW-44	5528.87	3.19	50.91	0	33.4	5498.66
3/3/2004	MW-45	5496.33	2.1	16.92	9.32	15.85	5487.80
3/3/2004	MW-46	5496.43	1.79	10.39		DRY	

Groundwater Elevation March 2004 Table1

Date	Well ID	Collar Elevation	Well Casing Height	Total Well Depth	Depth To SPH	Depth To Water	Corrected Groundwater Elevation
3/3/2004	MW-47	5496.43	2.64	14.28	10.31	11.79	5488.46
3/4/2004	P-03	5506.72	0.3	22.73	0	10.07	5496.95
3/4/2004	P-04	5426.31	3.25	13.94	0	8.29	5421.27
3/4/2004	P-05	5424.4	2.94	14.27	0	9.54	5417.80
3/4/2004	P-06(SB8-1103)	5492.86	1.24	14.46	0	10.83	5483.27
3/4/2004	P-07(SB9-1103)	5495.48	0	9.62	0	5.99	5489.49
3/4/2004	P-08(SB7-1103)	5495.15	0	10.19	8.64	9	5486.44
3/4/2004	P-09(SB6-1103)	5494.77	0	9.29	0	6.55	5488.22
3/2/2004	P10(SB11-1103)	5517.74	1.26	24.48	0	20.99	5498.01
3/2/2004	P-11(SB12-1103	5513.5	1.02	19.8	0	16.41	5498.11
3/3/2004	RW-01	5524.86	0.88	40.8	31.32	32.1	5494.26
3/3/2004	RW-02	5522.61	0.78	35.86	27.29	27.36	5496.09
3/4/2004	RW-03	5515.44	1.92	34.57	22.43	22.49	5494.92
3/3/2004	RW-09	5517.98	1.63	34.04	25.23	26.29	5494.17
3/3/2004	RW-14	5532.33	2.45	41.94	35.21	36.65	5499.28
3/3/2004	RW-15	5531.74	2.36	43.43	0	35.93	5498.17
3/3/2004	RW-16	5530.43	2.43	41.48	0	35.04	5497.82
3/3/2004	RW-17	5528.86	2.45	41.89	35.45	35.55	5495.84
3/3/2004	RW-18	5523.3	2.52	37.58	31.3	33.61	5494.06
3/3/2004	RW-19	5525.56	1.33	36.64	30.86	31.93	5495.82
3/3/2004	RW-22	5518.36	2.49	35.6	25.88	26.66	5494.81
3/3/2004	RW-23	5515.86	1.98	35.53	23.72	23.93	5494.08
3/3/2004	RW-28	5522.44	1.84	36.99	29.55	31.83	5494.27
3/3/2004	RW-42	5523.97	0	32.02	27.23	28.55	5496.48
3/3/2004	RW-43	5515.74	0.5	24.03	21.89	21.96	5494.34

Groundwater Elevation August 2004 Table 2

Date	Well ID	Collar Elevation	Well Casing Height	Total Well Depth	Depth To SPH	Depth To Water	Corrected Groundwater Elevation
8/23/2004	MW-01	5514.08	1.64	21.56	0	17.15	5512.29
8/23/2004	MW-03	5535.05	0.65	36.75	0	36.31	5528.44
8/25/2004	MW-04	5522.03	1.5	30.48	27.31	27.96	5496.09
8/26/2004	MW-05	5545.03	0.33	37.2	0	DRY	
8/24/2004	MW-06	5549.84	1.19	48	0	DRY	
8/25/2004	MW-07	5522.87	1.62	62.61	0	27.79	5518.93
8/19/2004	MW-08	5530.49	1.84	35.93	0	32.9	5525.75
8/16/2004	MW-11	5503.41	3.41	22.94	0	11.72	5504.48
8/16/2004	MW-12	5495.87	3.08	14.98	0	12.38	5496.47
8/18/2004	MW-13	5535.62	2.83	52.89	0	40.51	5530.35
8/26/2004	MW-20	5514.92	1.36	27.13	21.10	21.44	5495.11
8/23/2004	MW-21	5518.45	1.27	30.38	22.25	22.27	5497.47
8/26/2004	MW-24	5505.05	1.12	15.14		DRY	
8/19/2004	MW-25	5527.37	3	41.2	32.64	33.61	5497.54
8/19/2004	MW-26	5512.13	2.11	25.11	0	17.39	5510.76
8/18/2004	MW-27	5512.17	2.76	24.42	0	18.7	5511.19
8/19/2004	MW-29	5517.22	2.88	28.62	0	23.15	5515.47
8/23/2004	MW-30	5531.29	1.96	40.13	0	33.95	5526.46
8/19/2004	MW-31	5531.13	1.52	39.16	0	34.21	5525.81
8/17/2004	MW-32	5521.20	0.75	27.51	0	24.93	5516.96
8/17/2004	MW-33	5516.16	1.93	25.51	0	22.29	5513.63
8/17/2004	MW-34	5505.59	2.35	20.96	0	14.24	5505.09
8/17/2004	MW-35	5512.61	3.11	26.45	0	22.81	5511.16
8/17/2004	MW-36	5510.38	2.94	23.26	0	21.3	5509.06
8/17/2004	MW-37	5513.12	2.88	27.58	0	23.99	5511.20
8/17/2004	MW-38	5513.00	2.82	26.82	0	24.51	5510.92
8/26/2004	MW-39	5515.86	2.1	38.34	0	24.59	5513.04
8/25/2004	MW-40	5524.13	0	30.07	28.94	29.76	5495.03
8/25/2004	MW-41	5523.90	0	31.62	27.43	28.34	5496.29
8/23/2004	MW-44	5528.87	3.19	50.91	0	33.8	5525.30
8/16/2004	MW-45	5496.33	2.1	16.92	Not Measured - Pumping		
8/16/2004	MW-46	5496.43	1.79	10.39	0	DRY	

Groundwater Elevation August 2004 Table 2

Date	Well ID	Collar Elevation	Well Casing Height	Total Well Depth	Depth To SPH	Depth To Water	Corrected Groundwater Elevation
8/16/2004	MW-47	5496.43	2.64	14.28	10.32	11.55	5488.50
8/26/2004	P-03	5506.72	0.3	22.73	0	11.44	5504.73
8/18/2004	P-04	5426.31	3.25	13.94	0	8.41	5427.88
8/18/2004	P-05	5424.40	2.94	14.27	0	9.24	5425.49
8/25/2004	RW-01	5524.86	0.88	40.8	31.32	31.84	5494.32
8/25/2004	RW-02	5522.61	0.78	35.86	26.53	27.22	5496.72
8/26/2004	RW-03	5515.44	1.92	34.57	22.71	22.74	5494.64
8/25/2004	RW-09(MW-09)	5517.98	1.63	34.04	25.13	25.72	5494.36
8/23/2004	RW-14	5532.33	2.45	41.94	0	35.11	5527.76
8/25/2004	RW-15	5531.74	2.36	43.43	0	34.92	5527.12
8/25/2004	RW-16	5530.43	2.43	41.48	0	35.05	5525.85
8/25/2004	RW-17	5528.86	2.45	41.89	33.37	33.63	5497.89
8/25/2004	RW-18	5523.30	2.52	37.58	30.48	30.86	5495.26
8/25/2004	RW-19	5525.56	1.33	36.64	30.40	31.42	5496.29
8/25/2004	RW-22	5518.36	2.49	35.6	29.95	29.98	5490.89
8/25/2004	RW-23	5515.86	1.98	35.53	23.53	23.63	5494.29
8/25/2004	RW-28(MW-28)	5522.44	1.84	36.99	29.38	31.22	5494.53
8/25/2004	RW-42(MW42)	5523.97	0	32.02	27.39	28.4	5496.38
8/25/2004	RW-43(MW-43)	5515.74	0.5	24.03	21.00	21.28	5495.18
8/30/2004	P-06(SB8-1103)	5492.86	1.24	14.46	10.86	11.22	5483.17
8/30/2004	P-07(SB9-1103)	5495.48	0	9.62	0	6.18	5494.24
8/30/2004	P-08(SB7-1103)	5495.15	0	10.19	8.66	8.76	5486.47
8/30/2004	P-09(SB6-1103)	5494.77	0	9.29	0	6.47	5493.48
8/25/2004	P10(SB11-1103)	5517.74	1.26	24.48	0	20.81	5514.84
8/25/2004	P-11(SB12-1103	5513.50	1.02	19.8	0	16.23	5511.27
9/1/2004	SB1-0704	5495.28	0	10	0	7.01	5493.88
8/30/2004	SB2-0704	5494.96	0	11.5	0	6.81	5493.60
9/1/2004	SB3-0704	5495.21	0	11.5	6.75	7.76	5488.26
9/1/2004	SB4-0704	5495.96	0	11	0	7.55	5494.45
9/1/2004	SB5-0704	5497.78					
8/30/2004	SB6-0704	5496.86	0	10.5	0	6.78	5495.50
8/30/2004	SB7-0704	5496.70	0	10.5	6.12	6.69	5490.47
9/1/2004	SB8-0704	5497.91	0	10.5	0	5.94	5496.72

Water Quality Field Measurements

Table 3

TE	RW/MW	DEPTH TO LIQUID (ft)	SPH	WELL DEPTH	E.C.	pH	TEMP.	D.O	ORP
Aug-04	MW #1	17.15	0	21.56	927	6.90	63	5.4	-532
Mar-04		17.43	0	21.56	887	7.51	53		
Aug-03		17.16	0	21.62	1001	7.41	63	6.5	105
Aug-04	MW #3	36.31	0	36.75	7558	6.96	64		-11
Mar-04		36.33	0	36.75					
Aug-03		36.31	0	36.75	7818	6.96	66		57
Aug-04	MW #4	27.96	27.31	30.5	no sample	well	contains	hydrocarbon	
Mar-04		27.86	27.24	30.5	no sample	well	contains	hydrocarbon	
Aug-03		27.95	27.07	30.5	no sample	well	contains	hydrocarbon	
Aug-04	MW #5	0	0	36.92	dry	well			
Mar-04		0	0	36.92	dry	well			
Aug-03		0	0	36.92	dry	well			
Aug-04	MW #6	0	0	47.92	dry	well			
Mar-04		0	0	47.92	dry	well			
Aug-03		0	0	47.92	dry	well			
Aug-04	MW #7	27.79	0	62.61	8693	7.00	63	2.8	84
Mar-04		27.36	0	62.61					
Aug-03		27.57	0	62.61					
g-04	MW #8	32.9	0	35.93	2600	7.02	62	2.9	142
Mar-04		32.77	0	35.93					
Aug-03		32.93	0	35.93	2654	6.98	60	7.1	176
Aug-04	MW #11	11.72	0	22.94	2093	6.81	68	13.8	-36
Mar-04		11.32	0	22.94					
Aug-03		11.69	0	22.93	2338	6.82	66	5.6	-53
Aug-04	MW #12	12.38	0	14.98	2164	6.85	66	9.3	151
Mar-04		11.95	0	14.98	1464	7.22	49		
Aug-03		11.39	0	14.98	5920	7.06	64	5.8	81
Aug-04	MW #13	40.51	0	52.89	3638	6.79	62	5.0	158
Mar-04		40.41	0	52.89	3895	6.96	59		
Aug-03		40.23	0	52.9	4573	6.77	64	5.6	86
Aug-04	MW #20	21.44	21.10	27.15	no sample	well	contains	hydrocarbon	
Mar-04		21.47	21.05	27.15	1576	7.05	62		
Aug-03		21.87	20.99	27.15	no sample	well	contains	hydrocarbon	
Aug-04	MW #21	22.27	22.25	30.38	4405	6.81	63	4.0	-43
Mar-04		22.35	22.32	30.38					
Aug-03		22.46	22.33	30.38					

Water Quality Field Measurements

Table 3

TE	RW/MW	DEPTH TO LIQUID (ft)	SPH	WELL DEPTH	E.C.	pH	TEMP.	D.O	ORP
Aug-03	MW #24	14.93	14.91	15.13	not enough to sample - contains hydrocarbon				
Mar-04		0	0	15.13	dry	well			
Aug-03		14.93	14.91	15.13	not enough to sample - contains hydrocarbon				
Aug-04	MW #25	33.4	32.77	41.2	fuel fingerprint - contains hydrocarbon				
Mar-04		33.61	32.64	41.2					
Aug-03		33.57	32.42	41.2					
Aug-04	MW #26	17.39	0	25.11	2422	6.81	65	7.5	-33
Mar-04		17.32	0	25.11					
Aug-03		33.57	32.42	41.2	2267	6.65	68	4.9	-69
Aug-04	MW #27	18.70	0	24.42	2474	6.89	65	1.7	-143
Mar-04		18.71	0	24.42					
Aug-03		18.50	0	24.42	2776	6.73	65	4.1	-188
Aug-04	MW #29	23.15	0	28.62	850	7.03	62	4.7	115
Mar-04		23.32	0	28.62					
Aug-03		23.24	0	28.62					
Aug-04	MW #30	33.95	0	40.13	4480	6.90	62	over range	-196
Mar-04		33.96	0	40.13					
g-03		33.90	0	40.13					
ug-03	MW #31	34.21	0	39.16	3945	7.07	64	3.4	-19
Mar-04		34.13	0	39.16					
Aug-03		34.02	0	39.16					
Aug-04	MW #32	24.93	0	27.51	3576	6.88	62	5.6	79
Mar-04		24.98	0	27.51	4898	6.71	58		
Aug-03		24.8	0	27.51	5346	6.87	63	7.4	64
Aug-04	MW #33	22.29	0	25.51	4630	6.81	63	5.6	106
Mar-04		22.38	0	25.51	4950	7.35	57		
Aug-03		22.11	0	25.51	4373	6.89	66	5.0	110
Aug-04	MW #34	14.24	0	20.96	2144	6.80	64	1.7	-51
Mar-04		14.5	0	20.96					
Aug-03		14.57	0	20.97	2220	6.75	70	4.9	-76
Aug-04	MW #35	22.81	0	26.45	2000	6.81	60	3.6	-63
Mar-04		22.98	0	26.45	2026	6.97	58		
Aug-03		23.04	0	26.45	2005	6.72	66	5.4	-95
Aug-04	MW #36	21.30	0	23.26	1880	6.85	68	8.4	-111
Mar-04		21.23	0	23.26					
Aug-03		21.44	0	23.26					

Water Quality Field Measurements Table 3

DATE	RW/MW	DEPTH TO LIQUID (ft)	SPH	WELL DEPTH	E.C.	pH	TEMP.	D.O	ORP
Aug-04	MW #37	23.99	0	27.58	2085	7.06	62	4.3	-103
Mar-04		22.94	0	27.58	2033	7.29	57		
Aug-03		24.11	0	27.58	2061	7.16	68	6.4	-129
Aug-04	MW #38	24.51	0	26.82	2058	6.84	63	12.3	-124
Mar-04		24.32	0	26.82	1967	7.11	55		
Aug-03		24.6	0	26.82	1866	6.90	69	4.7	-145
Aug-04	MW #39	24.59	0	38.34	5424	7.51	65	4.7	-162
Mar-04		24.45	0	38.34					
Aug-03									
Aug-04	MW #40	29.76	28.94	30.07	no sample	well	contains	hydrocarbon	
Mar-04		29.95	29.05	30.07	no sample	well	contains	hydrocarbon	
Aug-03		29.99	28.85	30.07	no sample	well	contains	hydrocarbon	
Aug-04	MW #41	28.34	27.43	31.62	no sample	well	contains	hydrocarbon	
Mar-04		28.41	27.3	31.62	no sample	well	contains	hydrocarbon	
Aug-03		28.52	27.31	31.62	no sample	well	contains	hydrocarbon	
Aug-04	MW #44	33.8	0	50.91	5589	6.90	60	5.3	-52
Mar-04		33.4	0	50.91					
Aug-03		33.75	0	50.91					
Aug-03	MW #45	well is	pumping	hydrocarbon		fuel fingerprint			
Mar-04		15.85	9.32	16.92		6.97	52	no sample	hydrocarbon
Aug-03		13.19	9.35	16.92	no sample	well	contains	hydrocarbon	
Aug-04	MW #46	0	0	10.39	dry	well			
Mar-04		0	0	10.39	dry	well			
Aug-03		0	0	10.39	dry	well			
Aug-04	MW #47	11.55	10.32	14.28	fuel fingerprint - contains hydrocarbon				
Mar-04		11.79	10.31	14.28	3440	7.01	52		
Aug-03		10.58	0	14.39	3848	6.88	69	7.9	-75
Aug-03	P-#4	8.41	0	13.94	2316	6.92	69	8.4	-240
Mar-04		8.29	0	13.94	22398	7.56	46		
Aug-03		8.22	0	13.94	2606	7.06	69	0.2	-284
Aug-04	P-#5	9.24	0	14.27	2014	6.93	67	5.4	-124
Mar-04		9.54	0	14.27	2097	7.38	46		
Aug-03		10.29	0	14.27	2006	7.16	69	4.5	-104
Aug-04	O/F #2	n/a	n/a	n/a	996	6.88	67	6.3	74
Mar-04		n/a	n/a	n/a	1199	7.23	47		
Aug-03		DRY	no sample	DRY	no sample	DRY	no sample	DRY	

Water Quality Field Measurements Table 3

TE	RW/MW	DEPTH TO LIQUID (ft)	SPH	WELL DEPTH	E.C.	pH	TEMP.	D.O	ORP
Aug-04	O/F #3	n/a	n/a	n/a	980	6.81	64	9.8	103
Mar-04		n/a	n/a	n/a	1224	7.36	49		
Aug-03		n/a	n/a	n/a	904	7.02	63	7.8	194
Aug-04	RW #3	22.74	22.71	34.57	3138	6.82	67	5.5	-47
Mar-04		22.49	22.43	34.57					
Aug-03		22.68	0	34.57					
Aug-04	RW #14	35.11	2.45	41.94	4422	6.87	62	6.4	-83
Mar-04		36.65	35.21	41.94					
Aug-03		35.14	0	41.94					
Aug-04	RW #15	34.92	0	43.43	3481	6.83	61	over range	-85
Mar-04		35.93	0	43.43					
Aug-03		34.93	0	43.43					
Aug-04	RW #16	34.03	0	41.94	3162	6.93	62	8.7	-139
Mar-04		35.04	0	41.94					
Aug-03		34.03	0	41.94					
Aug-04	RW #17	33.63	33.37	41.89	fuel fingerprint - contains hydrocarbon				
Mar-04		35.55	35.45	41.89					
g-03		33.34	33.29	41.89					

Table 4

MARCH 2004 - BTEX & MTBE

EPA Method 8021B												
mg/L	Date Sampled	WQCC 20 NMAC 6.2.3103	MW #1	MW #12	MW #13	MW #20	MW #32	MW #33	MW #35	MW #37	MW #38	MW #45
Benzene	Mar-04	0.01	<0.0005	<0.0005	<0.0005	21	<0.0005	<0.0005	0.006	<0.0005	<0.0005	1
Toluene	Mar-04	0.75	<0.0005	<0.0005	<0.0005	1.2	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.86
EthylBen	Mar-04	0.75	<0.0005	<0.0005	<0.0005	0.1	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	7.5
Xylene	Mar-04	0.62	<0.0005	<0.0005	<0.0005	0.5	<0.0005	<0.0005	0.003	0.006	0.001	28
MTBE	Mar-04		<0.0025	<0.0025	0.02	95	<0.0025	<0.0025	0.011	0.004	0.015	<4.3

MARCH 2004 - BTEX & MTBE

EPA Method 8021B									
mg/L	Date Sampled	WQCC 20 NMAC 6.2.3103	MW #47	P #4	P #5	P #6	O/F #1	O/F #2	O/F #3
Benzene	Mar-04	0.01	0.56	4.5	1.2	13	NOT	<0.0005	<0.0005
Toluene	Mar-04	0.75	<0.05	0.3	<0.05	0.62	SAMPLED	<0.0005	<0.0005
EthylBen	Mar-04	0.75	0.9	3.6	2	9.1		<0.0005	<0.0005
Xylene	Mar-04	0.62	7.9	15	12	31		<0.0005	<0.0005
MTBE	Mar-04		<0.25	<0.25	<0.25	26		<0.0025	<0.0025

ORGANICS AUGUST 2004

Table 5

	mg/L	DATE SAMPLED	MW #1	MW #3	MW #7	MW #8	MW #11	MW #12	MW #13	MW #21	MW #26	MW #27	WQCC 20 NMAC 6.2.3103
EPA Method 80021B	Benzene	Aug-04	<0.0005	<0.0005	<0.0005	<0.0005	1.7	<0.0005	<0.0005	0.13	0.74	<0.0025	0.01
		Mar-04	<0.0005					<0.0005	<0.0005				
		Aug-03	<0.001	<0.001		<0.001	2.7	<0.001	<0.001		1.4	<0.0001	
		Mar-03	<0.0005					<0.0005	<0.0005				
	Toluene	Aug-04	<0.0005	<0.0005	<0.0005	<0.0005	<0.02	<0.0005	<0.0005	<0.0025	<0.025	<0.0025	0.75
		Mar-04	<0.0005					<0.0005	<0.0005				
		Aug-03	<0.001	<0.001		<0.001	<0.010	<0.001	<0.001		<0.05	<0.0001	
		Mar-03	0.00063					0.00087	<0.0005				
	EthylBen	Aug-04	<0.0005	<0.0005	<0.0005	<0.0005	0.064	<0.0005	<0.0005	0.0098	0.46	<0.0025	0.75
		Mar-04	<0.0005					<0.0005	<0.0005				
		Aug-03	<0.001	<0.001		<0.001	0.17	<0.001	<0.001		0.63	<0.0001	
		Mar-03	0.00065					0.0013	<0.0005				
	Xylene	Aug-04	<0.0005	<0.0005	<0.0005	<0.0005	0.015	0.00094	<0.0005	0.003	0.19	<0.0025	0.62
		Mar-04	<0.0005					<0.0005	<0.0005				
		Aug-03	<0.001	<0.001		<0.001	0.65	<0.001	<0.001		0.35	<0.0001	
		Mar-03	0.0043					0.015	0.0012				
	MTBE	Aug-04	<0.0025	<0.0025	<0.0025	<0.0025	<0.1	<0.0025	0.027	0.028	<0.130	<0.013	
		Mar-04	<0.0025					<0.0025	0.02				
		Aug-03	<0.001	<0.001		<0.001	0.079	<0.001	0.061		<0.05	<0.0001	
		Mar-03	<0.0025					<0.0025	0.049				

AUG - 2003 Analysis by 8260B

ORGANICS AUGUST 2004

Table 5

	mg/L	DATE SAMPLED	MW #29	MW #30	MW #31	MW #32	MW #33	MW #34	MW #35	MW #36	MW #37	MW #38	WQCC 20 NMAC 6.2.3103
EPA Method 80021B	Benzene	Aug-04	<0.0005	1.7	3.7	<0.0005	<0.0005	<0.0025	0.00082	0.0009	<0.0005	<0.0005	0.01
		Mar-04				<0.0005	<0.0005		0.006				
		Aug-03				<0.001	<0.001	<0.001	<0.010		0.0013	<0.001	
		Mar-03				<0.001	<0.0005		0.0038		<0.0025	<0.0005	
	Toluene	Aug-04	<0.0005	0.37	0.4	<0.0005	<0.0005	0.0039	<0.0005	<0.0005	<0.0005	<0.0005	0.75
		Mar-04				<0.0005	<0.0005		<0.0005				
		Aug-03				<0.001	<0.001	<0.001	<0.010		<0.001	<0.001	
		Mar-03				<0.001	<0.0005		<0.0025		0.0033	<0.0005	
	EthylBen	Aug-04	<0.0005	1.9	0.32	<0.0005	<0.0005	0.019	0.0061	<0.0005	0.0012	0.0012	0.75
		Mar-04				<0.0005	<0.0005		<0.0005				
		Aug-03				<0.001	<0.001	<0.001	<0.010		0.0014	<0.001	
		Mar-03				<0.001	<0.0005		0.0027		0.0038	<0.0005	
	Xylene	Aug-04	<0.0005	2.5	1.2	<0.0005	<0.0005	0.013	0.0033	0.004	0.00062	0.00068	0.62
		Mar-04				<0.0005	<0.0005		0.003				
		Aug-03				<0.001	<0.001	<0.001	<0.010		0.0097	<0.001	
		Mar-03				<0.001	0.00086		0.021		0.031	0.0014	
	MTBE	Aug-04	0.0026	<0.10	<0.250	<0.0025	<0.0025	<0.013	0.0096	0.0085	0.0026	0.0085	
		Mar-04				<0.0025	<0.0025		0.011				
		Aug-03				<0.001	<0.001	<0.001	0.02		0.0059	0.017	
		Mar-03				<0.001	<0.0025	<0.0025	0.014		<0.013	0.016	

AUG - 2003 Analysis by 8260B

ORGANICS AUGUST 2004

Table 5

	mg/L	DATE SAMPLED	MW #39	MW #44	RW #3	RW #14	RW #15	RW #16	P #4	P #5	O/F #2	O/F #3	WQCC 20 NMAC 6.2.3103
EPA Method 80021B	Benzene	Aug-04	0.46	<0.0005	0.33	1.9	9.4	2.1	4.1	1	<0.0005	<0.0005	0.01
		Mar-04							4.5	1.2	<0.0005	<0.0005	
		Aug-03							2.7	1.5		<0.001	
		Mar-03							4.1	1.3	<0.0005	<0.0005	
	Toluene	Aug-04	0.15	<0.0005	<0.020	17	15	<0..05	<0..05	<0..05	<0.0005	<0.0005	0.75
		Mar-04							0.3	<0.05	<0.0005	<0.0005	
		Aug-03							1.1	<0.25		<0.001	
		Mar-03							0.63	0.078	<0.0005	<0.0005	
	EthylBen	Aug-04	0.55	<0.0005	<0.020	3.2	2.8	0.17	3.3	1.6	<0.0005	<0.0005	0.75
		Mar-04							3.6	2	<0.0005	<0.0005	
		Aug-03							3	3.3		<0.001	
		Mar-03							3.1	3.5	<0.0005	<0.0005	
	Xylene	Aug-04	0.92	<0.0005	1.4	20	22	0.82	12	5.8	<0.0005	<0.0005	0.62
		Mar-04							15	12	<0.0005	<0.0005	
		Aug-03							8.4	14		<0.001	
		Mar-03							10	19	<0.0005	<0.0005	
	MTBE	Aug-04	<0.050	0.0048	<0.10	<0.10	<0.25	<0.25	<0.25	<0.25	<0.0025	<0.0025	
		Mar-04							<0.25	<0.25	<0.0025	<0.0025	
		Aug-03							<0.25	<0.25		<0.001	
		Mar-03							<0.10	<0.05	<0.0025	<0.0025	

AUG - 2003 Analysis by 8260B

GENERAL CHEMISTRY AUGUST 2004

Table 6

	mg/L	DATE SAMPLED	MW #1	MW #3	MW #7	MW #8	MW #11	MW #12	MW #13	MW #21	MW #26	MW #27	WQCC 20 NMAC 6.2.3103
EPA Method 300.0	Fluoride	Aug-04	0.63		0.75	0.64	0.41	0.52	0.2	0.18	0.29	0.2	1.6
		Aug-03	0.58	0.17		0.66	0.44	0.32	0.19		0.39	0.22	
		Aug-02											
		Sep-01											
	Chloride	Aug-04	29		25	250	97	130	330	420	230	290	250
		Aug-03	33	1400		260	150	130	510		160	360	
		Aug-02											
		Sep-01											
	Nitrite	Aug-04	<0.10		<0.10				1.6	<0.10	<0.10	<0.10	
		Aug-03	<0.10			<0.10	<0.10	<0.10	<0.10		<0.10	<0.10	
		Aug-02											
		Sep-01											
	Bromide	Aug-04	0.14		0.14	1.2	0.97	0.78	4.3	3.4	4.2	3.1	
		Aug-03	0.32	22		5	5.3	3.7	13		2.9	4.7	
		Aug-02											
		Sep-01											
	Nitrogen	Aug-04	1.9		<0.10				6.6	<0.10	<0.10	<0.10	10
		Aug-03	1.6	41		14	<0.10	<0.10	12		<0.10	<0.10	
		Aug-02											
		Sep-01											
	P	Aug-04	<0.50		<0.50	<0.50	<0.50		<0.50	<0.50	<0.50	<0.50	
		Aug-03	<0.50	<0.50		<0.50	<0.50	<0.50	<0.50		<0.50	<0.50	
		Aug-02											
		Sep-01											
	Sulfate	Aug-04	220		5100	920	13	680	950	1400	<0.50	120	600
		Aug-03	200	1900		950	4.2	3100	840		1	6.8	
		Aug-02				970	<5.0						
		Sep-01				760	<5.0						
EPA 160.1	TDS	Aug-04	650		7400	2100	1500	1600	2800	3400	1600	1700	1000
		Aug-03	610	5700		2100	1100	5500	3100		1400	1700	
		Aug-02											
		Sep-01											

GENERAL CHEMISTRY AUGUST 2004

Table 6

	mg/L	DATE SAMPLED	MW #1	MW #3	MW #7	MW #8	MW #11	MW #12	MW #13	MW #21	MW #26	MW #27	WQCC 20 NMAC 6.2.3103
EPA 120.1	E.C.	Aug-04	870		7800	2600	2100	1900	3400	4000	2200	2400	
		Aug-03	820	8500		2900	2500	6600	5000		1900	3100	
		Aug-02	795	7358		3263	2140	3010				2825	
		Sep-01				2000	2130						
	D.O.	Aug-04	5.4		2.8	2.9	13.8	9.3	5	4	7.5	1.7	
		Aug-03	6.5	6.5		7.1	5.6	5.3	5.6		4.9	4.1	
		Aug-02	2.8	4.8		3.8	1.1					1.5	
		Sep-01				13.1	13.9						
	O.R.P.	Aug-04	-532	-11	84	142	-36	151	158	-43	-33	-143	
		Aug-03	105	105		176	-5.3	81	86		-63	-188	
		Aug-02											
		Sep-01											
EPA 310.1	CO2	Aug-04	220		98	210	330	970	860	600	910	890	
		Aug-03	240			220	1300	310	1000		1300	1200	
		Aug-02											
		Sep-01											
	Alk	Aug-04	240		110	230	390	1100	950	670	1000	970	
		Aug-03	262			208	1120	319	917		1090	1040	
		Aug-02											
		Sep-01											

GENERAL CHEMISTRY AUGUST 2004

Table 6

	mg/L	DATE SAMPLED	MW #29	MW #30	MW #31	MW #32	MW #33	MW #34	MW #35	MW #36	MW #37	MW #38	WQCC 20 NMAC 6.2.3103
EPA Method 300.0	Fluoride	Aug-04	0.31	0.18	0.19	0.24	0.21	0.62	0.36	0.4	0.46	0.53	1.6
		Aug-03				0.18	0.24	0.57	0.39		0.49	0.67	
		Aug-02											
		Sep-01											
	Chloride	Aug-04	35	360	370	650	550	100	110	100	98	140	250
		Aug-03				940	750	120	120		110	120	
		Aug-02											
		Sep-01											
	Nitrite	Aug-04	<0.10	<0.10	<0.10	<0.10		<0.10	<0.10	<0.10	<0.10	<0.10	
		Aug-03				<1.0	<1.0	<0.10	<0.10		<0.10	<0.10	
		Aug-02											
		Sep-01											
	Bromide	Aug-04	<0.10	5.6	7.2	2.9	3.2	1.2	1.2	1	1	1.3	
		Aug-03				13	19	5.1	2.1		1.3	1.3	
		Aug-02											
		Sep-01											
	Nitrogen	Aug-04	0.6	<0.10	0.14	5		<0.10	<0.10	<0.10	<0.10	<0.10	10
		Aug-03				22	26	<0.10	<0.10		<0.10	<0.10	
		Aug-02											
		Sep-01											
	P	Aug-04	<0.50	<0.10	<0.50	<0.50	ND	<0.50	<0.50	<0.50	<0.50	<0.50	
		Aug-03				<0.50	<0.50	<0.50	<0.50		<0.50	<0.50	
		Aug-02											
		Sep-01											
	Sulfate	Aug-04	150	720	750	580	1600	29	1.7	16	15	330	600
		Aug-03				1200	1200	150	6.6		19	310	
		Aug-02						9.1	28				
		Sep-01						<5.0	27				
EPA 160.1	TDS	Aug-04	550	3100	2800	2400	3700	1500	1400	1200	1300	1500	1000
		Aug-03				3800	3400	1700	1300		1400	1600	
		Aug-02											
		Sep-01											

GENERAL CHEMISTRY AUGUST 2004

Table 6

	mg/L	DATE SAMPLED	MW #29	MW #30	MW #31	MW #32	MW #33	MW #34	MW #35	MW #36	MW #37	MW #38	WQCC 20 NMAC 6.2.3103
EPA 120.1	E.C.	Aug-04	760	3900	3700	3300	4400	2100	2000	1700	1800	1800	
		Aug-03				5800	5000	2800	1900		1800	1900	
		Aug-02						2130	1923	1386			
		Sep-01						2020	2200				
	D.O.	Aug-04	4.7	over range	3.4	5.6	5.6	1.7	3.6	8.4	4.3	12.3	
		Aug-03				7.4	5	4.9	5.4		6.4	4.7	
		Aug-02						2	2.1	2.4			
		Sep-01						4.2	6.9				
	O.R.P.	Aug-04	115	-196	-19	79	-7.3	-51	-63	-111	-103	-124	
		Aug-03				64	110	-76	-95		-129	-145	
		Aug-02											
		Sep-01											
EPA 310.1	CO2	Aug-04	210	1200	980	280	140	990	910	880	940	590	
		Aug-03				250	190	1300	1100		960	670	
		Aug-02											
		Sep-01											
	Alk	Aug-04	240	1400	1100	310	150	1100	1000	970	1000	660	
		Aug-03				242	198	1130	984		1010	600	
		Aug-02											
		Sep-01											

GENERAL CHEMISTRY AUGUST 2004

Table 6

	mg/L	DATE SAMPLED	MW #39	MW #44	RW #3	RW #14	RW #15	RW #16	P #4	P #5	O/F #2	O/F #3	WQCC 20 NMAC 6.2.3103
EPA Method 300.0	Fluoride	Aug-04	0.65	0.3	<0.50	0.18	0.3	0.3	0.29	0.29	0.67	0.46	1.6
		Aug-03							0.24	0.89		0.49	
		Aug-02											
		Sep-01											
	Chloride	Aug-04	140	210	170	840	460	460	77	100	23	28	250
		Aug-03							74	72		25	
		Aug-02											
		Sep-01											
	Nitrite	Aug-04	<0.10	<0.10		<0.10	<0.10	<0.10			<0.10		
		Aug-03							<0.10	<0.10		<0.10	
		Aug-02											
		Sep-01											
	Bromide	Aug-04	1.7	0.79	2	5.7	6.7	5.8	0.77	0.94	0.13	0.17	
		Aug-03							1.4	1.5		0.26	
		Aug-02											
		Sep-01											
	Nitrogen	Aug-04	<0.10	<0.10		<0.10	<0.10	<0.10			2.5		10
		Aug-03							<0.10	<0.10		3.9	
		Aug-02											
		Sep-01											
	P	Aug-04	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	
		Aug-03							<0.50	<0.50		<0.50	
		Aug-02											
		Sep-01											
	Sulfate	Aug-04	3100	2800	340	2	3.4	77	4.9	6.5	200	200	600
		Aug-03							56	<0.50		170	
		Aug-02					50						
		Sep-01					<5.0						
EPA 160.1	TDS	Aug-04	4900	4800	200	2700	2100	1900	1700	1400	670	660	1000
		Aug-03							1700	1400		490	
		Aug-02											
		Sep-01											

GENERAL CHEMISTRY AUGUST 2004

Table 6

	mg/L	DATE SAMPLED	MW #39	MW #44	RW #3	RW #14	RW #15	RW #16	P #4	P #5	O/F #2	O/F #3	WQCC 20 NMAC 6.2.3103
EPA 120.1	E.C.	Aug-04	5200	5200	2800	4000	3100	2800	2300	2000	880	830	
		Aug-03							2800	2400		780	
		Aug-02					3910						
		Sep-01					2900						
	D.O.	Aug-04	4.7	5.3	5.5	6.4	over range	8.7	8.4	5.4	6.3	9.8	
		Aug-03							0.2	4.5		7.8	
		Aug-02					2						
		Sep-01					6.3						
	O.R.P.	Aug-04	-162	-52	-47	-83	-85	-139	-240	-126	74	103	
		Aug-03							-284	-104		194	
		Aug-02											
		Sep-01											
EPA 310.1	CO2	Aug-04	35	400	1100	1100	1100	900	1300	1000	250	240	
		Aug-03							1300	1100		270	
		Aug-02											
		Sep-01											
	Alk	Aug-04	38	450	1200	1200	1300	1000	1500	1200	280	270	
		Aug-03							1390	1170		252	
		Aug-02											
		Sep-01											

DISSOLVED METALS AUGUST 2004

Table 7

EPA Method 6010C

mg/L	DATE SAMPLED	MW #1	MW #3	MW #7	MW #8	MW #11	MW #12	MW #13	MW #21	MW #26	MW #27	WQCC 20 NMAC 6.2.3103
Arsenic	Aug-04	<0.02	No Sample	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.10
	Aug-03	<0.02	<0.02		<0.02	<0.02	<0.02	<0.02		<0.02	<0.02	
	Aug-02											
	Sep-01											
Barium	Aug-04	0.025	No Sample	0.0097	0.021	0.47	0.06	0.022	0.028	1.8	0.083	1.00
	Aug-03	0.46	0.3		0.36	1.2	0.12	0.33		2.3	0.52	
	Aug-02											
	Sep-01											
Cadmium	Aug-04	<0.002	No Sample	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.01
	Aug-03	<0.002	<0.002		<0.002	<0.002	<0.002	<0.002		<0.002	<0.002	
	Aug-02											
	Sep-01											
Calcium	Aug-04	67	No Sample	300	210	100	130	210	450	75	170	
	Aug-03	61	490		200	120	420	270		91	210	
	Aug-02											
	Sep-01											
Cr	Aug-04	<0.006	No Sample	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	0.05
	Aug-03	<0.006	<0.006		<0.006	<0.006	0.0066	<0.006		0.0089	<0.006	
	Aug-02											
	Sep-01											
Copper	Aug-04	<0.006	No Sample	<0.006	<0.006	0.021	<0.006	<0.006	<0.006	<0.006	<0.006	1.00
	Aug-03	<0.006	<0.006		<0.006	<0.006	<0.006	0.0096		<0.006	<0.006	
	Aug-02											
	Sep-01											
Iron	Aug-04	0.27	No Sample	0.081	0.059	6.9	0.044	0.046	2.9	5.1	0.15	1.00
	Aug-03	<0.005	0.27		0.044	7.6	0.024	0.04		5	0.44	
	Aug-02				1.5	10						
	Sep-01											

DISSOLVED METALS AUGUST 2004

Table 7

Method 6010C												
mg/L	DATE SAMPLED	MW #1	MW #3	MW #7	MW #8	MW #11	MW #12	MW #13	MW #21	MW #26	MW #27	WQCC 20 NMAC 6.2.3103
Lead	Aug-04	<0.005	No Sample	<0.005	<0.005	0.022	<0.005	<0.005	<0.005	0.0056	<0.005	0.05
	Aug-03	<0.005	<0.005		<0.005	<0.005	<0.005	<0.005		<0.005	<0.005	
	Aug-02											
	Sep-01											
Mg	Aug-04	18	No Sample	31	35	23	31	80	97	27	26	
	Aug-03	16	140		38	25	130	110		32	34	
	Aug-02											
	Sep-01											
Mn	Aug-04	0.13	No Sample	0.28	0.57	1.7	0.55	0.58	1.4	2	0.94	0.20
	Aug-03	0.08	0.58		0.68	2	1.8	1.1		2.4	1.4	
	Aug-02											
	Sep-01											
K	Aug-04	2.1	No Sample	8.1	3	1.5	1.5	3.6	6.8	2.6	206	
	Aug-03	2.6	10		4	2.3	4.3	5.3		4.2	4	
	Aug-02											
	Sep-01											
Se	Aug-04	<0.05	No Sample	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05
	Aug-03	0.043	0.024		0.09	0.15	0.084	0.16		0.1	0.13	
	Aug-02											
	Sep-01											
Silver	Aug-04	<0.005	No Sample	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.05
	Aug-03	<0.005	<0.005		<0.005	<0.005	<0.005	<0.005		<0.005	<0.005	
	Aug-02											
	Sep-01											
Sodium	Aug-04	110	No Sample	1100	360	390	320	610	600	440	390	
	Aug-03	150	1100		350	420	960	680		430	420	
	Aug-02											
	Sep-01											

DISSOLVED METALS AUGUST 2004

Table 7

EPA Method 6010C												
mg/L	DATE SAMPLED	MW #1	MW #3	MW #7	MW #8	MW #11	MW #12	MW #13	MW #21	MW #26	MW #27	WQCC 20 NMAC 6.2.3103
Uranium	Aug-04	<0.1	No Sample	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	5.00
	Aug-03	<0.1	<0.1		<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	
	Aug-02											
	Sep-01											
Zinc	Aug-04	0.021	No Sample	0.0096	0.022	63	0.035	0.021	0.028	0.013	0.011	10.00
	Aug-03	0.12	0.094		0.13	0.18	0.088	0.09		0.19	0.037	
	Aug-02											
	Sep-01											

DISSOLVED METALS AUGUST 2004

EPA Method 6010C												
mg/L	DATE SAMPLED	MW #29	MW #30	MW #31	MW #32	MW #33	MW #34	MW #35	MW #36	MW #37	MW #38	WQCC 20 NMAC 6.2.3103
Arsenic	Aug-04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.10
	Aug-03				<0.02	<0.02	<0.02	<0.02		<0.02	<0.02	
	Aug-02											
	Sep-01											
Barium	Aug-04	0.025	0.13	0.35	0.022	0.02	0.78	0.71	0.59	0.28	0.19	1.00
	Aug-03				0.35	0.02	1.5	1		1.5	0.37	
	Aug-02											
	Sep-01											
Cadmium	Aug-04	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.01
	Aug-03				<0.002	<0.002	<0.002	<0.002		<0.002	<0.002	
	Aug-02											
	Sep-01											
Calcium	Aug-04	55	350	220	170	350	110	130	150	100	180	
	Aug-03				370	330	110	130		100	170	
	Aug-02											
	Sep-01											

DISSOLVED METALS AUGUST 2004

Table 7

EPA Method 6010C

mg/L	DATE SAMPLED	MW #29	MW #30	MW #31	MW #32	MW #33	MW #34	MW #35	MW #36	MW #37	MW #38	WQCC 20 NMAC 6.2.3103
Cr	Aug-04	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	0.05
	Aug-03				<0.006	<0.006	<0.006	<0.006		<0.006	<0.006	
	Aug-02											
	Sep-01											
Copper	Aug-04	<0.006	0.0061	<0.006	<0.006	0.0062	0.015	0.0065	<0.006	<0.006	<0.006	1.00
	Aug-03				<0.006	<0.006	<0.006	<0.006		<0.006	<0.006	
	Aug-02											
	Sep-01											
Iron	Aug-04	<0.005	4.7	0.46	0.056	0.11	5.6	7.2	3.1	1.5	8	1.00
	Aug-03				0.031	<0.005	5.5	6.3		0.6	7.5	
	Aug-02						9.6	9.3				
	Sep-01											
Lead	Aug-04	<0.005	0.0051	<0.005	<0.005	<0.005	<0.005	0.0063	<0.005	<0.005	<0.005	0.05
	Aug-03				<0.005	<0.005	<0.005	<0.005		<0.005	<0.005	
	Aug-02											
	Sep-01											
Mg	Aug-04	15	88	67	26	54	20	23	30	19	32	
	Aug-03				56	51	21	22		20	28	
	Aug-02											
	Sep-01											
Mn	Aug-04	0.82	2.1	0.58	<0.002	0.013	4.3	3.1	4.1	1.3	3.6	0.20
	Aug-03				0.0037	0.01	4.6	3.3		1.4	3	
	Aug-02											
	Sep-01											
K	Aug-04	2.7	<10.0	4.8	2.7	5.3	1.3	3	7.2	5	4.7	
	Aug-03				5	6.2	2.1	3.7		6.6	6.6	
	Aug-02											
	Sep-01											

DISSOLVED METALS AUGUST 2004

Table 7

A Method 6010C												
mg/L	DATE SAMPLED	MW #29	MW #30	MW #31	MW #32	MW #33	MW #34	MW #35	MW #36	MW #37	MW #38	WQCC 20 NMAC 6.2.3103
Se	Aug-04	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05
	Aug-03				0.05	0.023	0.15	0.15		0.13	0.11	
	Aug-02											
	Sep-01											
Silver	Aug-04	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.05
	Aug-03				<0.005	<0.005	<0.005	<0.005		<0.005	<0.005	
	Aug-02											
	Sep-01											
Sodium	Aug-04	100	750	640	550	670	400	300	180	350	250	
	Aug-03				800	660	470	330		370	240	
	Aug-02											
	Sep-01											
Uranium	Aug-04	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	5.00
	Aug-03				<0.1	<0.1	<0.1	<0.1		<0.1	<0.1	
	Aug-02											
	Sep-01											
Zinc	Aug-04	0.017	0.046	0.019	0.019	0.031	0.02	0.022	0.018	0.028	0.035	10.00
	Aug-03				0.095	0.0072	0.15	0.078		0.29	0.31	
	Aug-02											
	Sep-01											

DISSOLVED METALS AUGUST 2004

Table 7

EPA Method 6010C												
mg/L	DATE SAMPLED	MW #39	MW #44	RW #3	RW #14	RW #15	RW #16	P #4	P #5	O/F #2	O/F #3	WQCC 20 NMAC 6.2.3103
Arsenic	Aug-04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.10
	Aug-03							<0.02	<0.02		<0.02	
	Aug-02											
	Sep-01											
Barium	Aug-04	0.15	0.046	0.12	1.7	1.2	0.35	0.43	0.42	0.048	0.03	1.00
	Aug-03							0.91	0.71		0.25	
	Aug-02											
	Sep-01											
Cadmium	Aug-04	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.01
	Aug-03							<0.002	<0.002		<0.002	
	Aug-02											
	Sep-01											
Calcium	Aug-04	290	520	85	180	160	100	84	150	95	98	
	Aug-03							120	150		79	
	Aug-02											
	Sep-01											
Cr	Aug-04	<0.006	0.034	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	0.0071	<0.006	0.05
	Aug-03							<0.006	<0.006		<0.006	
	Aug-02											
	Sep-01											
Copper	Aug-04	<0.006	0.027	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	<0.006	1.00
	Aug-03							<0.006	<0.006		<0.006	
	Aug-02											
	Sep-01											
Iron	Aug-04	0.18	76	0.48	8.5	6	1.9	0.067	1	<0.02	0.024	1.00
	Aug-03							<0.02	0.91		<0.02	
	Aug-02											
	Sep-01											

DISSOLVED METALS AUGUST 2004

Table 7

[redacted] Method 6010C											
mg/L	DATE SAMPLED	MW #39	MW #44	RW #3	RW #14	RW #15	RW #16	P #4	P #5	O/F #2	O/F #3	WQCC 20 NMAC 6.2.3103
Lead	Aug-04	<0.005	0.015	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.05
	Aug-03							<0.005	<0.005		<0.005	
	Aug-02											
	Sep-01											
Mg	Aug-04	28	87	21	87	52	56	19	31	23	22	
	Aug-03							35	16		18	
	Aug-02											
	Sep-01											
Mn	Aug-04	0.3	1.7	1.1	3.6	3.3	1.7	0.021	0.26	0.0038	0.019	0.20
	Aug-03							0.17	2.1		0.017	
	Aug-02											
	Sep-01											
K	Aug-04	8.7	44	3.4	<10.0	3.7	3.3	4	3.7	2.3	1.8	
	Aug-03							5.3	2.8		2.1	
	Aug-02											
	Sep-01											
Se	Aug-04	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05
	Aug-03							0.11	0.13		0.032	
	Aug-02											
	Sep-01											
Silver	Aug-04	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.05
	Aug-03							<0.005	<0.005		<0.005	
	Aug-02											
	Sep-01											
Sodium	Aug-04	750	970	620	810	580	560	510	330	100	90	
	Aug-03							340	130		88	
	Aug-02											
	Sep-01											

DISSOLVED METALS AUGUST 2004

Table 7

EPA Method 6010C												
mg/L	DATE SAMPLED	MW #39	MW #44	RW #3	RW #14	RW #15	RW #16	P #4	P #5	O/F #2	O/F #3	WQCC 20 NMAC 6.2.3103
Uranium	Aug-04	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	5.00
	Aug-03							<0.10	<0.10		<0.10	
	Aug-02											
	Sep-01											
Zinc	Aug-04	<0.005	0.084	0.036	0.044	0.043	0.029	0.016	0.029	0.034	0.014	10.00
	Aug-03							0.07	0.093		0.04	
	Aug-02											
	Sep-01											

TOTAL METALS AUGUST 2004

Table 7

[redacted] Method 6010C , EPA Method 7470: Mercury												40 [redacted] R141.62
mg/L	Date Sampled	MW #1	MW #3	MW #7	MW #8	MW #11	MW #12	MW #13	MW #21	MW #26	MW #27	MCL
Arsenic	Aug-04	<0.02	No Sample	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.01
	Aug-03											
	Aug-02											
	Sep-01											
Barium	Aug-04	0.052	No Sample	<0.002	0.071	0.54	0.19	0.028	0.029	2	0.13	2
	Aug-03											
	Aug-02											
	Sep-01											
Cadmium	Aug-04	<0.002	No Sample	<0.002	<0.002	<0.002	0.003	<0.002	<0.002	<0.002	<0.002	0.005
	Aug-03											
	Aug-02											
	Sep-01											
Cr	Aug-04	<0.006	No Sample	<0.006	1.9	<0.006	0.11	0.085	<0.006	<0.006	0.019	0.1
	Aug-03	0.013	0.029		0.72	0.011	0.51	0.45		0.017	0.014	
	Aug-02											
	Sep-01											
Lead	Aug-04	<0.005	No Sample	<0.005	<0.005	0.027	0.18	<0.005	<0.005	<0.005	<0.005	0.015
	Aug-03	<0.005	0.022		<0.005	0.02	0.16	<0.005		0.0084	<0.005	
	Aug-02											
	Sep-01											
Se	Aug-04	<0.05	No Sample	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05
	Aug-03											
	Aug-02											
	Sep-01											
Silver	Aug-04	<0.005	No Sample	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
	Aug-03											
	Aug-02											
	Sep-01											

TOTAL METALS AUGUST 2004

Table 7

A Method 6010C , EPA Method 7470: Mercury												40CFR141.62
mg/L	Date Sampled	MW #1	MW #3	MW #7	MW #8	MW #11	MW #12	MW #13	MW #21	MW #26	MW #27	MCL
Mercury	Aug-04	<0.0002	No Sample	<0.0002	<0.0002	<0.0002	0.0005	<0.0002	<0.0002	<0.0002	<0.0002	0.002
	Aug-03	<0.0002	<0.0002		<0.0002	0.00026	<0.0002	<0.0002		<0.0002	<0.0002	
	Aug-02											
	Sep-01											

TOTAL METALS AUGUST 2004

EPA Method 6010C , EPA Method 7470: Mercury												40CFR141.62
mg/L	Date Sampled	MW #29	MW #30	MW #31	MW #32	MW #33	MW #34	MW #35	MW #36	MW #37	MW #38	MCL
Arsenic	Aug-04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.01
	Aug-03											
	Aug-02											
	Sep-01											
Barium	Aug-04	0.039	0.24	0.35	0.049	0.038	0.94	1.2	2.6	1.3	0.74	2
	Aug-03											
	Aug-02											
	Sep-01											
Cadmium	Aug-04	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.005
	Aug-03											
	Aug-02											
	Sep-01											
Cr	Aug-04	<0.006	0.0073	0.0088	<0.006	<0.006	<0.006	<0.006	0.025	0.018	0.079	0.1
	Aug-03				<0.006	<0.006	0.018	0.011		0.18	0.31	
	Aug-02											
	Sep-01											
Lead	Aug-04	<0.005	0.011	<0.005	<0.005	0.0067	<0.005	0.0067	0.0072	0.05	0.028	0.015
	Aug-03				<0.005	<0.005	<0.005	<0.005		0.18	0.21	
	Aug-02											
	Sep-01											

TOTAL METALS AUGUST 2004

Table 7

[redacted] Method 6010C , EPA Method 7470: Mercury												40 [redacted] R141.62
mg/L	Date Sampled	MW #29	MW #30	MW #31	MW #32	MW #33	MW #34	MW #35	MW #36	MW #37	MW #38	MCL
Se	Aug-04	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05
	Aug-03											
	Aug-02											
	Sep-01											
Silver	Aug-04	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
	Aug-03											
	Aug-02											
	Sep-01											
Mercury	Aug-04	<0.0002	0.00023	0.00022	<0.0002	0.00069	<0.0002	<0.0002	0.00031	0.00044	0.0012	0.002
	Aug-03				<0.0002	<0.0002	<0.0002	<0.0002		<0.0002	<0.0002	
	Aug-02											
	Sep-01											

TOTAL METALS AUGUST 2004

EPA Method 6010C , EPA Method 7470: Mercury												40CFR141.62
mg/L	Date Sampled	MW #39	MW #44	RW #3	RW #14	RW #15	RW #16	P #4	P #5	O/F #2	O/F #3	MCL
Arsenic	Aug-04	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	0.01
	Aug-03											
	Aug-02											
	Sep-01											
Barium	Aug-04	0.71	0.084	0.17	1.8	1.2	0.67	0.58	0.52	0.055	0.032	2
	Aug-03											
	Aug-02											
	Sep-01											
Cadmium	Aug-04	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.005
	Aug-03											
	Aug-02											
	Sep-01											

TOTAL METALS AUGUST 2004

Table 7

[redacted] Method 6010C , EPA Method 7470: Mercury												40 [redacted]R141.62
mg/L	Date Sampled	MW #39	MW #44	RW #3	RW #14	RW #15	RW #16	P #4	P #5	O/F #2	O/F #3	MCL
Cr	Aug-04	0.59	0.1	<0.006	<0.006	<0.006	0.012	<0.006	<0.006	0.0069	<0.006	0.1
	Aug-03							<0.006	<0.006		<0.006	
	Aug-02											
	Sep-01											
Lead	Aug-04	0.019	0.036	0.0068	<0.005	<0.005	<0.005	0.0082	0.011	<0.005	<0.005	0.015
	Aug-03							0.007	0.0066		<0.005	
	Aug-02											
	Sep-01											
Se	Aug-04	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.05
	Aug-03											
	Aug-02											
	Sep-01											
Silver	Aug-04	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	
	Aug-03											
	Aug-02											
	Sep-01											
Mercury	Aug-04	0.00021	0.00033	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	0.002
	Aug-03							<0.0002	<0.0002		<0.0002	
	Aug-02											
	Sep-01											

FUEL FINGERPRINTING AUGUST 2004 Table 8

EPA Method 8015B								
wt%	Date Sampled	P #6	MW #25	Draw North of MW #45	MW #45	MW #47	#2 Stormwater Outfall	RW #17
Diesel Range	Aug-04	4.4	77	79	72	10	ND	50
Motor Oil Range	Aug-04	ND	ND	ND	ND	ND	ND	ND
Gasoline Range	Aug-04	82	6.2	9.3	30	84	2.4	25

Temporary Piezometers 2004

Table 9

Date Sampled	mg/L	TP #1	TP #2	TP #3	TP #4	TP #5	TP #6	TP #7	TP #8	
EPA Method 8015B										
10/28/04	Diesel Range	6.1	1.3	<1.0	1.3	<1.0	<1.0	<1.0	4.4	
10/28/04	Motor Oil Range	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	
10/28/04	Gasoline Range	140	92	1.8	22	67	13	1.7	89	
EPA Method 8021B										WQCC 20 NMAC 6.2.3103
10/28/04	MTBE	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	
10/28/04	Benzene	1.2	3.1	0.0035	<0.05	0.28	0.098	0.0055	0.87	0.01
10/28/04	Touluene	0.34	8.2	0.023	<0.05	<0.05	<0.05	<0.05	0.34	0.75
10/28/04	Ethylbenzene	5.2	4.2	0.051	0.81	2.2	1.1	0.015	3.1	0.75
10/28/04	Xylenes	39	27	0.31	1.6	21	3.9	0.22	33	0.62

Soil Analysis

Table 10

Monitoring Well #48 — **Installed 10/28/04**

		EPA Method 8260B						EPA Method 8015B		
Depth Sampled	DATE SAMPLED	mg/KG benzene	mg/KG toluene	mg/KG ethylbenzene	mg/KG naphthalene	mg/KG total xylene	mg/KG MTBE	mg/KG DRO	mg/KG GRO	mg/KG MRO
5' - 6.5'	10/28/04	<1.0	<1.0	6.9	14	110	<1.0	140	1500	<50
10' - 11.5'	10/28/04	<0.05	<0.05	0.7	0.24	4.5	<0.05	<10	55	<50
15' - 16.5'	10/28/04	<0.05	<0.05	0.12	0.16	0.78	<0.05	<10	20	<50

Soil Analysis

Monitoring Well #49 — **Installed 10/28/04**

		EPA Method 8260B						EPA Method 8015B		
Depth Sampled	DATE SAMPLED	mg/KG benzene	mg/KG toluene	mg/KG ethylbenzene	mg/KG naphthalene	mg/KG total xylene	mg/KG MTBE	mg/KG DRO	mg/KG GRO	mg/KG MRO
5' - 6.5'	10/28/04	<0.25	<0.25	0.35	0.9	2.4	<0.25	39	550	<50
10' - 11.5'	10/28/04	<0.05	<0.05	0.13	0.45	2.3	<0.05	<10	110	<50
15' - 16.5'	10/28/04	<0.05	<0.05	<0.05	<0.1	<0.05	<0.05	<10	<5.0	<50

Water Analysis

Table 11

Organics

MONITORING WELL #48 — Installed 10/28/04

	EPA Method 8260B / 8021B					EPA Method 8015B			EPA Methaod 8310		
DATE SAMPLED	ppm benzene	ppm toluene	ppm ethylbenzene	ppm MTBE	ppm total xylene	mg/L DRO	mg/L MRO	mg/L GRO	ppm Napthalene	ppm 1-Methyl Naphthalene	ppm 2-Methyl Naphthalene
WQCC 20NMAC 6.2.3103	0.01	0.75	0.75		0.62				0.03	0.03	0.03
11/1/2004 (8260B)	0.89	<0.1	3.7	<0.1	24	1.5	<5.0	51	0.56	0.16	0.25
12/27/2004 (8021B)	0.69	<0.05	1.9	<0..25	8.2	<1.0	<5.0	28	0.19	0.069	0.076

General Chemistry

	EPA Method 300.0							EPA 160.1	EPA 120.1	EPA 150.1
	DATE SAMPLED	mg/L Fluoride	mg/L Chloride	mg/L Nitrite	mg/L Nitrogen	mg/L P	mg/L Sulfate	mg/L TDS	mg/L E.C.	pH
WQCC 20NMAC 6.2.3103		1.6	250		10		600	1000		6.0 - 9.0
	11/1/04	0.54	120	<0.10	<0.10	<0.50	250	1500	2700	7.88

Dissolved Metals

Table 11

MONITORING WELL #48

EPA Method 6010C												
WQCC 20 NMAC 6.2.3103	0.10	1.00	0.01	0.05	0.01	1.00	0.05		0.20			10.00
DATE SAMPLED	mg/L Arsenic	mg/L Barium	mg/L Cadmium	mg/L Cr	mg/L Cu	mg/L Iron	mg/L Lead	mg/L Mg	mg/L Mn	mg/L K	mg/L Sodium	mg/L Zn
11/1/04	<0.02	0.21	<0.002	<0.006	<0.006	0.16	0.014		0.55			0.026

Total Metals

EPA Method 6010C												
40 CFR 141.62 MCL	0.01	2.00	0.01		0.10		0.02					
DATE SAMPLED	mg/L Arsenic	mg/L Barium	mg/L Cadmium	mg/L Calcium	mg/L Cr	mg/L Iron	mg/L Lead	mg/L Mg	mg/L Mn	mg/L K	mg/L Sodium	mg/L Zn
11/1/04	<0.02	0.32	<0.002	130	0.0092	19	0.023	22	2.4	6.9	400	0.056

Water Analysis

Table 11

Organics

MONITORING WELL #49 — Installed 10/28/04

	EPA Method 8260B / 8021B					EPA Method 8015B			EPA Methaod 8310		
DATE SAMPLED	ppm benzene	ppm toluene	ppm ethylbenzene	ppm MTBE	ppm total xylene	mg/L DRO	mg/L MRO	mg/L GRO	ppm Napthalene	ppm 1-Methyl Naphthalene	ppm 2-Methyl Naphthalene
WQCC 20NMAC 6.2.3103	0.01	0.75	0.75		0.62				0.03	0.03	0.03
11/1/2004 (8260B)	<0.01	<0.01	0.015	<0.01	0.32	<1.0	<5.0	1.8	0.0067	0.01	0.006
12/27/2004 (8021B)	0.0097	<0.05	0.0019	<0.25	0.0005	<1.0	<5.0	0.23	<0.0025	<0.0025	<0.0025

General Chemistry

	EPA Method 300.0							EPA 160.1	EPA 120.1	EPA 150.1
	DATE SAMPLED	mg/L Fluoride	mg/L Chloride	mg/L Nitrite	mg/L Nitrogen	mg/L P	mg/L Sulfate	mg/L TDS	mg/L E.C.	pH
WQCC 20NMAC 6.2.3103		1.6	250		10		600	1000		6.0 - 9.0
	11/1/04	0.48	130	<0.10	<0.10	<0.50	280	1400	1900	7.73

Dissolved Metals

Table 11

MONITORING WELL #49

EPA Method 6010C												
WQCC 20 NMAC 6.2.3103	0.10	1.00	0.01	0.05	0.01	1.00	0.05		0.20			10.00
DATE SAMPLED	mg/L Arsenic	mg/L Barium	mg/L Cadmium	mg/L Cr	mg/L Cu	mg/L Iron	mg/L Lead	mg/L Mg	mg/L Mn	mg/L K	mg/L Sodium	mg/L Zn
11/1/04	<0.02	0.3	<0.002	<0.006	<0.006	0.18	<0.005		2.1			0.0089

Total Metals

EPA Method 6010C												
40 CFR 141.62 MCL	0.01	2.00	0.01		0.10		0.02					
DATE SAMPLED	mg/L Arsenic	mg/L Barium	mg/L Cadmium	mg/L Calcium	mg/L Cr	mg/L Iron	mg/L Lead	mg/L Mg	mg/L Mn	mg/L K	mg/L Sodium	mg/L Zn
11/1/04	<0.02	0.48	<0.002	160	<0.006	19	0.014	31	4.4	7.9	330	0.061

Table 12

Soil Composites from Remediation Efforts North of Hammond Ditch

	mg/Kg	Date Sampled	16 barrels of Impacted Soil	Date Sampled	Hydroblast Pad Composite	Tank #36 Composite
Method 5030B & 8021B	Benzene	8/13/2004	1.19	8/31/2004	0.097	0.011
	Toluene	8/13/2004	0.671	8/31/2004	0.086	0.015
	Ethylbenzene	8/13/2004	0.792	8/31/2004	0.105	0.014
	Xylene	8/13/2004	2.91	8/31/2004	0.434	0.109
Method 8015B	Gasoline Range	8/13/2004	3,880	8/31/2004	57.2	85.1
	Diesel Range	8/13/2004	5,400	8/31/2004	244	266
	Total Petroleum Hydrocarbons	8/13/2004	9,280	8/31/2004	301	351
Method 3050B & 6010B	mg/L					
	Arsenic	8/13/2004	0.009	8/31/2004	0.002	0.003
	Barium	8/13/2004	0.422	8/31/2004	0.068	0.073
	Cadmium	8/13/2004	<0.001	8/31/2004	<0.001	<0.001
	Chromium	8/13/2004	0.002	8/31/2004	0.001	0.001
	Lead	8/13/2004	0.001	8/31/2004	<0.001	<0.001
	Mecury	8/13/2004	<0.001	8/31/2004	<0.001	<0.001
	Selenium	8/13/2004	0.006	8/31/2004	<0.001	<0.001
	Silver	8/13/2004	<0.001	8/31/2004	<0.001	<0.001
40CFR261 Subpart C (261.21 - 261.23	Ignitability	8/13/2004		8/31/2004	Negative	Negative
	Corrosivity	8/13/2004		8/31/2004	Negative	Negative
	Reactivity	8/13/2004		8/31/2004	Negative	Negative
	pH	8/13/2004	8.00	8/31/2004	7.43	7.69

RIVER ANALYSIS - 2004

Table 13

DISSOLVED METALS

EPA Method 6010C											WQCC
mg/L	DATE Sampled	North of MW #46	North of MW #45	Upstream of Refinery	Down stream of Refinery	DATE Sampled	North of MW #46	North of MW #45	Upstream of Refinery	Downstream of Refinery	20 NMAC 6.2.3103
Arsenic	8/14/04					9/7/04	<0.02	<0.02	<0.02		0.10
Barium	8/14/04					9/7/04	0.082	0.081	0.081		1.00
Cadmium	8/14/04					9/7/04	<0.002	<0.002	<0.002		0.01
Calcium	8/14/04	41.6	39	39		9/7/04	39	39	39		
Cr	8/14/04					9/7/04	<0.006	<0.006	<0.006		0.05
Copper	8/14/04					9/7/04	<0.006	<0.006	<0.006		1.00
Iron	8/14/04	0.01	0.009	0.001		9/7/04	0.036	0.057	0.031		1.00
Lead	8/14/04					9/7/04	<0.005	<0.005	<0.005		0.05
Mg	8/14/04	6.93	6.54	6.1		9/7/04	7.5	7.5	7.5		
Mn	8/14/04					9/7/04	0.004	0.0052	0.0054		0.20
K	8/14/04	1.63	1.4	1.2		9/7/04	2.1	2.1	2.1		
Se	8/14/04					9/7/04	<0.05	<0.05	<0.05		0.05
Silver	8/14/04					9/7/04	<0.005	<0.005	<0.005		0.05
Sodium	8/14/04	30.2	36	37		9/7/04	21	21	20		
Uranium	8/14/04					9/7/04	<0.1	<0.1	<0.1		5.00
Zinc	8/14/04					9/7/04	0.023	0.023	0.0057		10.00

RIVER ANALYSIS - 2004

Table 13

DISSOLVED METALS

EPA Method 6010C											WQCC
mg/L	DATE Sampled	North of MW #46	North of MW #45	Upstream of Refinery	Down stream of Refinery	DATE Sampled	North of MW #46	North of MW #45	Upstream of Refinery	Downstream of Refinery	20 NMAC 6.2.3103
Arsenic	10/7/04	<0.02	<0.02	<0.02		11/3/04	<0.02	<0.02	<0.02		0.10
Barium	10/7/04	0.063	0.063	0.065		11/3/04	0.075	0.073	0.076		1.00
Cadmium	10/7/04	<0.002	<0.002	<0.002		11/3/04	<0.002	<0.002	<0.002		0.01
Calcium	10/7/04	46	44	45		11/3/04	43	44	43		
Cr	10/7/04	<0.006	<0.006	<0.006		11/3/04	<0.006	<0.006	<0.006		0.05
Copper	10/7/04	<0.006	<0.006	<0.006		11/3/04	<0.006	<0.006	<0.006		1.00
Iron	10/7/04	0.36	0.11	0.058		11/3/04	0.03	<0.02	0.021		1.00
Lead	10/7/04	<0.005	<0.005	<0.005		11/3/04	<0.005	0.0071	<0.005		0.05
Mg	10/7/04	8.1	7.8	8.1		11/3/04	7.6	7.8	7.6		
Mn	10/7/04	0.0084	0.0074	0.0081		11/3/04	0.011	0.017	0.012		0.20
K	10/7/04	2.2	2.1	2.2		11/3/04	2	2	2.1		
Se	10/7/04	<0.05	<0.05	<0.05		11/3/04	<0.05	<0.05	<0.05		0.05
Silver	10/7/04	<0.005	<0.005	<0.005		11/3/04	<0.005	<0.005	<0.005		0.05
Sodium	10/7/04	<0.1	<0.1	<0.1		11/3/04	30	31	31		
Uranium	10/7/04	ND	ND	ND		11/3/04	<0.1	<0.1	<0.1		5.00
Zinc	10/7/04	0.041	0.027	0.037		11/3/04	0.017	0.011	0.012		10.00

RIVER ANALYSIS - 2004

Table 13

DISSOLVED METALS

EPA Method 6010C											WQCC
mg/L	DATE Sampled	North of MW #46	North of MW #45	Upstream of Refinery	Down stream of Refinery	DATE Sampled	North of MW #46	North of MW #45	Upstream of Refinery	Downstream of Refinery	20 NMAC 6.2.3103
Arsenic	12/7/04	<0.02	<0.02	<0.02	<0.02						0.10
Barium	12/7/04	0.069	0.068	0.068	0.068						1.00
Cadmium	12/7/04	<0.002	<0.002	<0.002	<0.002						0.01
Calcium	12/7/04	44	44	43	46						
Cr	12/7/04	<0.006	<0.006	<0.006	<0.006						0.05
Copper	12/7/04	<0.006	<0.006	<0.006	<0.006						1.00
Iron	12/7/04	<0.02	0.062	<0.02	<0.02						1.00
Lead	12/7/04	<0.005	<0.005	<0.005	<0.005						0.05
Mg	12/7/04	7.7	7.6	7.6	7.9						
Mn	12/7/04	0.01	0.012	0.011	0.033						0.20
K	12/7/04	2	2	2	2						
Se	12/7/04	<0.05	<0.05	<0.05	<0.05						0.05
Silver	12/7/04	<0.005	<0.005	<0.005	<0.005						0.05
Sodium	12/7/04	30	30	29	32						
Uranium	12/7/04	<0.1	<0.1	<0.1	<0.1						5.00
Zinc	12/7/04	0.012	0.035	0.024	0.013						10.00

RIVER ANALYSIS - 2004

Table 13

TOTAL METALS

EPA Method 6010C , EPA Method 7470: Mercury											40CFR141.62
mg/L	DATE Sampled	North of MW #46	North of MW #45	Upstream of Refinery	Down stream of Refinery	DATE Sampled	North of MW #46	North of MW #45	Upstream of Refinery	Down stream of Refinery	MCL
Arsenic	8/14/04	0.001	0.001	<0.001		9/7/04	<0.02	<0.02	<0.02		0.01
Barium	8/14/04	0.027	0.016	0.005		9/7/04	0.11	0.11	0.1		2
Cadmium	8/14/04	<0.001	<0.001	<0.001		9/7/04	<0.002	<0.002	<0.002		0.005
Cr	8/14/04	<0.001	<0.001	<0.001		9/7/04	<0.006	<0.006	<0.006		0.1
Lead	8/14/04	<0.001	<0.001	<0.001		9/7/04	<0.005	<0.005	<0.005		0.015
Se	8/14/04	<0.001	<0.001	<0.001		9/7/04	<0.05	<0.05	<0.05		0.05
Silver	8/14/04	<0.001	<0.001	<0.001		9/7/04	<0.005	<0.005	<0.005		
Mercury	8/14/04					9/7/04	<0.0002	<0.0002	<0.0002		0.002

RIVER ANALYSIS - 2004

Table 13

TOTAL METALS

EPA Method 6010C , EPA Method 7470: Mercury											40CFR141.62
mg/L	DATE Sampled	North of MW #46	North of MW #45	Upstream of Refinery	Down stream of Refinery	DATE Sampled	North of MW #46	North of MW #45	Upstream of Refinery	Down stream of Refinery	MCL
Arsenic	10/7/2004	<0.02	<0.02	<0.02		11/3/04	<0.02	<0.02	<0.02		0.01
Barium	10/7/04	0.074	0.072	0.083		11/3/04	0.088	0.1	0.086		2
Cadmium	10/7/04	<0.002	<0.002	<0.002		11/3/04	<0.002	<0.002	<0.002		0.005
Cr	10/7/04	<0.006	<0.006	<0.006		11/3/04	<0.006	<0.006	<0.006		0.1
Lead	10/7/04	<0.005	<0.005	<0.005		11/3/04	<0.005	<0.005	<0.005		0.015
Se	10/7/04	<0.05	<0.05	<0.05		11/3/04	<0.05	<0.05	<0.05		0.05
Silver	10/07/04	<0.005	<0.005	<0.005		11/3/04	<0.005	<0.005	<0.005		
Mercury	10/7/04	<0.0002	<0.0002	<0.0002		11/3/04	<0.0002	<0.0002	<0.0002		0.002

RIVER ANALYSIS - 2004

Table 13

TOTAL METALS

EPA Method 6010C , EPA Method 7470: Mercury											40CFR141.62
mg/L	DATE Sampled	North of MW #46	North of MW #45	Upstream of Refinery	Down stream of Refinery	DATE Sampled	North of MW #46	North of MW #45	Upstream of Refinery	Down stream of Refinery	MCL
Arsenic	12/7/04	<0.02	<0.02	<0.02	<0.02						0.01
Barium	12/7/04	0.087	0.08	0.077	0.08						2
Cadmium	12/7/04	<0.002	<0.002	<0.002	<0.002						0.005
Cr	12/7/04	<0.006	<0.006	<0.006	<0.006						0.1
Lead	12/7/04	<0.005	<0.005	<0.005	<0.005						0.015
Se	12/7/04	<0.05	<0.05	<0.05	<0.05						0.05
Silver	12/7/04	<0.005	<0.005	<0.005	<0.005						
Mercury	12/7/04	<0.0002	<0.0002	<0.0002	<0.0002						0.002

RIVER ANALYSIS - 2004

General Chemistry

Table 13

		EPA Method 300.0							EPA 160.1	EPA 120.1	EPA 310.1	
	DATE SAMPLED	mg/L Fluoride	mg/L Chloride	mg/L Nitrite	mg/L Bromide	mg/L Nitrogen	mg/L P	mg/L Sulfate	mg/L TDS	mg/L E.C.	mg/L CO3	mg/L Alk
WQCC 20NMAC 6.2.3103		1.6	250			10		600	1000			
North of MW #46	8/14/04	0.18	23	0.004		0.2	0.4	91	228	402	<0.1	87
North of MW #45	8/14/04	0.6	26	0.003		0.2	0.2	89	244	398	<0.1	89
Upstream of Refinery	8/14/04	0.45	23	0.2		0.007	0.2	95	242	391	<0.1	86
Down from Refinery	8/14/04											
North of MW #46	9/7/04	0.19	3.7	<0.1	<0.1	0.16	<0.5	74	230	310	<4.0	100
North of MW #45	9/7/04	0.22	3.7	<0.1	<0.1	0.18	<0.5	74	220	310	<4.0	100
Upstream of Refinery	9/7/04	0.2	3.8	<0.1	<0.1	0.11	<0.5	74	220	310	<4.0	100
Down from Refinery	9/7/04											
North of MW #46	10/7/04	0.19	4.4	<0.1	<0.1	0.13	<0.5	90	300	370	<4.0	110
North of MW #45	10/7/04	0.21	4.2	<0.1	<0.1	0.13	<0.5	88	260	360	<4.0	100
Upstream of Refinery	10/7/04	0.19	4.3	<0.1	<0.1	0.16	<0.5	86	260	360	<4.0	102
Down from Refinery												

RIVER ANALYSIS - 2004

General Chemistry

Table 13

		EPA Method 300.0							EPA 160.1	EPA 120.1	EPA 310.1	
	DATE SAMPLED	mg/L Fluoride	mg/L Chloride	mg/L Nitrite	mg/L Bromide	mg/L Nitrogen	mg/L P	mg/L Sulfate	mg/L TDS	mg/L E.C.	mg/L CO3	mg/L Alk
WQCC 20NMAC 6.2.3103		1.6	250			10		600	1000			
North of MW #46	11/3/04	0.24	4.7	<0.1	<0.1	0.11	<0.5	110	290	370	<2	110
North of MW #45	11/3/04	0.25	5	<0.1	<0.1	<0.1	<0.5	110	290	370	<2.0	110
Upstream of Refinery	11/3/04	0.23	4.5	<0.1	<0.1	0.1	<0.5	100	280	360	<2.0	120
Down from Refinery												

WQCC 20NMAC 6.2.3103		1.6	250			10		600	1000			
North of MW #46	12/7/04	0.19	4.6	<0.1	<0.1	0.19	<0.5	110	300	410	<4.0	100
North of MW #45	12/7/04	0.02	4.5	<0.1	<0.1	0.16	<0.5	110	320	410	<4.0	100
Upstream of Refinery	12/7/04	0.19	4.4	<0.1	<0.1	0.16	<0.5	100	280	400	<4.0	92
Down from Refinery	12/7/04	0.18	4.6	<5.0	<0.1	<5.0	<0.5	120	310	440	<4.0	98

RIVER ANALYSIS - 2004

ORGANICS

Table 13

		EPA Method 8021B					EPA Method 8015B		
	DATE SAMPLED	mg/L Benzene	mg/L Toluene	mg/L EthylBen	mg/L Xylene	mg/L MTBE	mg/L DRO	mg/L MRO	mg/L GRO
WQCC 20NMAC 6.2.3103		0.01	0.75	0.75	0.62				
North of MW #46	8/14/04	0.006	0.085	0.029	0.11	<0.0002	<0.1		0.3
North of MW #45	8/14/04	0.0097	0.061	0.022	0.081	<0.0002	<0.1		0.2
Upstream of Refinery	8/14/04	<0.0002	<0.0002	<0.0002	<0.0002	<0.0002	<0.1		<0.2
Down from Refinery									
North of MW #46	9/7/04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
North of MW #45	9/7/04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
Upstream of Refinery	9/7/04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
Down from Refinery	9/30/04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
North of MW #46	10/7/04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
North of MW #45	10/7/04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
Upstream of Refinery	10/7/04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
Down from Refinery	10/7/04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05

RIVER ANALYSIS - 2004

ORGANICS

Table 13

		EPA Method 8021B					EPA Method 8015B		
	DATE SAMPLED	mg/L Benzene	mg/L Toluene	mg/L EthylBen	mg/L Xylene	mg/L MTBE	mg/L DRO	mg/L MRO	mg/L GRO
WQCC 20NMAC 6.2.3103		0.01	0.75	0.75	0.62				
North of MW #46	11/3/04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
North of MW #45	11/3/04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
Upstream of Refinery	11/3/04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
Down from Refinery	11/3/04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05

		EPA Method 8021B					EPA Method 8015B		
	DATE SAMPLED	mg/L Benzene	mg/L Toluene	mg/L EthylBen	mg/L Xylene	mg/L MTBE	mg/L DRO	mg/L MRO	mg/L GRO
WQCC 20NMAC 6.2.3103		0.01	0.75	0.75	0.62				
North of MW #46	12/7/04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
North of MW #45	12/7/04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
Upstream of Refinery	12/7/04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05
Down from Refinery	12/7/04	<0.0005	<0.0005	<0.0005	<0.0005	<0.0025	<1.0	<5.0	<0.05

Water Quality Field Measurements Table 14

DATE	RW/MW	DEPTH TO LIQUID (ft)	SPH	WELL DEPTH	E.C.	pH	TEMP.	D.O	ORP
Nov-04	MW #48	7.73	0	17.32	2648	7.01	54		
Dec-04		7.97	0	17.32	2773	7.01	54		
Nov-04	MW #49	9	0	16.48	2448	6.91	55		
Dec-04		9.3	0	16.48	2450	6.93	55		

Section 10.0 List of Figures

Figure 1

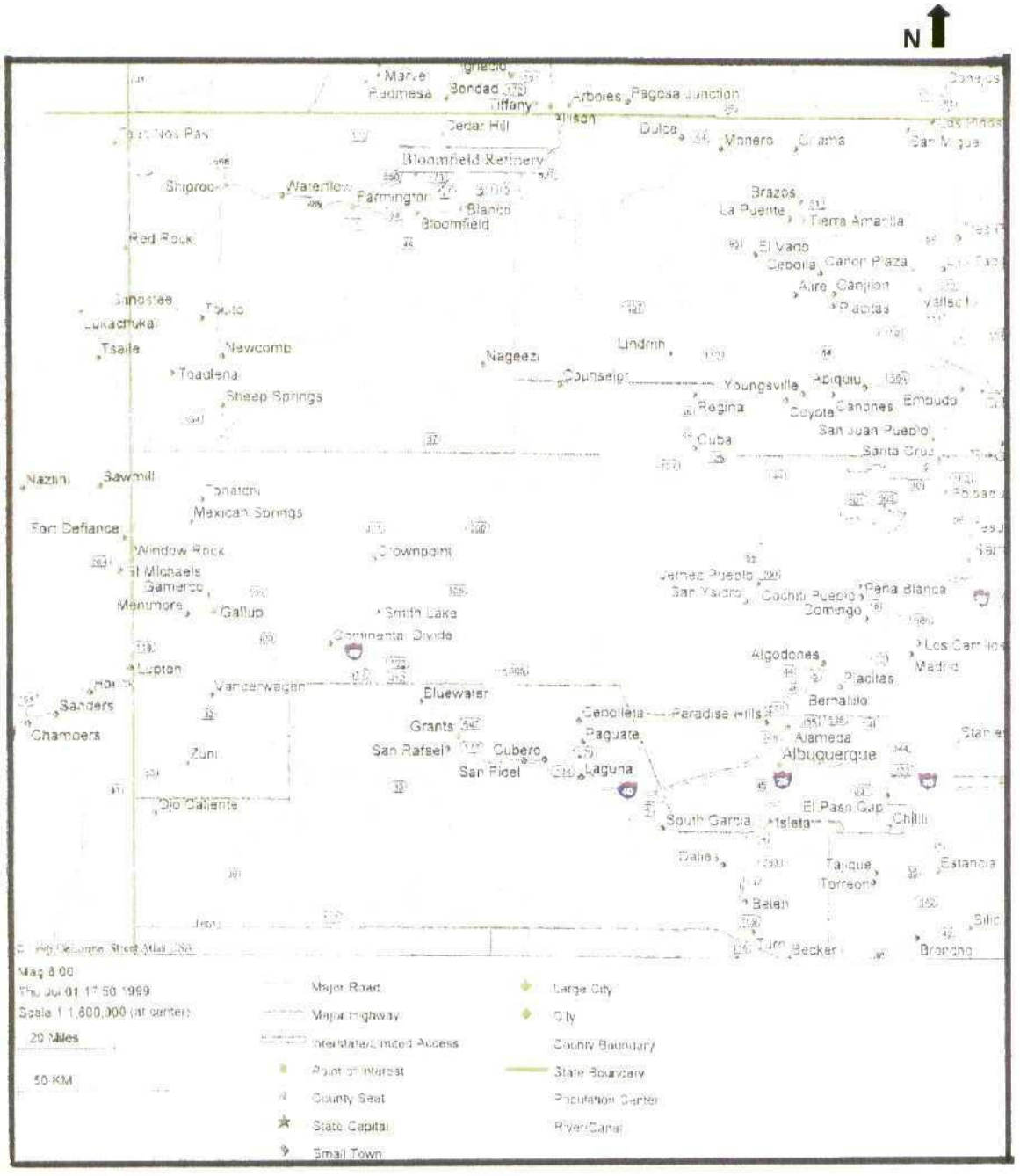
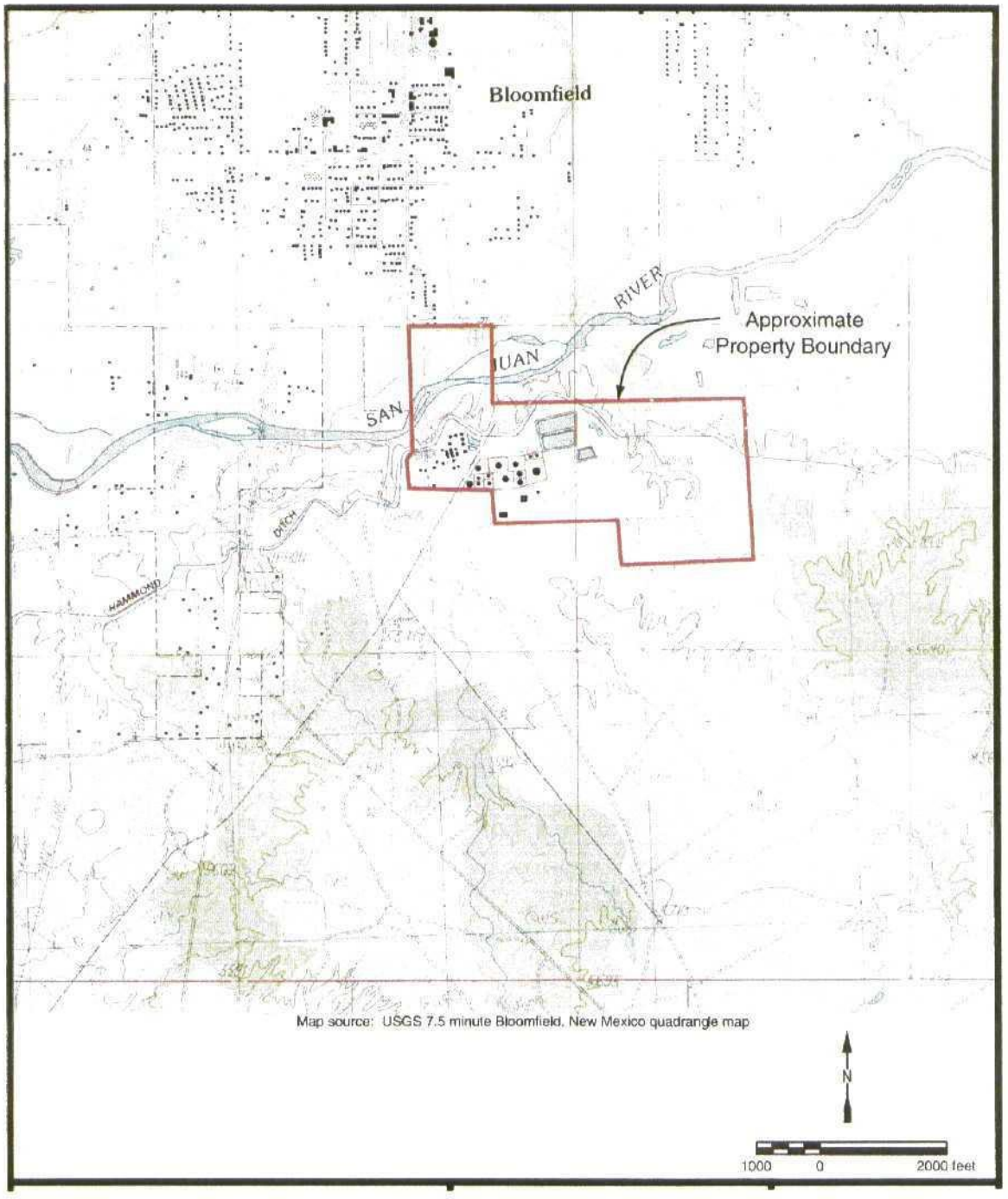
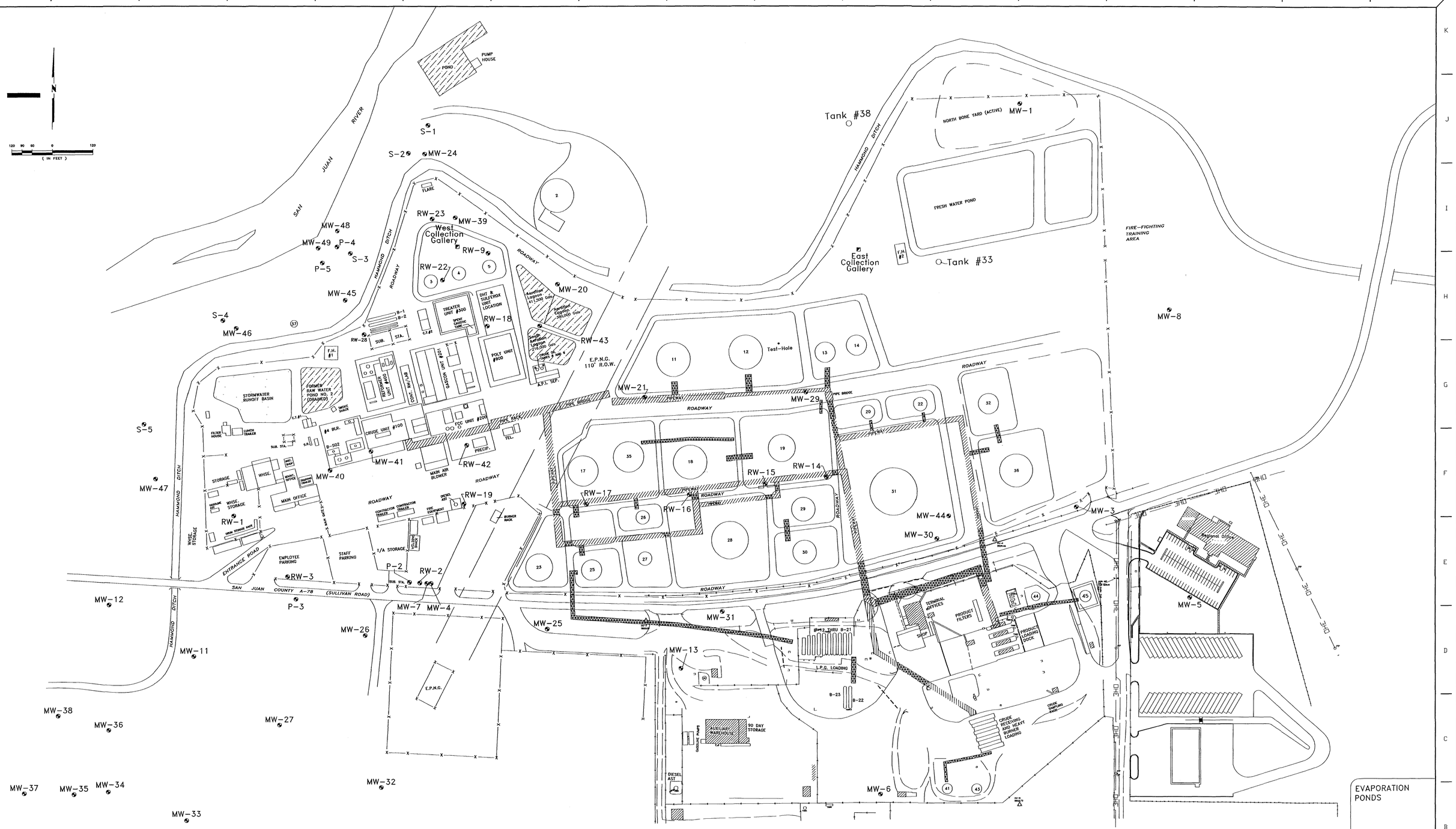

N
Bloomfield Refinery
Cedar Hill
Farmington
Bloomfield
Shiprock
Waterflow
Red Rock
Tsaile
Newcomb
Toadlena
Sheep Springs
Nageezi
Lindrith
Counselor
Youngsville
Abiquiu
Regina
Coyote
Canones
Embudo
Cuba
San Juan Pueblo
Santa Cruz
Nazlini
Sawmill
Ganado
Mexican Springs
Fort Defiance
Window Rock
Crownpoint
St Michaels
Gamerco
Gallup
Smith Lake
Continental Divide
Lupton
Vanderwagen
Bluewater
Sanders
Chambers
Grants
Zuni
San Rafael
Cubero
San Ysidro
Cochiti Pueblo
Domingo
Algodones
Placitas
Madrid
Bernalillo
Cebolleta
Paradise Hills
Paguate
Alameda
Albuquerque
San Ysidro
Laguna
Dio Caliente
South Garcia
Isleta
El Paso Gap
Chilili
Tajique
Torreon
Estancia
Belen
Becker
Broncho
Major Road
Major Highway
Interstate/Limited Access
Point of Interest
County Seat
State Capital
Small Town
Large City
City
County Boundary
State Boundary
Population Center
River/Canal
20 Miles
50 KM

Figure 2


Bloomfield
RIVER
Approximate
Property Boundary
SAN
DITCH
HAMMOND
Map source: USGS 7.5 minute Bloomfield, New Mexico quadrangle map
N
1000
0
2000 feet



NOTES "MW-XX" – Monitoring Wells Locations
"RW-XX" – Recovery Well Locations
"S-XX" – Seep Locations
"P" – Piezometer
– Denotes Under Ground Pipe-Way.
– Denotes Above Ground Pipe-Way.

NO.	REVISION	JOB No.	DRAWN BY	DATE	CHECKED BY	DATE	APPROVED BY	DATE
5	Updated To Indicate Changes As Per Enviro. Dept. Red-Line Mark-Ups.		NHB	3/05				
4	Updated To Indicate Changes As Per Enviro. Dept. Red-Line Mark-Ups.		NHB	2/04				
3	Updated To Indicate Under Ground Pipe Ways In The Tank Farm Area		NHB	12/03				
2	Updated As Per Enviromental Dept. Mark-Up. (C. Hurtado)		NHB	5/03				
1	Updated As Per Enviromental Dept. Mark Up							

REFERENCE DWGS.

SCALE	As Noted
DRAWN BY	NHB
DATE	8/29/02
INITIAL CHK.	
FINAL CHK.	
ENGR.	
APPR. BY	
AFE/WO No.	

Giant Bloomfield Refinery
Area Plot Plan
Recovery Well & Monitoring Well Locations

GIANT REFINING CO.
BLOOMFIELD REFINERY — BLOOMFIELD NEW MEXICO

DWG. NO. D-000-900-023 — REV. 5

Giant Refining Company
Bloomfield Refinery
Water Elevation & Flow Direction

March 2004

Contour Interval 1'

1"-200'

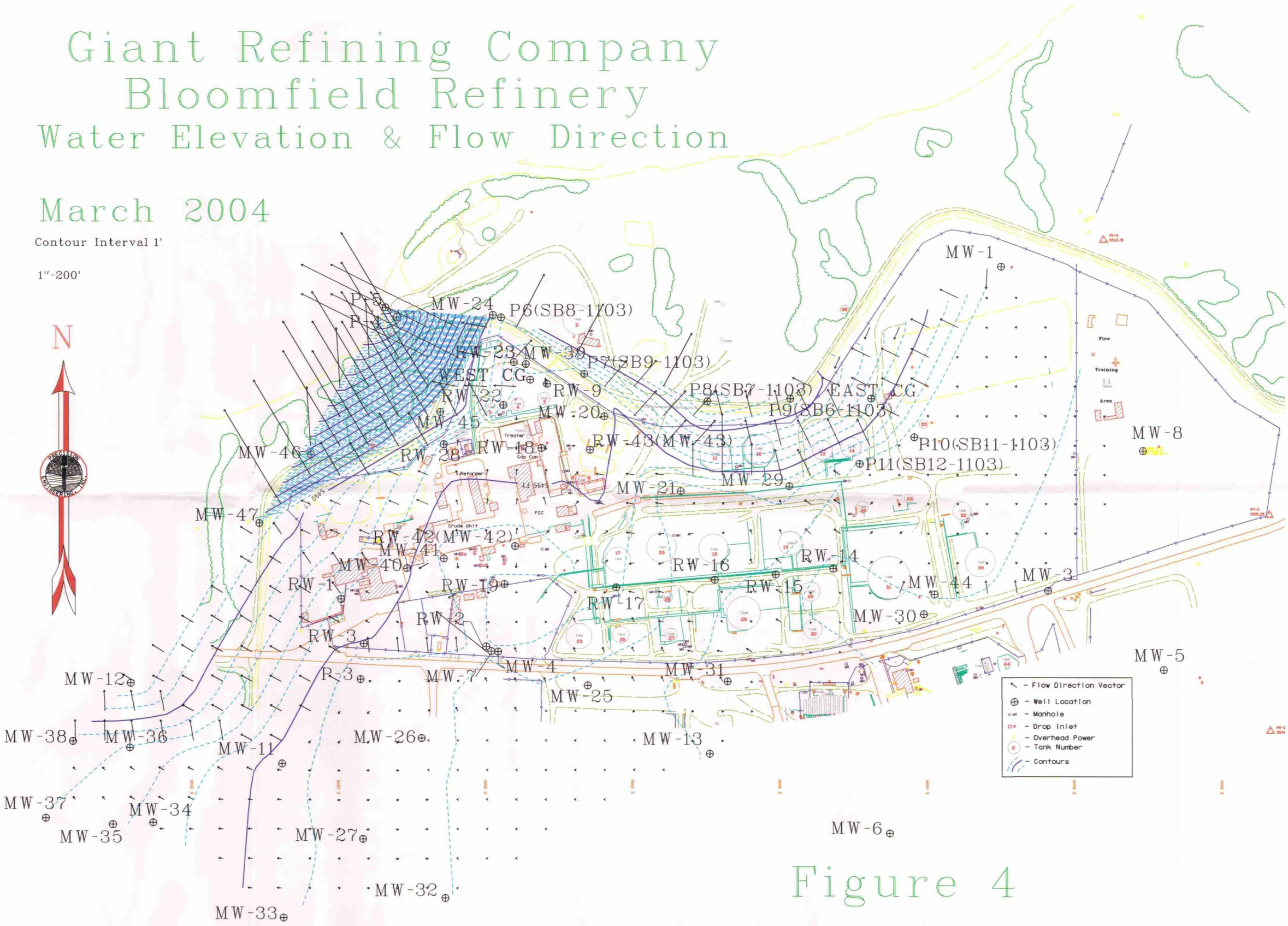


Figure 4

Giant Refining Company
Bloomfield Refinery
Water Elevation & Flow Direction

August 2004

Contour Interval 1'

1"-200'

N

MW-1
P-5
P-4
MW-24
P6(SB8-1103)
SB6-0704
SB5-0704
SB7-0704
RW-23
MW-39
SB4-0704
P7(SB9-1103)
P9(SB6-1103)
W CG
RW-9
P8(SB7-1103)
EAST CG
RW-22
MW-45
MW-20
SB8-0704
SB3-0704
SB2-0704
MW-46
RW-18
RW-43(MW-43)
P10(SB11-1103)
RW-28
SB1-0704
P11(SB12-1103)
MW-29
MW-21
MW-47
RW-42(MW-42)
MW-41
MW-40
RW-16
RW-14
RW-1
RW-19
RW-15
MW-44
MW-3
RW-17
RW-2
MW-30
RW-3
MW-5
MW-12
P-3
MW-7
MW-4
MW-31
MW-25
MW-38
MW-36
MW-11
MW-26
MW-13
MW-37
MW-34
MW-35
MW-27
MW-6
MW-32
MW-33

Fire Training Area

- Flow Direction Vector
- Well Location
- Manhole
- Drop Inlet
- Overhead Power
- Tank Number
- Contours

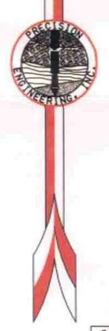
Figure 5

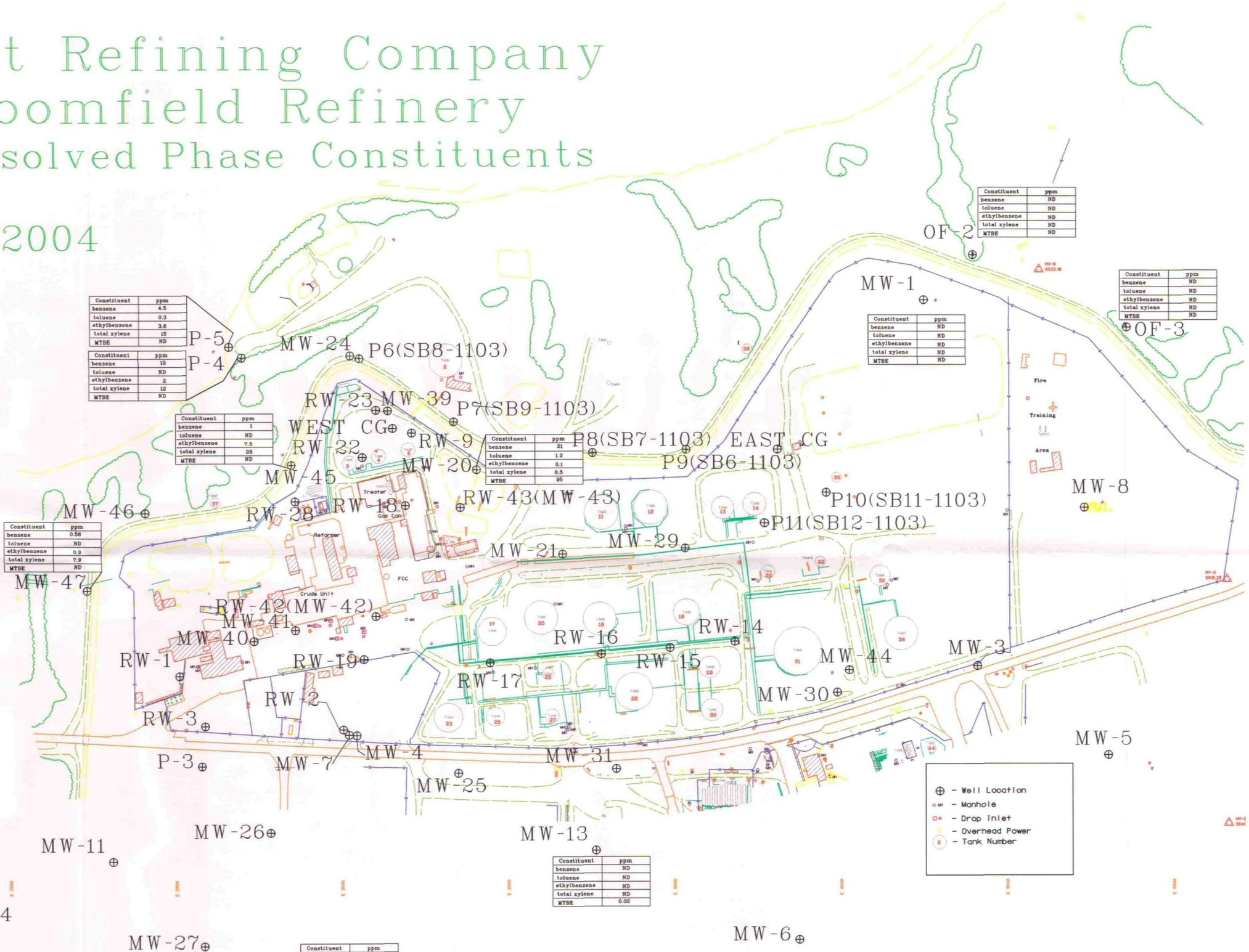
Giant Refining Company
Bloomfield Refinery
GW Disolved Phase Constituents

March 2004

1"-200'

N





Constituent	ppm
benzene	4.5
toluene	0.3
ethylbenzene	3.6
total xylene	15
MTBE	ND

Constituent	ppm
benzene	12
toluene	ND
ethylbenzene	2
total xylene	12
MTBE	ND

Constituent	ppm
benzene	1
toluene	ND
ethylbenzene	7.5
total xylene	28
MTBE	ND

Constituent	ppm
benzene	21
toluene	1.2
ethylbenzene	0.1
total xylene	0.5
MTBE	95

Constituent	ppm
benzene	0.56
toluene	ND
ethylbenzene	0.9
total xylene	7.9
MTBE	ND

Constituent	ppm
benzene	ND
toluene	ND
ethylbenzene	ND
total xylene	ND
MTBE	ND

Constituent	ppm
benzene	ND
toluene	ND
ethylbenzene	ND
total xylene	ND
MTBE	ND

Constituent	ppm
benzene	ND
toluene	ND
ethylbenzene	ND
total xylene	ND
MTBE	ND

Constituent	ppm
benzene	ND
toluene	ND
ethylbenzene	ND
total xylene	ND
MTBE	ND

Constituent	ppm
benzene	ND
toluene	ND
ethylbenzene	ND
total xylene	0.001
MTBE	0.015

Constituent	ppm
benzene	ND
toluene	ND
ethylbenzene	ND
total xylene	0.006
MTBE	0.004

Constituent	ppm
benzene	0.006
toluene	ND
ethylbenzene	ND
total xylene	0.003
MTBE	0.011

Constituent	ppm
benzene	ND
toluene	ND
ethylbenzene	ND
total xylene	ND
MTBE	ND

Constituent	ppm
benzene	ND
toluene	ND
ethylbenzene	ND
total xylene	ND
MTBE	0.02

Constituent	ppm
benzene	ND
toluene	ND
ethylbenzene	ND
total xylene	ND
MTBE	ND

Figure 6

Giant Refining Company
Bloomfield Refinery
GW Dissolved Phase Constituents

August 2004

1"-200'

N

Constituent	ppm
Benzene	0.33
Toluene	ND
Ethylbenzene	ND
Xylene	1.4
MTBE	ND

P-5

Constituent	ppm
Benzene	1
Toluene	ND
Ethylbenzene	1.6
Xylene	5.8
MTBE	ND

P-4

P6(SB8-1103)

SB6-0704

SB7-0704

MW-24

Constituent	ppm
Benzene	0.46
Toluene	0.15
Ethylbenzene	0.55
Xylene	0.92
MTBE	ND

SB5-0704

RW-23

MW-39

SB4-0704

W. CG

RW-9

P7(SB9-1103)

P8(SB7-1103)

P9(SB6-1103)

EAST CG

RW-22

SB3-0704

MW-45

MW-20

SB8-0704

MW-46

SB2-0704

RW-28

RW-18

RW-43(MW-43)

P10(SB11-1103)

SB1-0704

P11(SB12-1103)

MW-29

MW-21

Constituent	ppm
Benzene	0.13
Toluene	ND
Ethylbenzene	0.0098
Xylene	0.003
MTBE	0.028

Constituent	ppm
Benzene	ND
Toluene	ND
Ethylbenzene	ND
Xylene	ND
MTBE	0.0026

Constituent	ppm
Benzene	1.9
Toluene	17
Ethylbenzene	3.2
Xylene	20
MTBE	ND

MW-47

RW-42(MW-42)

MW-41

MW-40

RW-1

RW-19

RW-16

RW-14

RW-15

Constituent	ppm
Benzene	2.1
Toluene	ND
Ethylbenzene	0.17
Xylene	0.82
MTBE	ND

Constituent	ppm
Benzene	9.4
Toluene	15
Ethylbenzene	2.8
Xylene	22
MTBE	ND

RW-17

MW-44

MW-3

Constituent	ppm
Benzene	ND
Toluene	ND
Ethylbenzene	ND
Xylene	ND
MTBE	0.0048

Constituent	ppm
Benzene	0.33
Toluene	ND
Ethylbenzene	ND
Xylene	1.4
MTBE	ND

RW-2

RW-3

MW-30

Constituent	ppm
Benzene	1.7
Toluene	0.37
Ethylbenzene	1.9
Xylene	2.5
MTBE	ND

MW-5

P-3

MW-7

Constituent	ppm
Benzene	ND
Toluene	ND
Ethylbenzene	ND
Xylene	ND
MTBE	ND

MW-4

MW-31

Constituent	ppm
Benzene	3.7
Toluene	0.4
Ethylbenzene	0.32
Xylene	1.2
MTBE	ND

MW-25

Constituent	ppm
Benzene	ND
Toluene	ND
Ethylbenzene	ND
Xylene	ND
MTBE	ND

Constituent	ppm
Benzene	ND
Toluene	ND
Ethylbenzene	ND
Xylene	ND
MTBE	ND

MW-12

Constituent	ppm
Benzene	ND
Toluene	ND
Ethylbenzene	ND
Xylene	0.00094
MTBE	ND

MW-38

Constituent	ppm
Benzene	ND
Toluene	ND
Ethylbenzene	0.0012
Xylene	0.00068
MTBE	0.0085

MW-36

Constituent	ppm
Benzene	0.0009
Toluene	ND
Ethylbenzene	ND
Xylene	0.004
MTBE	0.0085

MW-26

Constituent	ppm
Benzene	0.074
Toluene	ND
Ethylbenzene	0.46
Xylene	0.19
MTBE	ND

MW-11

Constituent	ppm
Benzene	1.7
Toluene	ND
Ethylbenzene	0.064
Xylene	0.015
MTBE	ND

MW-13

Constituent	ppm
Benzene	ND
Toluene	ND
Ethylbenzene	ND
Xylene	ND
MTBE	0.027

MW-37

Constituent	ppm
Benzene	ND
Toluene	ND
Ethylbenzene	0.0012
Xylene	0.00062
MTBE	0.0026

MW-34

Constituent	ppm
Benzene	ND
Toluene	0.0039
Ethylbenzene	0.019
Xylene	0.013
MTBE	ND

MW-35

Constituent	ppm
Benzene	0.00062
Toluene	ND
Ethylbenzene	0.061
Xylene	0.0033
MTBE	0.0096

MW-27

Constituent	ppm
Benzene	ND
Toluene	ND
Ethylbenzene	ND
Xylene	ND
MTBE	ND

MW-33

Constituent	ppm
Benzene	ND
Toluene	ND
Ethylbenzene	ND
Xylene	ND
MTBE	ND

MW-32

Constituent	ppm
Benzene	ND
Toluene	ND
Ethylbenzene	ND
Xylene	ND
MTBE	ND

MW-6

OF-2

Constituent	ppm
Benzene	ND
Toluene	ND
Ethylbenzene	ND
Xylene	ND
MTBE	ND

MW-1

Constituent	ppm
Benzene	ND
Toluene	ND
Ethylbenzene	ND
Xylene	ND
MTBE	ND

OF-3

Constituent	ppm
Benzene	ND
Toluene	ND
Ethylbenzene	ND
Xylene	ND
MTBE	ND

MW-8

Constituent	ppm
Benzene	ND
Toluene	ND
Ethylbenzene	ND
Xylene	ND
MTBE	ND

Fire Training Area

Treater

Reformer

Crude Unit

FCC

Gas Con

- Well Location
- Manhole
- Drop Inlet
- Overhead Power
- Tank Number

Figure 7

Giant Refining Company
Bloomfield Refinery
Product Thickness

March 2004

Contour Interval 0.5'

1"-200'

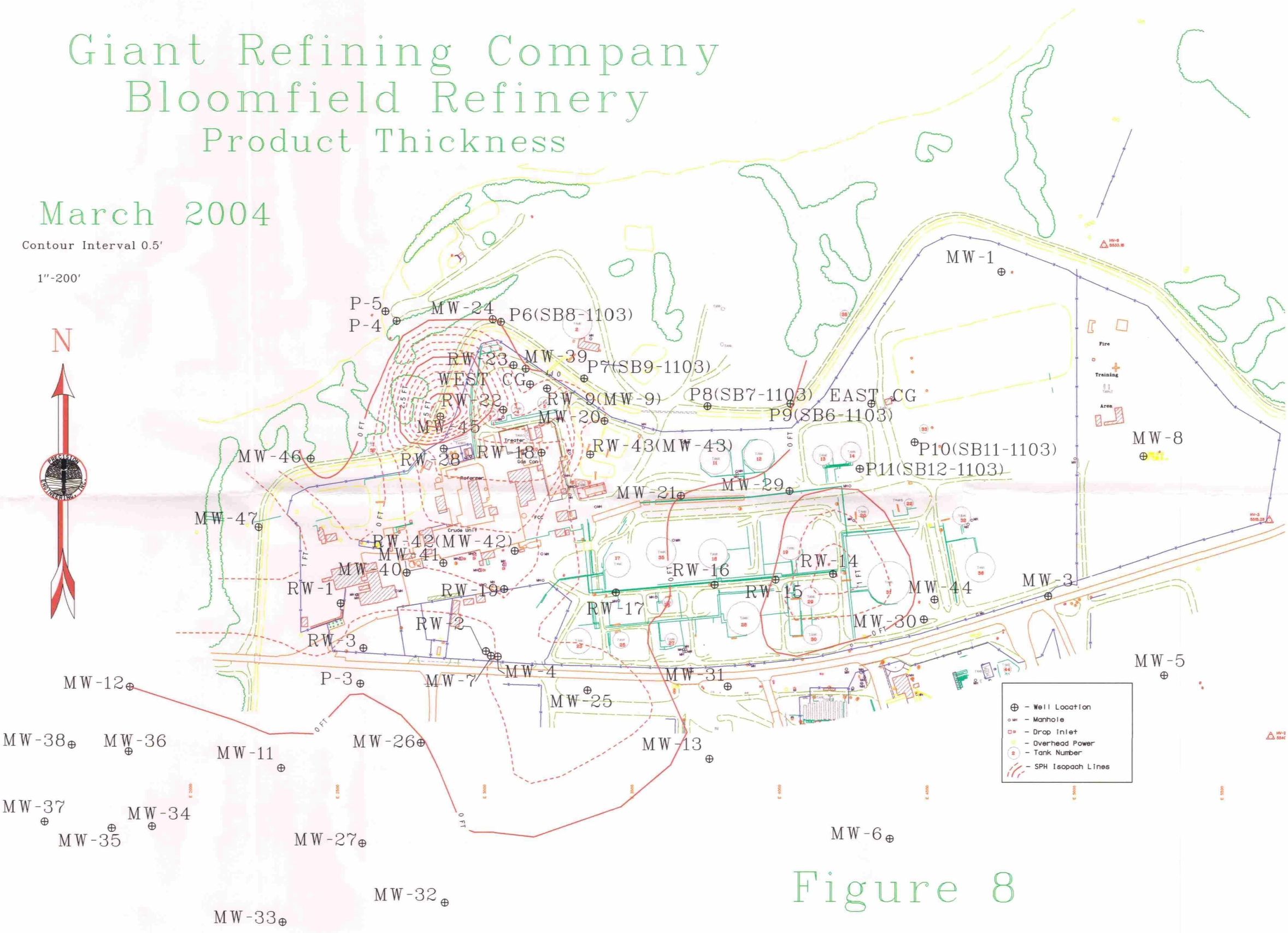


Figure 8

Giant Refining Company
Bloomfield Refinery
Product Thickness

August 2004

Contour Interval 0.5'

1"-200'

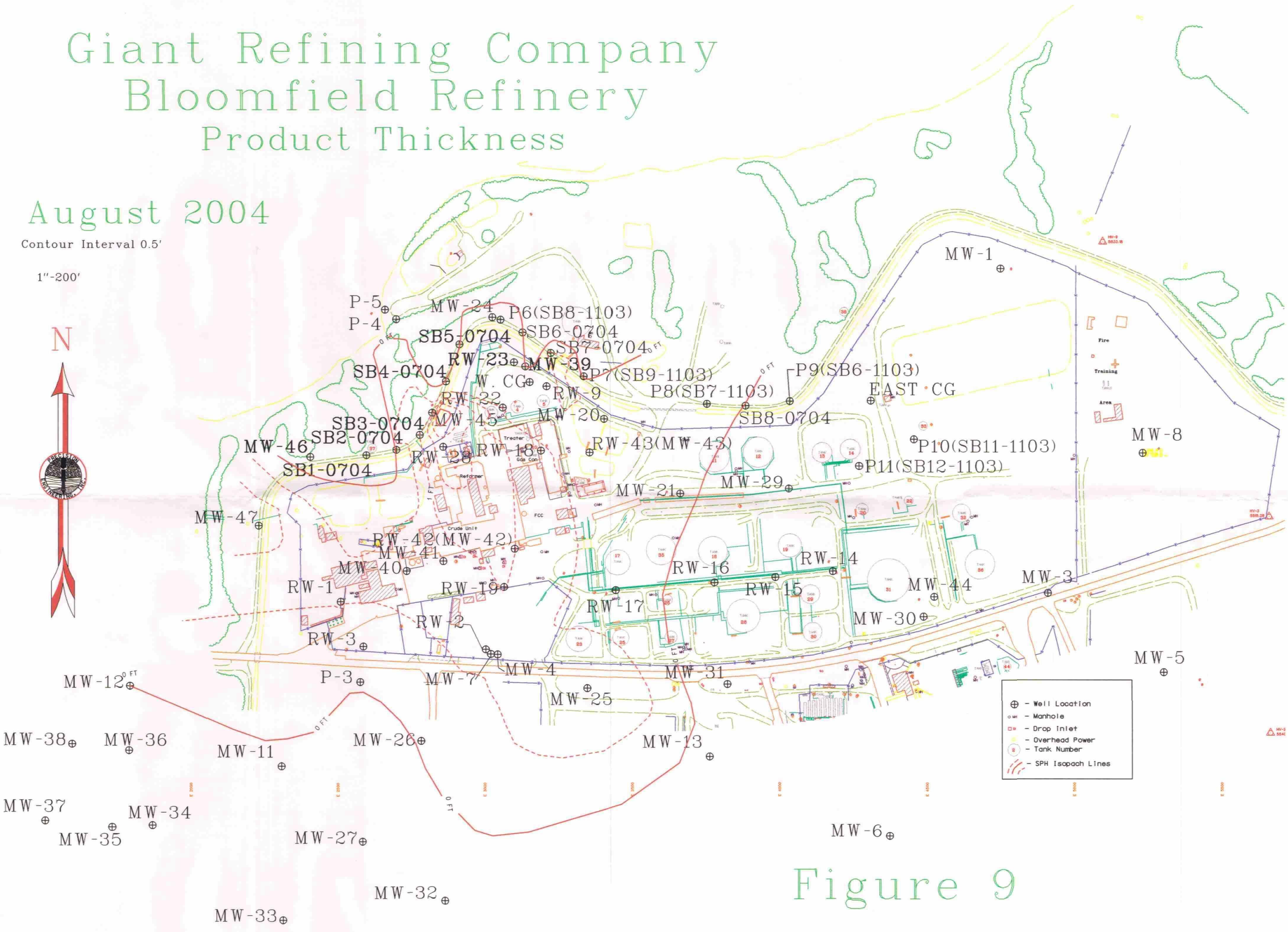
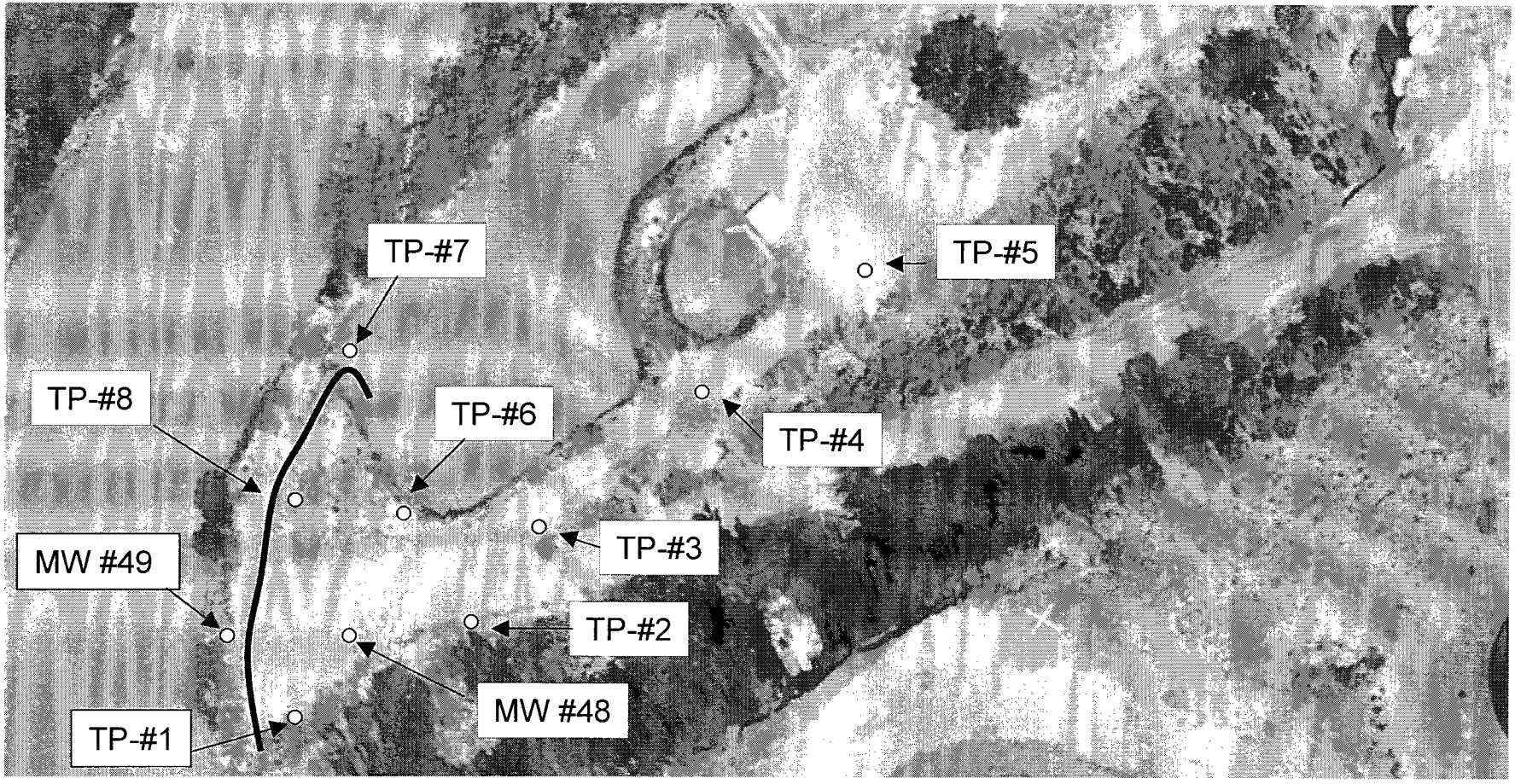


Figure 9

Figure 10

River Terrace Sampling Locations

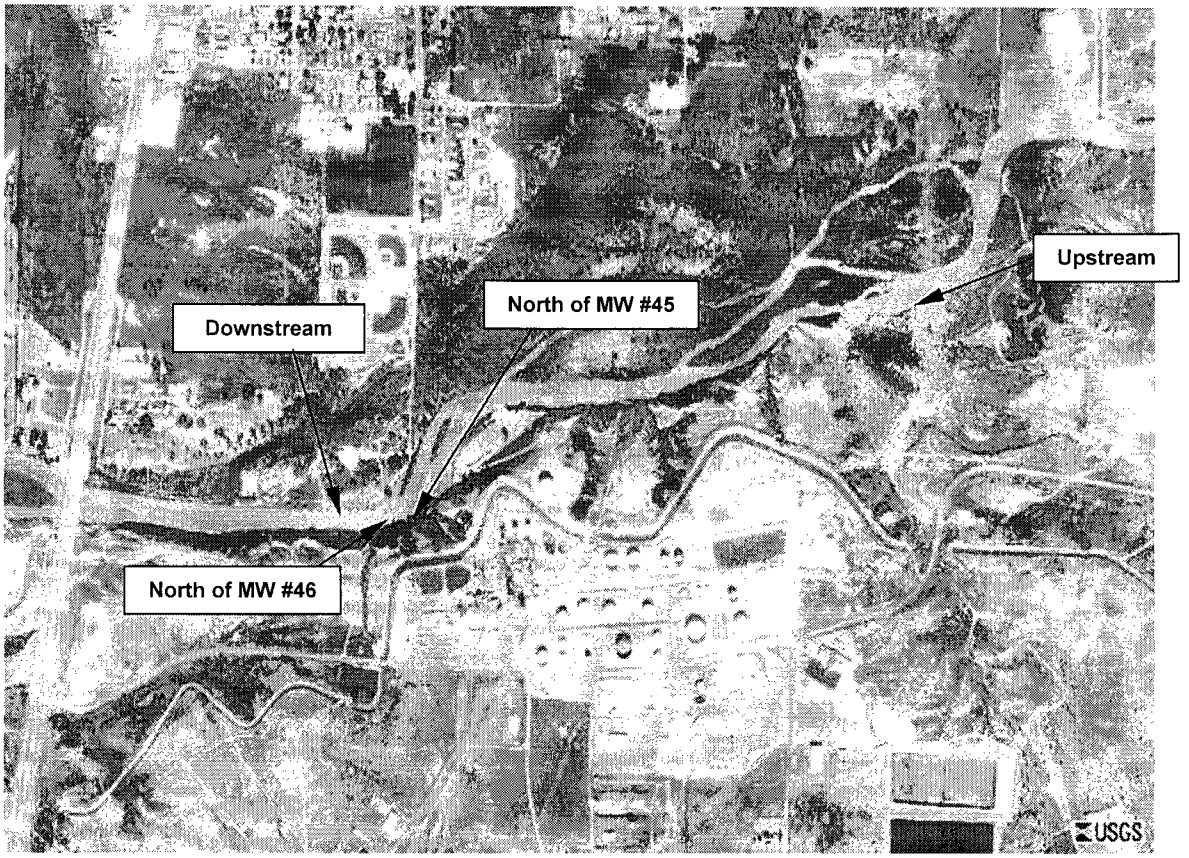


○ = Proposed Monitoring Well Location

○ = Proposed Grab-Sample Location

━ = Existing Barrier Alignment

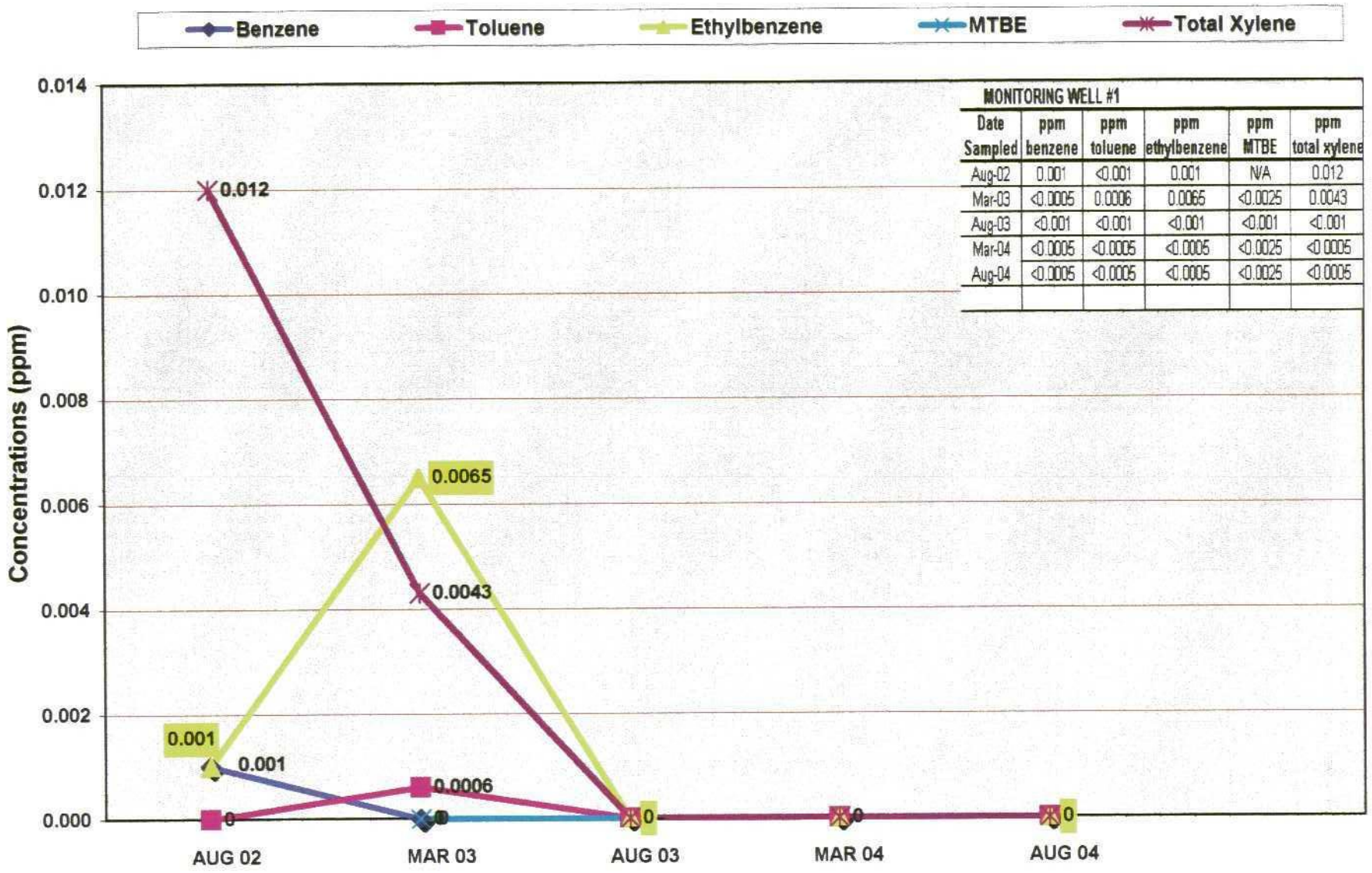
Figure 11



San Juan River Sampling Points

Section 11.0 BTEX & MTBE Concentration vs Time

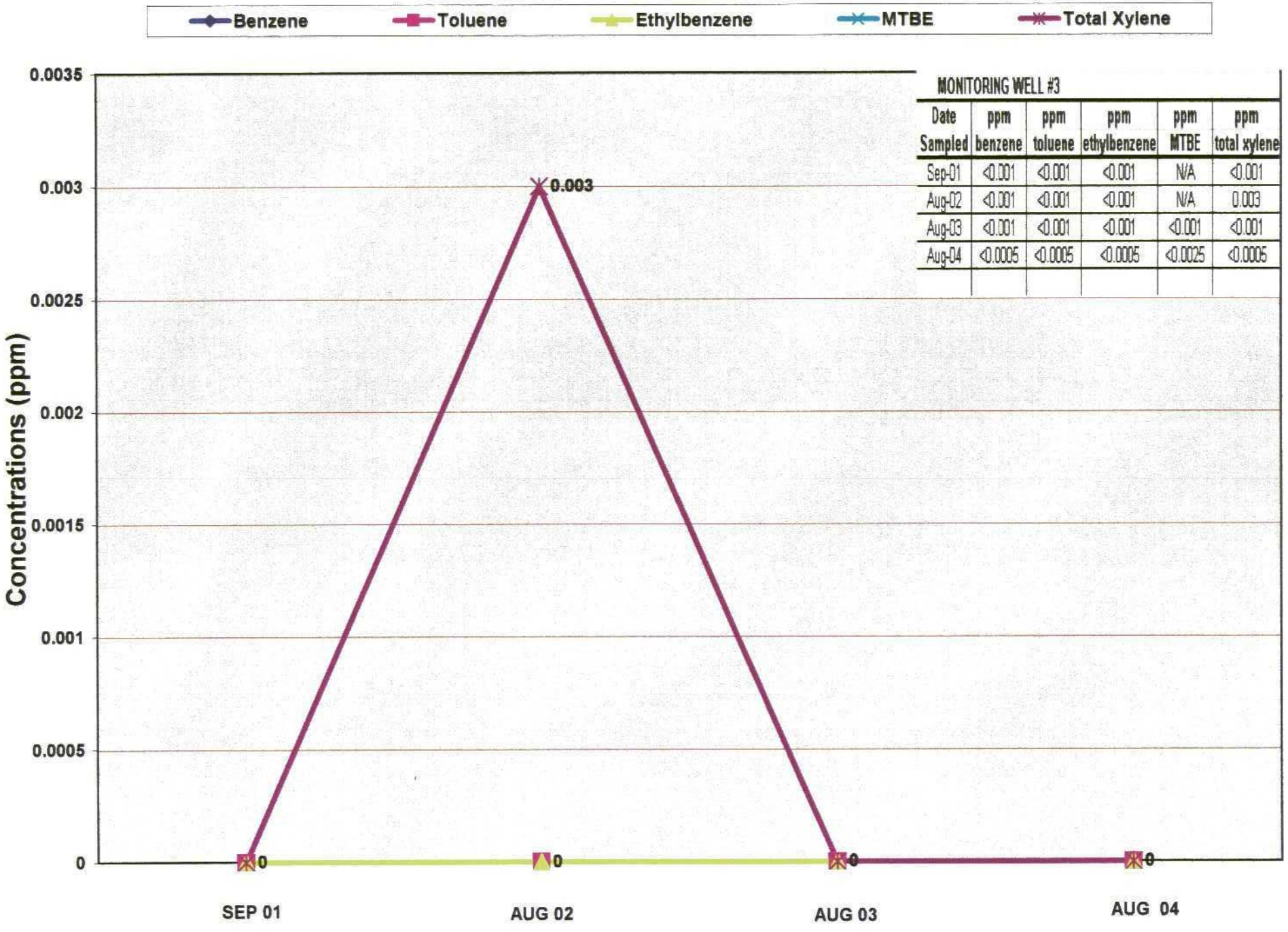
Monitoring Well #1



MONITORING WELL #1

Date Sampled	ppm benzene	ppm toluene	ppm ethylbenzene	ppm MTBE	ppm total xylene
Aug-02	0.001	<0.001	0.001	N/A	0.012
Mar-03	<0.0005	0.0006	0.0065	<0.0025	0.0043
Aug-03	<0.001	<0.001	<0.001	<0.001	<0.001
Mar-04	<0.0005	<0.0005	<0.0005	<0.0025	<0.0005
Aug-04	<0.0005	<0.0005	<0.0005	<0.0025	<0.0005

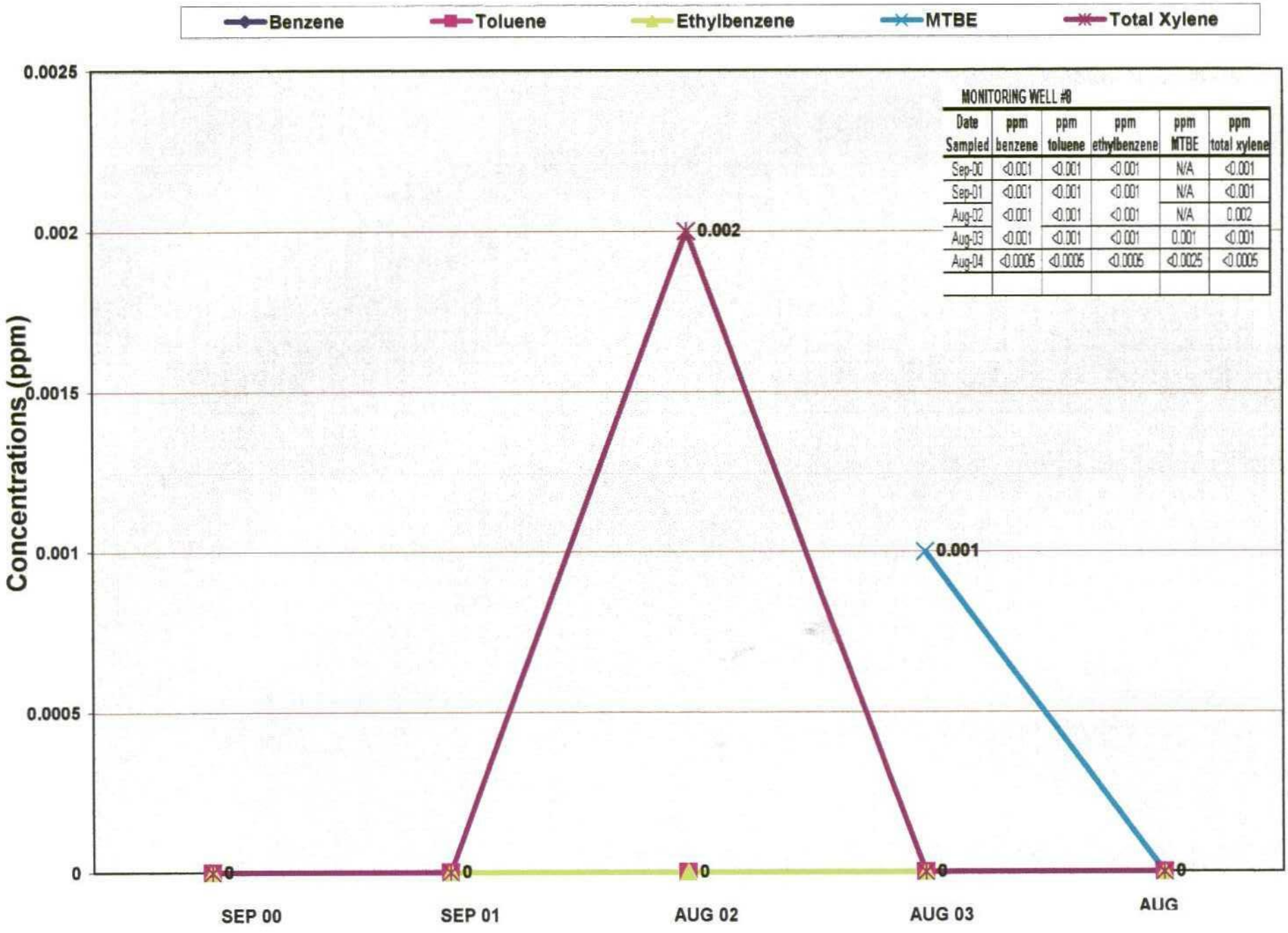
Monitoring Well #3



MONITORING WELL #3

Date Sampled	ppm benzene	ppm toluene	ppm ethylbenzene	ppm MTBE	ppm total xylene
Sep-01	<0.001	<0.001	<0.001	N/A	<0.001
Aug-02	<0.001	<0.001	<0.001	N/A	0.003
Aug-03	<0.001	<0.001	<0.001	<0.001	<0.001
Aug-04	<0.0005	<0.0005	<0.0005	<0.0025	<0.0005

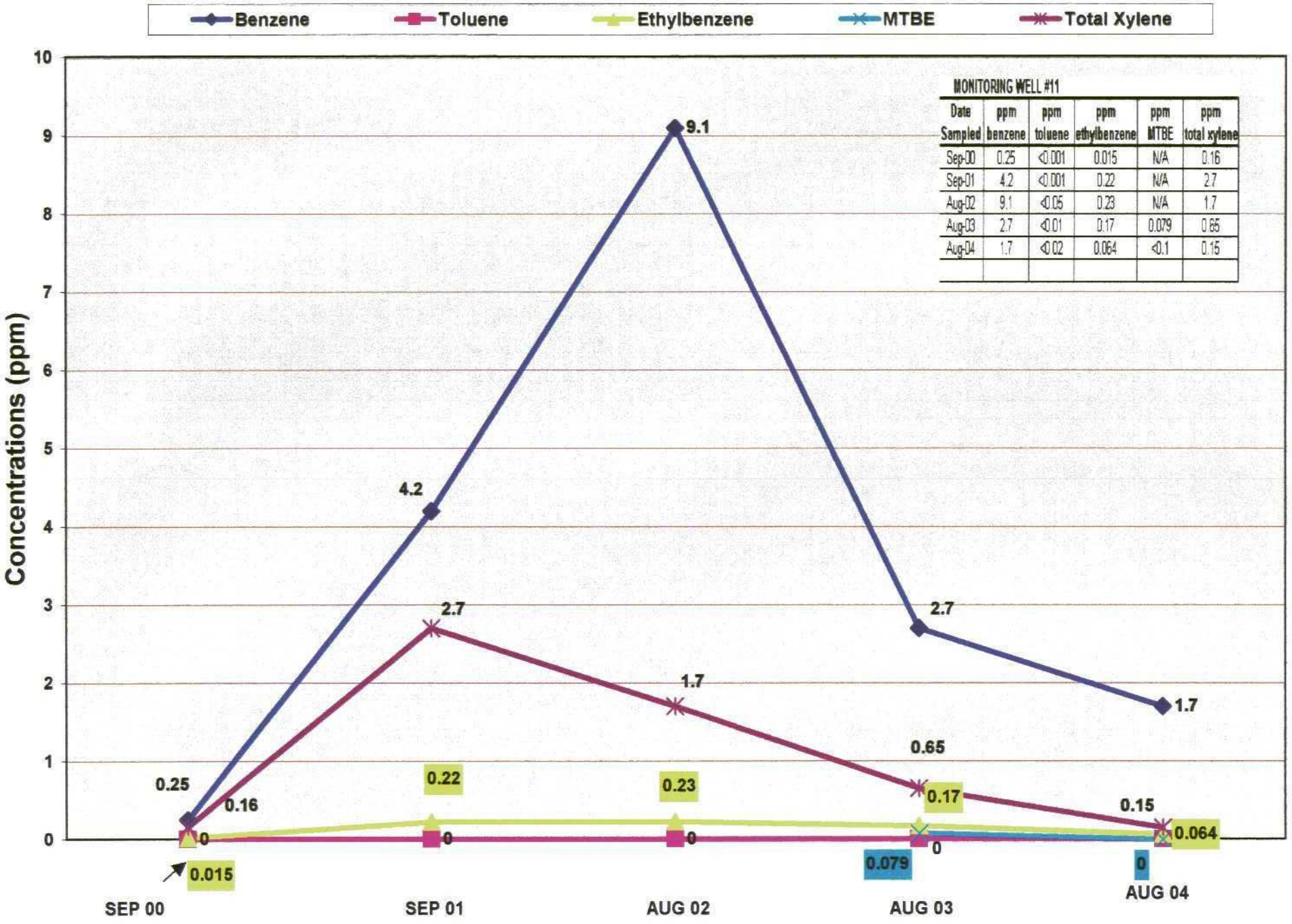
Monitoring Well #8



MONITORING WELL #8

Date Sampled	ppm benzene	ppm toluene	ppm ethylbenzene	ppm MTBE	ppm total xylene
Sep-00	<0.001	<0.001	<0.001	N/A	<0.001
Sep-01	<0.001	<0.001	<0.001	N/A	<0.001
Aug-02	<0.001	<0.001	<0.001	N/A	0.002
Aug-03	<0.001	<0.001	<0.001	0.001	<0.001
Aug-04	<0.0005	<0.0005	<0.0005	<0.0025	<0.0005

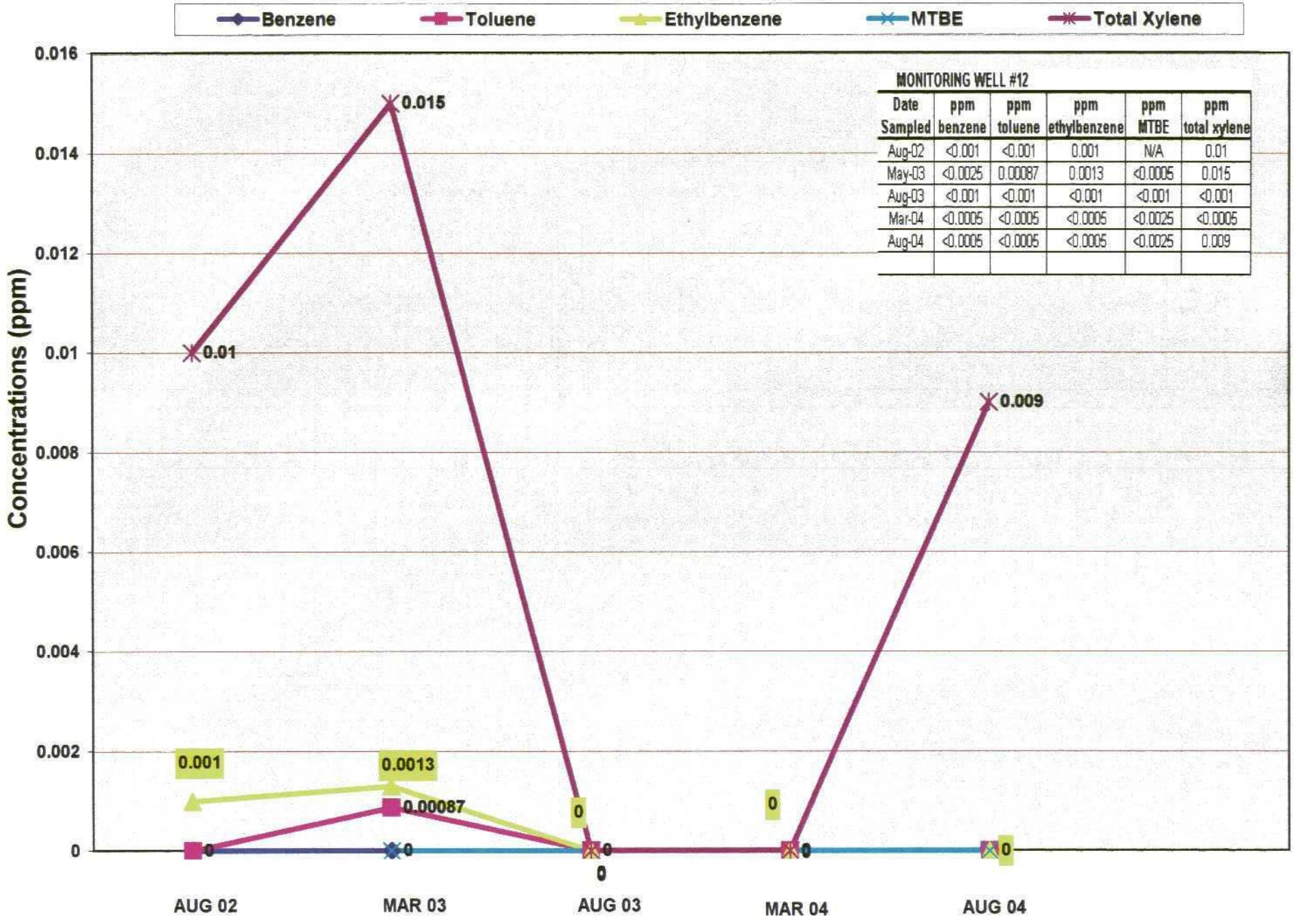
Monitoring Well #11



MONITORING WELL #11

Date Sampled	ppm benzene	ppm toluene	ppm ethylbenzene	ppm MTBE	ppm total xylene
Sep-00	0.25	<0.001	0.015	N/A	0.16
Sep-01	4.2	<0.001	0.22	N/A	2.7
Aug-02	9.1	<0.05	0.23	N/A	1.7
Aug-03	2.7	<0.01	0.17	0.079	0.65
Aug-04	1.7	<0.02	0.064	<0.1	0.15

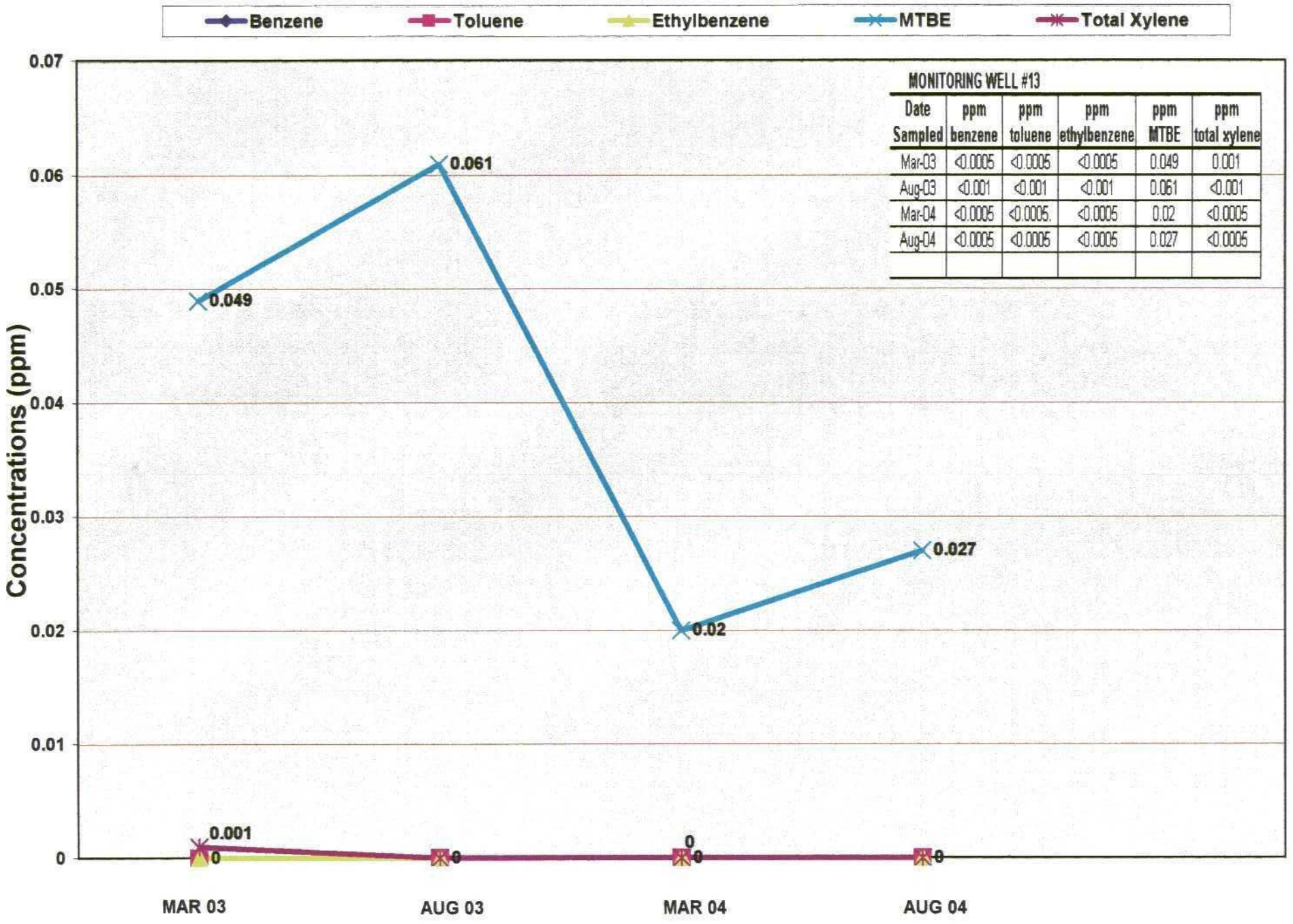
Monitoring Well #12



MONITORING WELL #12

Date Sampled	ppm benzene	ppm toluene	ppm ethylbenzene	ppm MTBE	ppm total xylene
Aug-02	<0.001	<0.001	0.001	N/A	0.01
May-03	<0.0025	0.00087	0.0013	<0.0005	0.015
Aug-03	<0.001	<0.001	<0.001	<0.001	<0.001
Mar-04	<0.0005	<0.0005	<0.0005	<0.0025	<0.0005
Aug-04	<0.0005	<0.0005	<0.0005	<0.0025	0.009

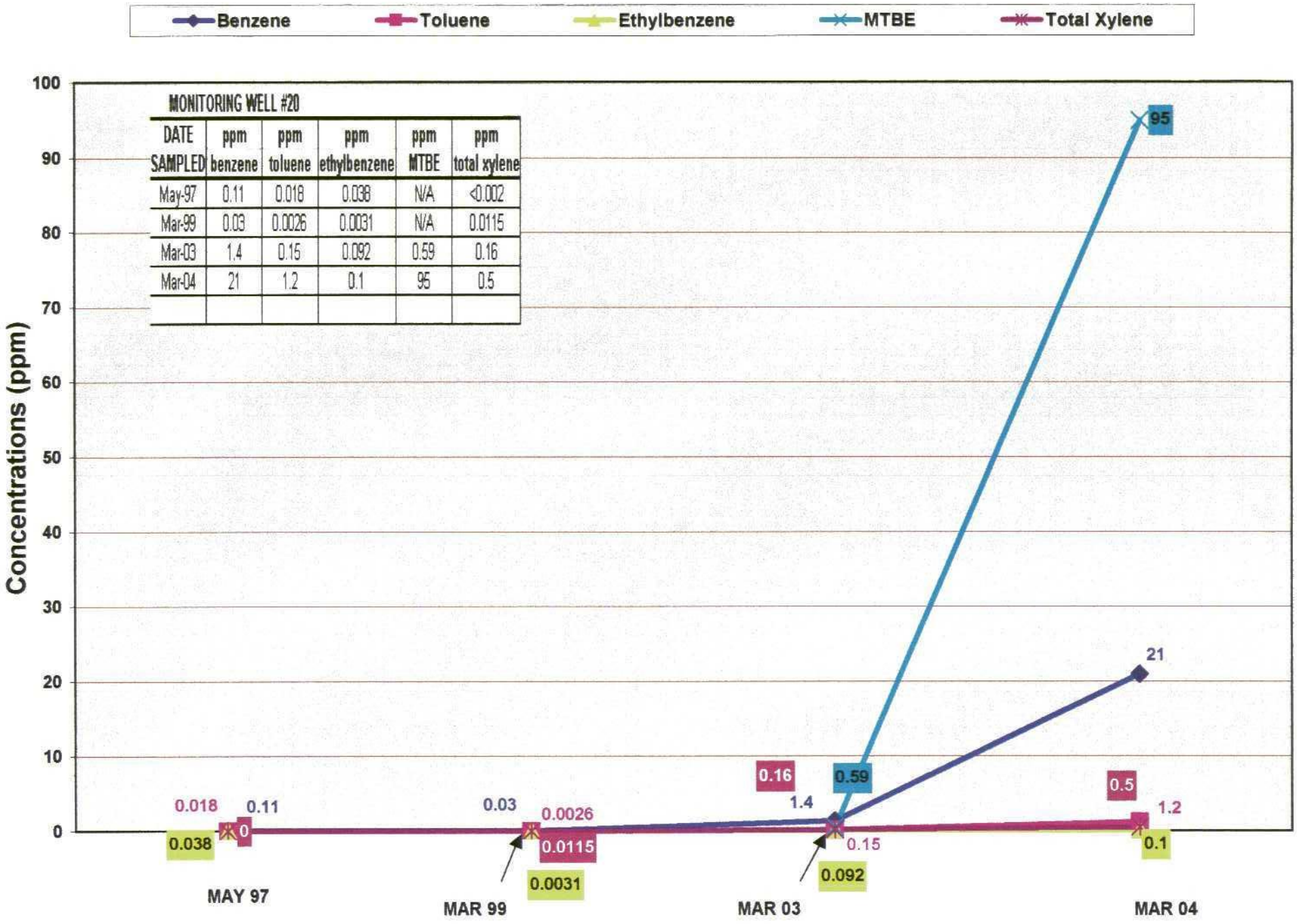
Monitoring Well #13



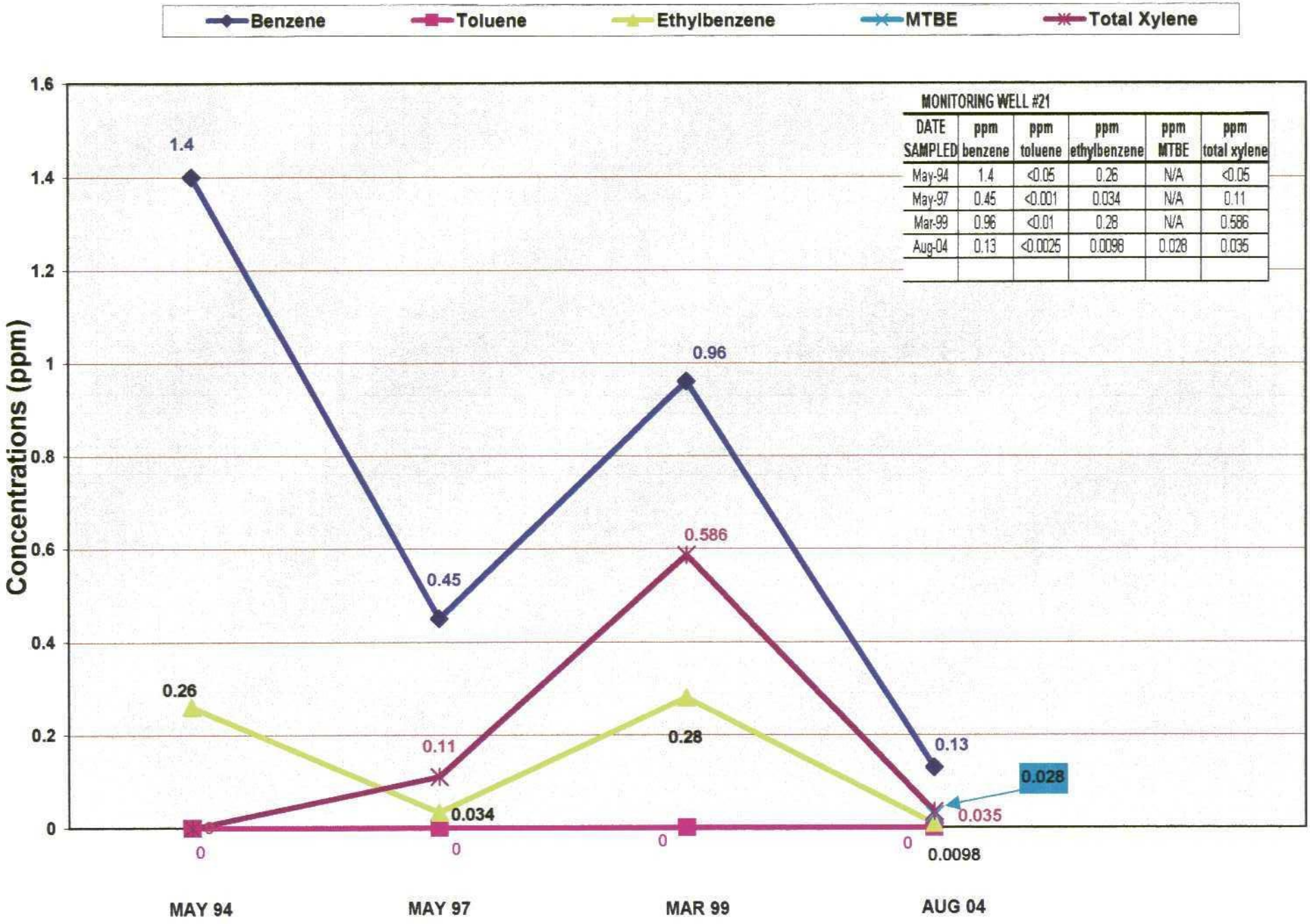
MONITORING WELL #13

Date Sampled	ppm benzene	ppm toluene	ppm ethylbenzene	ppm MTBE	ppm total xylene
Mar-03	<0.0005	<0.0005	<0.0005	0.049	0.001
Aug-03	<0.001	<0.001	<0.001	0.061	<0.001
Mar-04	<0.0005	<0.0005.	<0.0005	0.02	<0.0005
Aug-04	<0.0005	<0.0005	<0.0005	0.027	<0.0005

Monitoring Well #20



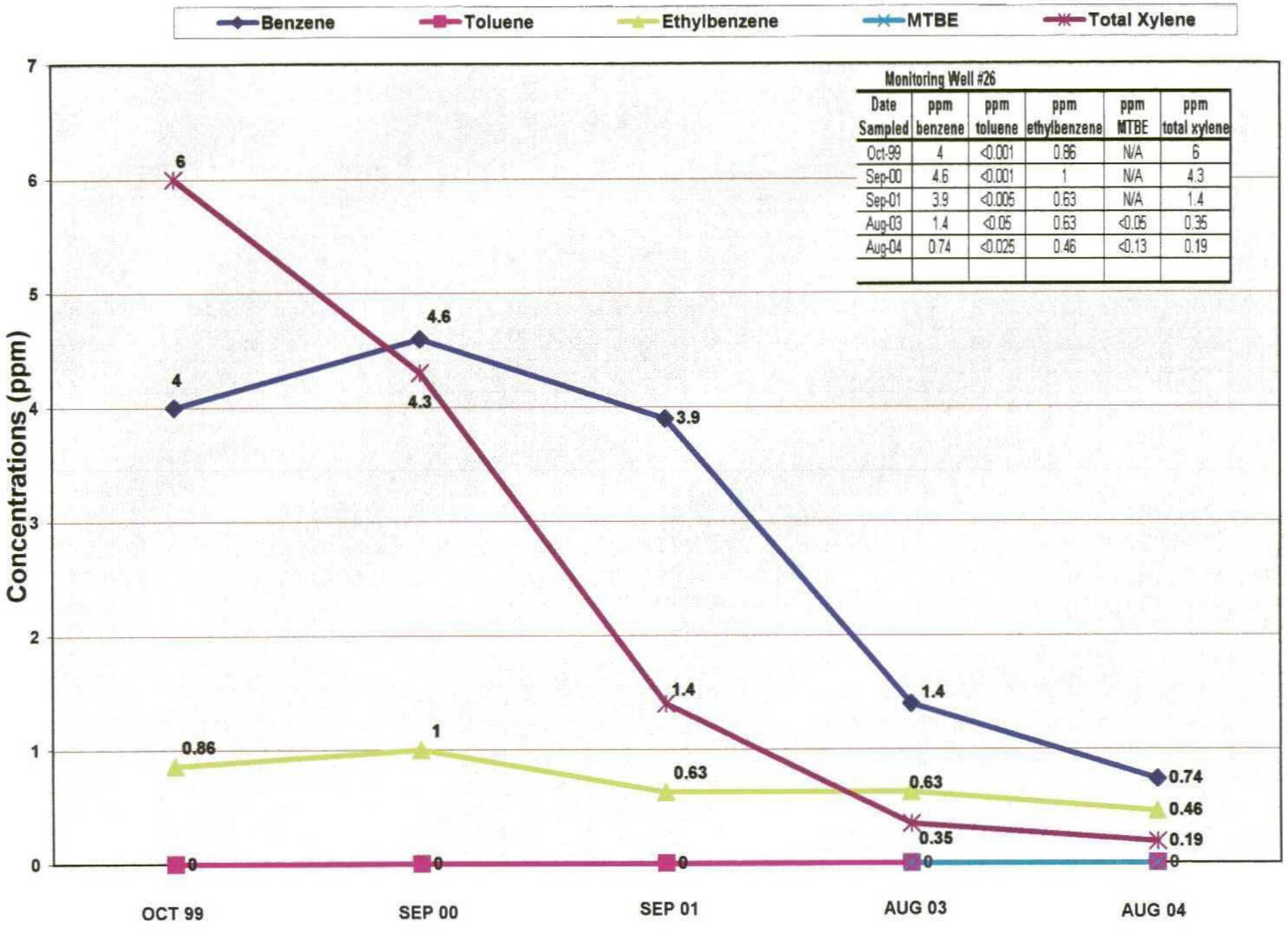
Monitoring Well #21



MONITORING WELL #21

DATE SAMPLED	ppm benzene	ppm toluene	ppm ethylbenzene	ppm MTBE	ppm total xylene
May-94	1.4	<0.05	0.26	N/A	<0.05
May-97	0.45	<0.001	0.034	N/A	0.11
Mar-99	0.96	<0.01	0.28	N/A	0.586
Aug-04	0.13	<0.0025	0.0098	0.028	0.035

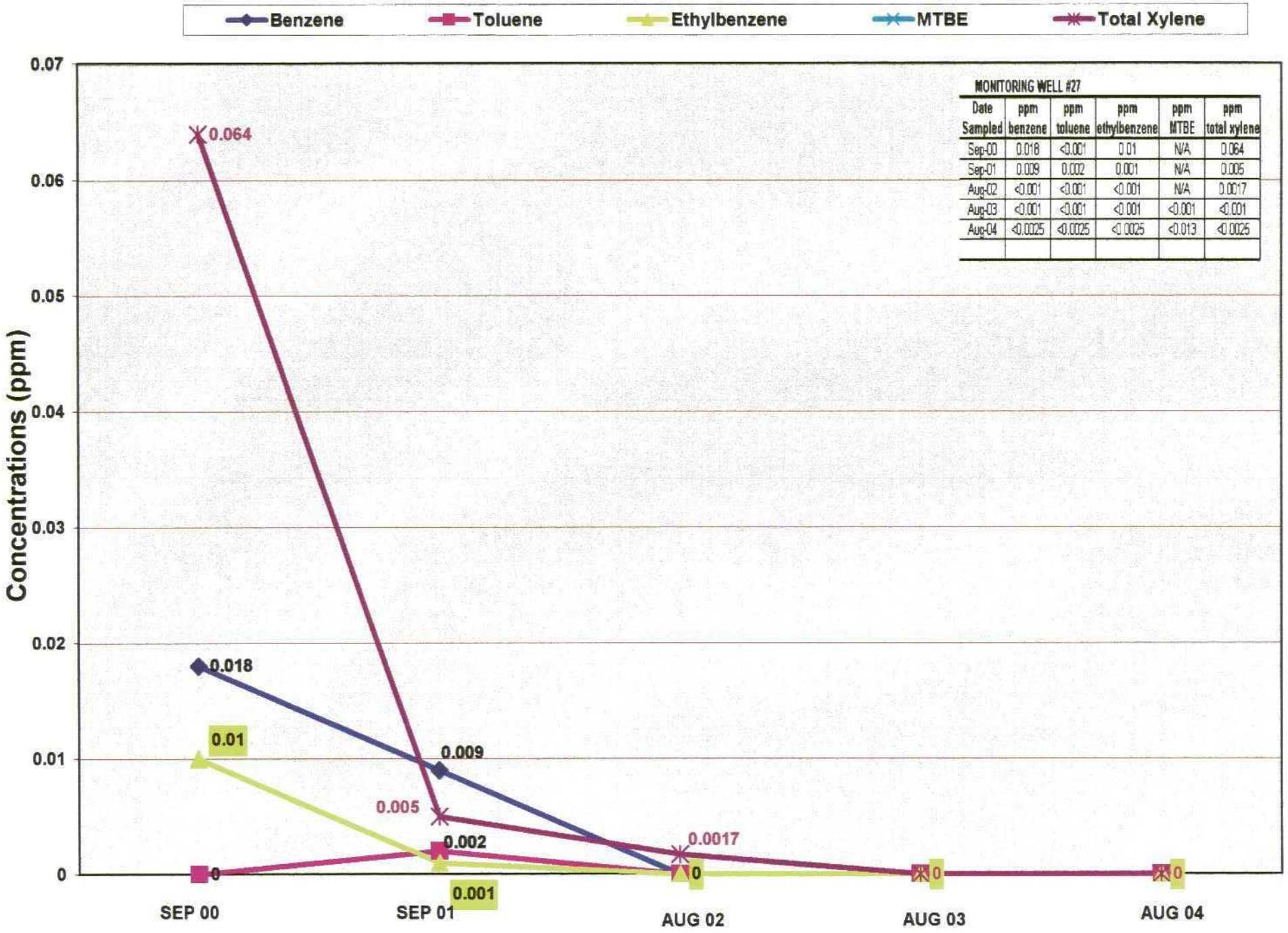
Monitoring Well #26



Monitoring Well #26

Date Sampled	ppm benzene	ppm toluene	ppm ethylbenzene	ppm MTBE	ppm total xylene
Oct-99	4	<0.001	0.86	N/A	6
Sep-00	4.6	<0.001	1	N/A	4.3
Sep-01	3.9	<0.005	0.63	N/A	1.4
Aug-03	1.4	<0.05	0.63	<0.05	0.35
Aug-04	0.74	<0.025	0.46	<0.13	0.19

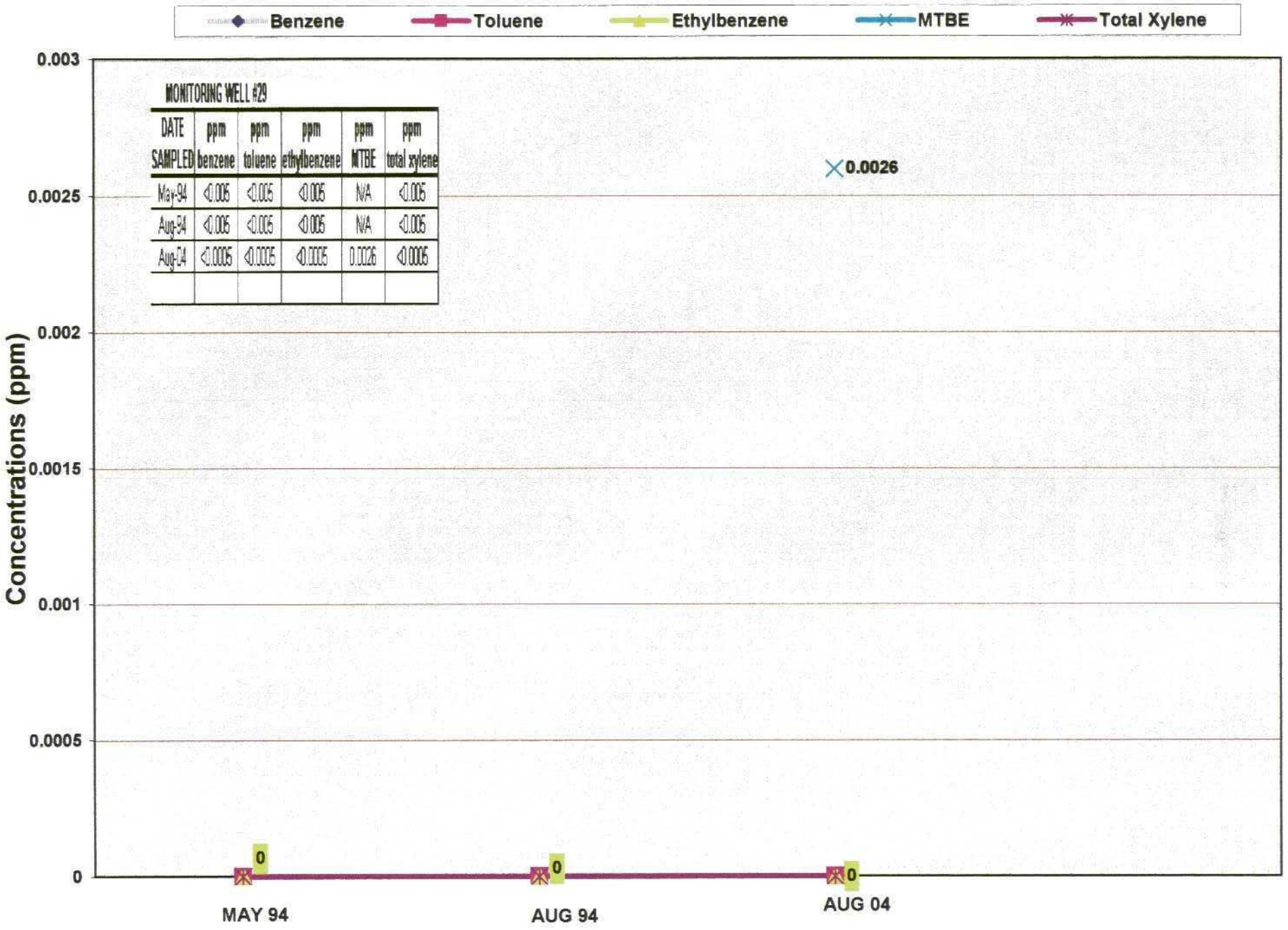
Monitoring Well #27



MONITORING WELL #27

Date Sampled	ppm benzene	ppm toluene	ppm ethylbenzene	ppm MTBE	ppm total xylene
Sep-00	0.018	<0.001	0.01	N/A	0.064
Sep-01	0.009	0.002	0.001	N/A	0.005
Aug-02	<0.001	<0.001	<0.001	N/A	0.0017
Aug-03	<0.001	<0.001	<0.001	<0.001	<0.001
Aug-04	<0.0025	<0.0025	<0.0025	<0.013	<0.0025

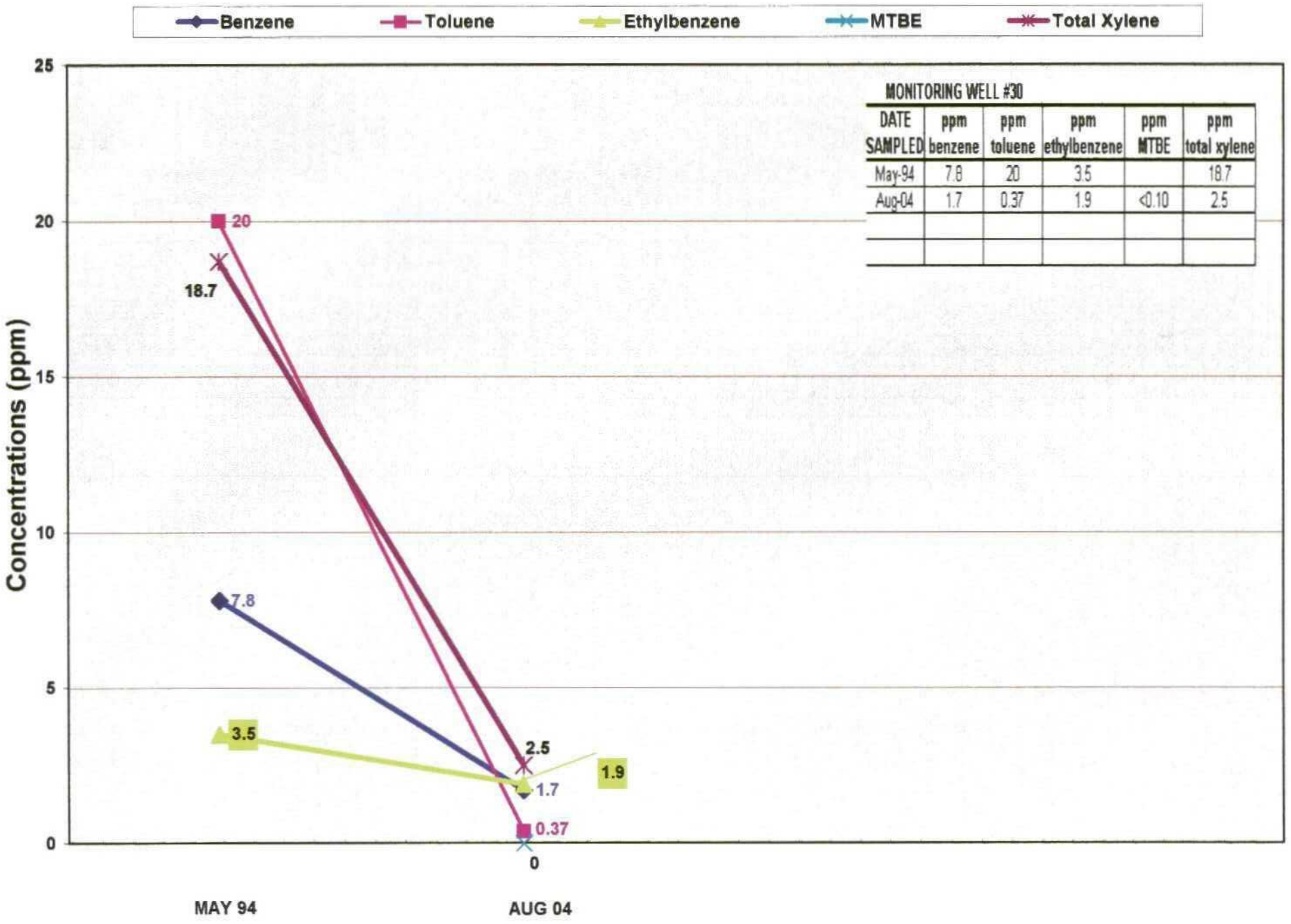
Monitoring Well #29



MONITORING WELL #29

DATE SAMPLED	ppm benzene	ppm toluene	ppm ethylbenzene	ppm MTBE	ppm total xylene
May-94	<0.005	<0.005	<0.005	N/A	<0.005
Aug-94	<0.005	<0.005	<0.005	N/A	<0.005
Aug-04	<0.0005	<0.0005	<0.0005	0.0026	<0.0005

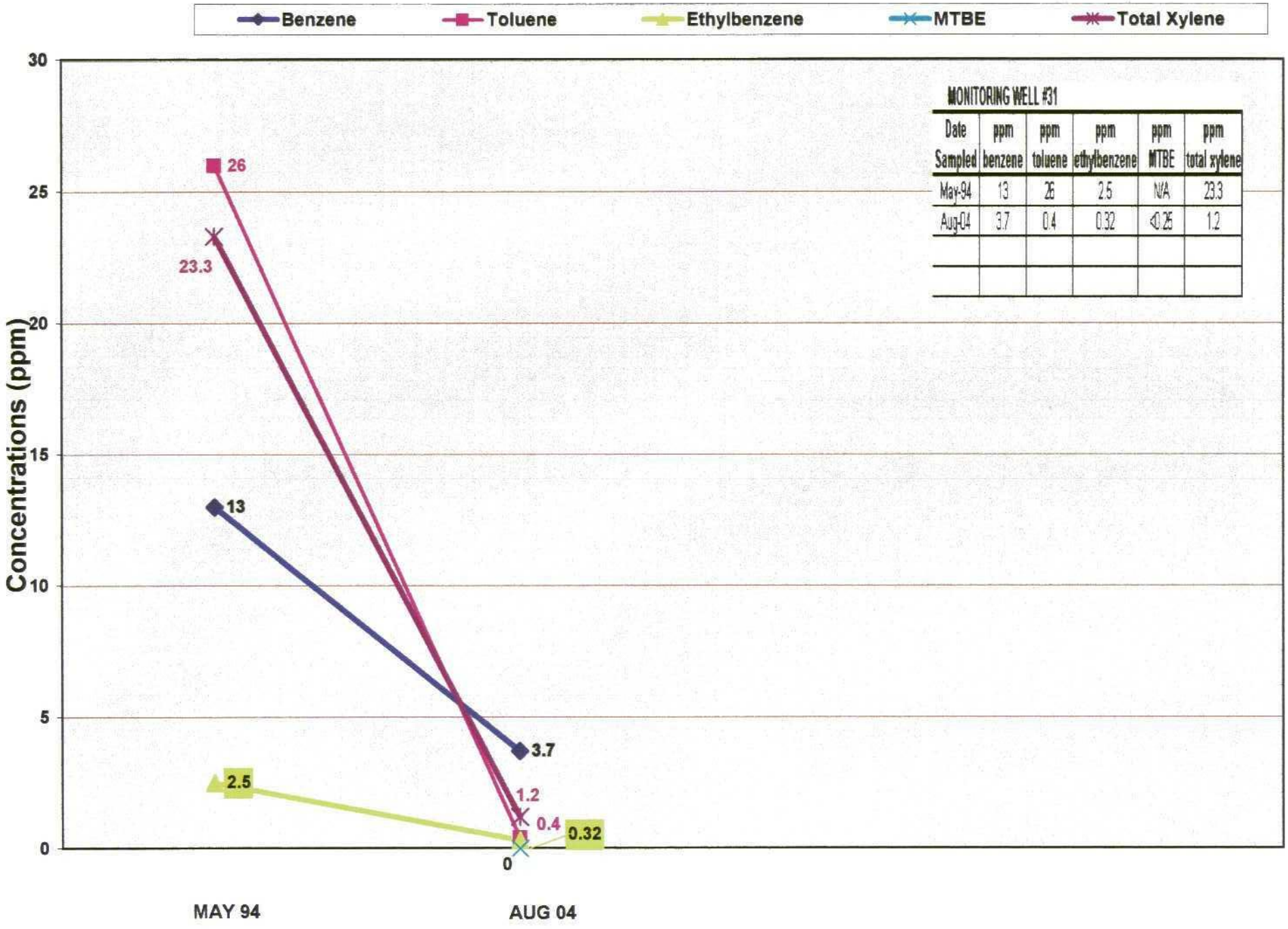
Monitoring Well #30



MONITORING WELL #30

DATE SAMPLED	ppm benzene	ppm toluene	ppm ethylbenzene	ppm MTBE	ppm total xylene
May-94	7.8	20	3.5		18.7
Aug-04	1.7	0.37	1.9	<0.10	2.5

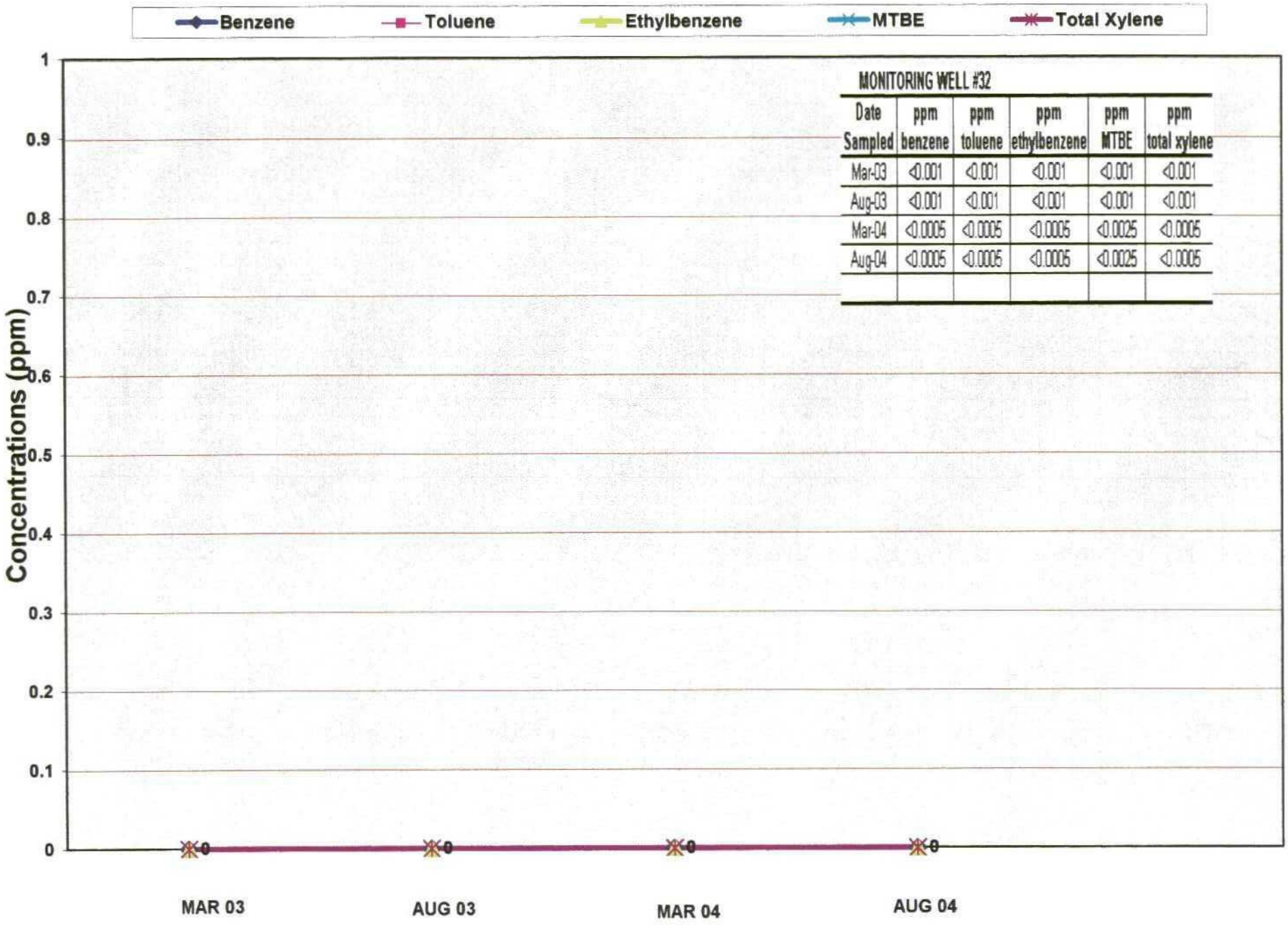
Monitoring Well #31



MONITORING WELL #31

Date Sampled	ppm benzene	ppm toluene	ppm ethylbenzene	ppm MTBE	ppm total xylene
May-94	13	26	2.5	N/A	23.3
Aug-04	3.7	0.4	0.32	<0.25	1.2

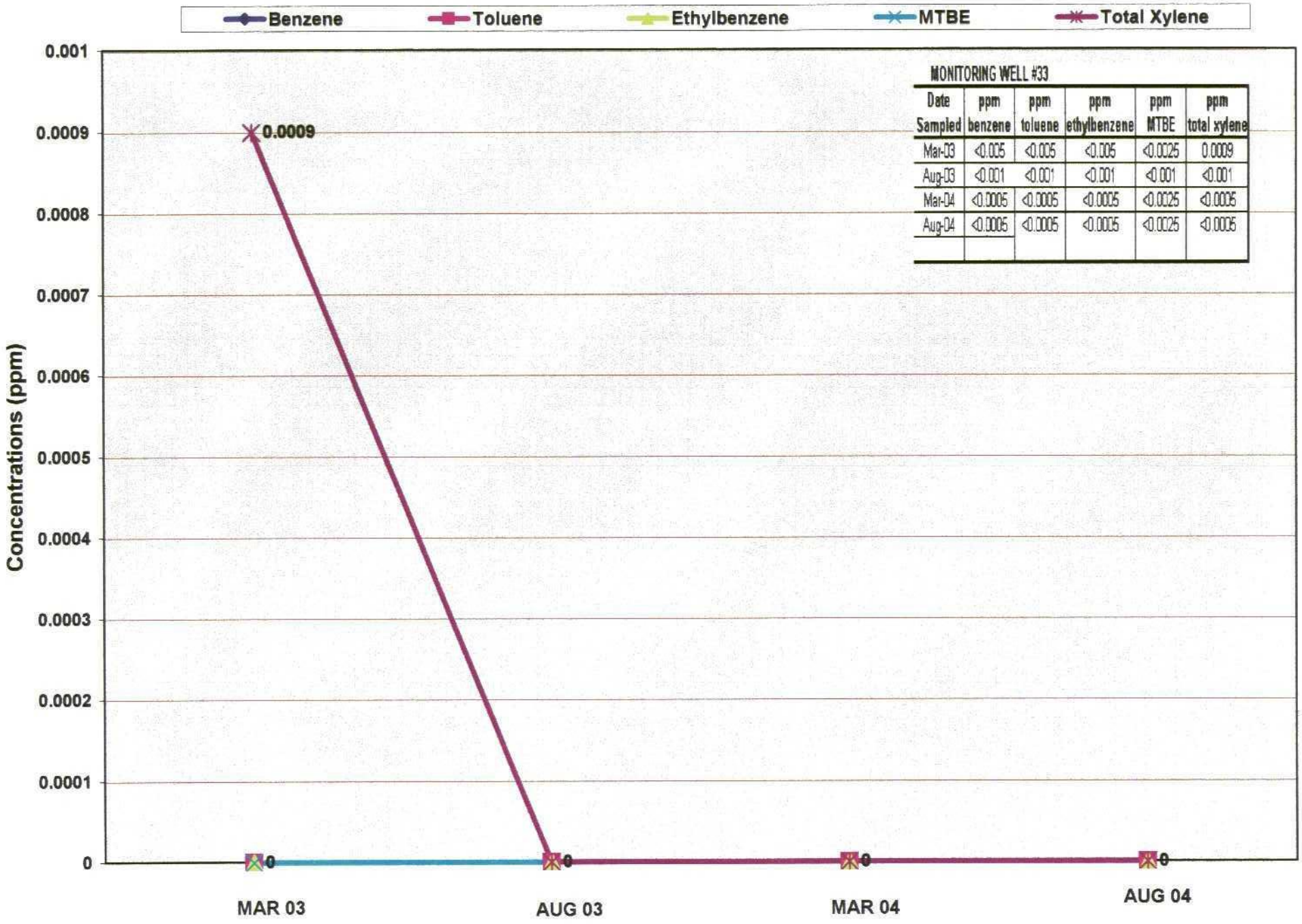
Monitoring Well #32



MONITORING WELL #32

Date Sampled	ppm benzene	ppm toluene	ppm ethylbenzene	ppm MTBE	ppm total xylene
Mar-03	<0.001	<0.001	<0.001	<0.001	<0.001
Aug-03	<0.001	<0.001	<0.001	<0.001	<0.001
Mar-04	<0.0005	<0.0005	<0.0005	<0.0025	<0.0005
Aug-04	<0.0005	<0.0005	<0.0005	<0.0025	<0.0005

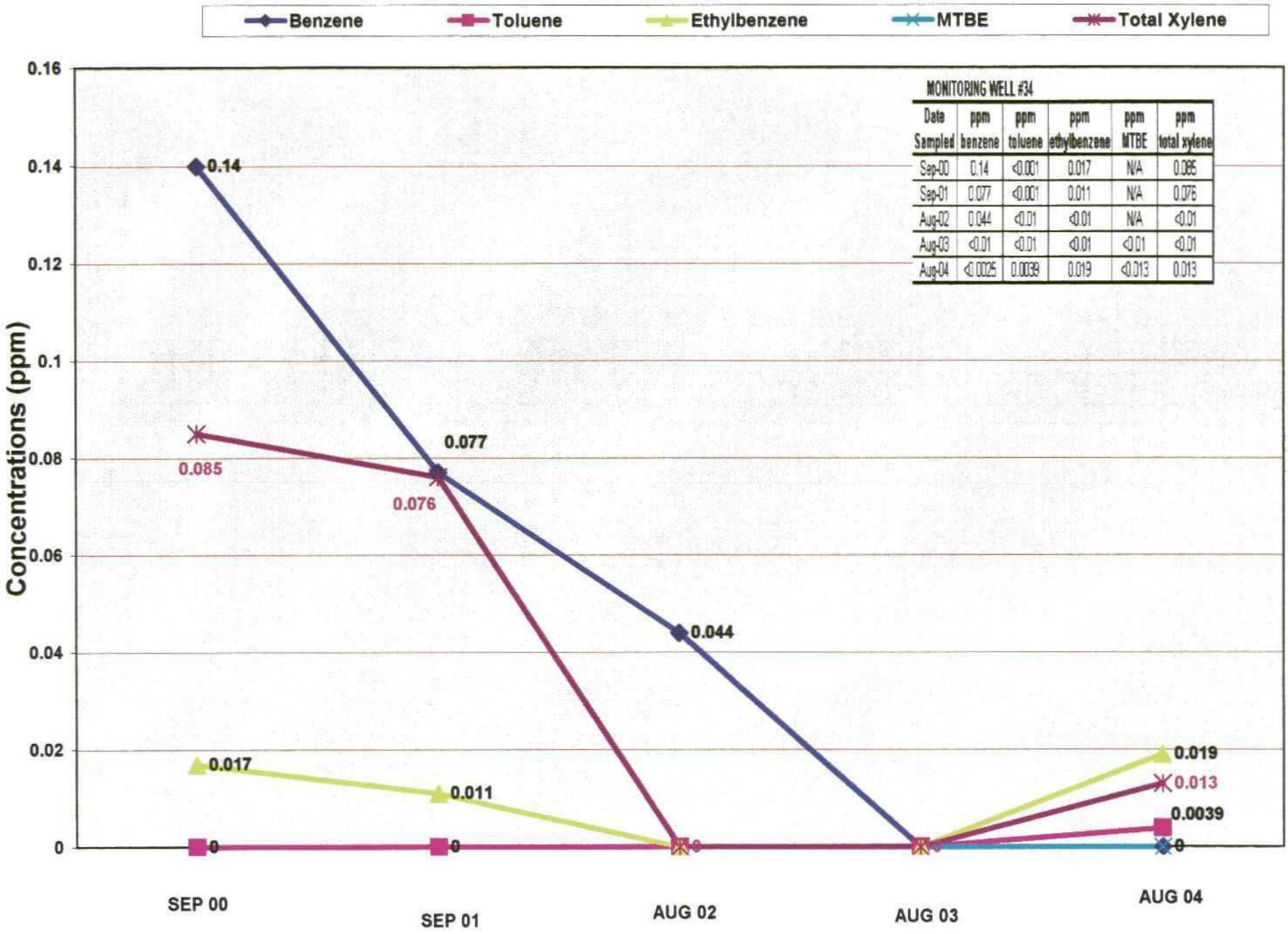
Monitoring Well #33



MONITORING WELL #33

Date Sampled	ppm benzene	ppm toluene	ppm ethylbenzene	ppm MTBE	ppm total xylene
Mar-03	<0.005	<0.005	<0.005	<0.0025	0.0009
Aug-03	<0.001	<0.001	<0.001	<0.001	<0.001
Mar-04	<0.0005	<0.0005	<0.0005	<0.0025	<0.0005
Aug-04	<0.0005	<0.0005	<0.0005	<0.0025	<0.0005

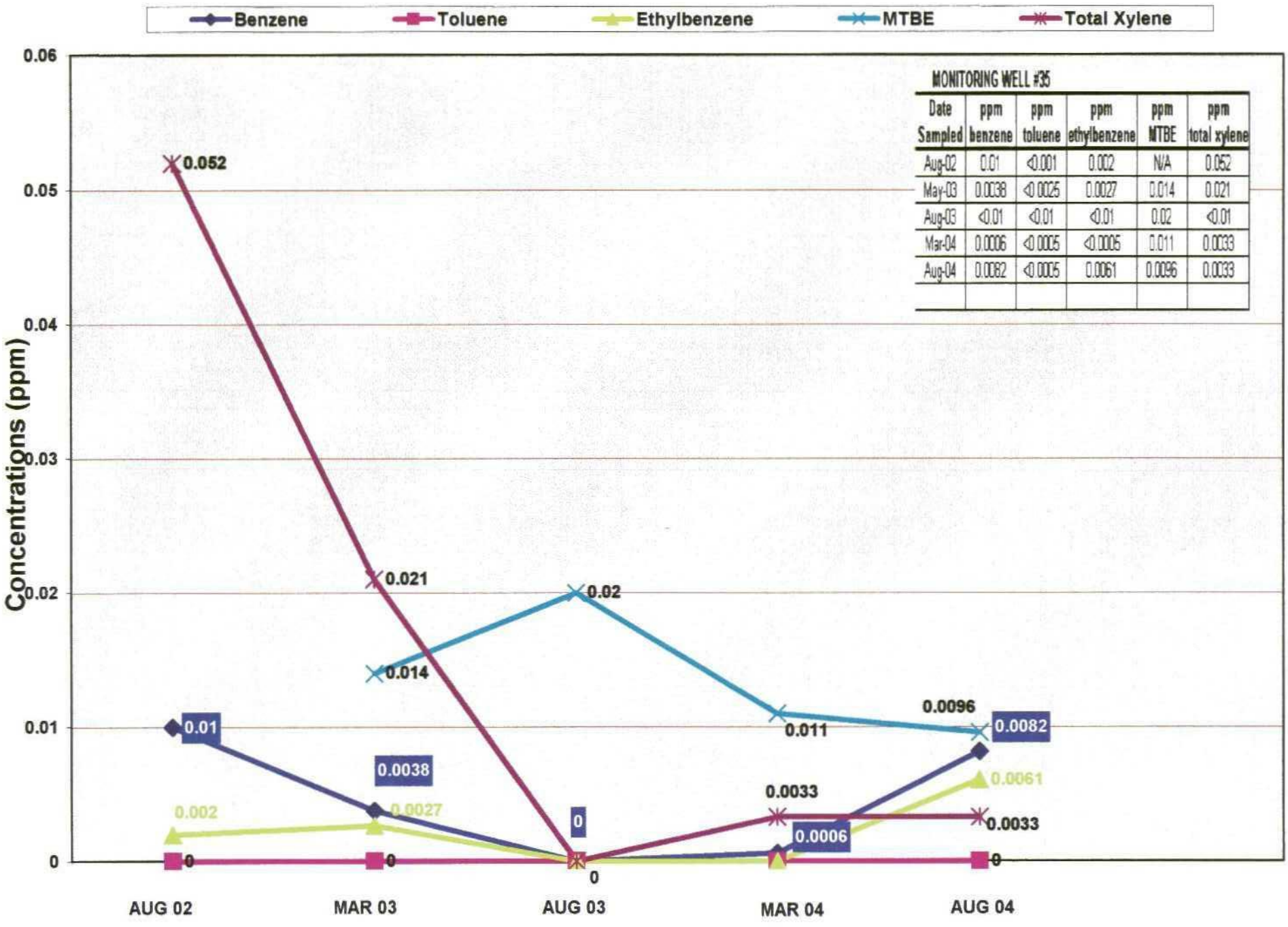
Monitoring Well #34



MONITORING WELL #34

Date Sampled	ppm benzene	ppm toluene	ppm ethylbenzene	ppm MTBE	ppm total xylene
Sep-00	0.14	<0.001	0.017	N/A	0.085
Sep-01	0.077	<0.001	0.011	N/A	0.076
Aug-02	0.044	<0.01	<0.01	N/A	<0.01
Aug-03	<0.01	<0.01	<0.01	<0.01	<0.01
Aug-04	<0.0025	0.0039	0.019	<0.013	0.013

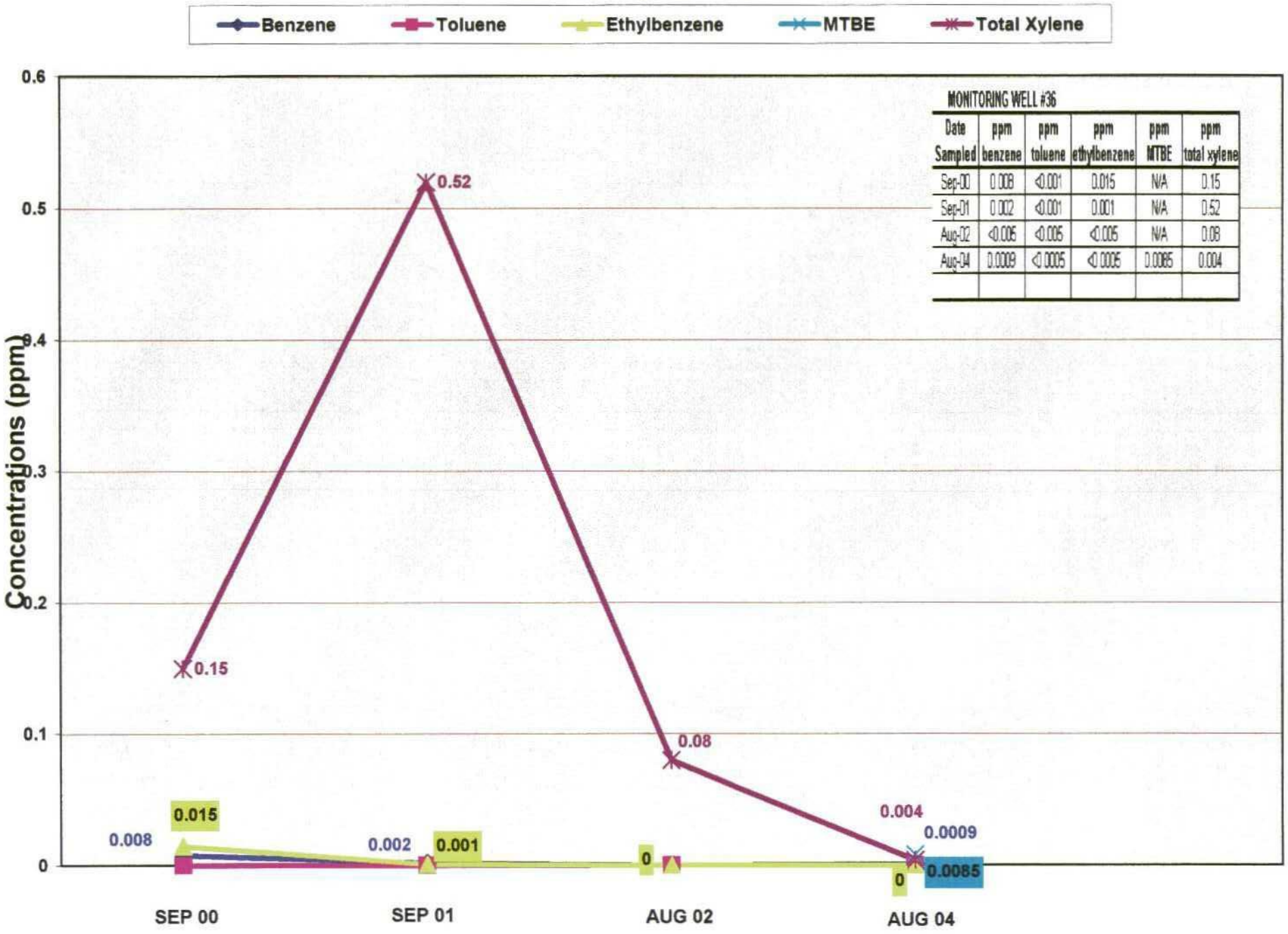
Monitoring Well #35



MONITORING WELL #35

Date Sampled	ppm benzene	ppm toluene	ppm ethylbenzene	ppm MTBE	ppm total xylene
Aug-02	0.01	<0.001	0.002	N/A	0.052
May-03	0.0038	<0.0025	0.0027	0.014	0.021
Aug-03	<0.01	<0.01	<0.01	0.02	<0.01
Mar-04	0.0006	<0.0005	<0.0005	0.011	0.0033
Aug-04	0.0082	<0.0005	0.0061	0.0096	0.0033

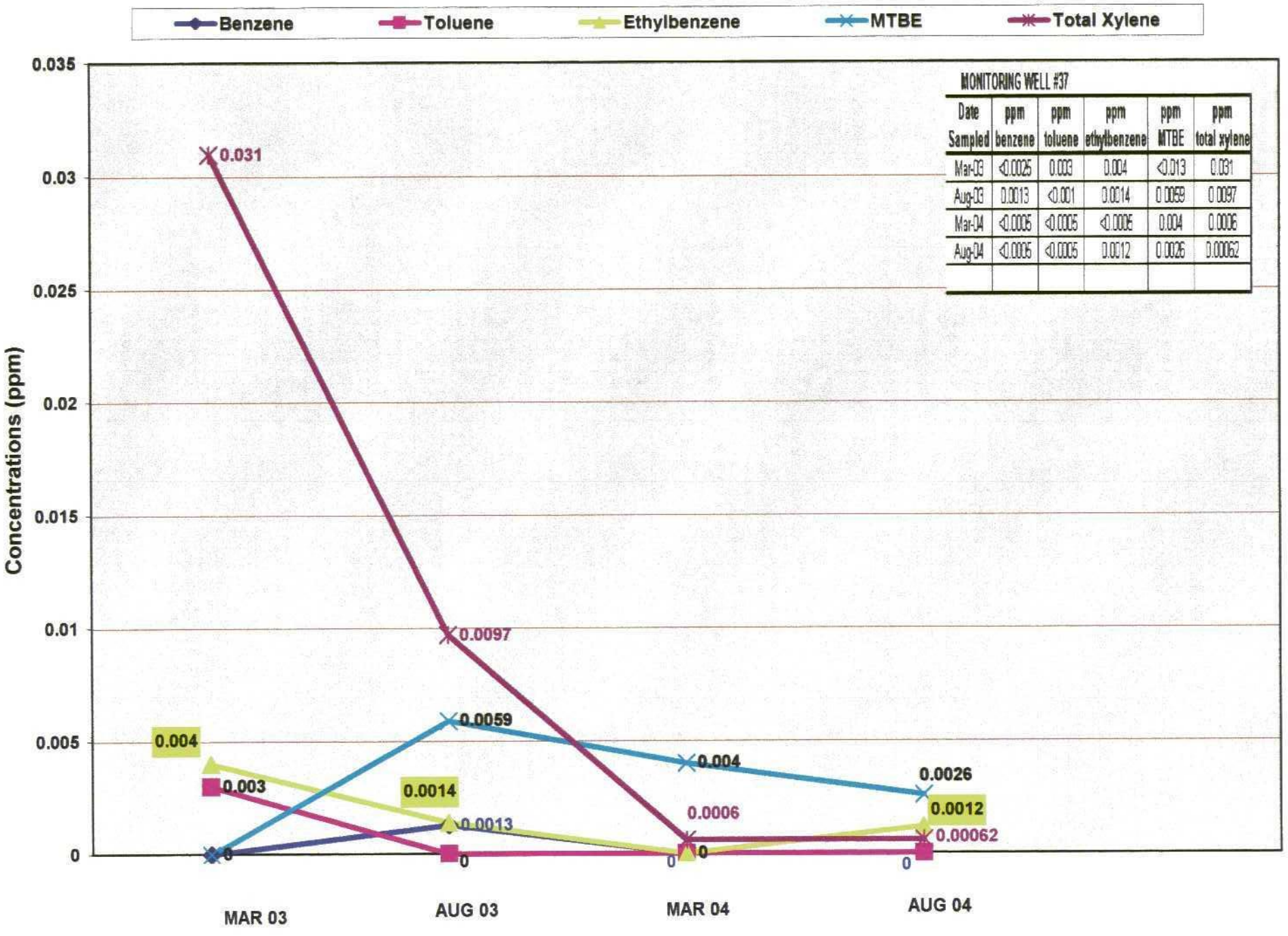
Monitoring Well #36



MONITORING WELL #36

Date Sampled	ppm benzene	ppm toluene	ppm ethylbenzene	ppm MTBE	ppm total xylene
Sep-00	0.008	<0.001	0.015	N/A	0.15
Sep-01	0.002	<0.001	0.001	N/A	0.52
Aug-02	<0.005	<0.005	<0.005	N/A	0.08
Aug-04	0.0009	<0.0005	<0.0005	0.0085	0.004

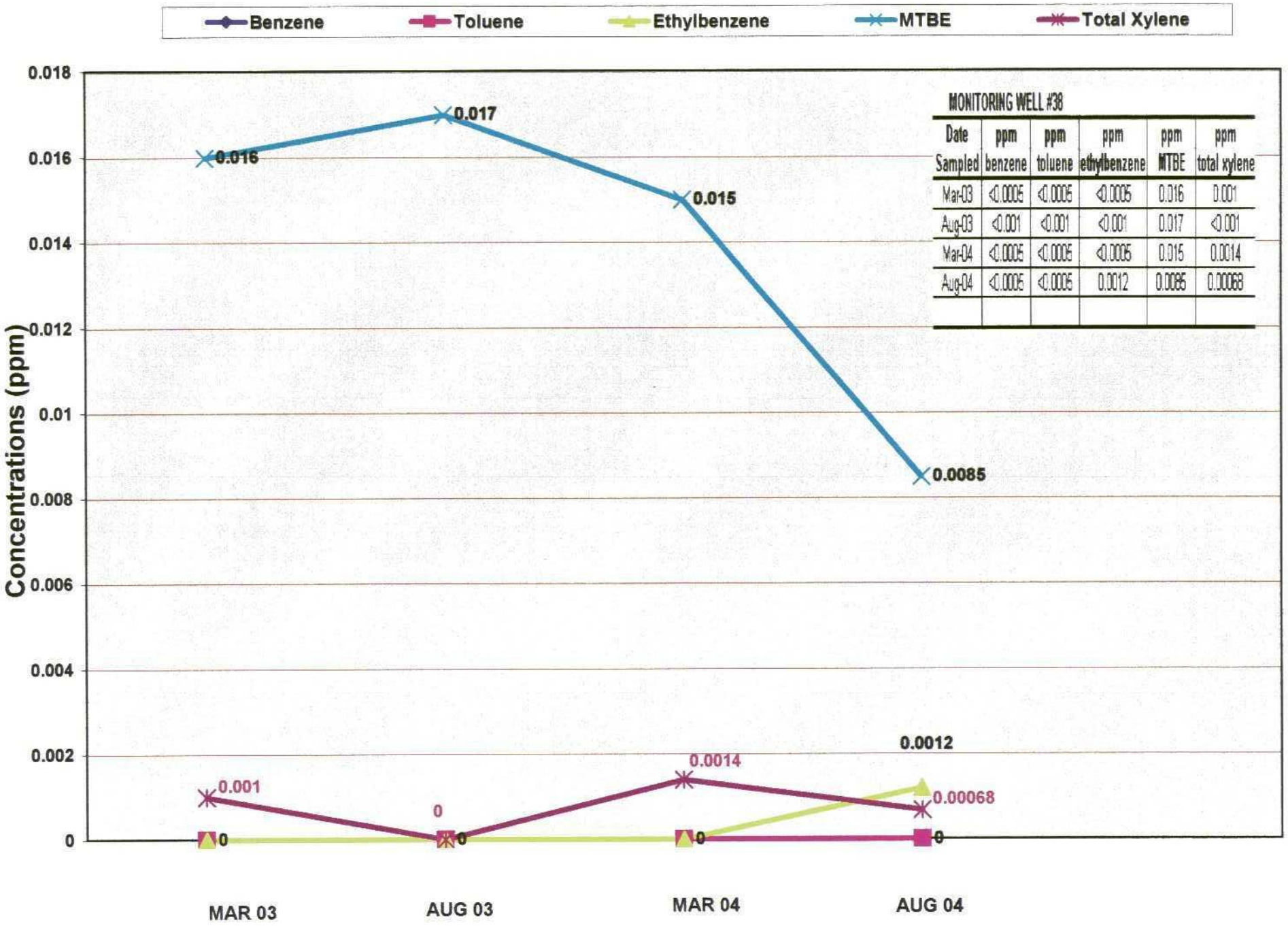
Monitoring Well #37



MONITORING WELL #37

Date Sampled	ppm benzene	ppm toluene	ppm ethylbenzene	ppm MTBE	ppm total xylene
Mar-03	<0.0025	0.003	0.004	<0.013	0.031
Aug-03	0.0013	<0.001	0.0014	0.0059	0.0097
Mar-04	<0.0005	<0.0005	<0.0005	0.004	0.0006
Aug-04	<0.0005	<0.0005	0.0012	0.0026	0.00062

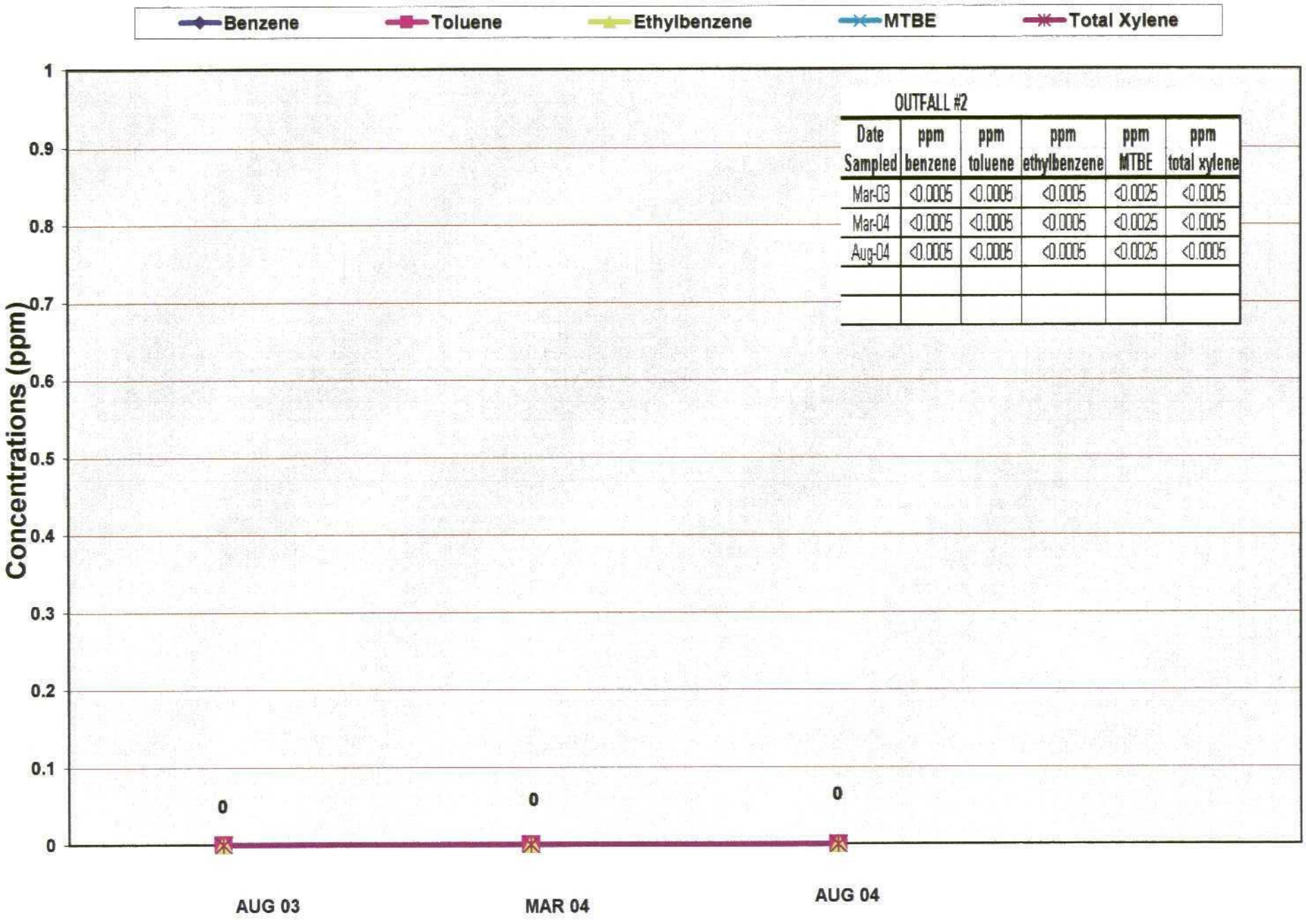
Monitoring Well #38



MONITORING WELL #38

Date Sampled	ppm benzene	ppm toluene	ppm ethylbenzene	ppm MTBE	ppm total xylene
Mar-03	<0.0005	<0.0005	<0.0005	0.016	0.001
Aug-03	<0.001	<0.001	<0.001	0.017	<0.001
Mar-04	<0.0005	<0.0005	<0.0005	0.015	0.0014
Aug-04	<0.0005	<0.0005	0.0012	0.0085	0.00068

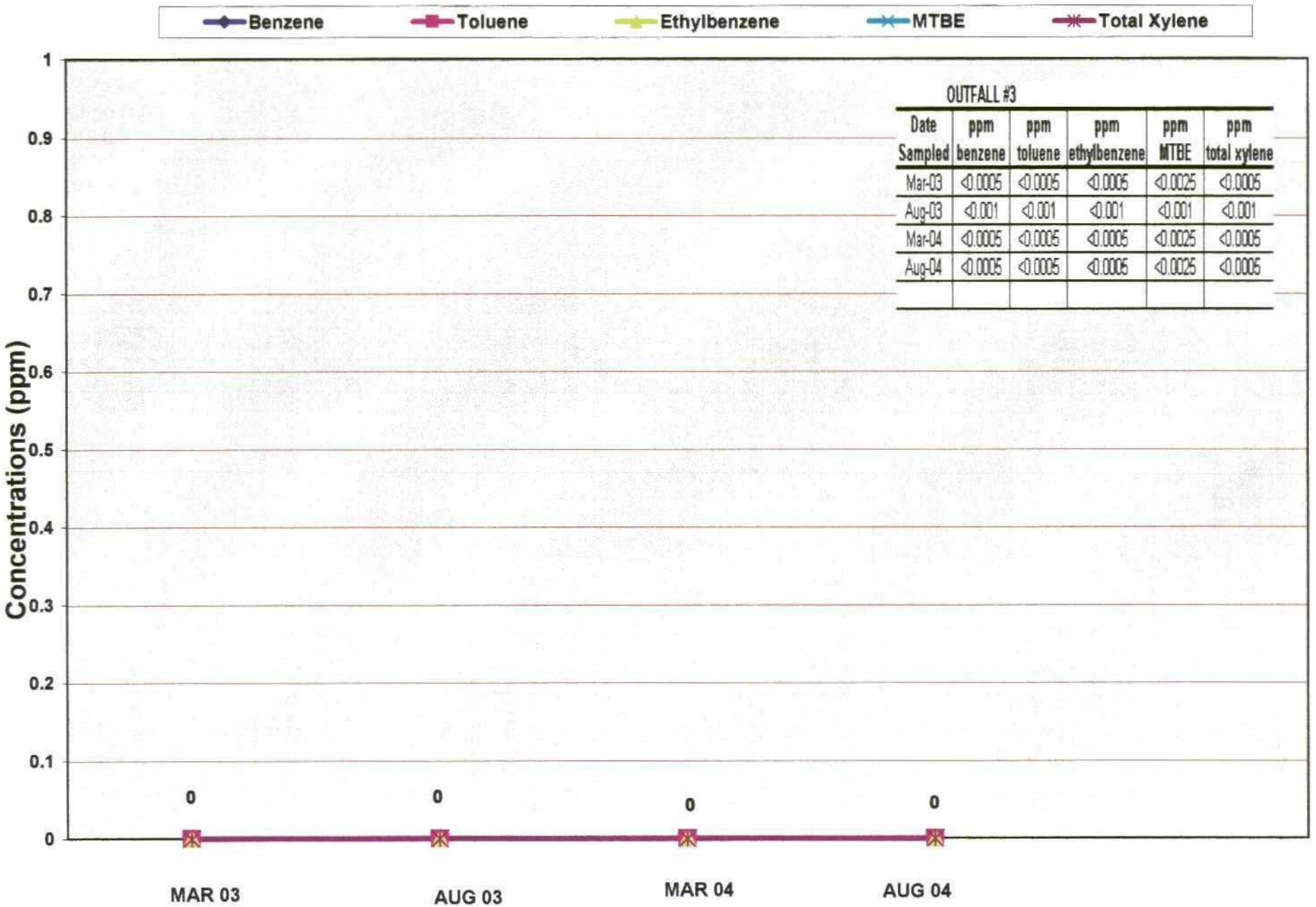
OUTFALL #2



OUTFALL #2

Date Sampled	ppm benzene	ppm toluene	ppm ethylbenzene	ppm MTBE	ppm total xylene
Mar-03	<0.0005	<0.0005	<0.0005	<0.0025	<0.0005
Mar-04	<0.0005	<0.0005	<0.0005	<0.0025	<0.0005
Aug-04	<0.0005	<0.0005	<0.0005	<0.0025	<0.0005

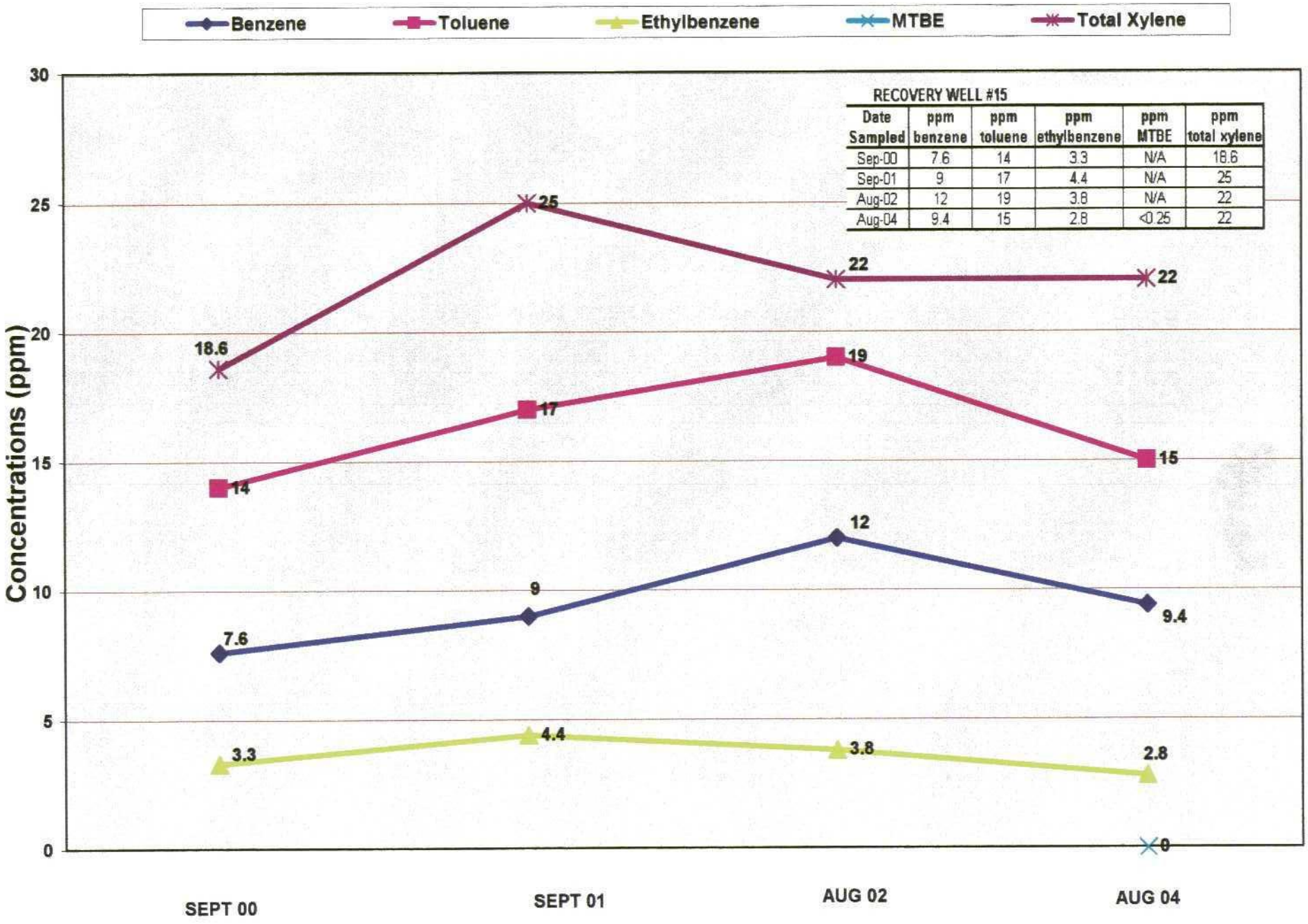
OUTFALL #3



OUTFALL #3

Date Sampled	ppm benzene	ppm toluene	ppm ethylbenzene	ppm MTBE	ppm total xylene
Mar-03	◁0.0005	◁0.0005	◁0.0005	◁0.0025	◁0.0005
Aug-03	◁0.001	◁0.001	◁0.001	◁0.001	◁0.001
Mar-04	◁0.0005	◁0.0005	◁0.0005	◁0.0025	◁0.0005
Aug-04	◁0.0005	◁0.0005	◁0.0005	◁0.0025	◁0.0005

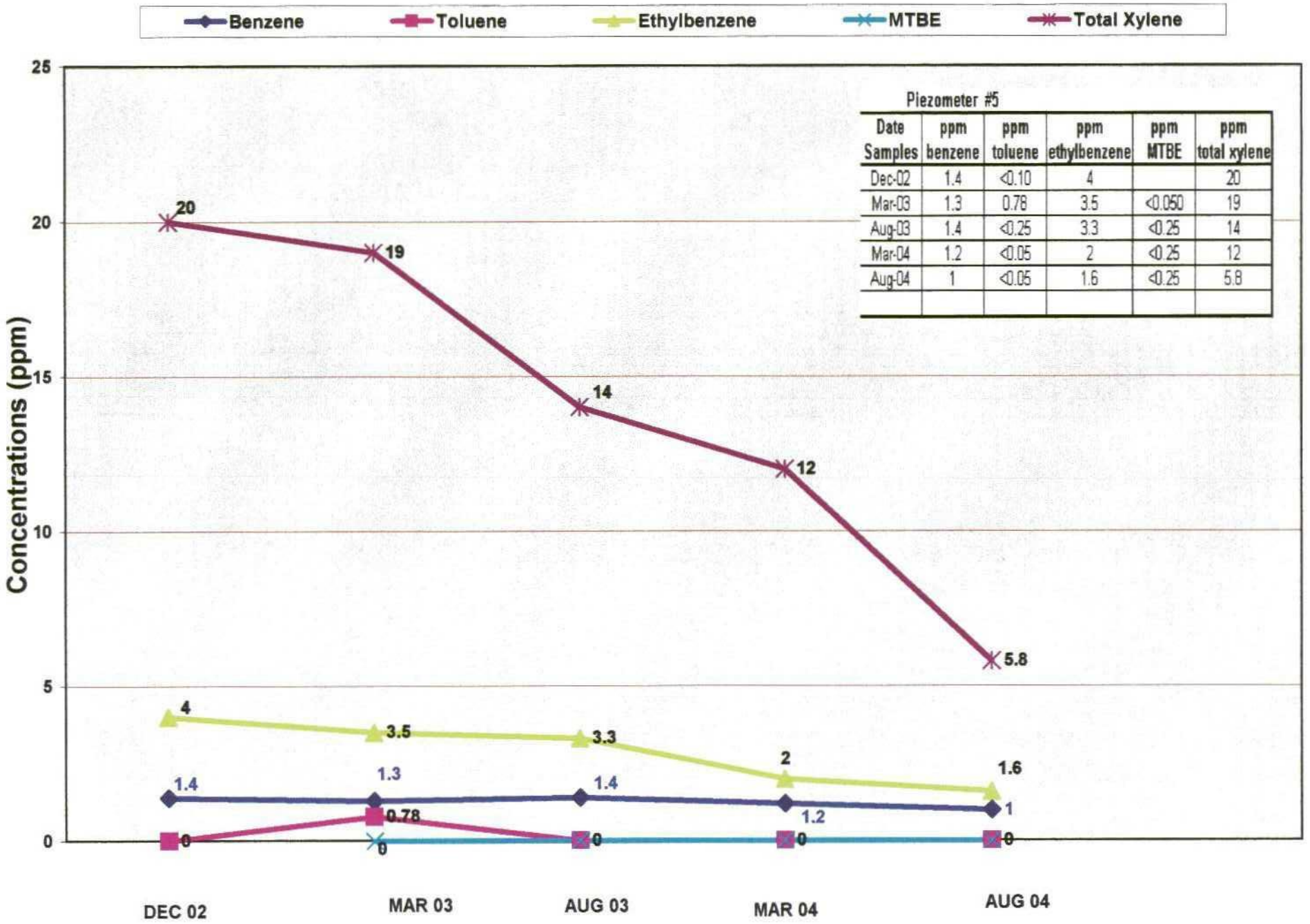
Recovery Well #15



RECOVERY WELL #15

Date Sampled	ppm benzene	ppm toluene	ppm ethylbenzene	ppm MTBE	ppm total xylene
Sep-00	7.6	14	3.3	N/A	18.6
Sep-01	9	17	4.4	N/A	25
Aug-02	12	19	3.8	N/A	22
Aug-04	9.4	15	2.8	<0.25	22

Piezometer #5



Piezometer #5

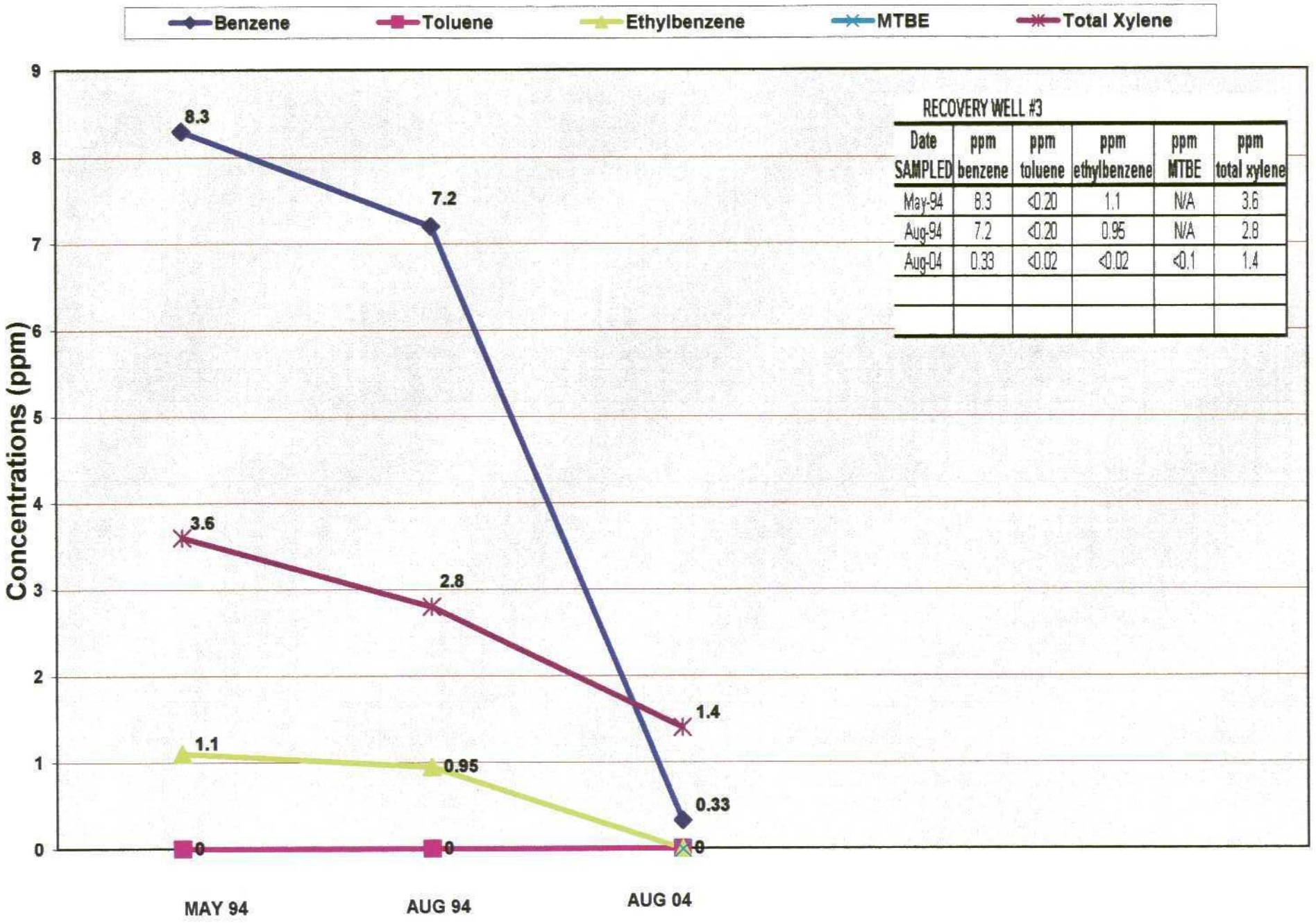
Date Samples	ppm benzene	ppm toluene	ppm ethylbenzene	ppm MTBE	ppm total xylene
Dec-02	1.4	<0.10	4		20
Mar-03	1.3	0.78	3.5	<0.050	19
Aug-03	1.4	<0.25	3.3	<0.25	14
Mar-04	1.2	<0.05	2	<0.25	12
Aug-04	1	<0.05	1.6	<0.25	5.8

Piezometer #4

Piezometer #4

Date Sampled	ppm benzene	ppm toluene	ppm ethylbenzene	ppm MTBE	ppm total xylene
Dec-02	5.9	<0.10	4.3		13
Mar-03	4.1	0.63	3.1	<0.10	10
Aug-03	2.7	1.1	3	<0.10	8.4
Mar-04	4.5	0.3	3.6	<0.25	15
Aug-04	4.1	<0.05	3.3	<0.25	12

Recovery Well #3



RECOVERY WELL #3

Date SAMPLED	ppm benzene	ppm toluene	ppm ethylbenzene	ppm MTBE	ppm total xylene
May-94	8.3	<0.20	1.1	N/A	3.6
Aug-94	7.2	<0.20	0.95	N/A	2.8
Aug-04	0.33	<0.02	<0.02	<0.1	1.4

Section 12.0 Field Methods

Field Methods

Groundwater Elevation
All water/product levels are determined to an accuracy of 0.01 foot using a Geotech Interface Meter. The technician records separate phase hydrocarbon, depth to water, and total well depth using this probe.

Water Quality/Groundwater Sampling
Water quality parameters are measured using an Ultrameter 6P by the Myron L Company. Electrical conductance, pH, and temperature are monitored during purging. After the well is satisfactorily purged, the Ultrameter 6P can also measure Oxidation Reduction Potential. Dissolved oxygen is determined using the Hach High Range Dissolved Oxygen AccuVac method within thirty minutes of sampling.

Well Purging Technique
At least three well volumes are purged from the well. Purge volumes are determined using the following equation:
Well Depth – Casing Height – Depth to Liquid X Conversion Factor X Three.
The conversion factor is determined by the diameter of the well casing.

Casing	Conversion Factor
6"	1.50 gal/ft
5"	1.02 gal/ft
4"	0.74 gal/ft
3"	0.367 gal/ft
2"	0.163 gal/ft

Typically disposable bailers are used for purging and sampling. Each bailer holds one liter of liquid. Three well volumes can be calculated by counting the number of times a well is bailed.
On occasion, the submersible pump is used for purging wells that have a large volume of water. All purged water is poured/pumped into a 55-gallon drum designated for sampling events.

Well Sampling and Sample Handling Procedure
Equipment and supplies needed for collecting representative groundwater samples include:

- Interface Meter
- Ultrameter 6P
- Distilled Water
- Disposable Latex Gloves
- Disposable Bailers
- Submersible pump and Generator (if needed)
- String/Twine
- Cooler with Ice

- Bottle kits with Preservatives (provided by the contract laboratory)
- Disposable 0.45 micron Field Filters and Syringes
- Glass Jar (usually 4 oz.)
- Sharpie Permanent Marker
- Field Paperwork/Logsheet
- Two 5-gallon buckets
- Trash container (plastic garbage bag)
- Ziploc Bags
- Paper towels

After sufficient purging, samples are collected with the bailer and poured into the appropriate sample containers. Two people are usually utilized for sampling. Sampling takes place over a bucket to insure that spills are contained

For dissolved metals, sample water is poured into a jar and then extracted with a syringe. The syringe is then used to push water through a field filter into the proper sample bottle to collect the dissolved metals sample. Volatile organic analysis samples are collected as to allow no head space in the container.

Samples are labeled immediately with location, date, time, analysis, preservative, and sampler. Then they are put in a Ziploc and placed in a cooler holding sufficient ice to keep them cool. The field logsheet is reviewed to verify all entries.

Purge and Decontamination Water Disposal

The Ultrameter 6P and the interface probe are rinsed with distilled water after every well. The rinse procedure takes place over a bucket to insure that spills are contained.

All rinse and purge water is contained and then disposed of through the refinery wastewater system.

The submersible pump is decontaminated by placing it in a 55-gallon barrel filled with plant water and some Alconox. The pump is activated and will pump down the barrel twice. External areas are washed down and rinsed, also. All wash and rinse water is on containment and runs to the refinery wastewater system.

Any glassware used is taken to the refinery laboratory and washed with Alconox and water and rinsed with reverse osmosis water. Laboratory wastewater runs through the refinery system.

Remediation System Measurement

Recovery well flows are measured using a 500 ml graduated cylinder. The discharge line of the pump is disconnected and placed in the graduated cylinder. During a pump cycle, a measurement is taken over time and then calculated to a gallon per day rate.

Recovery rates at Tk #37 (Hammond Ditch French Drain) and Tk #38 (#1 East Outfall) are determined through flow meters installed in those systems. Refinery personnel record the rates periodically.

Section 13.0 Waste Disposition

Mr. Wayne Price
New Mexico Oil Conservation Division
1220 South St. Frances Dr.
Santa Fe, New Mexico 87505

October 20, 2004

Re: **Request to Utilize Non-Hazardous Soil -Release North of MW #45**

Dear Mr. Price,

Giant Refining Company – Bloomfield Refinery requests permission for on-site utilization of the non-hazardous impacted soil removed from the release North of Monitoring Well #45. This soil will be placed in a low-lying area on the East end of the refinery property. An earthen berm will be constructed around this area to prevent storm water contamination.

Please find enclosed the analytical results from composite samples taken from this material:

1. Hydro Blast Pad Composite (1200 cubic yards)
   - BTEX – Non-hazardous for any chemical.
     Benzene =.097 (mg/Kg)
     Total BTEX= .722 (mg/Kg)
   - TCLP-

Arsenic	0.002 (mg/Kg)
Barium	0.068 (mg/Kg)
Cadmium	ND
Chromium	0.001 (mg/Kg)
Lead	ND
Mercury	ND
Selenium	ND
Silver	ND

   - TPH – 301 (mg/kg)
     GRO = 57.2 (mg/Kg)
     DRO = 244 (mg/Kg)

- Ignitability – Negative
- Corrosivity – Negative
- Reactivity – Negative
- PH = 7.43
- Flash Point >350 C

2. Tank 36 Composite (3600 cubic yards)
   - BTEX – Non-hazardous for any chemical.
     Benzene =.011 (mg/Kg)
     Total BTEX= .149 (mg/Kg)

   - TCLP-

Arsenic	0.003 (mg/Kg)
Barium	0.073 (mg/Kg)
Cadmium	ND
Chromium	0.001 (mg/Kg)
Lead	ND
Mercury	ND
Selenium	ND
Silver	ND

   - TPH – 351 (mg/kg)
     GRO = 85.1 (mg/Kg)
     DRO = 266 (mg/Kg)

   - Ignitability – Negative
   - Corrosivity – Negative
   - Reactivity – Negative
   - PH = 7.69
   - Flash Point >350 C

Your prompt attention to this matter will be greatly appreciated. If you need more information, please contact me at (505) 632-4171.

Sincerely,

Randy Schmaltz
Environmental Supervisor
Giant Refining Company – Bloomfield

Cc: Hope Monzeglio. NMED
Denny Foust, New Mexico Oil Conservation Division – Aztec

Ed Riege

Cindy Hurtado

From: Randy Schmaltz
Sent: Monday, October 25, 2004 7:16 AM
To: Cindy Hurtado; Ed Riege
Subject: FW: Soil Request

-----Original Message-----
From: Price, Wayne [mailto:WPrice@state.nm.us]
Sent: Thursday, October 21, 2004 8:31 AM
To: 'Randy Schmaltz'; Price, Wayne
Cc: 'Hope Monzeglio'; Foust, Denny
Subject: RE: Soil Request

OCD hereby approves of your request with the following conditions:

1. One treatment zone soil sample shall be collected three feet below the approximate center of the temporary landfarm area before placement of any soils. The soil sample shall be analyzed for TPH, BTEX, and general chemistry.

2. On the general site plot plan mark this location and submit for our files.

Please be advised that NMOCD approval of this plan does not relieve (Giant) of liability should their operations fail to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD approval does not relieve (Giant) of responsibility for compliance with any other federal, state, or local laws and/or regulations.

-----Original Message-----
From: Randy Schmaltz [mailto:rschmaltz@giant.com]
Sent: Wednesday, October 20, 2004 4:48 PM
To: 'Wayne Price'
Cc: 'Hope Monzeglio'; 'Denny Foust'
Subject: Soil Request

<<Release N. MW #45 Soil Request.doc>>

GIANT
REFINING COMPANY

Mr. Wayne Price
New Mexico Oil Conservation Division
1220 South St. Frances Dr.
Santa Fe, New Mexico 87505

September 8, 2004

Re: **Soil Final Disposition-Release North of MW #45**

Dear Mr. Price,

As you are aware of Giant Refining Company – Bloomfield Refinery removed all the impacted soil from the release North of Monitoring Well #45 as directed in the "Emergency Action Directive". The heavily impacted soil was sampled, removed and placed into 55-gallon drums. The remainder of the soil placed into staging piles. The staging piles were segregated into two categories based upon visual inspection of the soil.

Giant collected composite samples from the staging piles of each category. All samples were analyzed for Method 6010C (RCRA 8 metals) TCLP, BTEX, Reactivity, Corrosivity, Ignitability, Flash point, and TPH.

The following is a summary of sample results including quantity of material:

1. Drummed Soil (16 barrels)
   - BTEX – Hazardous for Benzene
   - TCLP –

Arsenic	0.009 (mg/Kg)
Barium	0.422 (mg/Kg)
Cadmium	ND
Chromium	0.002 (mg/Kg)
Lead	0.001 (mg/Kg)
Mercury	ND
Selenium	0.006 (mg/Kg)
Silver	ND

   - TPH – 9280 (mg/Kg)

2. Hydro Blast Pad Composite (1200 cubic yards)
   - BTEX – Non-hazardous for any chemical.
     Benzene =.097 (mg/Kg)
     Total BTEX= .722 (mg/Kg)

PHONE
505-632-8013
FAX
505-632-3911

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

- TCLP-

Arsenic	0.002 (mg/Kg)
Barium	0.068 (mg/Kg)
Cadmium	ND
Chromium	0.001 (mg/Kg)
Lead	ND
Mercury	ND
Selenium	ND
Silver	ND

- TPH – 301 (mg/kg)
  GRO = 57.2 (mg/Kg)
  DRO = 244 (mg/Kg)

- Ignitability – Negative
- Corrosivity – Negative
- Reactivity – Negative
- PH = 7.43
- Flash Point >350 C

3. Tank 36 Composite (3600 cubic yards)
   - BTEX – Non-hazardous for any chemical.
     Benzene =.011 (mg/Kg)
     Total BTEX= .149 (mg/Kg)

   - TCLP-

Arsenic	0.003 (mg/Kg)
Barium	0.073 (mg/Kg)
Cadmium	ND
Chromium	0.001 (mg/Kg)
Lead	ND
Mercury	ND
Selenium	ND
Silver	ND

   - TPH – 351 (mg/kg)
     GRO = 85.1 (mg/Kg)
     DRO = 266 (mg/Kg)

   - Ignitability – Negative
   - Corrosivity – Negative
   - Reactivity – Negative
   - PH = 7.69
   - Flash Point >350 C

Based on these results Giant will send the 16 barrels of soil to an EPA permitted TSD facility. Giant requests the Agency's permission to use the remaining soil for beneficial use at the refinery (dike material and leveling low lying areas).

Your prompt attention to this matter will be greatly appreciated. If you need more information, please contact me at (505) 632-4171.

Sincerely,

Randy Schmaltz
Environmental Supervisor
Giant Refining Company – Bloomfield

Cc: Hope Monzeglio, NMED
Denny Foust, New Mexico Oil Conservation Division – Aztec
Ed Riege

GIANT
REFINING COMPANY

Wayne Price
New Mexico Oil Conservation Division
1220 South St. Frances Dr.
Santa Fe, New Mexico 87505

Hope Monzeglio
New Mexico Environmental Department
Hazardous Waste Bureau
2905 Rodeo Park Dr. East
Bldg 1
Santa Fe, New Mexico 87505

October 26, 2004

Re: **Request for Disposal of Impacted Soil**

Dear Mr. Price and Ms. Monzeglio,

Giant Refining Company – Bloomfield Refinery requests for approval for final disposition of 16 barrels of impacted soil from the MW #45 Release to the San Juan County Landfill. The waste will be treated at the Landfill Facility to New Mexico State standards and directly disposed of at the San Juan County Landfill.

Enclosed; please find analytical data and Waste Management's profile and approval. Hard copies for your records will follow.

Your prompt attention to this matter will be greatly appreciated. If you need more information, please contact me at (505) 632-4161.

Sincerely,

Cindy Hurtado

Cindy Hurtado
Environmental Assistant
Giant Refining Company – Bloomfield

Cc: Dave Cobrain, NMED
Robert Wilkinson, EPA
Denny Foust, New Mexico Oil Conservation Division – Aztec
Ed Riege

PHONE
505-632-8013
FAX
505-632-3911

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

Cindy Hurtado

From: Hope Monzeglio [hope_monzeglio@nmenv.state.nm.us]
Sent: Wednesday, October 27, 2004 3:57 PM
To: Cindy Hurtado; Price, Wayne
Cc: Bob Wilkinson; Randy Schmaltz; Ed Riege; Denny Foust; David Cobrain
Subject: RE: Soil Disposal Request

NMED is in agreement with OCD, this email constitutes NMED's approval of Giant's request to dispose of hydrocarbon contaminated soil in the San Juan Co. Landfill. A follow up letter will follow.

Hope Monzeglio

-----Original Message-----
From: Price, Wayne
Sent: Wednesday, October 27, 2004 2:52 PM
To: 'Cindy Hurtado'; Price, Wayne; 'Hope Monzeglio'
Cc: Foust, Denny; 'Robert Wilkinson'; 'Dave Cobrain'; Randy Schmaltz; Ed Riege
Subject: RE: Soil Disposal Request

OCD hereby approves of Giant's request to dispose of hydrocarbon contaminated soil in the San Juan Co. Landfill with the following conditions:

1. The soil must be RCRA non-hazardous and NMED-haz waste must approve.
2. Giant shall provide proof of disposal, waste manifest, etc.
3. This approval is good for 30 days and only for soils generated during the emergency response approved by OCD.

Please be advised that NMOCD approval of this plan does not relieve (Giant) of liability should their operations fail to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD approval does not relieve (Giant) of responsibility for compliance with any other federal, state, or local laws and/or regulations.

-----Original Message-----
From: Cindy Hurtado [mailto:churtado@giant.com]
Sent: Wednesday, October 27, 2004 2:15 PM
To: 'Wayne Price'; 'Hope Monzeglio'
Cc: 'Denny Foust'; 'Robert Wilkinson'; 'Dave Cobrain'; Randy Schmaltz; Ed Riege
Subject: Soil Disposal Request

<<Soil Disposal Request.doc>> <<Drummed soil (MW #45).doc>>

ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA METHOD 8021
AROMATIC VOLATILE ORGANICS

Client:	Giant	Project #:	96012-028
Sample ID:	001	Date Reported:	08-18-04
Laboratory Number:	30030	Date Sampled:	08-13-04
Chain of Custody:	12752	Date Received:	08-13-04
Sample Matrix:	Soil	Date Analyzed:	08-18-04
Preservative:	Cool	Date Extracted:	08-16-04
Condition:	Cool & Intact	Analysis Requested:	BTEX-MTBE

Parameter	Concentration (ug/Kg)	Det. Limit (ug/Kg)
Methyl-tert-butyl Ether	ND	2.1
Benzene	1,190	1.8
Toluene	671	1.7
Ethylbenzene	792	1.5
p,m-Xylene	2,180	2.2
o-Xylene	728	1.0
Total BTEX	5,560	

ND - Parameter not detected at the stated detection limit.

Surrogate Recoveries:	Parameter	Percent Recovery
	Fluorobenzene	99 %
	1,4-difluorobenzene	99 %
	Bromochlorobenzene	99 %

References: Method 5030B, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, December 1996.

Method 8021B, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, December 1996.

Comments: Outfall Area Top of Spill.

Analyst

Review

ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA METHOD 8015 Modified
Nonhalogenated Volatile Organics
Total Petroleum Hydrocarbons

Client:	Giant	Project #:	96012-028
Sample ID:	001	Date Reported:	08-18-04
Laboratory Number:	30030	Date Sampled:	08-13-04
Chain of Custody No:	12752	Date Received:	08-13-04
Sample Matrix:	Soil	Date Extracted:	08-16-04
Preservative:	Cool	Date Analyzed:	08-18-04
Condition:	Cool and Intact	Analysis Requested:	8015 TPH

Parameter	Concentration (mg/Kg)	Det. Limit (mg/Kg)
Gasoline Range (C5 - C10)	3,880	0.2
Diesel Range (C10 - C28)	5,400	0.1
Total Petroleum Hydrocarbons	9,280	0.2

ND - Parameter not detected at the stated detection limit.

References: Method 8015B, Nonhalogenated Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, December 1996.

Comments: Outfall Area Top of Spill.

Analyst

Review

ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

TRACE METAL ANALYSIS

Client:	Giant	Project #:	96012-028
Sample ID:	001	Date Reported:	08-17-04
Laboratory Number:	30030	Date Sampled:	08-13-04
Chain of Custody:	12752	Date Received:	08-13-04
Sample Matrix:	Soil	Date Analyzed:	08-17-04
Preservative:	Cool	Date Digested:	08-16-04
Condition:	Cool & Intact	Analysis Needed:	RCRA Metals

Parameter	Concentration (mg/Kg)	Det. Limit (mg/Kg)	TCLP Regulatory Level (mg/Kg)
Arsenic	0.009	0.001	5.0
Barium	0.422	0.001	100
Cadmium	ND	0.001	1.0
Chromium	0.002	0.001	5.0
Lead	0.001	0.001	5.0
Mercury	ND	0.001	0.2
Selenium	0.006	0.001	1.0
Silver	ND	0.001	5.0

ND - Parameter not detected at the stated detection limit.

References: Method 3050B, Acid Digestion of Sediments, Sludges and Soils. SW-846, USEPA, December 1996.

Method 6010B, Analysis of Metals by Inductively Coupled Plasma Atomic Emmision Spectroscopy, SW-846, USEPA, December 1996.

Note: Regulatory Limits based on 40 CFR part 261 subpart C section 261.24, August 24, 1998.

Comments: Outfall Area Top of Spill.

Analyst

Review

ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

CATION / ANION ANALYSIS

Client:	Giant	Project #:	96012-028
Sample ID:	001	Date Reported:	08-19-04
Laboratory Number:	30057	Date Sampled:	08-14-04
Chain of Custody:	12756	Date Received:	08-14-04
Sample Matrix:	Soil Extract	Date Extracted:	08-17-04
Preservative:	Cool	Date Analyzed:	08-18-04
Condition:	Cool & Intact		

Parameter	Analytical Result	Units		Units
pH	8.00	s.u.		
Conductivity @ 25° C	267	umhos/cm		
Total Dissolved Solids @ 180C	236	mg/L		
Total Dissolved Solids (Calc)	218	mg/L		
SAR	1.8	ratio		
Total Alkalinity as CaCO3	53.6	mg/L		
Total Hardness as CaCO3	88.0	mg/L		
Bicarbonate as HCO3	53.6	mg/L	0.88	meq/L
Carbonate as CO3	<0.1	mg/L	0.00	meq/L
Hydroxide as OH	<0.1	mg/L	0.00	meq/L
Nitrate Nitrogen	1.7	mg/L	0.03	meq/L
Nitrite Nitrogen	0.025	mg/L	0.00	meq/L
Chloride	28.8	mg/L	0.81	meq/L
Fluoride	0.27	mg/L	0.01	meq/L
Phosphate	8.3	mg/L	0.26	meq/L
Sulfate	74.0	mg/L	1.54	meq/L
Iron	0.266	mg/L	0.01	meq/L
Calcium	25.6	mg/L	1.28	meq/L
Magnesium	5.86	mg/L	0.48	meq/L
Potassium	2.08	mg/L	0.05	meq/L
Sodium	39.0	mg/L	1.70	meq/L
Cations			3.52	meq/L
Anions			3.54	meq/L
Cation/Anion Difference			0.48%	

Reference: U.S.E.P.A., 600/4-79-020, "Methods for Chemical Analysis of Water and Wastes", 1983. Water And Waste Water", 18th ed., 1992.

Comments: Outfall Area Top of Spill.

Christine M Walters
Analyst

Review

ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA Method 8015 Modified
Nonhalogenated Volatile Organics
Total Petroleum Hydrocarbons

Quality Assurance Report

Client:	QA/QC	Project #:	N/A
Sample ID:	08-18-TPH QA/QC	Date Reported:	08-18-04
Laboratory Number:	30030	Date Sampled:	N/A
Sample Matrix:	Methylene Chloride	Date Received:	N/A
Preservative:	N/A	Date Analyzed:	08-18-04
Condition:	N/A	Analysis Requested:	TPH

	I-Cal Date	I-Cal RF:	C-Cal RF:	% Difference	Accept. Range
Gasoline Range C5 - C10	02-19-04	1.8591E-002	1.8572E-002	0.10%	0 - 15%
Diesel Range C10 - C28	02-19-04	1.5507E-002	1.5492E-002	0.10%	0 - 15%

Blank Conc. (mg/L - mg/Kg)	Concentration	Detection Limit
Gasoline Range C5 - C10	ND	0.2
Diesel Range C10 - C28	ND	0.1
Total Petroleum Hydrocarbons	ND	0.2

Duplicate Conc. (mg/Kg)	Sample	Duplicate	% Difference	Accept. Range
Gasoline Range C5 - C10	3,880	3,860	0.5%	0 - 30%
Diesel Range C10 - C28	5,400	5,380	0.4%	0 - 30%

Spike Conc. (mg/Kg)	Sample	Spike Added	Spike Result	% Recovery	Accept. Range
Gasoline Range C5 - C10	3,880	250	4,120	99.8%	75 - 125%
Diesel Range C10 - C28	5,400	250	5,640	99.8%	75 - 125%

ND - Parameter not detected at the stated detection limit.

References: Method 8015B, Nonhalogenated Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, December 1996.

Comments: **QA/QC for samples 30030 - 30034, 30055 - 30056.**

Analyst

Review

ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

TRACE METAL ANALYSIS
Quality Control / Quality Assurance Report

Client:	QA/QC	Project #:	N/A
Sample ID:	08-17-04 QA/AC	Date Reported:	08-17-04
Laboratory Number:	30030	Date Sampled:	N/A
Sample Matrix:	Soil	Date Received:	N/A
Analysis Requested:	Total RCRA Metals	Date Analyzed:	08-17-04
Condition:	N/A	Date Digested:	08-16-04

Blank & Duplicate Conc. (mg/Kg)	Instrument Blank (mg/L)	Method Blank	Detection Limit	Sample	Duplicate	% Diff.	Acceptance Range
Arsenic	ND	ND	0.001	0.009	0.009	0.0%	0% - 30%
Barium	ND	ND	0.001	0.422	0.419	0.7%	0% - 30%
Cadmium	ND	ND	0.001	ND	ND	0.0%	0% - 30%
Chromium	ND	ND	0.001	0.002	0.002	0.0%	0% - 30%
Lead	ND	ND	0.001	0.001	0.001	0.0%	0% - 30%
Mercury	ND	ND	0.001	ND	ND	0.0%	0% - 30%
Selenium	ND	ND	0.001	0.006	0.006	0.0%	0% - 30%
Silver	ND	ND	0.001	ND	ND	0.0%	0% - 30%

Spike Conc. (mg/Kg)	Spike Added	Sample	Spiked Sample	Percent Recovery	Acceptance Range
Arsenic	0.500	0.009	0.508	99.8%	80% - 120%
Barium	0.500	0.422	0.920	99.8%	80% - 120%
Cadmium	0.500	ND	0.500	100.0%	80% - 120%
Chromium	0.500	0.002	0.502	100.0%	80% - 120%
Lead	0.500	0.001	0.500	99.8%	80% - 120%
Mercury	0.050	ND	0.050	100.0%	80% - 120%
Selenium	0.500	0.006	0.505	99.8%	80% - 120%
Silver	0.500	ND	0.500	100.0%	80% - 120%

ND - Parameter not detected at the stated detection limit.

References: Method 3050B, Acid Digestion of Sediments, Sludges and Soils. SW-846, USEPA, December 1996.

Method 6010B, Analysis of Metals by Inductively Coupled Plasma Atomic Emmision Spectroscopy, SW-846, USEPA, December 1996.

Comments: QA/QC for samples 30030 - 30034.

Analyst

Review

ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA METHOD 8021
AROMATIC VOLATILE ORGANICS

Client:	N/A	Project #:	N/A
Sample ID:	08-18-BTEX QA/QC	Date Reported:	08-18-04
Laboratory Number:	30030	Date Sampled:	N/A
Sample Matrix:	Soil	Date Received:	N/A
Preservative:	N/A	Date Analyzed:	08-18-04
Condition:	N/A	Analysis:	BTEX

Calibration and Detection Limits (ug/L)	I-Cal RF:	C-Cal RF:	%Diff. Accept. Range 0 - 15%	Blank Conc	Detect. Limit
Methyl-tert-butyl Ether	7.7846E-001	7.8002E-001	0.2%	ND	0.2
Benzene	2.8990E-001	2.9077E-001	0.3%	ND	0.2
Toluene	2.5460E-002	2.5511E-002	0.2%	ND	0.2
Ethylbenzene	3.8451E-002	3.8567E-002	0.3%	ND	0.2
p,m-Xylene	3.2933E-002	3.3088E-002	0.3%	ND	0.2
o-Xylene	3.3333E-002	3.3400E-002	0.2%	ND	0.1

Duplicate Conc. (ug/Kg)	Sample	Duplicate	%Diff.	Accept Range	Detect. Limit
Methyl-tert-butly Ether	ND	ND	0.0%	0 - 30%	2.1
Benzene	1,190	1,220	2.5%	0 - 30%	1.8
Toluene	671	657	2.0%	0 - 30%	1.7
Ethylbenzene	792	776	2.0%	0 - 30%	1.5
p,m-Xylene	2,180	2,240	2.8%	0 - 30%	2.2
o-Xylene	728	750	3.0%	0 - 30%	1.0

Spike Conc. (ug/Kg)	Sample	Amount Spiked	Spiked Sample	% Recovery	Accept Range
Methyl-tert-butly Ether	ND	50.0	40	80.0%	80 - 120
Benzene	1,190	50.0	1,230	99.2%	39 - 150
Toluene	671	50.0	719	99.8%	46 - 148
Ethylbenzene	792	50.0	840	99.8%	32 - 160
p,m-Xylene	2,180	100	2,270	99.6%	46 - 148
o-Xylene	728	50.0	777	99.8%	46 - 148

ND - Parameter not detected at the stated detection limit.

References: Method 5030B, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, December 1996.
Method 8021B, Aromatic and Halogenated Volatiles by Gas Chromatography Using Photoionization and/or Electrolytic Conductivity Detectors, SW-846, USEPA December 1996.

Comments: QA/QC for samples 30030 - 30034, 30055.

Analyst

Review

WASTE MANAGEMENT
PO Box 15700
Rio Rancho, NM 87174

Monday, October 04, 2004

Giant Refinery
#50 Road 4990
P.O Box 159
Bloomfield, NM 87413

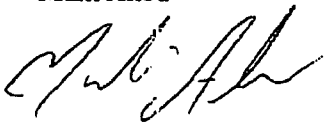
To: Cindy Hurtado

Effective 10/4/04 the waste material on Profile # SJC 06765 B has been approved for disposal at WASTE MANAGEMENT INC. San Juan County Landfill pending the return and approval of account set up information. The waste material will be treated on site to acceptable New Mexico State standards and directly disposed of at the San Juan County Landfill. This approval is limited to the waste described on the profile # stated above and is valid until 4/4/05. The San Juan County Facility reserves the right to reject any shipment of waste that fails to conform with profile sheet information/documentation.

Sincerely,

Waste Management
Industrial Landfill Sales New Mexico

Mark Allen



GENERATOR'S WASTE PROFILE SHEET

PLEASE PRINT IN INK OR TYPE

Profile Number, WMI: 06765B

Renewal Date: ONE TIME

Service Agreement on File? ☒YES ☐NO

☐Hazardous ☒Non-Hazardous ☐TSCA

A. Waste Generator Information

1. Generator Name:	Giant (San Juan) Refining	2. SIC Code:	
3. Facility Street Address:	#50 Road 4990	4. Phone:	505-632-4761
5. Facility City:	Bloomfield	6. State/Province:	N.M.
7. Zip/Postal Code:	87413	8. Generator USEPA/Federal ID #:	NMD089416416
9. County:	SAN JUAN	10. State/Province ID #:	
11. Customer Name:	~~PHILIP Transportation & Remediation~~ Same	12. Customer Phone:	~~602-252-4186~~
13. Customer Contact:	~~Scott Davis~~ AS	14. Customer Fax:	~~602-367-1690~~
15. Billing Address:	~~2002 W. McDowell Rd.~~ Above		☐Same as above

B. Waste Stream Information

1. Description
   a. Name of Waste: Petroleum contaminated soil
   b. Process Generating Waste: State mandated cleanup of petroleum hydrocarbons leaching from under oil refinery.

c. Color	d. Strong odor (describe):	e. Physical state @ 70°F	f. Layers	g. Free liquid range
Black		X solid	☒Single Layer	0
brown	oil	☐Gas ☐Sludge ☐Other	X	h. pH: Range 6to8

i. Liquid Flash Point: ☐<73°F ☐73-99°F ☐100-139°F ☐140-199°F ☐> 200°F ☒Not applicable

j. Chemical Composition (List all constituents [including halogenated organics, debris, and UHC's] present in any concentration and submit representative analysis)

Constituents	Concentration Range	Constituents	Concentration Range
Soil	98 – 100%		
Petroleum hydrocarbons	0-2%		

TOTAL COMPOSITION MUST EQUAL OR EXCEED 100%

k. ☐Oxidizer ☐Pyrophoric ☐Explosive ☐Radioactive ☐Carcinogen ☐Infectious ☐Shock Sensitive ☐Water Reactive

l. Does the waste represented by this profile contain asbestos? ☐YES ☒NO
   If yes: ☐friable ☐non-friable

m. Does the waste represented by this profile contain benzene? ☒YES ☐NO
   If yes, concentration 1,190 ppb

n. Does the waste contain debris? (list in Section B.1.j) ☐YES ☒NO

2. Quantity of Waste
   Estimated Annual Volume: 15 ☐Tons ☐Yards ☒Drums ☐Other (specify)

3. Shipping Information
   a. Packaging ☐Bulk Solid: Type/Size: , ☐Bulk Liquid, Type/Size: , ☒Drum, Type, Size:55 gal ☐Other
   b. Shipping Frequency: Units 16 x 55 gal. Per: ☐Month ☐Quarter ☐Year ☒One time ☐Other
   c. Is this a U.S. Department of Transportation (USDOT) Hazardous Material? (If no, skip d, e, and f) ☐YES ☐NO
   d. Reportable Quantity (lbs.; kgs.): e. Hazard Class/ID #:
   f. USDOT Shipping Name:
   g. Personal Protective Equipment Requirements:

C. Generator's Certification (Please check appropriate responses, sign, and date below.)

1	Is this a USEPA hazardous waste (40 CFR Part 261)? If the answer is no, skip to 2	☐YES ☒NO
	a. If yes, identify ALL USEPA listed and characteristic waste code numbers (D, F, K, P, U)	
	b. If a characteristic hazardous waste, do underlying hazardous constituents (UHCs) apply? (if yes, list in Section B.1.j)	☐YES ☐NO
2.	Is this a state hazardous waste? Identify ALL state hazardous waste codes	☐YES ☒NO
3	Is this waste from a CERCLA (40 CFR 300, Appendix B) or state mandated clean-up? If yes, attach Record of Decision (ROD), 104/106 or 122 order or court order that governs site clean-up activity. For state mandated clean-up, provide relevant documentation.	☒YES ☐NO
4.	Does the waste represented by this waste profile sheet contain radioactive material, or is disposal Regulated by the Nuclear Regulatory Commission?	☐YES ☒NO
5	Does the waste represented by this waste profile sheet contain concentrations of Polychlorinated Biphenyls (PCBs) regulated by 40 CFR 761? (if yes, list in Chemical Composition - B.1.j)	☐YES ☒NO
	a. If yes, were the PCBs imported into the U.S.?	☐YES ☐NO
6.	Do the waste profile sheet and all attachments contain true and accurate descriptions of the waste material, and has all relevant information within the possession of the Generator regarding known or Suspected hazards pertaining to the waste been disclosed to the Contractor?	☒YES ☐NO
7.	Will all changes which occur in the character of the waste be identified by the Generator and disclosed to the Contractor prior to providing the waste to the Contractor?	☒YES ☐NO

☐Check here if a Certificate of Destruction or Disposal is required.

Approved for disposal @ San Juan Landfill Tonya Miller 9/21/04

GENERATOR'S WASTE PROFILE SHEET

PLEASE PRINT IN INK OR TYPE

Any sample submitted is representative as defined in 40 CFR 261 - Appendix I or by using an equivalent method. I authorize WMI to obtain a sample from any waste shipment for purposes of recertification. If this certification is made by a broker, the undersigned signs as authorized agent of the generator and has confirmed the information contained in this Profile Sheet from information provided by the generator and additional information as it has determined to be reasonably necessary. If approved for management, Contractor has all the necessary permits and licenses for the waste that has been characterized and identified by this approved profile.

Certification Signature: Cindy Hurtado Title: Environmental Assistant

Name (Type or Print): Cindy Hurtado Company Name: Giant Refinery - Bloomfield Date: 9-21-04

☐ Check if additional information is attached. Indicate the number of attached pages ____.

Approved for disposal @ San Juan LF Terry Nelson 9/24/04

Instructions

Information on this form is used to determine if the waste may be transported, treated, stored or disposed in a legal, safe, and environmentally sound manner. This information will be maintained in strict confidence. Answers must be provided for sections A, B, and C and must be printed in ink or typed. A response of "NONE" or "NA" (not applicable) can be made if appropriate. If additional space is needed, indicate on the form that additional information is attached, and attach the information to Generator's Waste Profile Sheet. If you have questions concerning this form, please contact the Contractor's sales representative.

A. Waste Generator Information

1. Generator Name - Enter the name of the facility where the waste is generated.
2. SIC Code - Enter the four digit Standard Industrial Classification Code for the facility where the waste is generated.
3. Facility Street Address - Enter the street address (not P.O. Box) of the facility where the waste is generated.
4. Phone - Enter Generator's area code and phone number.
5. Facility City - Enter the city where the waste is generated.
6. State/Province - Enter the state or province where the waste is generated.
7. Zip/Postal Code - Enter the generating facility's zip or postal code.
8. Generator USEPA/Federal ID # - Enter the identification number issued by the USEPA, Canadian, or Mexican Federal Agency to the facility generating the waste (if applicable).
9. County - Enter the county where the waste is generated.
10. State/Province ID # - Enter the identification number issued by the state or province to the facility generating the waste (if applicable).
11. Customer Name - Entity that the Contractor is directly working with regarding the represented waste stream. If the same as the Generator, mark "Same as Above".
12. Customer Phone - Enter technical contact's area code and telephone number.
13. Customer Contact - Enter the name of the person who can answer technical questions about the waste.
14. Customer Fax - Area code and facsimile number for the customer.
15. Billing Address - Address where bill for services should be sent.

B. Waste Stream Information

1.a. Name of Waste - Enter a name generally descriptive of this waste (e.g., paint sludge, fluorescent bulbs).

1.b. Process Generating Waste - Describe the process generating the waste in detail. List the specific process/operation or source that generates the waste (e.g., incineration of municipal refuse, asbestos removal, wastewater treatment, building maintenance).

At a minimum, the Generator should answer the following questions in determining the process generating the waste:

- What chemicals are stored and/or used at the facility?
- Is the waste generated from the production/manufacturing of any of the following industries: wood preservation; inorganic pigments; organic pigments; pesticides; explosives; petroleum refining; iron and steel, copper, lead or zinc production?
- Is the waste a result from degreasing, solvent parts cleaning, recovery/reclaiming of solvents (bottoms), wastewater treatment (sludges), or electroplating?

1.c. Color - Describe the color of the waste (e.g., blue, transparent, varies).

1.d. Strong odor - DO NOT SMELL THE WASTE! If the waste has a known odor, then describe (e.g., acrid, pungent, solvent, sweet).

1.e. Physical state @ 70°F - If the four boxes provided do not apply, a descriptive phrase may be entered after "Other" (e.g., multi-phasal).

1.f. Layers - Single Layer means the waste is homogeneous. Multi-layer means the waste is comprised of two or more layers (e.g., oil/water/sludge).

1.g. Free liquid range - Range (in percent by volume) of free liquids in the waste.

1.h. pH Range - Indicate the pH range.

1.i. Liquid Flash Point - Indicate the flash point obtained using the appropriate test method.

1.j. Chemical Composition - List all organic and/or inorganic components of the waste using chemical names. If trade names are used, attach Material Safety Data Sheets or other documents that adequately describe the composition of the waste. For each component, estimate the range (in percent) in which the component is present. Identify any element, chemical compound, or mixture in concentration of 0.1 percent or greater that is considered a carcinogen or potential carcinogen pursuant to OSHA.

1.k. Check all that apply.

1.l. Indicate if this waste contains asbestos. Indicate if the asbestos is friable.

1.m. Indicate if the waste contains benzene, the level in ppm, and whether it is subject to the benzene NESHAP.

1.n. Indicate if the waste contains debris (list size and type in B.1.j).

2. Quantity of Waste - Approximate volume in tons, yards, or other (e.g., drums, gallons) that will be received by the ultimate management facility. This volume amount is not intended for use in complying with state and/or permit restrictions.

3.a. Packaging - Choose the appropriate option or "other" along with a description.

3.b. Shipping Frequency - Choose the appropriate option or "other" along with a description.

3.c. Is this a U.S. Department of Transportation (USDOT) hazardous material? - Choose the appropriate response: yes or no.

3.d. Reportable Quantity (lbs.; kgs.) - If the answer to 3.c. is yes, enter the Reportable Quantity (RQ) established by 40 CFR 302.4 or equivalent Canadian or Mexican regulation for this waste. Indicate the appropriate units for the RQ.

3.e. Hazard Class/ID # - If the answer to 3.c. is yes, indicate the proper USDOT hazard class and identification number.

3.f. USDOT Shipping Name - If the answer to 3.c. is yes, enter the proper USDOT shipping name for the waste.

3.g. Personal Protective Equipment Requirements - All personal protective equipment necessary to safely manage the waste stream.

C. Generator's Certification (Please check appropriate response, sign and date below.)

District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Avenue, Artesia, NM 88210
District III
1000 Rio Brazos Road, Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy Minerals and Natural Resources

Oil Conservation Division
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-138
Revised June 10, 2003

Submit Original
Plus 1 Copy
to Appropriate
District Office

REQUEST FOR APPROVAL TO ACCEPT SOLID WASTE

1. RCRA Exempt: ☐ Non-Exempt: ☒ Verbal Approval Received: Yes ☐ No ☐	4. Generator Giant Refining Company
	5. Originating Site Giant Refinery-Bloomfield
2. Management Facility Destination San Juan County Regional Landfill	6. Transporter Waste Management
3. Address of Facility Operator #78 CR 3160 Aztec, NM 87410	8. State New Mexico
7. Location of Material (Street Address or ULSTR) #49 CR 4990 Bloomfield, NM 87413	

9. Circle One:

A. All requests for approval to accept oilfield exempt wastes will be accompanied by a certification of waste from the Generator; one certificate per job.

B. All requests for approval to accept non-exempt wastes must be accompanied by necessary chemical analysis to PROVE the material is non-hazardous and the Generator's certification of origin. No waste classified hazardous by listing or testing will be approved

All transporters must certify the wastes delivered are only those consigned for transport.

BRIEF DESCRIPTION OF MATERIAL:

Petroleum Impacted Soil

Must have OCD approval letter before transporting and disposal at San Juan County Landfill.

S. Johnson 10/26/04

Estimated Volume 4 cy Known Volume (to be entered by the operator at the end of the haul) _____ cy

SIGNATURE J. L. Hammon TITLE: District Mgr. DATE: 10-26-04
Waste Management Facility Authorized Agent

TYPE OR PRINT NAME: John Hammon TELEPHONE NO. 505 334 1121

E-MAIL ADDRESS jhammon@wm.com

(This space for State Use)

APPROVED BY: _____ TITLE: _____ DATE: _____

APPROVED BY: _____ TITLE: _____ DATE: _____

SPECIAL WASTE SHIPMENT RECORD

SAN JUAN COUNTY REGIONAL LANDFILL - 241102

Mailing Address:
Box 1402
Aztec, New Mexico 87410
505/334-1121
A Waste Management Company

Physical Address:
#78 CR 3140
Aztec, New Mexico 87401

Shipment # 7277

Profile # 06765B (Required)

1. Generator's Work site name and address: GIANT INDUSTRIES, 50 CR 4990, BLOOMFIELD, NM 87413		
2. Generator's name and address: GIANT INDUSTRIES 50 CR 4990 BLOOMFIELD, NM 87413		Operator's Telephone no. (505) 632-4161
3. Authorized Agent name and address: GIANT INDUSTRIES 50 CR 4990 BLOOMFIELD, NM 87413		Owner's Telephone no. (505) 632-4161
4. Description materials PETROLEUM CONTAMINATED SOIL	5. Container's No. Type 20YD "S"	6. Total Quantity m3 (yd3) 4 YDS ~~20YDS~~

7. **Special handling instructions**

8. AUTHORIZED AGENT CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above and are classified, packed, marked and labeled, and are in all respects in proper condition for transport by highway in accordance with applicable international and government regulations. I hereby certify that the above named material does not contain free liquid as defined by 40CFR Part 258.28 and is not a hazardous waste as defined by 40CFR 261 or any applicable state law.

Printed/typed name and title	Authorized Agents Signature	Month/Day/Year
[illegible]	[signature]	11/14/04

9. Transporter 1 (Acknowlegement of receipt of materials)

Printed/typed name & title, address, telephone no.	Authorized Agents Signature	Month/Day/Year
SHANE MOORE, DRIVER #49386 WASTE MANAGEMENT, 101 SPRUCE ST. FARMINGTON, NM 87401 (505)327-6284	[signature]	11/14/04

10. Transporter 2 (Acknowledgement of receipt of materials)

Printed/typed name & title, address, telephone no.	Authorized Agents Signature	Month/Day/Year
		/ /

11. Discrepancy indication space
[illegible] HAS 4 YARDS

12. Waste disposal site certification of receipt of materials covered by this manifest except as noted in item 11.

Printed/typed name and title	Signature	Month / Day / Year
[illegible]	[signature]	11/14/04

White/GEN Yellow/LANDFILL Pink/TRANSPORTER Golden/GEN

san juan reproduction 98-165

ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

September 6, 2004

Mr. Randy Schmaltz
Giant Refinery
P.O. Box 159
Bloomfield, NM 87413

Phone: (505) 632-4171

Client No.: 96012-009

Dear Mr. Schmaltz,

Enclosed are the analytical results for the soil samples collected by Giant designated personnel on 8/31/04, and received by the Envirotech laboratory on 8/31/04 for Total Petroleum Hydrocarbons (TPH) per USEPA Method 8015, BTEX per USEPA Method 8021, RCRA 8 List Metals, Flashpoint, Ignitability, Corrosivity and Reactivity analysis..

The samples were documented on Envirotech Chain of Custody No. 12882. The samples were assigned Laboratory Nos. 30341 (Hydroblast Comp)and 30342 (Tank 36 Comp) for tracking purposes.

The samples were analyzed on 9/01/04 and 9/02/04 using USEPA or equivalent methods.

Should you have any questions or require additional information, please do not hesitate to contact us at (505) 632-0615.

Respectfully submitted,
Envirotech, Inc.

Christine M Walters

Christine M. Walters
Laboratory Coordinator / Environmental Scientist

enc.

CMW/cmw

C:/files/labreports/Giant.wpd

ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA METHOD 8021
AROMATIC VOLATILE ORGANICS

Client:	Giant Refinery	Project #:	96012-009
Sample ID:	Hydroblast Comp.	Date Reported:	09-01-04
Laboratory Number:	30341	Date Sampled:	08-31-04
Chain of Custody:	12882	Date Received:	08-31-04
Sample Matrix:	Soil	Date Analyzed:	09-01-04
Preservative:	Cool	Date Extracted:	09-01-04
Condition:	Cool & Intact	Analysis Requested:	BTEX

Parameter	Concentration (ug/Kg)	Det. Limit (ug/Kg)
Benzene	97.4	1.8
Toluene	85.9	1.7
Ethylbenzene	105	1.5
p,m-Xylene	285	2.2
o-Xylene	149	1.0
Total BTEX	722	

ND - Parameter not detected at the stated detection limit.

Surrogate Recoveries:	Parameter	Percent Recovery
	Fluorobenzene	95 %
	1,4-difluorobenzene	95 %
	Bromochlorobenzene	95 %

References: Method 5030B, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, December 1996.

Method 8021B, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, December 1996.

Comments:

Analyst

Review

ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA METHOD 8021
AROMATIC VOLATILE ORGANICS

Client:	Giant Refinery	Project #:	96012-009
Sample ID:	Tank 36 Comp.	Date Reported:	09-01-04
Laboratory Number:	30342	Date Sampled:	08-31-04
Chain of Custody:	12882	Date Received:	08-31-04
Sample Matrix:	Soil	Date Analyzed:	09-01-04
Preservative:	Cool	Date Extracted:	09-01-04
Condition:	Cool & Intact	Analysis Requested:	BTEX

Parameter	Concentration (ug/Kg)	Det. Limit (ug/Kg)
Benzene	11.3	1.8
Toluene	14.6	1.7
Ethylbenzene	14.0	1.5
p,m-Xylene	50.1	2.2
o-Xylene	58.8	1.0
Total BTEX	149	

ND - Parameter not detected at the stated detection limit.

Surrogate Recoveries:	Parameter	Percent Recovery
	Fluorobenzene	95 %
	1,4-difluorobenzene	95 %
	Bromochlorobenzene	95 %

References: Method 5030B, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, December 1996.

Method 8021B, Aromatic Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, December 1996.

Comments:

Analyst

Review

ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA METHOD 8021
AROMATIC VOLATILE ORGANICS

Client:	N/A	Project #:	N/A
Sample ID:	09-01-BTEX QA/QC	Date Reported:	09-01-04
Laboratory Number:	30341	Date Sampled:	N/A
Sample Matrix:	Soil	Date Received:	N/A
Preservative:	N/A	Date Analyzed:	09-01-04
Condition:	N/A	Analysis:	BTEX

Calibration and Detection Limits (ug/L)	I-Cal RF:	C-Cal RF:	%Diff. Accept. Range 0 - 15%	Blank Conc	Detect. Limit
Benzene	2.8990E-001	2.9077E-001	0.3%	ND	0.2
Toluene	2.5460E-002	2.5511E-002	0.2%	ND	0.2
Ethylbenzene	3.8451E-002	3.8567E-002	0.3%	ND	0.2
p,m-Xylene	3.2988E-002	3.3088E-002	0.3%	ND	0.2
o-Xylene	3.3333E-002	3.3400E-002	0.2%	ND	0.1

Duplicate Conc. (ug/Kg)	Sample	Duplicate	%Diff.	Accept Range	Detect. Limit
Benzene	97.4	96.2	1.2%	0 - 30%	1.8
Toluene	85.9	84.2	2.0%	0 - 30%	1.7
Ethylbenzene	105	102	2.0%	0 - 30%	1.5
p,m-Xylene	285	281	1.2%	0 - 30%	2.2
o-Xylene	149	147	1.2%	0 - 30%	1.0

Spike Conc. (ug/Kg)	Sample	Amount Spiked	Spiked Sample	% Recovery	Accept Range
Benzene	97.4	50.0	147	99.9%	39 - 150
Toluene	85.9	50.0	135	99.6%	46 - 148
Ethylbenzene	105	50.0	154	99.8%	32 - 160
p,m-Xylene	285	100	384	99.8%	46 - 148
o-Xylene	149	50.0	198	99.7%	46 - 148

ND - Parameter not detected at the stated detection limit.

References: Method 5030B, Purge-and-Trap, Test Methods for Evaluating Solid Waste, SW-846, USEPA, December 1996.
Method 8021B, Aromatic and Halogenated Volatiles by Gas Chromatography Using Photoionization and/or Electrolytic Conductivity Detectors, SW-846, USEPA December 1996.

Comments: QA/QC for samples 30341 - 30342, 30345.

Analyst

Review

ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA METHOD 8015 Modified
Nonhalogenated Volatile Organics
Total Petroleum Hydrocarbons

Client:	Giant Refinery	Project #:	96012-009
Sample ID:	Tank 36 Comp.	Date Reported:	09-01-04
Laboratory Number:	30342	Date Sampled:	08-31-04
Chain of Custody No:	12882	Date Received:	08-31-04
Sample Matrix:	Soil	Date Extracted:	09-01-04
Preservative:	Cool	Date Analyzed:	09-01-04
Condition:	Cool and Intact	Analysis Requested:	8015 TPH

Parameter	Concentration (mg/Kg)	Det. Limit (mg/Kg)
Gasoline Range (C5 - C10)	85.1	0.2
Diesel Range (C10 - C28)	266	0.1
Total Petroleum Hydrocarbons	351	0.2

ND - Parameter not detected at the stated detection limit.

References: Method 8015B, Nonhalogenated Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, December 1996.

Comments:

Analyst

Review

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ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA METHOD 8015 Modified
Nonhalogenated Volatile Organics
Total Petroleum Hydrocarbons

Client:	Giant Refinery	Project #:	96012-009
Sample ID:	Hydroblast Comp.	Date Reported:	09-01-04
Laboratory Number:	30341	Date Sampled:	08-31-04
Chain of Custody No:	12882	Date Received:	08-31-04
Sample Matrix:	Soil	Date Extracted:	09-01-04
Preservative:	Cool	Date Analyzed:	09-01-04
Condition:	Cool and Intact	Analysis Requested:	8015 TPH

Parameter	Concentration (mg/Kg)	Det. Limit (mg/Kg)
Gasoline Range (C5 - C10)	57.2	0.2
Diesel Range (C10 - C28)	244	0.1
Total Petroleum Hydrocarbons	301	0.2

ND - Parameter not detected at the stated detection limit.

References: Method 8015B, Nonhalogenated Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, December 1996.

Comments:

Analyst

Review

ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA Method 8015 Modified
Nonhalogenated Volatile Organics
Total Petroleum Hydrocarbons

Quality Assurance Report

Client:	QA/QC	Project #:	N/A
Sample ID:	09-01-TPH QA/QC	Date Reported:	09-01-04
Laboratory Number:	30341	Date Sampled:	N/A
Sample Matrix:	Methylene Chloride	Date Received:	N/A
Preservative:	N/A	Date Analyzed:	09-01-04
Condition:	N/A	Analysis Requested:	TPH

	I-Cal Date	I-Cal RF:	C-Cal RF:	% Difference	Accept. Range
Gasoline Range C5 - C10	02-19-04	1.8591E-002	1.8572E-002	0.10%	0 - 15%
Diesel Range C10 - C28	02-19-04	1.5507E-002	1.5492E-002	0.10%	0 - 15%

Blank Conc. (mg/L - mg/Kg)	Concentration	Detection Limit
Gasoline Range C5 - C10	ND	0.2
Diesel Range C10 - C28	ND	0.1
Total Petroleum Hydrocarbons	ND	0.2

Duplicate Conc. (mg/Kg)	Sample	Duplicate	% Difference	Accept. Range
Gasoline Range C5 - C10	57.2	57.0	0.3%	0 - 30%
Diesel Range C10 - C28	244	243	0.3%	0 - 30%

Spike Conc. (mg/Kg)	Sample	Spike Added	Spike Result	% Recovery	Accept. Range
Gasoline Range C5 - C10	57.2	250	307	99.8%	75 - 125%
Diesel Range C10 - C28	244	250	493	99.8%	75 - 125%

ND - Parameter not detected at the stated detection limit.

References: Method 8015B, Nonhalogenated Volatile Organics, Test Methods for Evaluating Solid Waste, SW-846, USEPA, December 1996.

Comments: **QA/QC for samples 30341 - 30345.**

Analyst

Review

ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA METHOD 1311
TOXICITY CHARACTERISTIC
LEACHING PROCEDURE
TRACE METAL ANALYSIS

Client:	Giant Refinery	Project #:	96012-009
Sample ID:	Hydroblast Comp.	Date Reported:	09-02-04
Laboratory Number:	30341	Date Sampled:	08-31-04
Chain of Custody:	12882	Date Received:	08-31-04
Sample Matrix:	TCLP Extract	Date Analyzed:	09-02-04
Preservative:	Cool	Date Extracted:	09-01-04
Condition:	Cool & Intact	Analysis Needed:	TCLP metals

Parameter	Concentration (mg/L)	Det. Limit (mg/L)	Regulatory Level (mg/L)
Arsenic	0.002	0.001	5.0
Barium	0.068	0.001	100
Cadmium	ND	0.001	1.0
Chromium	0.001	0.001	5.0
Lead	ND	0.001	5.0
Mercury	ND	0.001	0.2
Selenium	ND	0.001	1.0
Silver	ND	0.001	5.0

ND - Parameter not detected at the stated detection limit.

References: Method 1311, Toxicity Characteristic Leaching Procedure, SW-846, USEPA, December 1996.

Methods 3010, 3020, Acid Digestion of Aqueous Samples and Extracts for Total Metals, SW-846, USEPA, December 1996.

Methods 6010B Analysis of Metals by Inductively Coupled Plasma-Atomic Emission SW-846, USEPA. December 1996.

Note: Regulatory Limits based on 40 CFR part 261 subpart C section 261.24, August 24, 1998.

Comments:

Analyst

Review

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ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA METHOD 1311
TOXICITY CHARACTERISTIC
LEACHING PROCEDURE
TRACE METAL ANALYSIS

Client:	Giant Refinery	Project #:	96012-009
Sample ID:	Tank 36 Comp.	Date Reported:	09-02-04
Laboratory Number:	30342	Date Sampled:	08-31-04
Chain of Custody:	12882	Date Received:	08-31-04
Sample Matrix:	TCLP Extract	Date Analyzed:	09-02-04
Preservative:	Cool	Date Extracted:	09-01-04
Condition:	Cool & Intact	Analysis Needed:	TCLP metals

Parameter	Concentration (mg/L)	Det. Limit (mg/L)	Regulatory Level (mg/L)
Arsenic	0.003	0.001	5.0
Barium	0.073	0.001	100
Cadmium	ND	0.001	1.0
Chromium	0.001	0.001	5.0
Lead	ND	0.001	5.0
Mercury	ND	0.001	0.2
Selenium	ND	0.001	1.0
Silver	ND	0.001	5.0

ND - Parameter not detected at the stated detection limit.

References: Method 1311, Toxicity Characteristic Leaching Procedure, SW-846, USEPA, December 1996.

Methods 3010, 3020, Acid Digestion of Aqueous Samples and Extracts for Total Metals, SW-846, USEPA, December 1996.

Methods 6010B Analysis of Metals by Inductively Coupled Plasma-Atomic Emission SW-846, USEPA. December 1996.

Note: Regulatory Limits based on 40 CFR part 261 subpart C section 261.24, August 24, 1998.

Comments:

Analyst

Review

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ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

EPA METHOD 1311
TOXICITY CHARACTERISTIC LEACHING PROCEDURE
TRACE METAL ANALYSIS
Quality Assurance Report

Client:	N/A	Project #:	N/A
Sample ID:	09-02-TCM QA/QC	Date Reported:	09-02-04
Laboratory Number:	30341	Date Sampled:	N/A
Sample Matrix:	TCLP Extract	Date Received:	N/A
Analysis Requested:	TCLP Metals	Date Analyzed:	09-02-04
Condition:	N/A	Date Extracted:	09-01-04

Blank & Duplicate Conc. (mg/L)	Instrument Blank	Method Blank	Detection Limit	Sample	Duplicate	% Difference	Acceptance Range
Arsenic	ND	ND	0.001	0.002	0.002	0.0%	0% - 30%
Barium	ND	ND	0.001	0.068	0.067	1.5%	0% - 30%
Cadmium	ND	ND	0.001	ND	ND	0.0%	0% - 30%
Chromium	ND	ND	0.001	0.001	0.001	0.0%	0% - 30%
Lead	ND	ND	0.001	ND	ND	0.0%	0% - 30%
Mercury	ND	ND	0.001	ND	ND	0.0%	0% - 30%
Selenium	ND	ND	0.001	ND	ND	0.0%	0% - 30%
Silver	ND	ND	0.001	ND	ND	0.0%	0% - 30%

Spike Conc. (mg/L)	Spike Added	Sample	Spiked Sample	Percent Recovery	Acceptance Range
Arsenic	0.500	0.002	0.502	100.0%	80% - 120%
Barium	0.500	0.068	0.566	99.6%	80% - 120%
Cadmium	0.500	ND	0.500	100.0%	80% - 120%
Chromium	0.500	0.001	0.501	100.0%	80% - 120%
Lead	0.500	ND	0.499	99.8%	80% - 120%
Mercury	0.050	ND	0.050	100.0%	80% - 120%
Selenium	0.500	ND	0.499	99.8%	80% - 120%
Silver	0.500	ND	0.499	99.8%	80% - 120%

ND - Parameter not detected at the stated detection limit.

References: Method 1311, Toxicity Characteristic Leaching Procedure, SW-846, USEPA, Dec. 1996

Methods 3010, 3020, Acid Digestion of Aqueous Samples and Extracts for Total Metals, SW-846, USEPA, December 1996.

Methods 6010B Analysis of Metals by Inductively Coupled Plasma-Atomic Emission, SW-846, USEPA, December 1996.

Comments: QA/QC for sample 30341 - 30342.

Analyst

Review

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CHAIN OF CUSTODY RECORD

128

Client / Project Name	Project Location
Giant Refinery	~~Tank 36~~
Sampler:	Client No. 96012-009

Sample No./ Identification	Sample Date	Sample Time	Lab Number	Sample Matrix	No. of Containers	8015 TPH	RCI	TCLP Metals	BTEX	Flash Point		Remarks
Hydrobest Comp	8/31/04	14:15	30341	Soil	1	✓	✓	✓	✓	✓		
Tank 36 Comp	8/31/04	14:00	30342	Soil	1	✓	✓	✓	✓	✓		

ANALYSIS / PARAMETERS

	Date	Time		Date	Time
Relinquished by: (Signature)	8/31/04	14:40	Received by: (Signature)	8/31/04	14:40
Relinquished by: (Signature)			Received by: (Signature)		
Relinquished by: (Signature)			Received by: (Signature)		

ENVIROTECH INC.

5796 U.S. Highway 64
Farmington, New Mexico 87401
(505) 632-0615

Sample Receipt	Y	N	N/A
Received Intact	✓		
Cool - Ice/Blue Ice	✓		

ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

SUSPECTED HAZARDOUS WASTE ANALYSIS

Client:	Giant Refinery	Project #:	96012-009
Sample ID:	Hydroblast Comp.	Date Reported:	09-01-04
Lab ID#:	30341	Date Sampled:	08-31-04
Sample Matrix:	Soil	Date Received:	08-31-04
Preservative:	Cool	Date Analyzed:	09-01-04
Condition:	Cool and Intact	Chain of Custody:	12882

Parameter	Result	
IGNITABILITY:	Negative	
CORROSIVITY:	Negative	pH = 7.43
REACTIVITY:	Negative	

RCRA Hazardous Waste Criteria

Parameter	Hazardous Waste Criterion
IGNITABILITY:	Characteristic of Ignitability as defined by 40 CFR, Subpart C, Sec. 261.21. *(i.e. Sample ignition upon direct contact with flame or flash point < 60° C.)*
CORROSIVITY:	Characteristic of Corrosivity as defined by 40 CFR, Subpart C, Sec. 261.22. *(i.e. pH less than or equal to 2.0 or pH greater than or equal to 12.5)*
REACTIVITY:	Characteristic of Reactivity as defined by 40 CFR, Subpart C, Sec. 261.23. *(i.e. Violent reaction with water, strong base, strong acid, or the generation of Sulfide or Cyanide gases at STP with pH between 2.0 and 12.5)*
Reference:	40 CFR part 261 Subpart C sections 261.21 - 261.23, July 1, 1992.

Comments:

Analyst

Review

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ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

SUSPECTED HAZARDOUS WASTE ANALYSIS

Client:	Giant Refinery	Project #:	96012-009
Sample ID:	Tank 36 Comp.	Date Reported:	09-01-04
Lab ID#:	30342	Date Sampled:	08-31-04
Sample Matrix:	Soil	Date Received:	08-31-04
Preservative:	Cool	Date Analyzed:	09-01-04
Condition:	Cool and Intact	Chain of Custody:	12882

Parameter	Result	
IGNITABILITY:	**Negative**	
CORROSIVITY:	**Negative**	**pH = 7.69**
REACTIVITY:	**Negative**	

RCRA Hazardous Waste Criteria

Parameter	Hazardous Waste Criterion
IGNITABILITY:	Characteristic of Ignitability as defined by 40 CFR, Subpart C, Sec. 261.21. *(i.e. Sample ignition upon direct contact with flame or flash point < 60° C.)*
CORROSIVITY:	Characteristic of Corrosivity as defined by 40 CFR, Subpart C, Sec. 261.22. *(i.e. pH less than or equal to 2.0 or pH greater than or equal to 12.5)*
REACTIVITY:	Characteristic of Reactivity as defined by 40 CFR, Subpart C, Sec. 261.23. *(i.e. Violent reaction with water, strong base, strong acid, or the generation of Sulfide or Cyanide gases at STP with pH between 2.0 and 12.5)*
Reference:	40 CFR part 261 Subpart C sections 261.21 - 261.23, July 1, 1992.

Comments:

Analyst

Review

ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

FLASH POINT ANALYSIS

Client:	Giant Refinery	Project #:	96012-009
Sample ID:	Hydroblast Comp.	Date Reported:	09-01-04
Lab ID#:	30341	Date Sampled:	08-31-04
Sample Matrix:	Soil	Date Received:	08-31-04
Preservative:	Cool	Date Analyzed:	09-01-04
Condition:	Cool & Intact	Chain of Custody:	12882

Parameter	Result
FLASH POINT	> 350° C

Reference: Method 1010, Pensky-Metrens Closed-Cup Method For Determining Flash Point. SW846, USEPA September 1986.

Comments:

Analyst

Review

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ENVIROTECH LABS

PRACTICAL SOLUTIONS FOR A BETTER TOMORROW

FLASH POINT ANALYSIS

Client:	Giant Refinery	Project #:	96012-009
Sample ID:	Tank 36 Comp.	Date Reported:	09-01-04
Lab ID#:	30342	Date Sampled:	08-31-04
Sample Matrix:	Soil	Date Received:	08-31-04
Preservative:	Cool	Date Analyzed:	09-01-04
Condition:	Cool & Intact	Chain of Custody:	12882

Parameter	Result
FLASH POINT	> 350° C

Reference: Method 1010, Pensky-Metrens Closed-Cup Method For Determining Flash Point. SW846, USEPA September 1986.

Comments:

Analyst

Review

5796 U.S. Highway 64 • Farmington, NM 87401 • Tel 505 • 632 • 0615 • Fax 505 • 632 • 1865

HALL
ENVIRONMENTAL
ANALYSIS
LABORATORY

COVER LETTER

November 10, 2004

Cindy Hurtado
San Juan Refining
#50 CR 4990
Bloomfield, NM 87413
TEL: (505) 632-4161
FAX (505) 632-3911

RE: Landfarm - Background

Order No.: 0410292

Dear Cindy Hurtado:

Hall Environmental Analysis Laboratory received 1 sample on 10/29/2004 for the analyses presented in the following report.

These were analyzed according to EPA procedures or equivalent.

Reporting limits are determined by EPA methodology. No determination of compounds below these (denoted by the ND or < sign) has been made.

Please don't hesitate to contact HEAL for any additional information or clarifications.

Sincerely,

Andy Freeman, Business Manager
Nancy McDuffie, Laboratory Manager

Hall Environmental Analysis Laboratory

Date: *10-Nov-04*

CLIENT:	San Juan Refining	**Client Sample ID:**	Landfarm
Lab Order:	0410292	**Collection Date:**	10/28/2004 2:30:00 PM
Project:	Landfarm - Background		
Lab ID:	0410292-01	**Matrix:**	SOIL

Analyses	Result	PQL	Qual	Units	DF	Date Analyzed
EPA METHOD 9056A: ANIONS						Analyst: **MAP**
Fluoride	3.1	0.30		mg/Kg	1	11/3/2004 11:01:59 PM
Chloride	180	3.0		mg/Kg	10	11/4/2004 4:08:06 PM
Nitrogen, Nitrate (As N)	20	0.30		mg/Kg	1	11/3/2004 11:01:59 PM
Sulfate	1400	15		mg/Kg	10	11/4/2004 4:08:06 PM
Nitrogen, Nitrite (As N)	ND	0.30		mg/Kg	1	11/3/2004 11:01:59 PM
Phosphorus, Orthophosphate (As P)	ND	1.5		mg/Kg	1	11/3/2004 11:01:59 PM
EPA METHOD 8015B: DIESEL RANGE						Analyst: **JMP**
Diesel Range Organics (DRO)	ND	10		mg/Kg	1	11/1/2004 2:18:51 PM
Motor Oil Range Organics (MRO)	ND	50		mg/Kg	1	11/1/2004 2:18:51 PM
Surr: DNOP	98.0	60-124		%REC	1	11/1/2004 2:18:51 PM
EPA METHOD 8015B: GASOLINE RANGE						Analyst: **NSB**
Gasoline Range Organics (GRO)	ND	5.0		mg/Kg	1	11/3/2004 5:10:12 PM
Surr: BFB	108	74-118		%REC	1	11/3/2004 5:10:12 PM
EPA METHOD 8021B: VOLATILES						Analyst: **NSB**
Methyl tert-butyl ether (MTBE)	ND	0.10		mg/Kg	1	11/3/2004 5:10:12 PM
Benzene	ND	0.025		mg/Kg	1	11/3/2004 5:10:12 PM
Toluene	ND	0.025		mg/Kg	1	11/3/2004 5:10:12 PM
Ethylbenzene	ND	0.025		mg/Kg	1	11/3/2004 5:10:12 PM
Xylenes, Total	ND	0.025		mg/Kg	1	11/3/2004 5:10:12 PM
Surr: 4-Bromofluorobenzene	104	74-118		%REC	1	11/3/2004 5:10:12 PM
SPECIFIC CONDUCTANCE						Analyst: **MAP**
Specific Conductance	910	0.010		µmhos/cm	1	11/9/2004
EPA METHOD 6010C: SOIL METALS						Analyst: **NMO**
Calcium	12000	250		mg/Kg	10	11/4/2004 7:50:07 AM
Magnesium	2100	25		mg/Kg	1	11/3/2004 3:25:22 PM
Potassium	890	50		mg/Kg	1	11/3/2004 3:25:22 PM
Sodium	450	25		mg/Kg	1	11/3/2004 3:25:22 PM
EPA METHOD 150.1: PH						Analyst: **MAP**
pH	7.73	0.010		pH Units	1	11/9/2004

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

B - Analyte detected in the associated Method Blank

* - Value exceeds Maximum Contaminant Level

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

E - Value above quantitation range

Hall Environmental Analysis Laboratory

Date: *16-Nov-04*

CLIENT: San Juan Refining
Work Order: 0410292
Project: Landfarm - Background

QC SUMMARY REPORT
Method Blank

Sample ID **MB-6785** Batch ID: **6785** Test Code: **E300** Units: **mg/Kg** Analysis Date **11/3/2004 8:30:44 PM** Prep Date **11/3/2004**
Client ID: Run ID: **LC_041103A** SeqNo: **317399**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	ND	0.3									
Chloride	ND	0.3									
Nitrogen, Nitrate (As N)	ND	0.3									
Sulfate	ND	1.5									
Nitrogen, Nitrite (As N)	ND	0.3									
Phosphorus, Orthophosphate (As P)	ND	1.5									

Sample ID **MB-6759** Batch ID: **6759** Test Code: **SW8015** Units: **mg/Kg** Analysis Date **11/1/2004 11:52:23 AM** Prep Date **11/1/2004**
Client ID: Run ID: **FID(17A) 2_041101A** SeqNo: **316689**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	ND	10									
Motor Oil Range Organics (MRO)	ND	50									
Surr: DNOP	9.379	0	10	0	93.8	60	124	0			

Sample ID **MB-6768** Batch ID: **6768** Test Code: **SW8015** Units: **mg/Kg** Analysis Date **11/3/2004 2:41:12 PM** Prep Date **11/1/2004**
Client ID: Run ID: **PIDFID_041103A** SeqNo: **317530**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	ND	5									
Surr: BFB	1040	0	1000	0	104	74	118	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

CLIENT: San Juan Refining
Work Order: 0410292
Project: Landfarm - Background

QC SUMMARY REPORT
Method Blank

Sample ID **MB-6768** Batch ID: **6768** Test Code: **SW8021** Units: **mg/Kg** Analysis Date **11/3/2004 2:41:12 PM** Prep Date **11/1/2004**
Client ID: Run ID: **PIDFID_041103A** SeqNo: **317506**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	ND	0.1									
Benzene	ND	0.025									
Toluene	ND	0.025									
Ethylbenzene	ND	0.025									
Xylenes, Total	ND	0.025									
Surr: 4-Bromofluorobenzene	1.005	0	1	0	101	74	118	0			

Sample ID **MB-6773** Batch ID: **6773** Test Code: **SW6010A** Units: **mg/Kg** Analysis Date **11/10/2004 4:13:49 PM** Prep Date **11/2/2004**
Client ID: Run ID: **ICP_041110B** SeqNo: **319433**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Calcium	38.66	50	0	0	0	0	0	0			J
Magnesium	ND	25	0	0	0	0	0	0			
Potassium	ND	50	0	0	0	0	0	0			
Sodium	48.13	50	0	0	0	0	0	0			J

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Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

Hall Environmental Analysis Laboratory

Date: *16-Nov-04*

CLIENT: San Juan Refining
Work Order: 0410292
Project: Landfarm - Background

QC SUMMARY REPORT
Sample Matrix Spike

Sample ID **0410292-01a ms** Batch ID: **6768** Test Code: **SW8015** Units: **mg/Kg** Analysis Date **11/3/2004 7:39:02 PM** Prep Date **11/1/2004**
Client ID: **Landfarm** Run ID: **PIDFID_041103A** SeqNo: **317540**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	27.77	5	25	1.08	107	73.8	120	0			
Surr: BFB	1148	0	1000	0	115	74	118	0			

Sample ID **0410292-01a msd** Batch ID: **6768** Test Code: **SW8015** Units: **mg/Kg** Analysis Date **11/3/2004 8:08:43 PM** Prep Date **11/1/2004**
Client ID: **Landfarm** Run ID: **PIDFID_041103A** SeqNo: **317542**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	27.84	5	25	1.08	107	73.8	120	27.77	0.252	11.6	
Surr: BFB	1167	0	1000	0	117	74	118	1148	1.67	0	

Sample ID **0410292-01a ms** Batch ID: **6768** Test Code: **SW8021** Units: **mg/Kg** Analysis Date **11/3/2004 7:39:02 PM** Prep Date **11/1/2004**
Client ID: **Landfarm** Run ID: **PIDFID_041103A** SeqNo: **317519**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	1.867	0.1	2	0	93.4	65	132	0			
Benzene	0.4022	0.025	0.42	0	95.8	77	122	0			
Toluene	1.755	0.025	1.9	0	92.4	81	115	0			
Ethylbenzene	0.3842	0.025	0.41	0	93.7	84	117	0			
Xylenes, Total	1.837	0.025	1.9	0	96.7	84	116	0			
Surr: 4-Bromofluorobenzene	1.044	0	1	0	104	74	118	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

CLIENT: San Juan Refining
Work Order: 0410292
Project: Landfarm - Background

QC SUMMARY REPORT
Sample Matrix Spike Duplicate

Sample ID **0410292-01a msd** Batch ID: **6768** Test Code: **SW8021** Units: **mg/Kg** Analysis Date **11/3/2004 8:08:43 PM** Prep Date **11/1/2004**
Client ID: **Landfarm** Run ID: **PIDFID_041103A** SeqNo: **317520**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	1.881	0.1	2	0	94.0	65	132	1.867	0.713	28	
Benzene	0.4084	0.025	0.42	0	97.2	77	122	0.4022	1.54	27	
Toluene	1.814	0.025	1.9	0	95.5	81	115	1.755	3.25	19	
Ethylbenzene	0.3953	0.025	0.41	0	96.4	84	117	0.3842	2.83	10	
Xylenes, Total	1.859	0.025	1.9	0	97.8	84	116	1.837	1.19	13	
Surr: 4-Bromofluorobenzene	1.044	0	1	0	104	74	118	1.044	0.00670	0	

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Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

Hall Environmental Analysis Laboratory

Date: *16-Nov-04*

CLIENT: San Juan Refining
Work Order: 0410292
Project: Landfarm - Background

QC SUMMARY REPORT
Laboratory Control Spike - generic

Sample ID **LCS-6785** Batch ID: **6785** Test Code: **E300** Units: **mg/Kg** Analysis Date **11/3/2004 8:47:33 PM** Prep Date **11/3/2004**
Client ID: Run ID: **LC_041103A** SeqNo: **317400**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoride	1.418	0.3	1.5	0	94.6	90	110	0			
Chloride	13.89	0.3	15	0	92.6	90	110	0			
Nitrogen, Nitrate (As N)	7.225	0.3	7.5	0	96.3	90	110	0			
Sulfate	28.84	1.5	30	0	96.1	90	110	0			
Nitrogen, Nitrite (As N)	2.72	0.3	3	0	90.7	90	110	0			
Phosphorus, Orthophosphate (As P)	14.21	1.5	15	0	94.8	90	110	0			

Sample ID **LCS-6759** Batch ID: **6759** Test Code: **SW8015** Units: **mg/Kg** Analysis Date **11/1/2004 1:20:20 PM** Prep Date **11/1/2004**
Client ID: Run ID: **FID(17A) 2_041101A** SeqNo: **316691**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	48.9	10	50	0	97.8	67.4	117	0			

Sample ID **LCSD-6759** Batch ID: **6759** Test Code: **SW8015** Units: **mg/Kg** Analysis Date **11/1/2004 1:49:36 PM** Prep Date **11/1/2004**
Client ID: Run ID: **FID(17A) 2_041101A** SeqNo: **316692**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel Range Organics (DRO)	46.99	10	50	0	94.0	67.4	117	48.9	4.00	17.4	

Sample ID **LCS-6768** Batch ID: **6768** Test Code: **SW8015** Units: **mg/Kg** Analysis Date **11/3/2004 3:10:58 PM** Prep Date **11/1/2004**
Client ID: Run ID: **PIDFID_041103A** SeqNo: **317532**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Gasoline Range Organics (GRO)	28.15	5	25	0	113	73.8	120	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

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CLIENT: San Juan Refining
Work Order: 0410292
Project: Landfarm - Background

QC SUMMARY REPORT
Laboratory Control Spike - generic

Sample ID **LCS-6768** Batch ID: **6768** Test Code: **SW8021** Units: **mg/Kg** Analysis Date **11/3/2004 3:10:58 PM** Prep Date **11/1/2004**
Client ID: Run ID: **PIDFID_041103A** SeqNo: **317513**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	1.783	0.1	2	0	89.1	65	132	0			
Benzene	0.4238	0.025	0.42	0	101	77	122	0			
Toluene	1.888	0.025	1.9	0	99.3	81	115	0			
Ethylbenzene	0.4007	0.025	0.41	0	97.7	84	117	0			
Xylenes, Total	1.924	0.025	1.9	0	101	84	116	0			

Sample ID **LCS-6773** Batch ID: **6773** Test Code: **SW6010A** Units: **mg/Kg** Analysis Date **11/10/2004 4:16:18 PM** Prep Date **11/2/2004**
Client ID: Run ID: **ICP_041110B** SeqNo: **319434**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Calcium	2432	50	2500	38.66	95.7	80	120	0			
Magnesium	2464	25	2500	0	98.6	80	120	0			
Potassium	2616	50	2500	0	105	80	120	0			
Sodium	2901	50	2500	48.13	114	80	120	0			

Sample ID **LCSD-6773** Batch ID: **6773** Test Code: **SW6010A** Units: **mg/Kg** Analysis Date **11/10/2004 4:26:48 PM** Prep Date **11/2/2004**
Client ID: Run ID: **ICP_041110B** SeqNo: **319436**

Analyte	Result	PQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Calcium	2394	50	2500	38.66	94.2	80	120	2432	1.61	20	
Magnesium	2444	25	2500	0	97.8	80	120	2464	0.808	20	
Potassium	2605	50	2500	0	104	80	120	2616	0.410	20	
Sodium	2900	50	2500	48.13	114	80	120	2901	0.0100	20	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

Hall Environmental Analysis Laboratory

Sample Receipt Checklist

Client Name SJR | Date and Time Received: 10/29/2004

Work Order Number 0410292 | Received by AT

Checklist completed by _____ 10/29/04
Signature | Date

Matrix | Carrier name UPS

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐	
Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	Not Present ☑	Not Shipped ☐
Custody seals intact on sample bottles?	Yes ☑	No ☐	N/A ☐	
Chain of custody present?	Yes ☑	No ☐		
Chain of custody signed when relinquished and received?	Yes ☑	No ☐		
Chain of custody agrees with sample labels?	Yes ☑	No ☐		
Samples in proper container/bottle?	Yes ☑	No ☐		
Sample containers intact?	Yes ☑	No ☐		
Sufficient sample volume for indicated test?	Yes ☑	No ☐		
All samples received within holding time?	Yes ☑	No ☐		
Water - VOA vials have zero headspace?	No VOA vials submitted ☐	Yes ☑	No ☐	
Water - pH acceptable upon receipt?	Yes ☐	No ☐	N/A ☑	

Container/Temp Blank temperature? **3°** *4° C ± 2 Acceptable* If given sufficient time to cool.

COMMENTS:

Client contacted _____ Date contacted: _____ Person contacted _____

Contacted by: _____ Regarding _____

Comments: _____

Corrective Action _____

CHAIN-OF-CUSTODY RECORD

Accreditation Applied: NELAC ☐ USACE ☐

Other: _____

Client: San Juan Refining

Address: #50 CR 4990
Bloomfield, NM 87413

Phone #: 505-632-4161

Fax #: 505-632-3911

Project Name: Land farm - Background

Project #:

Project Manager:

Sampler: Cindy Hurtado

Sample Temperature: 3.0

HALL ENVIRONMENTAL ANALYSIS LABORATORY
4901 Hawkins NE, Suite D
Albuquerque, New Mexico 87109
Tel. 505.345.3975 Fax 505.345.4107
www.hallenvironmental.com

ANALYSIS REQUEST

Date	Time	Matrix	Sample I.D. No.	Number/Volume	Preservative H_2Cl_2	Preservative HNO_3	Preservative	HEAL No.	BTEX + MTBE + TMB's (8021)	BTEX + MTBE + TPH (Gasoline Only)	TPH Method 8015B MOD (Gas/Diesel)	TPH (Method 418.1)	EDB (Method 504.1)	EDC (Method 8021)	8310 (PNA or PAH)	RCRA 8 Metals	Cations (Na, K, Ca, Mg)	Anions (F, Cl, NO_3, NO_2, PO_4, SO_4)	8081 Pesticides / PCB's (8082)	8260 (VOA)	8270 (Semi-VOA)	pH, EC			Air Bubbles or Headspace (Y or N)
10-28-04	2:30pm	Soil	Land farm	2-4oz jars				0410292-1	X		X						X	X				X			

Remarks:

Date	Time	Relinquished By: (Signature)	Remarks:
10-28-04	3:30pm	Cindy Hurtado	10/29/04
Date:	Time:	Relinquished By: (Signature)	Remarks:

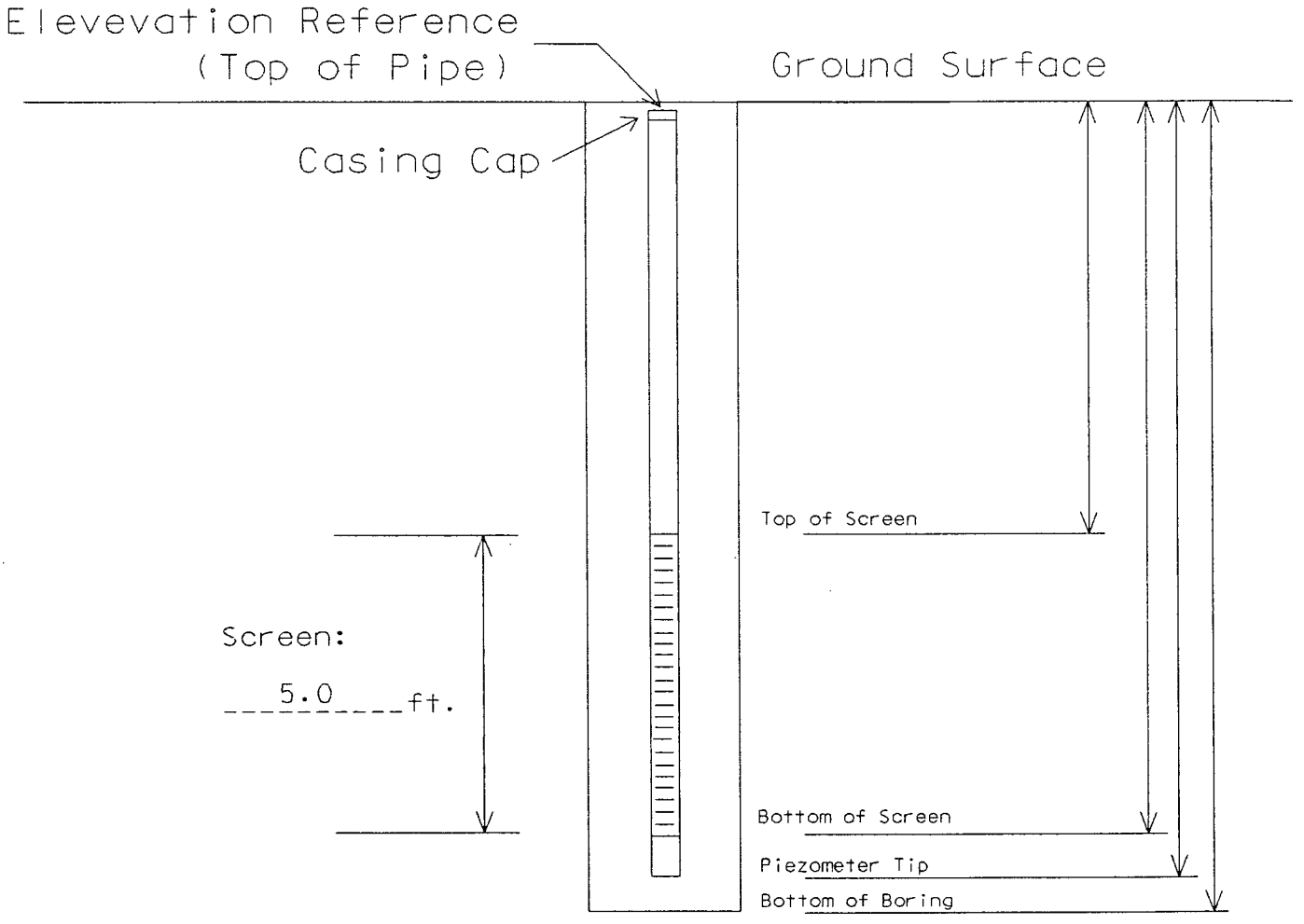
Section 14.0 Drilling Logs and Installation Diagrams

PRECISION ENGINEERING, INC.

505-523-7674

Temporary Piezometer Installation - Typical

See Logs for Depth Details



Boring Diameter: 8 5/8"

Sand Type: Native Backfill

Bollards, Type/Size: None

Bentonite: None

Screen Type/Size: 2" PVC Sch. 40, 0.060" Hand Slotted @ 3" Intervals

Cement/Grout: None

Riser Type/Size: 2" PVC Sch. 40

Water: Potable

Locking Expandable Casing Plug? No (Slip Cap)

Site Northing: _____

Other: N/A

Bottom Cap Used? Yes

Site Easting: _____

Giant Refining Co.

Project #: 03-122

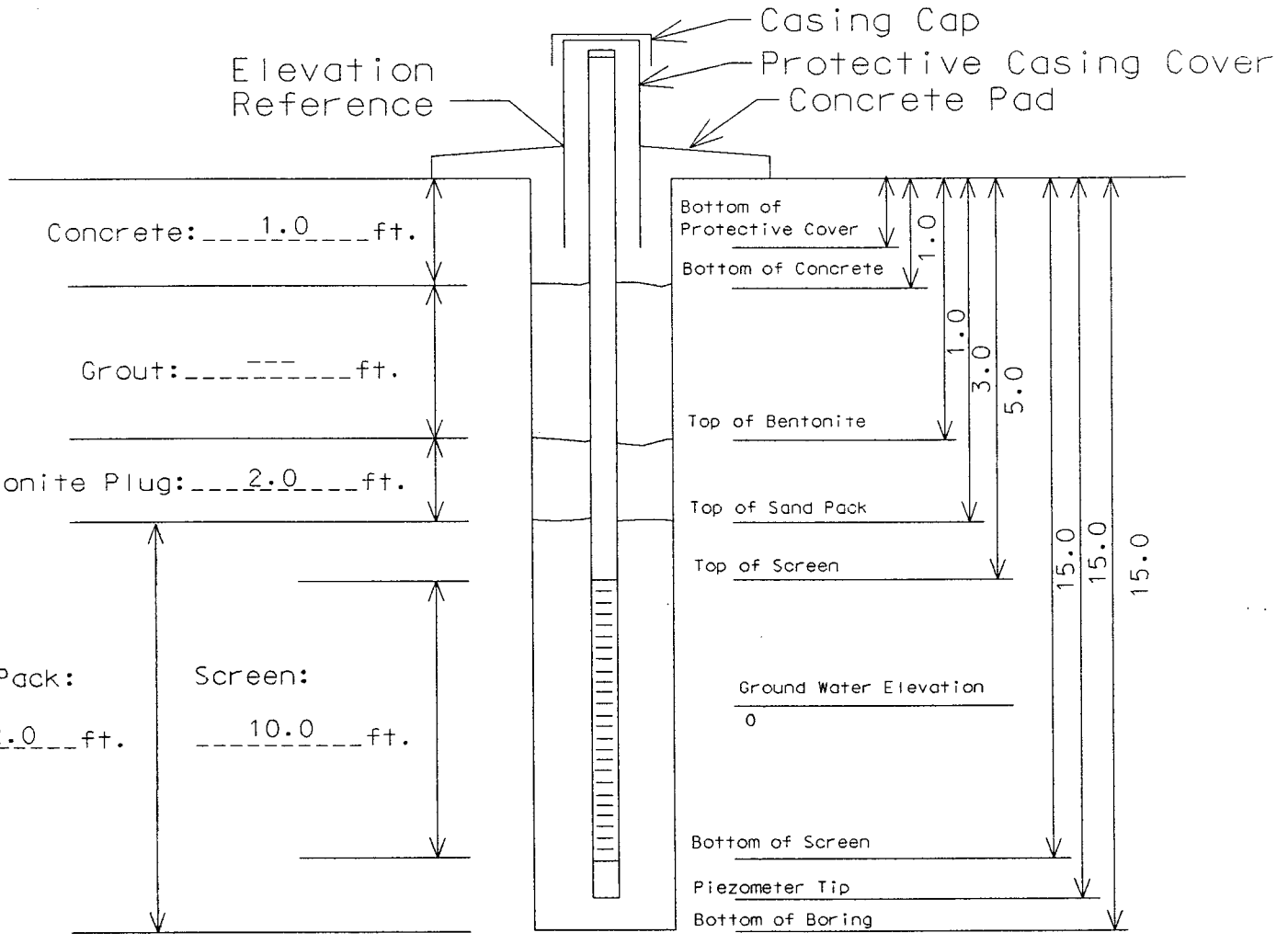
Project Name: Bloomfield Wells

Elevation: _____

PRECISION ENGINEERING, INC.
505-523-7674

Installation Diagram

Monitoring Well No. MW-48



Boring Diameter: 12 5/8"

Sand Type: 8-12 Silica

Bollards, Type/Size: Steel, 3"

Bentonite: 3/8" Chips

Screen Type/Size: 4" PVC Sch. 40, 0.020" Slotted

Cement/Grout: ---

Riser Type/Size: 4" PVC Sch. 40

Water: Potable

Locking Expandable Casing Plug? Yes

Site Northing: 6204.63

Other: N/A

Bottom Cap Used? Yes

Site Easting: 2700.70

Giant Refining Co.

Project #: 03-122

Project Name: Bloomfield Wells

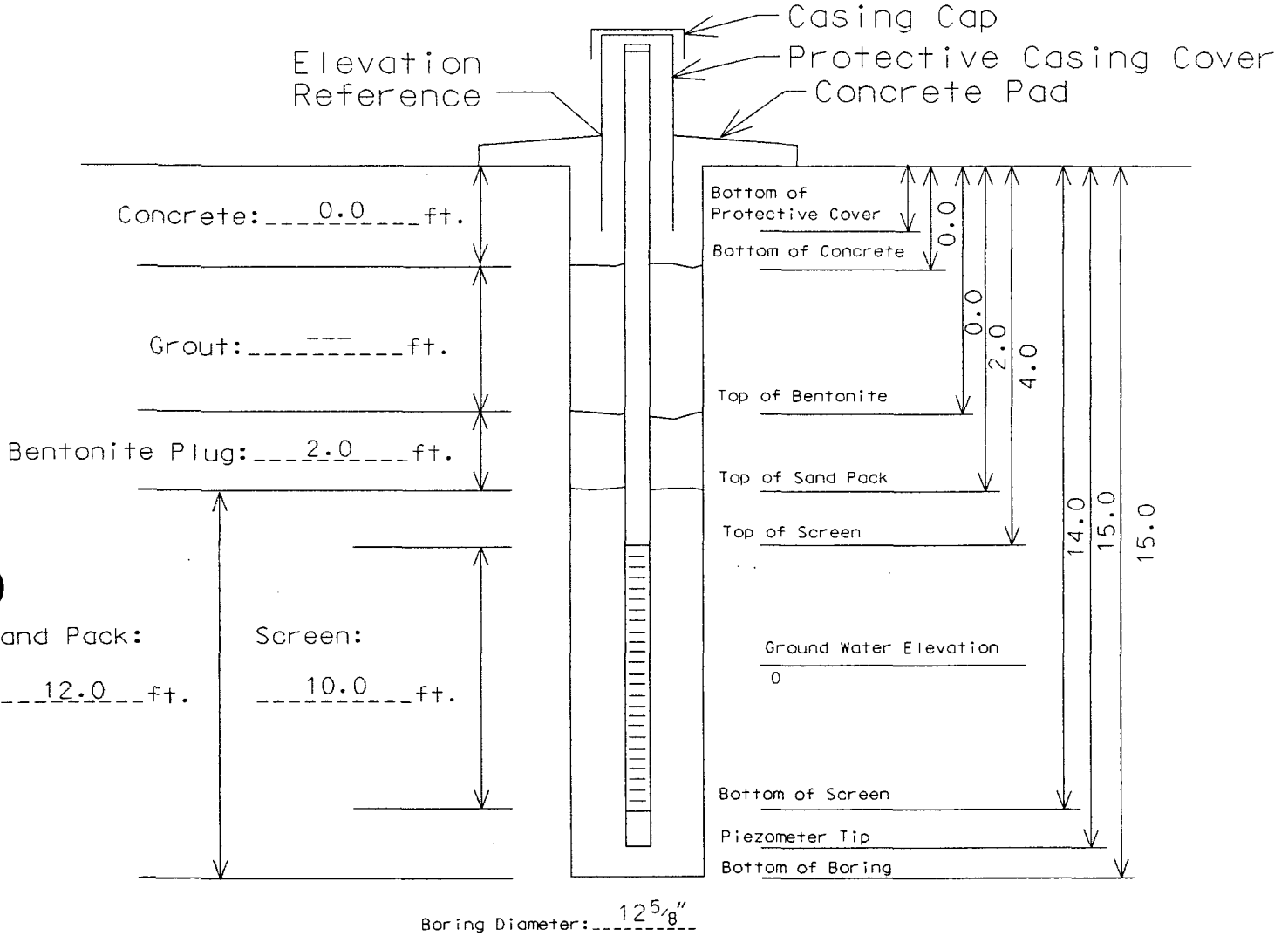
Elevation: not surveyed

PRECISION ENGINEERING, INC.

505-523-7674

Installation Diagram

Monitoring Well No. MW-49



Boring Diameter: 12 5/8"

Sand Type: 8-12 Silica

Bollards, Type/Size: Steel, 3"

Bentonite: 3/8" Chips

Screen Type/Size: 4" PVC Sch. 40, 0.020" Slotted

Cement/Grout: ---

Riser Type/Size: 4" PVC Sch. 40

Water: Potable

Locking Expandable Casing Plug? Yes

Site Northing: 6196.16

Other: N/A

Bottom Cap Used? Yes

Site Easting: 2653.14

Giant Refining Co.

Project #: 03-122

Project Name: Bloomfield Wells

Elevation: Not Surveyed

Sheet: 1 of 8
Bore Point: See plan
Water Elevation: 6.90
Boring No : SB1-0704

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

File #: 03-122
Site: Bloomfield
Giant Refining
Elevation: 5495.28
Date: 7/6/2004

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-2		*-**-*-* *-**-*-* *-**-*-* *-**-*-*		Sand, silty, brown, moist				
	2-8.0		o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o	2.5 5.0 7.5	Cobbles, gravel, silty, sand, brown, moist Black with hydrocarbon odor				
	8.0-9.0		= = = = = = = =		Nacimiento Formation T.D. 8.0				
				10.0 15.0 20.0	Placed 2" PVC, 4' hand slotted screen, backfilled with cuttings 17.5' N of canal edge				

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

C:\unzipped\B1\[B1.xls]Sheet1

Sheet: 2 of 8
Bore Point: See plan
Water Elevation: 6.85
Boring No.: SB2-0704

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

File #: 03-122
Site: Bloomfield
Giant Refining
Elevation: 5494.96
Date: 7/6/2004

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-2.5		*-**-*-*		**Sand**, fine, silty, brown, moist, moderately dense				
			*-**-*-*						
			*-**-*-*						
			*-**-*-*						
			*-**-*-*	2.5					
	2.5-9.0		o*o*o*o		**Cobbles**, very dense, cobbles to 12", grey, dry				
			o*o*o*o						
			o*o*o*o						
			o*o*o*o						
			o*o*o*o	5.0					
			o*o*o*o						
			o*o*o*o						
			o*o*o*o						
			o*o*o*o						
			o*o*o*o	7.5					
			o*o*o*o						
			o*o*o*o						
			o*o*o*o						
	9.0-10.0		* * * * *		**Sand**, black, water bearing, hydrocarbon odor, loose				
			* * * * *	10.0					
	10.0-11.5		= = = =		**Nacimiento Formation**				
			= = = =						
			= = = =		T.D. 11.5				
					Placed 2" PVC, 4' hand slotted screen, backfilled with cuttings 16' N of canal edge				
				15.0					
				20.0					

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

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Sheet: 3 of 8
Bore Point: See plan
'ater Elevation: 6.79
Boring No.: SB3-0704

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

File #: 03-122
Site: Bloomfield
Giant Refining
Elevation: 5495.21
Date: 7/6/2004

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-4.0		*-**-*-*		**Sand**, fine, silty, brown, damp, loose				
			*-**-*-*						
			*-**-*-*						
			*-**-*-*						
			*-**-*-*	2.5					
			*-**-*-*						
			*-**-*-*						
			*-**-*-*						
	4.0-8.5		o*o*o*o		**Cobbles**, gravelly, grey, dry, dense-very dense				
			o*o*o*o	5.0					
			o*o*o*o						
			o*o*o*o						
			o*o*o*o						
			o*o*o*o						
			o*o*o*o	7.5					
			o*o*o*o						
			o*o*o*o						
	8.5-10.0		* * * * *		**Sand**, fine, black, water bearing, loose				
			* * * * *						
			* * * * *	10.0					
	10.0-11.5		= = = =		**Nacimiento Formation**, mudstone, moist, not				
			= = = =		water bearing below 10.5, grey-black, hard				
			= = = =		T.D. 11.5				
					Placed 2" PVC, 4' hand slotted screen, backfilled with cuttings **SPH 6.78 (total .1')**				
				15.0					
				20.0					

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

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Sheet: 4 of 8
Bore Point: See plan
Water Elevation: 7.50
Boring No.: SB4-0704

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

File #: 03-122
Site: Bloomfield
Giant Refining
Elevation: 5495.21
Date: 7/6/2004

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-2.75		*-**-*-* *-**-*-* *-**-*-* *-**-*-* *-**-*-* *-**-*-*	2.5	**Sand**, silty: some fine gravel, brown, moist, loose				
	2.75-8.0		o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o	5.0 7.5	**Cobbles**, gravelly, grey, dry, very dense				
	8.0-9.5		o*o*o*o * * * * * * * * * *		**Sand**, fine, some fine gravel, clayey, grey				
	9.5-11.0		= = = = = = = = = = = =	10.0	**Nacimiento Formation**, mudstone, very sandy, grey, moist-wet				
				15.0 20.0	T.D. 11.0 Placed 2" PVC, 4' hand slotted screen, @ 10.5' backfilled with cuttings SPH 7.49 (total .1')				

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

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Sheet: 5 of 8
Bore Point: See plan
Water Elevation: 6.95
Boring No.: SB5-0704

Precision Engineering, Inc.
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Las Cruces, NM 88004
505-523-7674

File #: 03-122
Site: Bloomfield
Giant Refining
Elevation: 5497.98
Date: 7/6/2004

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-2.5		*-**-*-*		**Sand**, fine, silty, brown, damp-moist				
			*-**-*-*						
			*-**-*-*						
			*-**-*-*						
			*-**-*-*	2.5					
	2.5-8.5		o*o*o*o		**Cobbles**, gravelly, grey, dry, very dense				
			o*o*o*o						
			o*o*o*o						
			o*o*o*o						
			o*o*o*o	5.0					
			o*o*o*o						
			o*o*o*o						
			o*o*o*o						
			o*o*o*o						
			o*o*o*o	7.5					
			o*o*o*o						
			o*o*o*o						
	8.5-9.25		* * * * *		**Sand**, fine, some fine gravel, grey, moist				
			* * * * *		~~fresh hydrocarbon odor~~				
	9.25-10.5		= = = =	10.0	**Nacimiento Formation**, mudstone, very sandy,				
			= = = =		grey, moist-wet				
					T.D. 10.5				
					Placed 2" PVC, 4' hand slotted screen, backfilled with cuttings				
				15.0					
				20.0					

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

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Sheet: 6 of 8
Bore Point: See plan
Water Elevation: 6.68
Boring No.: SB6-0704

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

File #: 03-122
Site: Bloomfield
Giant Refining
Elevation: 5496.86
Date: 7/6/2004

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-1.0		*-**-*-* *-**-*-*		**Sand**, fine. silty, brown. damp, loose				
	1.0-6.5		o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o	2.5 5.0	**Cobbles**, some gravel, grey, dry, very dense				
	6.5-8.0		* * * * * * * * * * * * * * *	7.5	**Sand**, fine. black, strong hydrocarbon odor, wet. water bearing @ 7.0'				
	8.0-10.5		= = = = = = = = = = = = = = = = = = = =	10.0	**Nacimiento Formation**, sandstone, green-grey very dense,				
				15.0 20.0	T.D. 10.5 Placed 2" PVC, 4' hand slotted screen, backfilled with cuttings				

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

Sheet: 7 of 8
Bore Point: See plan
Water Elevation: 6.35
Boring No.: SB7-0704

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

File #: 03-122
Site: Bloomfield
Giant Refining
Elevation: 5496.86
Date: 7/7/2004

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-1.5		*-**-*-* *-**-*-* *-**-*-*		**Sand**, fine, silty, brown, damp, loose				
	1.5-8.5		o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o	2.5 5.0 7.5	**Cobbles**, grey, damp, very dense				
	8.5-9.0		* * * * *		**Sand**, fine, black,				
	9.0-10.5		= = = = = = = = = = = =	10.0	**Nacimiento Formation**, mudstone, sandstone, green-grey				
				15.0 20.0	T.D. 10.5 Placed 2" PVC, 4' hand slotted screen, backfilled with cuttings				

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

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Sheet: 8 of 8
Bore Point: See plan
Water Elevation: 5.92
Boring No.: SB8-0704

Precision Engineering, Inc.
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Las Cruces, NM 88004
505-523-7674

File #: 03-122
Site: Bloomfield
Giant Refining
Elevation: 5497.91
Date: 7/7/2004

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-5.0		*-**-*-*		**Sand**, fine, silty, brown, moist, loose				
			*-**-*-*						
			*-**-*-*						
			*-**-*-*						
			*-**-*-*	2.5					
			*-**-*-*						
			*-**-*-*						
			*-**-*-*						
			*-**-*-*						
			*-**-*-*	5.0					
	5.0-8.5		o*o*o*o		**Cobbles**, gravelly, grey, dry-damp, very dense				
			o*o*o*o						
			o*o*o*o						
			o*o*o*o						
			o*o*o*o	7.5					
			o*o*o*o						
			o*o*o*o						
	8.5-9.0		* * * * *		**Sand**, clayey, fine, green-grey-black,				
	9.0-11.0		= = = =		**Nacimiento Formation**, mudstone, moist,				
			= = = =	10.0	green-grey				
			= = = =						
					T.D. 10.5				
					Placed 2" PVC, 4' hand slotted screen, backfilled with cuttings				
				15.0					
				20.0					

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

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Sheet: 1 of 8
Bore Point:
Water Elevation:
Boring No.: SB1-1004

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Las Cruces, NM 88004
505-523-7674

File #: 03-122
Site: Bloomfield
Giant Refining
Elevation:
Date:

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
				2.5					
				5.0	Not Drilled				
				7.5					
				10.0					
				15.0					
				20.0					

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

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Sheet: 2 of 8
Bore Point: 21' 7" W of canal edge
Water Elevation: 8.0' below ground surface
Boring No.: SB2-1004

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

File #: 03-122
Site: Bloomfield
Giant Refining
Elevation: 5489.17
Date: 10/28/2004

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-3.0		*-**-*-* *-**-*-* *-**-*-* *-**-*-* *-**-*-* *-**-*-*	2.5	**Sand**, fine to coarse, silty, damp, tan				
	3.0-5.0		***o*** o*o*o*o o*o*o*o o*o*o*o	5.0	**Cobbles**, gravel, sand, silty, tan, damp				
46450	5.0-5.4		******** ********		**Sand**, fine to coarse, dry, clean, tan, moderately dense	3.8		N/P	SP-SM A-3
	6.0-7.0		******** ********		**Gravel**, sand, medium, dry, tan,				
	7.0-11.5		******** ******** ******** ******** ******** ******** ********	7.5 10.0	**Sand**, medium, gravel, dark grey, hydrocarbon odor, moist wet at 8'				
46451	11.0-11.5		******** ********		**Sand**, medium, gravel, dark grey, moist	15.6		N/P	SP/A-1-b
46456	11.5-12.0 12.0-12.5		= = = = = = = =		**Nacimiento Formation** mudstone, dry Sample Number HC 1				
				15.0 20.0	Total depth bottom of well 12' 5' of hand slotted screen no water for first 8 hours				

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

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Sheet: 2 of 8
Bore Point: 17' 7" W of canal edge
Water Elevation: 7.2' below ground surface
Boring No.: SB3-1004

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

File #: 03-122
Site: Bloomfield
Giant Refining
Elevation: 5487.02
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		*-**-*-* *-**-*-*		**Silt**, sandy, very fine to fine, brown, moist				
	1-8.0		o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o	2.5 5.0 7.5	**Cobbles**, gravel, sand, fine, silty, moist, brown				
	8-10.5		**o**o** **o**o** **o**o** **o**o** **o**o**	10.0	**Sand**, fine to coarse, gravel, dark grey, wet, hydrocarbon odor				
	10.5-11.5		******** ********		**Sand**, medium, argillaceous, damp				
	12.0		= = = =		**Nacimiento Formation**, mudstone				
				15.0 20.0	Total depth 11' 9" 5' of hand slotted screen 8' 5" top of pipe no water for first 8 hours				

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

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Sheet: 4 of 8
Bore Point: 16' 2" W of canal edge
Water Elevation: 8.5' below ground surface
Boring No.: SB4-1004

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

File #: 03-122
Site: Bloomfield
Giant Refining
Elevation: 5486.72
Date: 10/28/2004

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-6.0		*-**-*-*		**Silt**, sandy, very fine to fine, brown, damp				
			*-**-*-*						
			*-**-*-*						
			*-**-*-*						
			*-**-*-*	2.5					
			*-**-*-*						
			*-**-*-*						
			*-**-*-*						
			*-**-*-*						
			*-**-*-*	5.0					
			*-**-*-*						
			*-**-*-*						
	6.0-9.0		o*o*o*o		**Cobbles**, gravel, sand, fine to medium, silty, brown, damp				
			o*o*o*o						
			o*o*o*o	7.5					
			o*o*o*o						
			o*o*o*o						
			o*o*o*o						
	9.0-10.5		********		**Sand**, medium to coarse, grey, wet hydrocarbon odor				
			********	10.0					
			********						
	10.5-11.0		= = = =		**Nacimiento Formation**, mudstone				
					Total depth 10' 1/2"				
					5' of hand slotted screen				
				15.0	no water for first 8 hours				
				20.0					

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

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Sheet: 5 of 8
Bore Point: 16' 10" W of canal edge
Water Elevation: 8.7' below ground surface
Boring No.: SB5-1004

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

File #: 03-122
Site: Bloomfield
Giant Refining
Elevation: 5487.51
Date: 10/28/2004

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-6.0		*-**-*-*		**Silt**, sandy, very fine to fine, brown, moist				
			*-**-*-*						
			*-**-*-*						
			*-**-*-*						
			*-**-*-*	2.5					
			*-**-*-*						
			*-**-*-*						
			*-**-*-*						
			*-**-*-*						
			*-**-*-*	5.0					
			*-**-*-*						
			*-**-*-*						
	6.0-9.0		o*o*o*o		**Cobbles**, gravel, sand, fine to medium, silty,				
			o*o*o*o		brown, moist				
			o*o*o*o	7.5	hydrocarbon odor				
			o*o*o*o						
			o*o*o*o						
			o*o*o*o						
46452	9.0-10.0		********		**Sand**, medium, brown, wet	5.6		N/P	SM/A-1-b
			********	10.0					
46453	10.0-10.5		= = = =		**Nacimiento Formation**, mudstone, moist	16.1			
46454	9.5-10.5				Sample Number HC 2				
					Total depth 10' 7"				
					5' of hand slotted screen				
				15.0	no water for first 8 hours				
				20.0					

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

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Sheet: 6 of 8
Bore Point: 22' 7" W of canal edge
Water Elevation: Not Encountered
Boring No.: SB6-1004

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

File #: 03-122
Site: Bloomfield
Giant Refining
Elevation: 5489.95
Date: 10/28/2004

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-0.5		*-**-*-*		**Silt**, sandy, very fine to fine, brown, damp				
	0.5-7.0		o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o	2.5 5.0	**Cobbles**, gravel, sand, very fine to medium, silty, brown. damp				
	7.0-7.5		********	7.5	**Sand**, medium to coarse, brown, occasional gravel, damp, slight hydrocarbon odor				
46455	7.5-8.5		= = = = = = = = = = = =		**Nacimiento Formation**, mudstone; moist very compact, grey to black	9.3			
				10.0					
					Total depth 8' 6" 5' of hand slotted screen				
				15.0					
				20.0					

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

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Sheet: 7 of 8
Bore Point: 12' 11" N of canal edge
Water Elevation: 8.6' below ground surface
Boring No.: SB7-1004

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

File #: 03-122
Site: Bloomfield
Giant Refining
Elevation: 5490.37
Date: 11/1/2004

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-0.5		*-**-*-*		**Silt**, sandy, very fine to fine, brown, damp				
	0.5-9.0		o*o*o*o		**Cobbles**, gravel, sand, fine to coarse,				
			o*o*o*o		silty, brown, moist				
			o*o*o*o						
			o*o*o*o	2.5					
			o*o*o*o						
			o*o*o*o						
			o*o*o*o						
			o*o*o*o						
			o*o*o*o	5.0					
			o*o*o*o						
			o*o*o*o						
			o*o*o*o						
			o*o*o*o						
			o*o*o*o	7.5					
			o*o*o*o		**Sand**, fine to coarse, brown, occasional				
			o*o*o*o		gravel, wet, slight hydrocarbon odor				
			o*o*o*o						
	9.0-9.5		********		**Sand**, fine to coarse, grey, occasional				
			********	10.0	wet, slight hydrocarbon odor				
46457			= = = =		**Nacimiento Formation**, mudstone, moist	11.8			
			= = = =		gray to black				
					Total depth 10' 2"				
					5' of hand slotted screen				
					does not produce water in the first 8 hours				
				15.0					
				20.0					

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

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Sheet: 8 of 8
Bore Point: 11' N of canal edge
Water Elevation: 9.8' below ground surface
Boring No.: SB8-1004

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

File #: 03-122
Site: Bloomfield
Giant Refining
Elevation: 5492.02
Date: 10/27/2004

Log of Test Borings

LAB #	DEPTH	BLOW COUNT	PLOT	SCALE	MATERIAL CHARACTERISTICS (MOISTURE, CONDITION, COLOR,ETC.)	%M	LL	PI	CLASS.
	0-0.5		*-**-*-*		**Silt**, sandy, very fine to fine, brown, damp				
	0.5-10.0		o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o o*o*o*o	2.5 5.0 7.5 10.0	**Cobbles**, gravel, sand, fine to coarse, silty, brown, moist				
46458	10.0-11.0		******** ********		**Sand**, fine to coarse, grey, strong hydrocarbon odor, water bearing	19.2		N/P	SP/A-1-b
46459 46460	11.0-12.5 12-12.5		= = = = = = = = = = = =		**Nacimiento Formation**, argillaceous sandstone moist, gray to green gray Sample number HC3	16.5 5.5			
				15.0 20.0	Total Depth 12.5' 5' of hand slotted screen				

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

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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		*-**-*-*		**Silt**, sand, very fine to fine, brown, damp, a few				
			*-*O-*-*		cobbles				
	1-15.0		*-*o-*-*		**Sand**, silty, very fine to fine, brown, damp,				
			*-*o-*-*		gravelly				
	2.0		*-*o-*-*	2.5	Black with hydrocarbon odor				
			*-*o-*-*						
			*-*o-*-*						
			*-*o-*-*						
			********		medium to coarse sand				
			********	5.0					
			********						
			********						
			********						
			********						
			********	7.5					
			********		water bearing				
			********						
			********						
			********						
			o*	10.0	some gravel				
			o*						
			o*						
			o*						
			o*						
			o*						
			o*						
			o*						
			o*						
			o*	15.0					
					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				
				20.0					

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

C:\Documents and Settings\cindyh\Local Settings\Temporary Internet Files\OL

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

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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

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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 7.5	**Sand**, fine to medium, black, damp, water bearing				
				10.0 15.0 20.0	T.D. 9.0 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

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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

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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	**Sand**, silty, very fine, gravel to 2", brown				
			********* ********* *********	5.0					
			********* *********		black, hydrocarbon odor water bearing				
			********* ********* ********* ********* *********	7.5					
			*********	10.0					
					T.D. 10.0 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

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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

C:\Documents and Settings\cindyh\Local Settings\Temporary Internet Files\OL

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

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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

C:\Documents and Settings\cindyh\Local Settings\Temporary Internet Files\OL

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

C:\Documents and Settings\cindyh\Local Settings\Temporary Internet Files\OL

Section 15.0 Below Grade Testing

2004 Below Grade Testing

System ID	Drawing Reference	Test Date	Test Method	Pass/Fail	Repair Information
FCC North Sewer System	D-201-500-001	1/20/2004	Hydrotest	Fail	Replaced Corroded Sewer Lines
		2/24/2004	Hydrotest	Pass	
Lab to Main Sewer in FCC	D-201-500-001	4/8/2004	Hydrotest	Pass	
FCC South Sewer System	D-201-500-233	4/12/2004	Hydrotest	Fail	Replaced Corroded Sewer Lines
		8/7/2004	Hydrotest	Pass	
Treater	D-500-500-122	3/18/2004	Hydrotest	Fail	Entire Replacement of Treater Sewer Lines
		7/21/2004	Hydrotest	Pass	

Section 16.0 Correspondence

Giant Bloomfield Refinery
Monitoring and Contingency Plan
Prepared August 2004

River Sampling: The river will be sampled at the mouth of the draws on a monthly basis and analyzed for BTEX/MTBE (8021), TPH (8015 DRO and GRO), WQCC metals, semi-volatiles organics (8270) and general chemistry. After four months of sampling and no evidence of pollutants the sampling frequency will be reduced to quarterly.

Monitoring of the draws: All draws will be inspected every other week for visual hydrocarbon staining.

Record Keeping: Records of monitoring and sampling will be kept onsite and available for inspection. A recap summarizing all events will be submitted to OCD in the annual report. Any new discovery of hydrocarbon will require immediate reporting.

Immediate containment and corrective actions to be taken in the event of a release to the river: In the event of a release to the river containment booms will be deployed on the river to contain the release. The earthen containment structures will be constructed at the point of release. Downstream containment booms will be deployed in the event the release gets out side of the immediate containment.

Emergency Resources:

- 1- 100 foot floating containment boom.
- 1- 75 foot floating containment boom
- Various sizes of absorbent pads
- Vacuum truck
- Backhoe

Outside Contractors:

- Envirotech – Morgan Killion (work) 632-0615, (cell) 320-1436, (home) 324-8465
- Envirotech – Morris Young (work) 632-0615.
- Riley Industrial Services – George Riley 327-4947.
- Key Energy – 327-0416, (24 hr dispatch) 325-6892.

Emergency notification: In the event of a release to the river, the Bloomfield Refinery will notify the following agencies and water users pursuant to OCD Rule 116 and WQCC 1203:

- Denny Foust, OCD Aztec, 334-6178.
- Wayne Price, OCD Santa Fe, 476-3487.
- William Olson, OCD Santa Fe, 476-3491
- Dave Cobrain, NMED Santa Fe, 428-2553
- Hope Monzeglio, NMED Santa Fe, 428-2545
- Robert Wilkinson, EPA Dallas Tex. (214) 665-8316

Downstream Water Users

- Lower Valley Water Users Cooperative Association, (emergency) 598-5175
- BHP 598-4200
- PNM, San Juan Generating Station 598-7200
- Williams Field Service, (24 hr emergency) 632-4600

AQUIFER TEST RESULTS SUMMARY REPORT
San Juan River Terrace Site
Giant Refinery, Bloomfield, NM

GENERAL

This report describes the aquifer (pump) test that was performed in December 2004 on well MW-48 at the Giant Refinery Facility located in Bloomfield, New Mexico. The purpose of the pump test was to obtain aquifer hydraulic properties of the river terrace alluvial aquifer below the refinery. Monitoring well MW-48 was pump tested at a constant pumping rate of 4.7 gallons per minute for a period of over 17 hours. Water levels were monitored in the test well, well MW-49, and six piezometers throughout the test. A temporary staff gage was placed in the San Juan River located adjacent to well MW-49 and hourly stage river level readings were recorded. Once the pump test was terminated, water level recovery measurements were recorded in the test well and 2 piezometers for a period of approximately 5 hours. The locations of the wells and piezometers are shown on Figure 1.

The test well and piezometers are located on the San Juan River floodplain located at the Giant refinery. Well MW-48 was drilled and installed in October 28, 2004. The well consists of a 4-inch diameter, schedule 40 well casing and 0.020–inch slotted screen. The well extends to a depth of 15-feet and is gravel packed with Colorado Silica 8 -12 sand. The screen length is 10 feet and is positioned 5 to 15-feet below ground surface. The lithologic materials encountered during drilling and installation of the well ranged from fine sands to gravel and cobbles. Observation of nearby bluff exposures along the river suggests that bedrock is present at a depth of about 15 to 20 feet below ground surface at the terrace.

Well MW-48 is located approximately 65 feet east and 100 feet south of the San Juan River. An exposed bedrock (Nacimiento Formation) bluff face is located about 65 feet to the south. The barrier wall was installed in the early 1990s, and is located approximately 15 to 20 feet east of the San Juan River. The barrier wall is approximately 150 to 180 feet in length, beginning near the bedrock bluff to the south, running north and parallel to the San Juan River. Well MW-48 is located approximately 40 feet east of the barrier wall, 100 feet south from the San Juan River, and approximately 70 feet north of the bedrock bluff.

A pre-pump test "kick off" meeting was held prior to the pump test with Malcolm Pirnie (MPI), Giant, and Envirotech, Inc. personnel. Pump test procedures, personnel duties, individual assignments, equipment checks, and other requirements for the test were

finalized at that time. A geologist was assigned to manage the test and that person was responsible for the operation of the pumping test.

EQUIPMENT

Envirotech Inc. provided the pump, discharge equipment, generator, piping and related accessories to perform the test. Envirotech personnel operated the pump throughout the testing activities. A 4-inch, 3/4 horsepower pump capable of pumping 25 gallons per minute was installed in well MW-48. The discharge water was piped to and contained in a temporary 16,000 gallon tank provided by Giant. The tank was located approximately 25 feet from well MW-48. The outlet for the discharge pipe entered the tank from the top.

Refer to Table 1 for the list of equipment used during the pre-pumping and final pump tests. In addition to the equipment listed, a micro processor-based data acquisition system (In-Situ) was utilized to collect water level information during the pumping periods in piezometers TP-6 and TP-8. In all observation wells identified for monitoring, water levels were measured using battery-powered water level sensing devices.

TABLE 1
Equipment List

- Pump test forms (Write-in-Rain™ paper)
- Ruler – Engineer Scale
- Water Level Measuring Devices (with assigned number on each device)
- Extra batteries with each device
- Calculator
- Pencils and Erasers
- Table and Chair
- Log Paper – 3-cycle semi-log graph
- Flashlights (with extra batteries)
- Metal Clipboard (with cover)
- Stop Watches
- Base Map of pumping well & observation wells
- Boring logs and Piezometer Construction Details

MONITORING LOCATIONS

Water levels were monitored in the pumping well and seven observation wells (six piezometers and one monitoring well) throughout the pumping test. The piezometers included TP-1, TP-2, TP- 5, TP-6, TP-7, and TP-8. Monitoring well MW-49, located on the river side of the existing barrier wall, was also monitored. A temporary staff gage was placed in the river adjacent to well MW-49 and was monitored hourly throughout the test. The locations of all observation wells are shown on Figure 1.

Pre-pumping Test

One day prior to the pump test, a 10- to 30-minute pre-pumping test was run in the pumping well. The objectives of the pre-pumping test were as follows:

- Select a pumping rate for the optional final pumping test.
- Determine the expected drawdown in the test well at various pumping rates.
- Calibrate and verify the operational capacity of all equipment being used in pump test.

These trial runs were needed to make final adjustments to the pump test plan, which included making final decisions on equipment changes and measurement of water levels. The pre-pump test procedures were as follows:

- Coordinate installation of the test pump, power supply, discharge line, and flow meter with Envirotech.
- Install battery-powered electrical depth gages in all observation wells to measure groundwater levels during the test.
- Install In-Situ data acquisition system and transducers (mini trolls) in piezometers TP-6 and TP-8 to monitor groundwater levels during the test.
- Start the pre-test, measuring pump discharge during the test. At least three pumping rates were run to determine the optimum pumping rate for the long-term pump test.
- Collect water level readings at 5-minute levels to the nearest 0.01 foot. The depth to water was referenced from the top of the monitoring well casing.

CONSTANT-RATE PUMP TEST

A 17-hour Constant-Rate Pump Test was performed in well MW-48. The constant rate aquifer test began at 1:15 PM on December 9, 2004. All of the equipment, including pumping, discharge piping, water flow, and water depth measuring equipment, was assembled, proven operational, and inspected the day before initiation of the constant rate drawdown test.

Scheduling, Planning, and Coordination

A meeting of all pump test field personnel was held at the test well site one hour prior to commencing the pump test. The data acquisition and transducer systems were checked and proven operational. Personnel were given a final brief on their individual duties and responsibilities and a final equipment check was conducted at that time, including synchronization of stop watches.

Rest Period

Static non-pumping water level readings were recorded at least one hour prior to the start of pumping. The last readings were recorded immediately before starting the pump.

Data Collection

The pumping test was started at 1:15 PM on December 9, 2004. Any adjustments of the pumping rate required to maintain a nearly constant pumping rate throughout the test were noted on the field forms. The exact time of each recorded measurement was documented on the pumping well and observation well forms. As discussed above, the depth-to-water level measurements were referenced from the top of the monitoring well or top of the steel casing. Measurements were made to the nearest 0.01 foot. MPI, Giant, and Envirotech personnel assisted in recording water level measurement readings. In addition, river stage readings were recorded on an hourly basis.

Pumping Rate

The well was pumped at a constant pumping rate of 4.7 gpm determined from the pre-test pumping. The pumping rate remained constant for the duration of the pumping test. The pumping rate was measured by using both a totalizing flow meter and using the "bucket test".

Recovery Period

After completion of the pump test, we recorded the exact time of pump shutdown, and the rate of recovery of the water levels in wells being monitored and recorded these levels for a 5-hour period.

FIELD REDUCTION OF DATA

During the pump test, the field data was compiled and reduced to estimate drawdown and calculated recovery in the pumping well. Drawdown and recovery measurements for the pumping well and piezometers are presented in Appendix A.

The distances from test well MW-48 to well MW-49 and all the peizometers were measured in the field using a 100-foot tape measure. Table 2 shows a summary of the distances from MW-48 to each respective well or piezometer.

TABLE 2 Summary of Well / Piezometer Distances from MW-48		
Well / Piezometer ID	**Distance from MW-48 (ft)**	**Location**
MW-49	53	Outside Barrier Wall
TP-1	66	Inside Barrier Wall
TP-2	52	Adjacent to Bluff
TP-5	99	East of Well MW-48
TP-6	44	East of Well MW-48
TP-7	96	North End of Barrier Wall
TP-8	42	Inside Barrier Wall

AQUIFER TEST RESULTS

Drawdown was measured in pumping well MW-48 and piezometers TP-1, TP-2, TP-5, TP-6, TP-7, and TP-8 (Appendix A). The pumping test ran for approximately 1,050 minutes until the generator failed. Recovery measurements began shortly there after.

The following is a summary of the results observed after 1,000 minutes of pumping:

- The drawdown observed in MW-48 showed a water level decline of approximately 2.5 feet.
- The maximum drawdown observed in all piezometers was 0.45 feet measured in TP-8.
- A minimum drawdown observed in the piezometers was 0.10 feet in TP-6.
- The staff gage showed no significant change in river stage height (>0.10 foot of decline) during the test.
- No drawdown was observed in well MW-49, except for a slight decline measured near the end of the test. The water level declined <0.05 feet. The water level fully recovered prior to terminating the pumping test, suggesting the decline was caused by a variation in river stage height.

Recovery water levels were taken in well MW-48 and piezometers TP-6 and TP-8 for approximately 5 hours after the pump test was terminated. The water level in the test well MW-48 recovered 2.24 feet, or 88% of recovery to static level after 5 hours. Water levels in TP-6, located east of pumping well MW-48, did not recover during that period. Water levels in piezometer in TP-8 recovered 0.16 feet, or 36 % of recovery from static water level.

AQUIFER TEST INTERPRETATION

Data from the aquifer test was utilized from both the pumping and recovery phases. The aquifer test data was used to estimate hydraulic conductivity of the aquifer. The drawdown data was plotted on a semi-log cycle graph and analyzed over a single time log cycle. The transmissivity was determined from the Cooper and Jacob (1946) equation, $T = 264\ Q/\ \Delta s$, and the hydraulic conductivity was calculated using a 10-foot aquifer thickness.

Analysis of the drawdown data revealed two distinct types of curves. These curves indicate the presence of distinct hydraulic boundaries in the vicinity of each well. At TP-8, the slope of the drawdown curve increases sharply as the test progresses, while TP-6 remains relatively flat. The response at TP-8 is characteristic of an impermeable boundary (i.e. barrier wall and/or bedrock face). The results from TP-6 are more characteristic of a recharging boundary (i.e. San Juan River).

For piezometers TP-1 and TP-2, the slopes of the drawdown curves "steepen" or increase throughout the test. These piezometers are located adjacent to either the barrier wall or to the bedrock face. The increased drawdown observed is typically encountered when the cone of depression reaches an impermeable boundary, causing the rate of drawdown to increase in that direction.

The drawdown curves for piezometer TP-5 and well MW-49, like TP-6, indicate an opposite effect. The drawdown response is relatively flat, which reflects recharge effects from the San Juan River. Piezometers TP-5 and TP-6 are located upgradient of the pumping well, between well MW-48 and the river. Very little drawdown was observed at these two locations and at MW-49 until the later portion of the aquifer test. The observed drawdown in MW-49 was likely due to a slight change in river stage near the end of the pumping test.

Distribution of Drawdown

The semi-log drawdown curves for piezometers located near the barrier wall and the bluff face (TP-1,-2 and -8) show continuous drawdown when pumping at 4.7 gpm. As the cone of depression from the pumping well spreads laterally and intercepts the barrier wall and bedrock face, drawdown increases in these areas due to their impermeable characteristics (lack of available water for the well to draw in). In contrast, the water levels east or upgradient of well MW-48 only slightly declined during the test.

Impermeable Boundary Effects

The semi-log drawdown curves for the three piezometers by the barrier wall and the bluff face show nearly 0.5 feet of drawdown after 17 hours of pumping. The drawdown data

suggests the barrier wall and bluff face (impermeable boundary) have a large affect on water level declines in TP-1, TP-2, TP-6 and TP-7. After several hundred minutes of pumping, the drawdown curves show an increasing rate of drawdown. The drawdown curves, if extrapolated out to several days and weeks, suggest drawdown would likely accelerate due to the effects of the impermeable boundaries.

River Recharge Effects

The semi-log drawdown curves for the two piezometers (TP-5 and TP-6) and well MW-49 show little to effect from pumping well MW-48. A slight drawdown was observed after several hours of pumping in all three observation points. However, when recovery levels measured in TP-6 were reviewed, no recovery was evident as the water level had stabilized for 5 hours, suggesting the San Juan River stage had decreased about 0.10 foot. This drop likely caused aquifer levels to drop in response to the change. It appears that the area east of pumping well MW-48 is affected by recharge from the river.

Parameter Estimation Results

Transmissivity (T) and hydraulic conductivity (K) were calculated for well MW-48 and piezometers TP-1, TP-2, and TP-8 using the Jacob method (semi-log straight line method). Drawdown and recovery curves were analyzed. Each curve yielded a different hydraulic conductivity. An aquifer thickness of 10 feet (bedrock is shallow below the alluvial aquifer) was assumed. T and K values calculated for each well or piezometer decreased significantly from early time to late time analyses. Average T and K values were calculated as follows:

- Early Time : T=1,200 ft2/day; K= 120 ft/d
  Boundary effects are absent in the early time response.
- Mid-Late Time: T =500 ft2/day; K-50 ft/d
  Boundary effects are significant during late time response.

CAPTURE ZONE ANALYSIS

The hydraulic conductivities determined from the pump test analysis were used to estimate the capture zone for a pumping well located on the river terrace. A groundwater spreadsheet (D.K. Todd. Groundwater Hydrology. *John Wiley and Sons, Inc., New York, 1990, 2nd Edition.)* was used to calculate and model the area of capture. The formulas in the spreadsheet assume an aquifer of uniform thickness that is homogeneous, isotropic and infinite in aerial extent.

The hydraulic conductivity input was evaluated based on the proximity of the pumping well to a hydraulic boundary. As the boundary conditions were observed to drive the

hydraulic response of the aquifer during the pump test, similarly the capture zone of a pumping well will be affected by the boundaries.

In addition to the hydraulic conductivity, a pumping rate, aquifer thickness and hydraulic gradient were input parameters for the capture model. A sensitivity analysis of each parameter revealed various capture zone shapes and sizes. The hydraulic gradient was determined from a topographic map of the San Juan river basin, and ranged from 0.0005 foot per foot (ft/ft) to 0.001 ft/ft. The aquifer thickness was varied between 10 feet and 15 feet, and the pumping rate was varied between 1 gpm and 5 gpm. In this range of inputs, the area of capture for a pumping well located on the river terrace extended as far as 500 feet downgradient, 1600 feet upgradient and 3000 feet wide.

After running multiple iterations of the capture zone model, Malcolm Pirnie determined that an adequate capture zone can be obtained at a pumping rate of 2 to 5 gpm.

CORRECTIVE ACTION PLAN

GIANT BLOOMFIELD REFINERY

November 17, 2004

Prepared for:

Giant Refining Company

50 Road 4990

Bloomfield, New Mexico 87413

Prepared by:

Malcolm Pirnie, Inc.

4646 E. Van Buren St., Suite 400

Phoenix, AZ 85008

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1.0 INTRODUCTION

1.1 PURPOSE

This Corrective Action Plan describes Giant's proposed actions to mitigate the off-site migration of petroleum hydrocarbons within the shallow-zone soils along the north property boundary of the Giant Refinery in Bloomfield, New Mexico. For the Corrective Action, Giant has committed to the installation of a containment barrier and fluid collection systems along the north refinery boundary, extending from County Road 4990 to a location approximately 200 feet east of the El Paso Natural Gas Pipelines.

1.2 FACILITY DESCRIPTION

The Bloomfield refinery was originally built in the late 1950's and has been operated by Kimball Campbell, O.L. Garretson (Plateau), Suburban Propane, Inc. (Plateau), Bloomfield Refining Company and Giant Refining Company. The facility consists of approximately 285 acres and is located approximately one mile south of Bloomfield, New Mexico on a bluff overlooking the San Juan River (Figure 1).

1.3 CORRECTIVE ACTION DESCRIPTION

Recent emergence of active seeps of petroleum hydrocarbons at the face of the river bluff on the north side of the refinery prompted the New Mexico Oil Conservation Division (OCD) to issue Giant an Emergency Action Directive stating the actions required by the agency. Upon receiving the Emergency Action Directive, Giant implemented the tasks outlined therein, which included the installation of temporary catchments and excavation of hydrocarbon-stained soil from the identified areas along the San Juan River bluff. In addition, Giant collected water samples from the San Juan River upstream of the refinery and at the mouth of each draw of concern. Giant continues to provide progress reports of these activities to OCD.

As a corrective action to mitigate further migration of petroleum hydrocarbons towards the San Juan River and beyond the northern property boundaries of the refinery, Giant

has committed to the installation of a containment barrier wall approximately 2,600 feet in length along the north side of the Hammond Ditch and extending from County Road 4990 to a location approximately 200 feet east of the El Paso Natural Gas Pipelines. In addition, a fluids collection system consisting of multiple recovery wells and/or collection galleries positioned along the plant side of the barrier will be installed to provide hydraulic control of fluids accumulating upgradient of the barrier.

Results from previous site characterization activities, information collected during boring campaigns conducted between November 2003 and October 2004, and a conceptual model of the Nacimiento Formation surface elevation will be used to determine the containment barrier design, develop performance specifications for construction of the containment barrier, and prepare a preliminary design for the fluids collection system. Final design of the collection system will be completed upon installation of the containment barrier and collection of additional groundwater and product level data.

2.0 SITE GEOLOGY

The Bloomfield Refinery is located within the San Juan Basin, a sub-province of the Colorado Plateau physiographic province, about 120 ft above the present river level and 500 feet from the river.

There are three distinct stratigraphic units that underlay the Bloomfield Refinery. From oldest to youngest these units are: the Nacimiento Formation, the Jackson Lake Terrace, and an unnamed structureless loess unit composed of silts and fine windblown sand that have been deposited as the result of eolian deposition.

GEOLOGY ALONG NORTH BOUNDARY

Surficial Windblown Sands

- ✓ Depth: 0 to 4 feet deep
- ✓ Permeability: Low to Moderate
- ✓ Saturation: Dry

Jackson Lake Terrace

- ✓ Depth: 6 to 10 feet deep
- ✓ Permeability: Moderate to High
- ✓ Saturation: Dry to 1-ft depth; water bearing
- ✓ Seeps located in erosional channels

Nacimiento Formation

- ✓ Perching unit for Jackson Lake Terrace
- ✓ Thickness: Approximately 900 feet
- ✓ Permeability: Low
- ✓ Saturation: Non-water bearing

During the last glacial retreat, wind blown sand and silt from the floodplains settled over the course clastics to form structureless loess deposits.

The underlining Quaternary Jackson Lake Terrace deposits consist of 10 to 15 feet of course-grained fluvioglacial outwash. It is primarily composed of well rounded gravels, cobbles, and sand sized rocks placed as the result of high energy deposition during melting of the last glacial advance. The cobbles and gravel is often disk-shaped. Cobbles and boulders are commonly observed in the deposits.

The Nacimiento Formation is described as an inter-bedded black carbonaceous mudstone/clay stone with white, medium to coarse-grained sandstones approximately 570 feet thick in this area. The Nacimiento Formation at the outcrop is a tight unfractured rock unit. A permeable saturated cobble and sand layer directly overlies the bedrock (Nacimiento Formation) at the site in areas of depressions (draws) within the bedrock formation. The morphology of the contact between the Quaternary cobble and silt of the Jackson Lake Terrace in the vicinity of the facility and the underlying Nacimiento Formation is important in that it influences control over the direction of the groundwater and SPH flow.

3.0 HYDROLOGY

Surface water in the vicinity of the refinery includes the San Juan River (to the north) and the Hammond Ditch along the north property boundary. The town of Bloomfield and the surrounding areas derive their potable water from the San Juan River, which is controlled by the Navajo Dam. The San Juan River level is approximately 75 feet lower than the Hammond Ditch, and the Hammond Ditch in turn is approximately 25 feet lower than the grade level in the northwestern part of the refinery. Water within the Hammond Ditch, a concrete lined channel, is used for irrigation and watering of livestock and not intended for human consumption.

Since the lining of the Hammond Ditch in 2001, it is no longer a contributor to local groundwater recharge at the site. Stormwater within the facility is collected in the curbed, concrete-paved process areas connected to sewers leading to the wastewater treatment system. Some areas not served by sewers collect process and stormwater in sumps, which are then emptied by a vacuum truck for delivery to the wastewater treatment system.

Prior to the lining of the Hammond Ditch, the infiltration of source water through the shallow-zone soils served as a hydraulic curtain for the migration of Phase-Separated Hydrocarbon (PSH) along the north property boundary. Lining of the Hammond Ditch and the decommissioning of unlined surface water ponds within the process area of the refinery has resulted in a significant reduction in groundwater recharge to the shallow-zone water-bearing zone on top of the Nacimiento Formation.

4.0 SITE CHARACTERIZATION DATA

This section describes recent site characterization and routine monitoring data that will be used to design and construct the north boundary barrier and fluids collection system.

4.1 WATER LEVEL & PHASE-SEPARATED HYDROCARBON (PSH) DATA

Giant conducts routine monitoring activities at the refinery, which include monthly groundwater and product level measurements in monitoring wells and peizometers (installed in soil borings made to investigate the depth to the Nacimiento Formation) along the north property boundary. Groundwater and product level measurements were collected during the months of August and October of 2004 from these location points along the north property boundary. Table 1 summarizes these data with respect to the well depth and Nacimiento Formation surface elevation. This information, combined with the collection of additional monitoring data, will be used to design the fluids collection system and provide the barrier installation contractor with soil saturation information for excavation purposes.

4.2 SLUG TESTS

In order to further understand the nature and variability of the shallow-zone soils and their hydraulic behavior, additional site characterization activities were conducted by Malcolm Pirnie, Inc. and Precision Engineering, Inc. during October 2004. Field activities included the completion of slug tests on monitoring wells MW-45 and MW-47.

The slug tests were performed to monitor the recovery rate of fluids through the shallow-zone soils. Results from the slug tests were used to estimate the aquifer properties of the shallow-zone soils and the anticipated amount of fluids accumulation along the barrier. This information will also be provided to the barrier installation contractor for estimating slurry loss into the formation during barrier construction. The following summarizes the hydraulic properties estimated from the slug test data:

Summary of Hydraulic Properties from Slug Tests

Well ID	Transmissivity (Ft^2/day)	Hydraulic Conductivity (Ft/day)
MW-45	N/A	N/A
MW-47	19.6	31.6

It should be noted that MW-45 penetrates into the Nacimiento Formation approximately 10 feet. In addition, the groundwater level measured in MW-45 during October 2004 was below the top of the Nacimiento formation. As such, the results of the slug test performed on MW-45 are not representative of the hydraulic properties of the shallow-zone soils, but rather the impermeable nature of the Nacimiento Formation.

4.3 NACIMIENTO FORMATION SURFACE CONTOUR MODEL DEVELOPMENT

Giant has conducted several drilling campaigns over the years to assess the environmental impacts of historic product releases at the refinery. In 1997, Giant

commissioned the development of a Nacimiento Formation conceptual model to assess its topographic character beneath the refinery. An initial conceptual model was developed using information from previous drilling activities. Data collected from additional borings made in November 2003 and July 2004 to specifically investigate the Nacimiento Formation were added to the conceptual model to develop a July 2004 version of the contour model (Figure 2).

A review of the July 2004 Nacimiento Formation contour model identified some uncertainties with respect to the elevation of the Nacimiento Formation along the western and far eastern portions of the proposed barrier alignment. As such, seven (7) additional soil borings were installed by Precision Engineering, Inc. during October 2004; five (5) borings were installed along the west portion and two (2) along the east portion of the proposed barrier alignment. Figure 3 shows the location of the July and October 2004 borings with respect to the proposed barrier alignment.

Each boring installed during the October 2004 drilling campaign was drilled 3 to 5 feet into the Nacimiento Formation. Soil samples were collected every 2.5 ft and submitted to a geotechnical laboratory for grain size analysis to estimate properties important for the design of the barrier and collection system. Samples collected of the Nacimiento Formation were also submitted to the lab for hydraulic conductivity testing. The following summarizes the hydraulic conductivity test results for the samples collected during the October 2004 boring campaign.

Hydraulic Conductivity Data of Nacimiento Formation

Depth of Sample (ft)	Hydraulic Conductivity (cm / sec)
12 - 12.5	6.0×10^{-7}
9.5 – 10.5	1.2×10^{-9}

The lithologic logs for the borings installed in July and October 2004 are included in Appendix A. It is our understanding that OCD has copies of the previous borings on file.

5.0 HYDROGEOLOGY OF SHALLOW-ZONE SOILS

The hydraulic properties of the shallow-zone soils are key factors in estimating the hydraulic effects of the containment barrier, as well as in the design of the fluids collection system. Results from site characterization activities, in conjunction with the Nacimiento Formation contour model, provide a conceptual understanding of the hydrogeologic behavior of the shallow-zone soils.

5.1 NACIMIENTO FORMATION SURFACE CONCEPTUAL MODEL

As discussed in Section 2.0, the shallow-zone soils (windblown sands and Jackson Lake Terrace deposits) are underlain by the non-water bearing Nacimiento Formation. The surface contour model of the Nacimiento Formation, as discussed in Section 4.3, indicates that depressions (troughs) exist within the Nacimiento Formation surface in areas along the north property boundary and underlying the refinery process areas. With the significant reduction of groundwater recharge after the lining of the Hammond Ditch and decommissioning of unlined surface water ponds within the process areas of the refinery, the surface contours of the Nacimiento Formation likely influence the migration and accumulation of groundwater and PSH beneath the refinery. This notion is further discussed in Section 5.2. Figure 4 shows the updated version of the Nacimiento Formation surface contour model based on information collected during the October 2004 drilling campaign.

5.2 SHALLOW-ZONE GROUNDWATER CONDITIONS

Based on the groundwater and product level measurements collected in August and October 2004 (shown in Table 1), the occurrence of fluids along the north property boundary varies based on the underlying topography of the Nacimiento Formation.

These fluids level measurements were used to develop a cross-sectional profile along the proposed barrier alignment (Figure 5). As shown in Figure 5, there were areas where no groundwater was detected, which support the notion that the surface contours of the Nacimiento Formation likely influence the collection of fluids within the overlying thin water-bearing zone. Figure 4 shows the location of the north boundary wells containing detectable PSH with respect to the updated surface contour of the Nacimiento Formation.

5.3 AQUIFER TEST RESULTS

The hydraulic properties of the perched aquifer located above the Nacimiento Formation were previously tested during several aquifer tests conducted by Groundwater Technologies in June 1994. Two types of tests were attempted: a short-term, variable discharge rate (step-drawdown test), and a long-term pumping test. The objective of the short-term, variable discharge rate test was to estimate the specific capacity of the well and estimate the sustainable flowrate. The objective of the long-term aquifer test was to estimate the hydraulic properties of the saturated zone, which include the transmissivity, hydraulic conductivity, and specific yield. The following is a summary of the estimated hydraulic properties of the shallow-zone developed from these tests (Groundwater Technology, 1994).

Summary of Hydraulic Properties

Well No.	Transmissivity (ft^2 / day)	Hydraulic Conductivity (ft/day)	Storativity (Dimensionless)
MP-3	1412	177	0.015
MP-4	1260	158	0.003
RW-22	353	44	NA

The calculated values of transmissivity and hydraulic conductivity from the June 1994 aquifer tests are indicative of a high-permeability saturated zone, representing sand and gravel deposits.

A slug test was performed on MW-47, as discussed in Section 4.2. The results from the slug test have similar hydraulic properties to the wells tested above. Note, the above wells were located in the plant facility and had much greater saturated thickness. Based on the aquifer test and slug test results, the Jackson Lake Terrace Deposits have hydraulic conductivity, ranging between 40 to 180 ft/day, averaging 150 ft/day. The deposits exhibit high permeability characteristics, but have minimal saturated thickness near the Hammond Ditch.

5.4 CONCLUSIONS

Based on the hydraulic properties of the shallow-zone soils and limited saturation, groundwater flow and fluids accumulating along the proposed barrier are estimated to be below 10 gallons per minute (gpm). This estimate was determined based on the following:

$$Q = \frac{K\,I\,A}{\eta}$$ where

K = 150 ft/day

η = 40% porosity

I = .002ft/ft gradient

A = 2600 feet x 2 feet saturation

It is our opinion that groundwater that flows toward the barrier will accumulate in the depressions on the surface of the Nacimiento Formation. Collection methods to extract the groundwater behind the barrier may include collection trenches, wells, or other methods. It is believed that extracting groundwater only in the depressions will provide sufficient capture of groundwater behind the barrier. This approach will cause groundwater to move from the higher elevations to the lower areas of depressions and limit potential groundwater level rise away from the collection areas.

5.5 ADDITIONAL MONITORING PLAN

Continued monitoring of the groundwater and PSH levels along the north property boundary, including the soil borings installed in October 2004, will be conducted by Giant on a monthly basis through January 2005. The water level information will be used

to confirm preliminary conclusions with respect to the amount of fluids that may accumulate at the barrier and to prepare a final design for the fluids collection system (Section 6.2). Table 2 includes the list of monitoring wells and soil borings along the north property boundary that will be included in the on-going monitoring activities.

6.0 PROPOSED CORRECTIVE ACTION PLAN

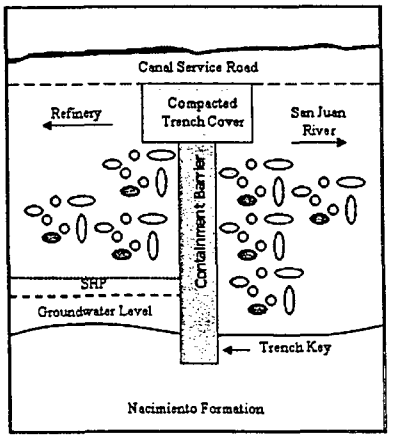
As a corrective action to mitigate further off-site migration of petroleum hydrocarbons, Giant has committed to the installation of a containment barrier and fluids collection system along the north property boundary. The containment barrier will extend from County Road 4990 to a location approximately 200 feet east of the El Paso Natural Gas Pipelines. The approximately 2,600-foot long barrier will be installed along the north side of and parallel to the Hammond Ditch, within the existing service roadway. A fluids collection system, consisting of multiple fluids recovery location points along the refinery side of the barrier, will serve to provide hydraulic control of fluids accumulating along the barrier.

6.1 BARRIER CONCEPT

In general, the north boundary barrier will be constructed by excavating a narrow trench, typically 3 to 5 feet wide, through the Jackson Lake Terrace and into the Nacimiento Formation. The barrier, varying in depth from approximately 10 to 15 feet along the alignment, will key into the top of the Nacimiento Formation a minimum of 3 feet to mitigate potential underflow of fluids.

The barrier design and method of construction will be determined by Giant based on competitive proposals solicited from experienced barrier contractors. The performance requirement will be to install a finished barrier that provides a hydraulic conductivity (permeability (k)) of $1x10^{-7}$ cm/sec or less.

Barrier Concept



Several designs and construction methods are available to achieve this performance objective: soil-bentonite slurry trench walls; soil-cement slurry trench walls; slurry trench with geo-membrane barrier; and shallow soil mixing using bentonite and/or cement to create an in-place wall. Contractor proposals will be evaluated based on their ability to achieve the required performance specifications, constructability considering site conditions, ability to meet the desired installation schedule, and cost effectiveness.

Appropriate construction quality control measures will be applied during barrier construction to verify that the performance requirements will be achieved.

Clean soil excavated from the trench may be utilized by the contractor for barrier construction (if appropriate) and for backfill purposes. Contaminated soil will be segregated to the extent possible and properly stock-piled in a separate location on-site for proper characterization and subsequent management. Giant will determine the management approach (e.g., on-site treatment or off-site disposal) for the contaminated soil once the quantity and character of the soil is determined.

6.1.1 Utility Crossings

Subsurface utilities have been identified at three locations along the proposed barrier alignment. Those locations are:

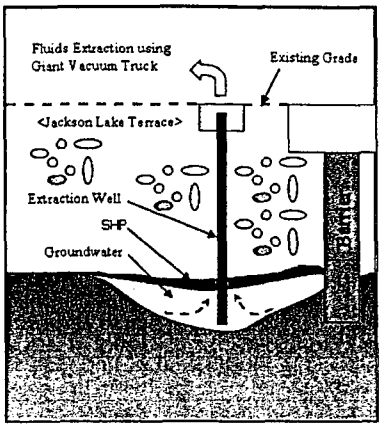
- Tank 37 (French Drain Collection System), located approximately 50 feet east of SB1-0704,
- Fire water supply pipeline, located approximately 100 feet west of the El Paso Pipeline easement, and
- El Paso Natural Gas Pipelines, located within a 100-foot easement west of P8 (SB7-1103).

In locations where it is possible to install sufficient barrier height to achieve the desired performance, the barrier will pass beneath the utilities. However, depending on the depth of the subsurface utilities with respect to the Nacimiento Formation in those locations, utilities may be required to penetrate the barrier. If so, proper sealing techniques will be employed at those locations to mitigate leakage.

6.2 FLUIDS COLLECTION CONCEPT

Hydraulic control of fluids (groundwater and PSH) captured by the barrier will be accomplished by installing a series of collection wells and/or interceptor trenches at locations along the length of the barrier. Conceptually, collection wells or trenches will be located at Nacimiento trough intersections along the barrier. Additional collection points may be required along the barrier based on the results of the additional water level monitoring (Section 5.5) and/or operational experience after the barrier is installed.

Fluids Collection System



Fluids will be removed from the collection points using a vacuum truck when necessary based on fluids level monitoring results. Collected fluids will delivered to the existing French Drain collection tank near SB2-0704.

6.3 IMPLEMENTATION CONCEPT

Implementation of the barrier and fluids collection system will be completed in two phases. Phase I will include development of construction documents and solicitation of bids for the containment barrier, followed by construction of the barrier. Phase II will consist of the design and installation of the fluids collection system. The fluids collection system will be installed after completion of the containment barrier construction.

6.4 CONSTRUCTION PERMITS

Giant will comply with all permitting requirements associated with the construction of the containment barrier.

Preliminarily, it appears only a construction stormwater permit will be required. Giant will submit a Notice of Intent (NOI) to United States Environmental Protection Agency (USEPA) Region 6 prior to the start of construction activities. The NOI process will include an Endangered Species Act Review by United States Fish and Wildlife Services (USFWS) for the adjacent reach of the San Juan River, and development of a Storm Water Pollution Prevention Plan (SWPPP).

VOC air emissions during the excavation activities are expected to be insignificant and not trigger any state permitting requirements. On-site treatment (e.g., landfarming) of petroleum-contaminated soils may require air permitting activities. Giant will further evaluate that issue if on-site soil treatment is pursued.

7.0 SCHEDULE

Construction of the northern boundary containment barrier is anticipated to start by January 17, 2004. Figure 6 shows the estimated implementation schedule.

8.0 REFERENCES

Groundwater Technology, 1994. Uppermost Aquifer Hydraulic Testing and Modeling; Giant Refining Company.

State of New Mexico
ENVIRONMENT DEPARTMENT
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303
Telephone (505) 428-2500
Fax (505) 428-2567
www.nmenv.state.nm.us

BILL RICHARDSON
GOVERNOR

RON CURRY
SECRETARY

DERRITH WATCHMAN-MOORE
DEPUTY SECRETARY

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

December 21, 2004

Mr. Randy Schmaltz
Environmental Supervisor
Giant Refining Company
P.O. Box 159
Bloomfield, New Mexico 87413

Mr. Ed Riege
Environmental Superintendent
Giant Refining Company
Route 3, Box 7
Gallup, New Mexico 87301

SUBJECT: APPROVAL WITH CONDITIONS
VOLUNTARY CORRECTIVE MEASURES PLAN
BLOOMFIELD REFINING COMPANY
RCRA PERMIT NO. NMD 089416416
HWB-GRCB-04-005

Dear Mr. Schmaltz and Mr. Riege:

The New Mexico Environment Department (NMED) has completed its review of the Voluntary Corrective Measures Plan titled *Corrective Action Plan* (CAP) dated November 17, 2004, submitted on behalf of Giant Refining Company Bloomfield (GRCB). NMED hereby approves the CAP with the conditions listed below:

1. In addition to NMED, all requested information shall be submitted to the Oil Conservation Division Santa Fe office and the OCD District office.

2. The barrier wall shall be imbedded a minimum of 5 feet into the Nacimiento Formation. A barrier wall conceptional "flow net study" shall be conducted to ensure the wall is buried deep enough to stop significant seepage from going under the wall. Please provide the results of the study for NMED approval before actual installation of the wall.

3. The final barrier wall type shall be submitted to NMED for approval before installation. GRCB shall demonstrate to NMED that the barrier wall type and design will meet any structural requirement and hydraulic conductivity (k) of 1×10^{-7} cm/sec.

4. Detailed "as built drawings" and photo documentation shall be supplied at the completion of construction. At least one of the drawings shall show a cross section along the entire wall.

5. Daily logs shall be kept during the construction phase. All pertinent information shall be logged such as contamination observed, soil characteristics, water levels, depth to Nacimiento Formation, progress made each day, dewatering or contaminant removal activities, general weather, and all other pertinent information that should be logged that may cause a deviation of the approved design and/or any anomalies found in the trench which may cause GRCB to deviate from the plan or be of a concern. GRCB shall notify NMED of any deviations from the plan within one business day of making the change.

6. GRCB shall submit a weekly progress report and photos via E-mail on Monday morning.

7. GRCB shall submit the fluid collection system design for approval before actual installation. This should include a map identifying the locations of recovery wells or trenches and all other pertinent information. The Permittee may remove fluids during the course of the project for logistic and safety reasons. All fluids and waste removed shall be disposed or recycled in an approved manner.

8. GRCB shall maintain a qualified technical person on site during the construction phase to ensure quality assurance and control of the project. This person shall be experienced in identifying the Nacimiento Formation. Ample confirmation bottom hole soil samples shall be collected in areas where the proposed collection systems may be placed. Samples shall be collected and preserved to properly identify/classify the soils.

9. GRCB will notify the NMED at least 72 hours in advance of the start of construction and all scheduled sampling activities throughout the construction process such that the NMED has the opportunity to witness the events and/or collect split samples during NMED's normal business hours.

10. GRCB shall submit a plan for NMED approval to evaluate the effectiveness of the barrier wall. This plan should include monitoring points on both sides of the barrier wall.

11. GRCB must submit construction diagrams for the peizometers along the north property boundary installed during the November 2003, July 2004, and October 2004 drilling programs. This information must include the slot-size and slot intervals of the PVC hand–slotted screens, length of screen, depth at which the screens were set, and depth of water bearing zones. The "Log of Test Borings" (boring logs) found in the CAP do not include all of this information.

12. Boring log SB1-0704 states "[b]lack with hydrocarbon odor;" the term black is also used in other boring logs SB2-0704, SB3-0704, SB6-0704, and SB7-0704. GRCB must clarify the use of the term "black" in the boring logs. (e.g. is black referring to hydrocarbon staining or is black the actual mineral color in the sand).

13. The CAP, Sections 4.2 contains a table presenting the hydraulic properties from a slug test. GRCB must provide the results of the slug test and the associated calculations. Include graphs as necessary.

14. The CAP, Section 4.3 states "[e]ach boring installed during the October 2004 drilling campaign was drilled 3 to 5 feet into the Nacimiento Formation. Soil samples were collected every 2.5 ft and submitted to a geotechnical laboratory for grain size analysis to estimate the properties important for the design of the barrier and collection system. Samples collected of the Nacimiento Formation were also submitted to the lab for hydraulic conductivity testing."

    GRCB must submit the results of the grain size analyses and hydraulic conductivity testing for all borings.

15. CAP, page 2 of Section 6.1 Barrier Concept, states "Appropriate construction quality control measures will be applied during barrier construction to verify that the performance requirements will be achieved."

    GRCB must identify the quality control measures that will be used and the performance requirements that will be achieved.

16. The CAP, Section 6.2 Fluids Collection Concept, states "[f]luids will be removed from the collection points using a vacuum truck when necessary based on fluids level monitoring results. Collection fluids will be delivered to the existing French Drain collection tank near SB2-0704."

GRCB must clarify if a vacuum truck is the only method of fluid collection removal to be employed upon completion of the barrier wall and fluid collection system.

17. Appendix A provides results from a sieve analysis. GRCB must identify what soil samples are associated with "PEI Lab No." 46464, 46465, 46461, 46462, and 46463 because these were not identified in the October boring logs.

18. The barrier wall installation may cause the displacement of hydrocarbons. In the future, NMED may require additional sampling and monitoring from the monitoring wells located in the southern portion of the refinery (e.g. MW-32, 33, 34, 35, 36, 36, and 38) and the three outfall locations.

The Permittees must submit the requested information within 30 days of receipt of this letter or NMED will rescind approval.

If you have any questions regarding this approval please contact me at (505) 428-2545.

Sincerely,

Hope Monzeglio

Hope Monzeglio
Project Leader
Hazardous Waste Bureau

HCM:hcm

cc: J. Bearzi, NMED HWB
J. Kieling, NMED HWB
D. Cobrain, NMED HWB
W. Price, OCD
D. Foust, OCD Aztec Office
B. Wilkinson, EPA

Reading File and GRCB 2004 File

Cindy Hurtado

From: Randy Schmaltz
Sent: Wednesday, March 30, 2005 2:23 PM
To: Cindy Hurtado
Subject: FW: Giant Bloomfield Corrective Action Plan

Corrective Action plan approva...

-----Original Message-----
From: Price, Wayne [mailto:WPrice@state.nm.us]
Sent: Friday, December 17, 2004 1:23 PM
To: Randy Schmaltz (E-mail); Ed Rigie (E-mail)
Cc: Hope Monzeglio (E-mail); Foust, Denny; Bob Wilkinson (E-mail)
Subject: Giant Bloomfield Corrective Action Plan

Please find enclosed a letter that is going out today approving of the plan.

<<Corrective Action plan approval DEC 17 2004.doc>>

Sincerely:

Wayne Price
New Mexico Oil Conservation Division
1220 S. Saint Francis Drive
Santa Fe, NM 87505
505-476-3487
fax: 505-476-3462
E-mail: WPRICE@state.nm.us

December 17, 2004

Mr. James R. Schmaltz
Environmental Manager
Giant Refining Company (Giant)
P.O. Box 159
Bloomfield, New Mexico 87413

Re: Corrective Action Plan

Dear Mr. Schmaltz:

The New Mexico Oil Conservation Division (OCD) is in receipt of the Corrective Action Plan and cover letter dated November 16, 2004. The plan outlines how Giant proposes to mitigate the off-site migration of petroleum hydrocarbons within the shallow-zone soils along the north property boundary of the Bloomfield refinery.

OCD hereby approves of the plan with the following conditions:

1. All information and or actions required by the New Mexico Environment Department Hazardous Waste Bureau shall become part of this approval.

2. The barrier wall shall be imbedded a minimum of 5 feet into the Nacimiento Formation. A barrier wall conceptional "flow net study" shall be conducted to ensure the wall is buried deep enough to stop significant seepage from going under the wall. Please provide for OCD approval before actual installation of wall.

3. The final barrier wall type shall be submitted to OCD for approval before installation. Giant shall demonstrate to OCD that the barrier wall type and design will meet any structural requirement and hydraulic conductivity (permeability (k)) of 1×10^{-7} cm/sec.

4. Detail "as built drawings" and photo documentation shall be supplied at the end of construction. At least one of the drawings shall show a side view along the entire wall.

Daily logs shall be kept during the construction phase. All pertinent information shall be logged such as contamination observed, soil characteristics, water levels, depth to Nacimiento formation, progress made each day, general weather, and any other pertinent information that should be logged that may cause a deviation of the approved design and/or any anomalies found in the trench which may cause Giant to deviate from the plan or be of a concern.

5. Giant shall submit a weekly progress report and photos via E-mail on Monday morning.

6. Giant shall submit the fluid collection system design for approval before actual installation. Giant may remove fluids during the course of the project for logistic and safety reasons. All fluids and waste removed shall be disposed of or recycled in an approved manner.

7. Giant shall maintain a qualified technical person on site during the construction phase to ensure quality assurance and control of the project. This person shall be experienced in identifying the Nacimiento Formation. Ample confirmation bottom hole soil samples shall be collected in areas where the proposed collection systems may be placed. Samples shall be collected and preserved to properly identify/classify the soils and perform permeability test in a certified soils laboratory if deemed warranted by OCD.

8. Giant will notify the OCD Santa Fe office and the OCD District office at least 72 hours in advance of all scheduled activities such that the OCD has the opportunity to witness the events and/or split samples during OCD's normal business hours.

9. Giant shall submit a plan for OCD approval to measure and monitor the effectiveness of the barrier wall. This plan should include any area where contamination as been discovered and various monitoring points behind the barrier wall.

Please be advised that NMOCD approval of this plan does not relieve (Giant) of liability should their operations fail to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD approval does not relieve (Giant) of responsibility for compliance with any other federal, state, or local laws and/or regulations.

If you have any questions please do not hesitate to contact me at 505-476-3487 or e-mail WPRICE@state.nm.us.

Sincerely;

Wayne Price-Pet. Engr. Spec.

cc: OCD Aztec Office

GIANT
REFINING COMPANY

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:

PHONE
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.

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

State of New Mexico
ENVIRONMENT DEPARTMENT
Hazardous Waste Bureau
2905 Rodeo Park Drive East, Building 1
Santa Fe, New Mexico 87505-6303
Telephone (505) 428-2500
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www.nmenv.state.nm.us

BILL RICHARDSON
GOVERNOR

RON CURRY
SECRETARY

DERRITH WATCHMAN-MOORE
DEPUTY SECRETARY

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

December 29, 2004

Mr. Randy Schmaltz
Environmental Supervisor
Giant Refining Company
P.O. Box 159
Bloomfield, New Mexico 87413

Mr. Ed Riege
Environmental Superintendent
Giant Refining Company
Route 3, Box 7
Gallup, New Mexico 87301

SUBJECT: APPROVAL WITH CONDITIONS
VOLUNTARY CORRECTIVE MEASURES
BLOOMFIELD REFINING COMPANY
RCRA PERMIT NO. NMD 089416416
HWB-GRCB-04-006

Dear Mr. Schmaltz and Mr. Riege:

The New Mexico Environment Department (NMED) has completed its review of the Voluntary Corrective Measures Plan (VCM Plan) titled *Giant Bloomfield Refinery – River Terrace Sheet Pile Area* (RTSPA Plan) dated November 24, 2004, submitted on behalf of Giant Refining Company Bloomfield Refinery (GRCB). NMED hereby approves the RTSPA Plan with the conditions listed below:

1. GRCB must submit construction diagrams for permanent wells MW-48 and MW-49.

2. GRCB must survey the top of the well casings of monitoring wells MW- 48, MW-49 and temporary wells TP-1 through TP-8 relative to a common benchmark to determine the elevations of the well casing rims. GRCB must measure depth to water from the casing rim in each well and, based on the well casing elevation data, determine the groundwater elevations to the nearest 0.01 ft. The groundwater elevation data, including the date(s) of

measurement, must be submitted to NMED in conjunction with the RTSPA Plan conditions.

3. GRCB must submit construction diagrams for the eight recently installed temporary well points (TP-1 through TP-8). This information must include slot size and slot intervals of the PVC hand–slotted screens, identify if the screened intervals intersect the water table, and provide the depth at which the screen was set.

4. GRCB must indicate if separate phase hydrocarbon (SPH) was observed during the installation process and sampling of monitoring wells MW-48, MW-49 and temporary well points TP-1 through TP-8.

5. The "Log of Test Borings" (boring logs) states "Sand, fine to medium, black, damp" in boring log TP1-1004; the term "black" is also used in other boring logs (TP2-1004, TP4-1004, TP5-1004, TP6-1004; TP7-1004, TP8-1004, MW-48, and MW-49). GRCB must clarify the use of the term "black" in the boring logs. (i.e; is black referring to hydrocarbon stained sand or is black the natural color of the sand).

6. GRCB must provide all laboratory analytical results from this investigation. (NMED has received laboratory analytical results from 10/28/04 MW-48 & MW-49 soil sampling, 11/1/04 MW# 48 & MW #49 water sampling, and 10/28/04 TP-1 – TP-8 water sampling)

7. NMED requires GRCB to determine the extent of contamination east of TP-3. GRCB must provide NMED with a map containing proposed well locations for NMED approval prior to installation. NMED requires GRCB to use factory machine-slotted PVC well screen and not hand-slotted screened PVC because the closer spacing of the slots.

8. The RTSPA Plan, Proposed Additional Activities Section, recommends activities #1 – 6. NMED requires the following: (comments 1-6 correspond to the proposed activities 1-6 in the RTSPA Plan).

   1) Submit the results and findings of the 24-hour aquifer test performed on MW-48.
   2) Submit the results of the capture zone analysis.
   3) See comment #7.
   4) Submit all monthly sampling laboratory analytical and monitoring results from MW-48 and MW-49 collected since their installation.
   5) Provide a comment clarifying that the term "feasibility study" was used to describe the implementation of voluntary corrective measures at the riverbank for containment of contaminants.

6) Submit the results of the "interim voluntary corrective measures" for NMED's review.

GRCB must submit the requested information by January 31, 2005. If any of these activities will not be performed, an explanation for the change in scope must be provided to NMED.

If you have any questions regarding this conditional approval please call me at (505) 428-2545.

Sincerely,

Hope Monzeglio
Project Leader
Hazardous Waste Bureau

HCM:hcm

cc: J. Kieling, NMED HWB
D. Cobrain, NMED HWB
W. Price, OCD
D. Foust, OCD Aztec Office
B. Wilkinson, EPA

Reading File and GRCB 2004 File

Cindy Hurtado

From: Price, Wayne [WPrice@state.nm.us]
Sent: Friday, December 17, 2004 2:58 PM
To: 'Randy Schmaltz'; Dave Cobrain; Foust, Denny; Hope Monzeglio; Robert Wilkinson; Price, Wayne
Cc: Ed Riege; Chad King; Cindy Hurtado
Subject: RE: Giant Bloomfield River Terrace Investigation

Dear Mr. Schmaltz:

OCD hereby approves of the submitted plan. Please provide a report of your findings including recommendations by January 31, 2005.

Please be advised that NMOCD approval of this plan does not relieve (Giant)of liability should their operations fail to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD approval does not relieve (Giant) of responsibility for compliance with any other federal, state, or local laws and/or regulations.

-----Original Message-----
From: Randy Schmaltz [mailto:rschmaltz@giant.com]
Sent: Wednesday, November 24, 2004 11:05 AM
To: Dave Cobrain; Denny Foust; Hope Monzeglio; Robert Wilkinson; Wayne Price
Cc: Ed Riege; Chad King; Cindy Hurtado
Subject: Giant Bloomfield River Terrace Investigation

Please find enclosed a report summarizing Giant's field investigation of the river terrace sheet-pile area. Hard copies of the report will follow.

<<River Terrace Investigation Letter 11-22-04.doc>> <<Figure 1_Sample Location Map.ppt>> <<Figure 2_Analytical Result Summary Location Map-River Tearrace.ppt>> <<River Terrace Appendix A_Boring Logs.pdf>> <<River Terrace Table 1_Analytical Summary.xls>>