

GW - 40

MONITORING REPORTS

DATE:

1992

QUARTERLY DATA REPORT
GIANT BLOOMFIELD REFINERY
FOURTH QUARTER, 1992

Prepared By:

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INTRODUCTION AND SUMMARY QUARTERLY REPORT FOURTH QUARTER, 1992

INTRODUCTION

One change was made to the remediation system during the fourth quarter of 1992. SHS-7 is now an operational recovery well. Other operations remain the same.

SUMMARY

Section 2

Section 2 contains a summary of the quarterly analytical results. Raw data, as received from the laboratory, is available on request as a supplement to the quarterly report.

Section 3

A quarterly potentiometric surface map, as well as the adjusted water surface elevation and product thickness for each well, is included in Section 3.

Section 4

Section 4 illustrates the volume history for the quarter. Total volume pumped from each well, as well as current tank volumes and the reinjection volume, is reported. Additional detail, on a weekly basis, is also available if desired.

Section 5

Specific conductance tracking for GRW-13 is included in this section.

SECTION 2

The following pages show the quarterly analytical data for the Giant Refining Remediation Project. The data is broken down into units as described below.

	Unit of <u>Measure</u>
Total dissolved solids (180)	mg/l
Total dissolved solids (calc)	mg/l
Total alkalinity as CaCO ₃	mg/l
Total hardness as CaCO ₃	mg/l
Bicarbonate as HCO ₃	mg/l
Carbonate as CO ₃	mg/l
Chloride	mg/l
Sulfate	mg/l
Calcium	mg/l
Magnesium	mg/l
Potassium	mg/l
Sodium	mg/l

The remainder of the data is measured in ug/l.

GIANT REFINING COMPANY
ONSITE REMEDIATION PROJECT
QUARTERLY ANALYTICAL DATA SUMMARY
FOURTH QUARTER, 1992

STRIPPER INFLUENT

	10/92	11/92	12/92
GENERAL WATER CHEMISTRY			
Lab pH (s.u.)	7.15	7.55	8.03
Lab conductivity, umhos/cm	3590.00	3550.00	3550.00
Lab resistivity, ohm-m	2.79	2.82	2.82
Total dissolved solids (180)	2720.00	2670.00	2690.00
Total dissolved solids (calc)	2620.00	2510.00	2520.00
Total alkalinity as CaCO3	364.00	408.00	299.00
Total hardness as CaCO3	1000.00	991.00	991.00
Sodium absorption ratio	6.86	6.72	6.63
Bicarbonate as HCO3	443.00	498.00	365.00
Carbonate as CO3	ND	ND	ND
Chloride	407.00	365.00	353.00
Sulfate	1100.00	1120.00	1150.00
Calcium	362.00	137.00	299.00
Magnesium	24.00	158.00	59.70
Potassium	2.46	2.51	2.50
Sodium	499.00	486.00	480.00

HALOCARBONS

Bromodichloromethane	ND	ND	ND
Bromoform	ND	ND	ND
Bromomethane	ND	ND	ND
Carbon tetrachloride	ND	ND	ND
Chloroethane	ND	ND	ND
2-Chloroethylvinylether	ND	ND	ND
Chloroform	ND	ND	ND
Chloromethane	ND	ND	ND
Dibromochloromethane	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND
1,1-Dichloroethane	ND	0.70	ND
1,2-Dichloroethane	0.40	0.50	ND
1,1-Dichloroethene	ND	ND	ND
1,2-Dichloroethene	3.00	ND	1.00
trans-1,2-Dichloroethene	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND
trans-1,3-Dichloropropene	ND	3.30	ND
Methylene chloride	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND
Tetrachloroethene	ND	ND	ND

STRIPPER INFLUENT (Continued)

	10/92	11/92	12/92
1,1,1-Trichloroethane	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND
Trichloroethene	ND	0.20	ND
Trichlorofluoromethane	ND	ND	ND
Vinyl chloride	ND	ND	ND
AROMATICS			
Benzene	19.30	30.00	30.00
Chlorobenzene	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND
Ethylbenzene	ND	13.90	ND
Toluene	ND	ND	ND
Xylenes	11.20	16.00	11.00
Trichlorotrifluoroethane	ND	ND	ND

STRIPPER EFFLUENT

	10/92	11/92	12/92
GENERAL WATER CHEMISTRY			
Lab pH (s.u.)	6.86	7.12	
Lab conductivity, umhos/cm	3800.00	3600.00	3610.00
Lab resistivity, ohm-m	2.63	2.78	
Total dissolved solids (180)	2670.00	2650.00	
Total dissolved solids (calc)	2620.00	2570.00	
Total alkalinity as CaCO ₃	304.00	344.00	
Total hardness as CaCO ₃	996.00	988.00	
Sodium absorption ratio	6.72	6.62	
Bicarbonate as HCO ₃	371.00	420.00	
Carbonate as CO ₃	ND	ND	
Chloride	465.00	410.00	
Sulfate	1100.00	1100.00	
Calcium	363.00	325.00	
Magnesium	22.30	43.30	
Potassium	2.54	2.52	
Sodium	488.00	478.00	
HALOCARBONS			
Bromodichloromethane	ND	ND	ND
Bromoform	ND	ND	ND
Bromomethane	ND	ND	ND
Carbon tetrachloride	ND	ND	ND
Chloroethane	ND	ND	ND
Chloroethane	ND	ND	ND
2-Chloroethylvinylether	ND	ND	ND
Chloroform	ND	ND	ND
Chloromethane	ND	ND	ND
Dibromochloromethane	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND
1,2-Dichloroethane	0.60	0.20	ND
1,2-Dichloroethene	2.10	0.30	0.30
cis-1,2-Dic anthracene	ND	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND
Methylene chloride	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND
Tetrachloroethene	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND
Trichloroethene	ND	ND	ND
Trichlorofluoromethane	ND	ND	ND
Vinyl chloride	ND	ND	ND

STRIPPER EFFLUENT (Continued)

	10/92	11/92	12/92
AROMATICS			
Benzene	2.20	ND	ND
Chlorobenzene	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND
Ethylbenzene	1.80	ND	ND
Toluene	ND	ND	ND
Xylenes	2.00	ND	ND
Trichlorotrifluoroethane	ND	ND	ND

GBR-17

10/92

11/92

12/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)
 Lab conductivity, umhos/cm
 Lab resistivity, ohm-m
 Total dissolved solids (180)
 Total dissolved solids (calc)
 Total alkalinity as CaCO₃
 Total hardness as CaCO₃
 Sodium absorption ratio
 Bicarbonate as HCO₃
 Carbonate as CO₃
 Chloride
 Sulfate
 Calcium
 Magnesium
 Potassium
 Sodium

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chlorobenzene	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	ND
1,2-Dichloroethane	ND
1,1-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

GBR-17 (Continued)

	10/92	11/92	12/92
AROMATICS			
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		
Trichlorotrifluoroethane	ND		

GBR-19

10/92

11/92

12/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)

Lab conductivity, umhos/cm

Lab resistivity, ohm-m

Total dissolved solids (180)

Total dissolved solids (calc)

Total alkalinity as CaCO₃Total hardness as CaCO₃

Sodium absorption ratio

Bicarbonate as HCO₃Carbonate as CO₃

Chloride

Sulfate

Calcium

Magnesium

Potassium

Sodium

HALOCARBONS

Bromodichloromethane

ND

Bromoform

ND

Bromomethane

ND

Carbon tetrachloride

ND

Chlorobenzene

ND

Chloroethane

ND

2-Chloroethylvinylether

ND

Chloroform

ND

Chloromethane

ND

Dibromochloromethane

ND

1,2-Dichlorobenzene

ND

1,3-Dichlorobenzene

ND

1,4-Dichlorobenzene

ND

1,1-Dichloroethane

0.80

1,2-Dichloroethane

2.70

1,2-Dichloroethene

2.70

cis-1,2-Dichloroethene

ND

trans-1,2-Dichloroethene

ND

1,2-Dichloropropane

ND

cis-1,3-Dichloropropene

ND

trans-1,3-Dichloropropene

ND

Methylene chloride

ND

1,1,2,2-Tetrachloroethane

ND

Tetrachloroethene

ND

1,1,1-Trichloroethane

ND

1,1,2-Trichloroethane

ND

Trichloroethene

1.00

Trichlorofluoromethane

ND

Vinyl chloride

ND

GBR-19 (Continued)

	10/92	11/92	12/92
AROMATICS			
Benzene	28.10		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	0.90		
Toluene	2.50		
Xylenes	ND		
Trichlorotrifluoroethane	ND		

OFFSITE WELLS

SHS-3

10/92

11/92

12/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)
 Lab conductivity, umhos/cm
 Lab resistivity, ohm-m
 Total dissolved solids (180)
 Total dissolved solids (calc)
 Total alkalinity as CaCO₃
 Total hardness as CaCO₃
 Sodium absorption ratio
 Bicarbonate as HCO₃
 Carbonate as CO₃
 Chloride
 Sulfate
 Calcium
 Magnesium
 Potassium
 Sodium

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	ND
1,2-Dichloroethane	ND
1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

SHS-3 (Continued)

10/92

11/92

12/92

AROMATICS

Benzene	ND
Chlorobenzene	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
Ethylbenzene	ND
Toluene	ND
Xylenes	ND
Trichlorotrifluoroethane	ND

SHS-4

10/92

11/92

12/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)
Lab conductivity, umhos/cm
Lab resistivity, ohm-m
Total dissolved solids (180)
Total dissolved solids (calc)
Total alkalinity as CaCO₃
Total hardness as CaCO₃
Sodium absorption ratio
Bicarbonate as HCO₃
Carbonate as CO₃
Chloride
Sulfate
Calcium
Magnesium
Potassium
Sodium

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	ND
1,2-Dichloroethane	ND
1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

SHS-4 (Continued)

	10/92	11/92	12/92
AROMATICS			
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		
Trichlorotrifluoroethane	ND		

SHS-6

10/92

11/92

12/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)
 Lab conductivity, umhos/cm
 Lab resistivity, ohm-m
 Total dissolved solids (180)
 Total dissolved solids (calc)
 Total alkalinity as CaCO₃
 Total hardness as CaCO₃
 Sodium absorption ratio
 Bicarbonate as HCO₃
 Carbonate as CO₃
 Chloride
 Sulfate
 Calcium
 Magnesium
 Potassium
 Sodium

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	ND
1,2-Dichloroethane	ND
1,2-Dichloroethene	0.40
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

SHS-6 (Continued)

	10/92	11/92	12/92
AROMATICS			
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		
Trichlorotrifluoroethane	ND		

SHS-10

10/92

11/92

12/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)
 Lab conductivity, umhos/cm
 Lab resistivity, ohm-m
 Total dissolved solids (180)
 Total dissolved solids (calc)
 Total alkalinity as CaCO₃
 Total hardness as CaCO₃
 Sodium absorption ratio
 Bicarbonate as HCO₃
 Carbonate as CO₃
 Chloride
 Sulfate
 Calcium
 Magnesium
 Potassium
 Sodium

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	ND
1,2-Dichloroethane	ND
1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

SHS-10 (Continued)

AROMATICS	10/92	11/92	12/92
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	13.30		
Toluene	1.00		
Xylenes	ND		
Trichlorotrifluoroethane	ND		

SHS-12

GENERAL WATER CHEMISTRY

10/92

11/92

12/92

Lab pH (s.u.)
 Lab conductivity, umhos/cm
 Lab resistivity, ohm-m
 Total dissolved solids (180)
 Total dissolved solids (calc)
 Total alkalinity as CaCO₃
 Total hardness as CaCO₃
 Sodium absorption ratio
 Bicarbonate as HCO₃
 Carbonate as CO₃
 Chloride
 Sulfate
 Calcium
 Magnesium
 Potassium
 Sodium

HALOCARBONS

Bromodichloromethane	
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	ND
1,2-Dichloroethane	ND
1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

SHS-12 (Continued)

AROMATICS	10/92	11/92	12/92
Benzene			
Chlorobenzene	0.50		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	4.90		
Xylenes	ND		
Trichlorotrifluoroethane	10.60		
	ND		

SHS-13

GENERAL WATER CHEMISTRY	10/92	11/92	12/92
Lab pH (s.u.)			
Lab conductivity, umhos/cm			
Lab resistivity, ohm-m			
Total dissolved solids (180)			
Total dissolved solids (calc)			
Total alkalinity as CaCO ₃			
Total hardness as CaCO ₃			
Sodium absorption ratio			
Bicarbonate as HCO ₃			
Carbonate as CO ₃			
Chloride			
Sulfate			
Calcium			
Magnesium			
Potassium			
Sodium			
HALOCARBONS			
Bromodichloromethane			
Bromoform		ND	
Bromomethane		ND	
Carbon tetrachloride		ND	
Chloroethane		ND	
2-Chloroethylvinylether		ND	
Chloroform		ND	
Chloromethane		ND	
Dibromochloromethane		ND	
1,2-Dichlorobenzene		ND	
1,3-Dichlorobenzene		ND	
1,4-Dichlorobenzene		ND	
1,1-Dichloroethane		ND	
1,2-Dichloroethane		1.50	
1,2-Dichloroethene		4.70	
cis-1,2-Dichloroethene		0.60	
trans-1,2-Dichloroethene		ND	
1,2-Dichloropropane		ND	
cis-1,3-Dichloropropene		ND	
trans-1,3-Dichloropropene		ND	
Methylene chloride		ND	
1,1,2,2-Tetrachloroethane		ND	
Tetrachloroethene		ND	
1,1,1-Trichloroethane		ND	
1,1,2-Trichloroethane		ND	
Trichloroethene		ND	
Trichlorofluoromethane		ND	
Vinyl chloride		ND	
		ND	

SHS-13 (Continued)

AROMATICS	10/92	11/92	12/92
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		
Trichlorotrifluoroethane	ND		

SHS-15

GENERAL WATER CHEMISTRY	10/92	11/92	12/92
Lab pH (s.u.)			
Lab conductivity, umhos/cm			
Lab resistivity, ohm-m			
Total dissolved solids (180)			
Total dissolved solids (calc)			
Total alkalinity as CaCO ₃			
Total hardness as CaCO ₃			
Sodium absorption ratio			
Bicarbonate as HCO ₃			
Carbonate as CO ₃			
Chloride			
Sulfate			
Calcium			
Magnesium			
Potassium			
Sodium			
HALOCARBONS			
Bromodichloromethane	ND		
Bromoform	ND		
Bromomethane	ND		
Carbon tetrachloride	ND		
Chloroethane	ND		
2-Chloroethylvinylether	ND		
Chloroform	ND		
Chloromethane	3.30		
Dibromochloromethane	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		
1,2-Dichloroethene	ND		
cis-1,2-Dichloroethene	ND		
trans-1,2-Dichloroethene	ND		
1,2-Dichloropropane	ND		
cis-1,3-Dichloropropene	ND		
trans-1,3-Dichloropropene	ND		
Methylene chloride	ND		
1,1,2,2-Tetrachloroethane	ND		
Tetrachloroethene	ND		
1,1,1-Trichloroethane	ND		
1,1,2-Trichloroethane	ND		
Trichloroethene	ND		
Trichlorofluoromethane	ND		
Vinyl chloride	ND		

SHS-15 (Continued)

AROMATICS	10/92	11/92	12/92
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		
Trichlorotrifluoroethane	ND		

SHS-16

GENERAL WATER CHEMISTRY	10/92	11/92	12/92
Lab pH (s.u.)			
Lab conductivity, umhos/cm			
Lab resistivity, ohm-m			
Total dissolved solids (180)			
Total dissolved solids (calc)			
Total alkalinity as CaCO ₃			
Total hardness as CaCO ₃			
Sodium absorption ratio			
Bicarbonate as HCO ₃			
Carbonate as CO ₃			
Chloride			
Sulfate			
Calcium			
Magnesium			
Potassium			
Sodium			
HALOCARBONS			
Bromodichloromethane	ND		
Bromoform	ND		
Bromomethane	ND		
Carbon tetrachloride	ND		
Chloroethane	ND		
2-Chloroethylvinylether	ND		
Chloroform	ND		
Chloromethane	ND		
Dibromochloromethane	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		
1,2-Dichloroethene	ND		
cis-1,2-Dichloroethene	ND		
trans-1,2-Dichloroethene	ND		
1,2-Dichloropropane	ND		
cis-1,3-Dichloropropene	ND		
trans-1,3-Dichloropropene	ND		
Methylene chloride	ND		
1,1,2,2-Tetrachloroethane	ND		
Tetrachloroethene	ND		
1,1,1-Trichloroethane	ND		
1,1,2-Trichloroethane	ND		
Trichloroethene	ND		
Trichlorofluoromethane	ND		
Vinyl chloride	ND		

SHS-16 (Continued)

AROMATICS	10/92	11/92	12/92
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		
Trichlorotrifluoroethane	ND		

SHS-17

GENERAL WATER CHEMISTRY	10/92	11/92	12/92
Lab pH (s.u.)			
Lab conductivity, umhos/cm			
Lab resistivity, ohm-m			
Total dissolved solids (180)			
Total dissolved solids (calc)			
Total alkalinity as CaCO ₃			
Total hardness as CaCO ₃			
Sodium absorption ratio			
Bicarbonate as HCO ₃			
Carbonate as CO ₃			
Chloride			
Sulfate			
Calcium			
Magnesium			
Potassium			
Sodium			
HALOCARBONS			
Bromodichloromethane	ND		
Bromoform	ND		
Bromomethane	ND		
Carbon tetrachloride	ND		
Chloroethane	ND		
2-Chloroethylvinylether	ND		
Chloroform	ND		
Chloromethane	ND		
Dibromochloromethane	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		
1,2-Dichloroethene	ND		
cis-1,2-Dichloroethene	ND		
trans-1,2-Dichloroethene	ND		
1,2-Dichloropropane	ND		
cis-1,3-Dichloropropene	ND		
trans-1,3-Dichloropropene	ND		
Methylene chloride	ND		
1,1,2,2-Tetrachloroethane	ND		
Tetrachloroethene	ND		
1,1,1-Trichloroethane	ND		
1,1,2-Trichloroethane	ND		
Trichloroethene	ND		
Trichlorofluoromethane	ND		
Vinyl chloride	ND		

SHS-17 (Continued)

AROMATICS	10/92	11/92	12/92
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		
Trichlorotrifluoroethane	ND		

SHS-18

GENERAL WATER CHEMISTRY

10/92

11/92

12/92

Lab pH (s.u.)

Lab conductivity, umhos/cm

Lab resistivity, ohm-m

Total dissolved solids (180)

Total dissolved solids (calc)

Total alkalinity as CaCO₃Total hardness as CaCO₃

Sodium absorption ratio

Bicarbonate as HCO₃Carbonate as CO₃

Chloride

Sulfate

Calcium

Magnesium

Potassium

Sodium

HALOCARBONS

Bromodichloromethane

ND

Bromoform

ND

Bromomethane

ND

Carbon tetrachloride

ND

Chloroethane

ND

2-Chloroethylvinylether

ND

Chloroform

ND

Chloromethane

ND

Dibromochloromethane

ND

1,2-Dichlorobenzene

ND

1,3-Dichlorobenzene

ND

1,4-Dichlorobenzene

ND

1,1-Dichloroethane

ND

1,2-Dichloroethane

ND

1,2-Dichloroethene

0.40

cis-1,2-Dichloroethene

ND

trans-1,2-Dichloroethene

ND

1,2-Dichloropropane

ND

cis-1,3-Dichloropropene

ND

trans-1,3-Dichloropropene

ND

Methylene chloride

ND

1,1,2,2-Tetrachloroethane

ND

Tetrachloroethene

ND

1,1,1-Trichloroethane

ND

1,1,2-Trichloroethane

ND

Trichloroethene

ND

Trichlorofluoromethane

ND

Vinyl chloride

ND

SHS-18 (Continued)

AROMATICS	10/92	11/92	12/92
Benzene	9.00		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
6.00	ND		
Ethylbenzene	76.00		
Toluene	ND		
Xylenes	150.00		
Trichlorotrifluoroethane	ND		

GIANT REFINING BLOOMFIELD REFINERY
QUARTERLY POTENTIOMETRIC SURFACE

OCTOBER, 1992

WELL #	WELLHEAD ELEVATION IN FEET	DEPTH TO WATER IN FEET	DEPTH TO PRODUCT IN FEET	PRODUCT THICKNESS IN FEET	ADJUSTED WSEL* IN FEET
GRW-1	5394.30	58.30	58.30	0.00	5336.00
GRW-2	5391.28	46.52	46.52	0.00	5344.76
GRW-3	5388.77	46.77	46.77	0.00	5342.00
GRW-4	5390.02	49.80	49.80	0.00	5340.22
GRW-5	5390.56	47.55	47.55	0.00	5343.01
GRW-6	5390.81	45.71	45.71	0.00	5345.10
GRW-10	5395.02	46.10	46.10	0.00	5348.92
GRW-11	5397.85	59.10	59.10	0.00	5338.75
GRW-12	5397.24	46.93	46.93	0.00	5350.31
GRW-13	5396.90	55.90	55.90	0.00	5341.00
GBR-5	5395.07	26.44	25.13	1.31	5369.68
GBR-6	5395.70	58.85	58.85	0.00	5336.85
GBR-7	5395.85	30.87	30.21	0.66	5365.51
GBR-8	5390.50	41.20	40.74	0.46	5349.67
GBR-9	5389.92	49.56	49.56	0.00	5340.36
GBR-10	5390.57	41.29	41.29	0.00	5349.28
GBR-11	5389.43	40.20	40.19	0.01	5349.24
GBR-13	5393.04	37.72	37.72	0.00	5355.32
GBR-15	5397.99	42.53	42.53	0.00	5355.46
GBR-17	5402.69	35.48	35.48	0.00	5367.21
GBR-18	5421.68	26.09	26.09	0.00	5395.59
GBR-19	5393.83	38.36	38.36	0.00	5355.47
GBR-20	5393.47	37.90	37.30	0.60	5356.05
GBR-21S	5400.65	20.10	20.10	0.00	5380.55
GBR-21D	5400.19	34.61	34.61	0.00	5365.58
GBR-22	5395.91	36.59	35.58	1.01	5360.13
GBR-23	5403.72	22.97	22.97	0.00	5377.30
GBR-24S	5396.08	26.42	26.42	0.00	5364.73
GBR-24D	5396.77	31.35	31.35	0.00	5365.42
GBR-25	5396.72	30.54	30.54	0.00	5366.18
GBR-26	5395.59	37.31	37.31	0.00	5358.28
GBR-30	5396.58	33.77	33.77	0.00	5362.81
GBR-31	5394.86	34.85	34.85	0.00	5360.01
GBR-33	5396.28	37.44	37.44	0.00	5358.84
GBR-34	5394.00	35.27	35.00	0.27	5358.95
GBR-35	5393.66	34.88	34.81	0.07	5358.84
GBR-39	5397.55	39.81	39.81	0.00	5357.74
GBR-40	5400.76	27.88	27.88	0.00	5372.88
GBR-41	5396.35	20.76	20.76	0.00	5375.59
GBR-51	5389.68	39.79	39.79	0.00	5349.89
GBR-52	5387.74	38.20	38.20	0.00	5349.54

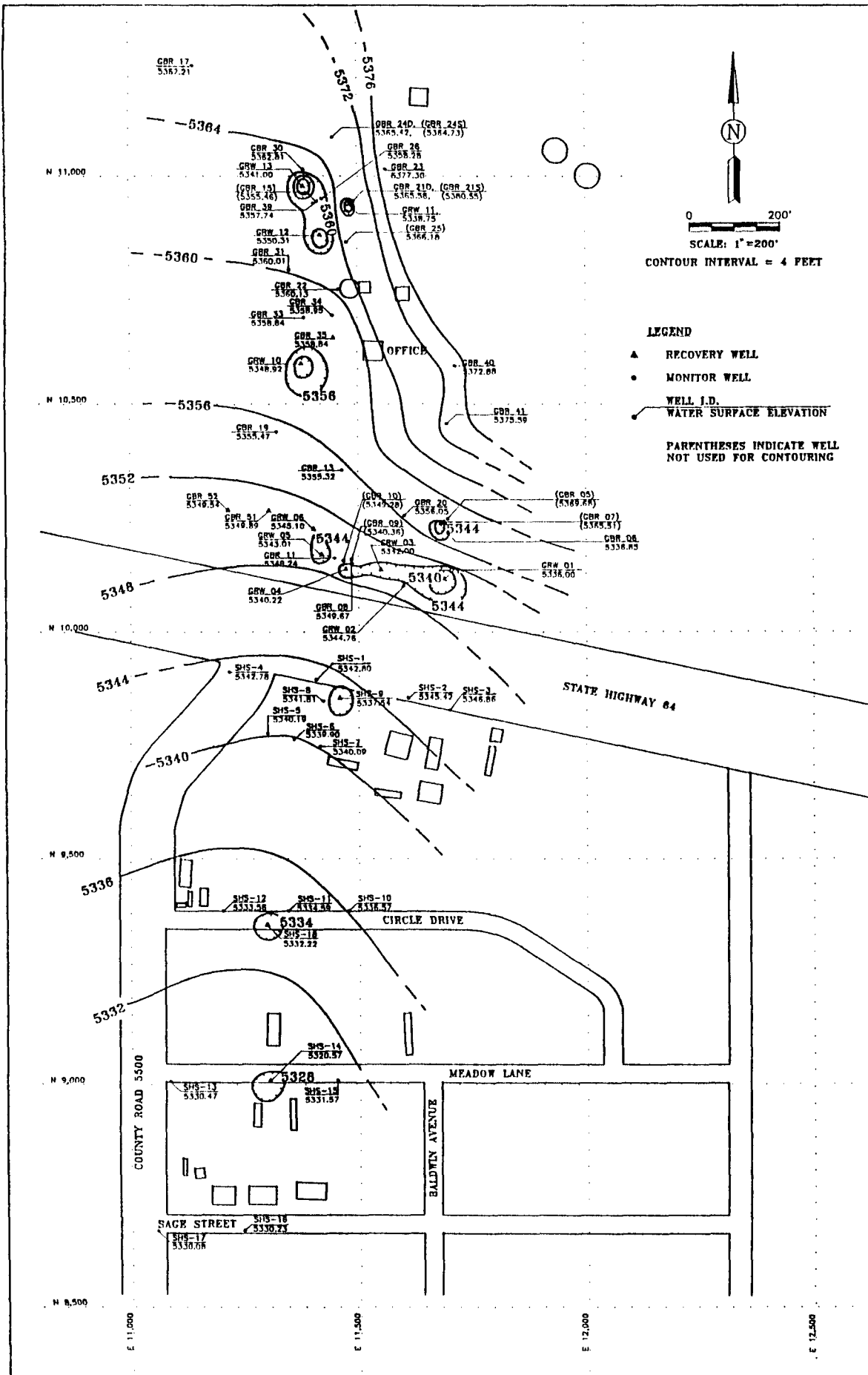
* WSEL - WATER SURFACE ELEVATION ADJUSTED FOR PRODUCT DEPTH

GIANT REFINING BLOOMFIELD REFINERY
 QUARTERLY POTENTIOMETRIC SURFACE
 OCTOBER, 1992
 Page 2

WELL #	WELLHEAD ELEVATION IN FEET	DEPTH TO WATER IN FEET	DEPTH TO PRODUCT IN FEET	PRODUCT THICKNESS IN FEET	ADJUSTED WSEL* IN FEET
SHS-1	5383.54	40.75	40.74	0.01	5342.80
SHS-2	5381.66	36.24	36.24	0.00	5345.42
SHS-3	5383.33	36.47	36.47	0.00	5346.86
SHS-4	5383.62	40.84	40.84	0.00	5342.78
SHS-5	5378.36	38.17	38.17	0.00	5340.19
SHS-6	5378.17	38.27	38.27	0.00	5339.90
SHS-7	5375.89	35.80	35.80	0.00	5340.09
SHS-8	5380.25	38.44	38.44	0.00	5341.81
SHS-9	5380.79	43.25	43.25	0.00	5337.54
SHS-10	5373.80	37.23	37.23	0.00	5336.57
SHS-11	5373.17	38.58	38.58	0.00	5334.59
SHS-12	5373.94	40.38	40.38	0.00	5333.56
SHS-13	5367.81	37.34	37.34	0.00	5330.47
SHS-14	5367.07	46.50	46.50	0.00	5320.57
SHS-15	5366.21	34.64	34.64	0.00	5331.57
SHS-16	5362.58	32.35	32.35	0.00	5330.23
SHS-17	5364.35	34.27	34.27	0.00	5330.08
SHS-18	5373.64	41.42	41.42	0.00	5332.22

* WSEL - WATER SURFACE ELEVATION ADJUSTED FOR PRODUCT DEPTH

October 1992, Water Surface Contour Map
Giant-Bloomfield Refinery



Giant Refining Co. Bloomfield Refinery
Quarterly Net Tank
Volume Change

Fourth Quarter, 1992

Tank Number	Beginning Volume	Ending Volume	Net Change
102	14369	14509	140
106	8010	8010	0
21	363474	260459	-103015
22	259158	250887	-8271
27	0	0	0
32	0	0	0
34	0	0	0
35	0	0	0
37	0	0	0
Total Net Volume Change			-111146

Giant Refining Co. Bloomfield Refinery
Quarterly Recovery Well
Volume Tabulation

Fourth Quarter, 1992

Well	Month #1	Month #2	Month #3	Total
GRW-1	13750	6520	10910	31180
GRW-2	20680	9020	14010	43710
GRW-3	7550	7830	15390	30770
GRW-4	27160	13940	29050	70150
GRW-5	58450	24880	46080	129410
GRW-6	40630	22530	49080	112240
GRW-9	11850	4550	8030	24430
GRW-10	251720	106620	252450	610790
GRW-11	50930	21060	46450	118440
GRW-12	14900	7360	18120	40380
GRW-13	17520	8850	21790	48160
SHS-7	0	193	94	287
SHS-9	17273	7695	4802	29770
SHS-14	150524	76170	39252	265946
SHS-18	53949	24794	13922	92665
Total Volume Pumped In Gallons				1648328

Giant Refining Co. Bloomfield Refinery
Total Volume Summary

Fourth Quarter, 1992

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Total Volume Of Water Recovered	1648328
Net Change In Storage Volume	-111146

Total Water Pumped To The Infiltration Gallery	1594644
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Difference	-164830
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Comments: Total Water Pumped To The
Infiltration Gallery was estimated
due to repeated meter failure
during December, 1992.

SECTION 5

Specific Conductance Tracking

GRW-13

GENERAL WATER CHEMISTRY

Lab conductivity, umhos/cm

10/92

11/92

12/92

4090.00

4180.00

4440.00



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20978901

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT	: GIANT REFINING, FARMINGTON	DATE SAMPLED	: 09/21/92
PROJECT #	: 9834	DATE RECEIVED	: 09/22/92
PROJECT NAME	: REF REMEDIAT	DATE EXTRACTED	: N/A
CLIENT I.D.	: 9209211309 STRIPPER EFFLUENT	DATE ANALYZED	: 09/25/92
SAMPLE MATRIX	: AQUEOUS	UNITS	: UG/L
		DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
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BENZENE	0.9
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	0.9
1,2-DICHLOROETHANE	0.5
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	1.0
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	1.6
TRICHLOROTRIFLUOROETHANE	<2.0

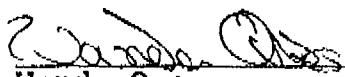
SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	98
BROMOFLUOROBENZENE (%)	104

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 10/26/92
 ID: Stripper Influent
 SITE: 9210121450 DATE RECEIVED: 10/12/92
 LAB NO: 1004 DATE COLLECTED: 10/12/92

Lab pH (s.u.)..... 7.15
 Lab Conductivity, umhos/cm @ 25C.... 3590
 Lab Resistivity, ohm-m..... 2.79
 Total Dissolved Solids (180C), mg/L. 2720
 Total Dissolved Solids (calc), mg/L. 2620
 Total Alkalinity, as CaCO₃, mg/L..... 364
 Total Hardness as CaCO₃, mg/L..... 1000
 Sodium Adsorption Ratio..... 6.86

	mg/L	meq/L
Bicarbonate as HCO ₃	443	7.27
Carbonate as CO ₃	<0.10	<0.01
Chloride.....	407	11.5
Sulfate.....	1100	23
Calcium.....	362	18.1
Magnesium.....	24	1.97
Potassium.....	2.46	0.06
Sodium.....	499	21.7
Major Cations.....		41.8
Major Anions.....		41.8
Cation/Anion Difference.....		0.05 %


 Wanda Orso
 Water Lab Supervisor

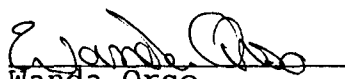
Post-It™ brand fax transmittal memo 7671		# of pages ▶ 1
To <i>DEAN</i>	From <i>FRAN</i>	
Co. <i>Giant Ref.</i>	Co. <i>FAL</i>	
Dept.	Phone #	
Fax #	Fax #	

CLIENT: Giant Refinery
ID: Stripper Effluent
SITE: 9210161535
LAB NO: 1036

DATE REPORTED: 10/29/92
DATE RECEIVED: 10/16/92
DATE COLLECTED: 10/16/92

Lab pH (s.u.).....	6.86
Lab Conductivity, umhos/cm @ 25C....	3800
Lab Resistivity, ohm-m.....	2.63
Total Dissolved Solids (180C), mg/L.	2670
Total Dissolved Solids (calc), mg/L.	2620
Total Alkalinity as CaCO ₃ , mg/L.....	304
Total Hardness as CaCO ₃ , mg/L.....	996
Sodium Adsorption Ratio.....	6.72

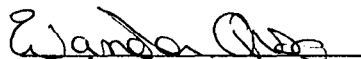
	mg/L	meq/L
Bicarbonate as HCO ₃	371	6.08
Carbonate as CO ₃	<0.10	<0.01
Chloride.....	465	13.1
Sulfate.....	1100	22.9
Calcium.....	363	18.1
Magnesium.....	22.3	1.84
Potassium.....	2.54	0.06
Sodium.....	488	21.2
Major Cations.....		41.2
Major Anions.....		42.1
Cation/Anion Difference.....		1.08 %


Wanda Orso
Water Lab Supervisor

CLIENT: Giant Refinery
ID: RW 13
SITE: 9210161540
LAB NO: 1037

DATE REPORTED: 10/29/92
DATE RECEIVED: 10/16/92
DATE COLLECTED: 10/16/92

Lab Conductivity, umhos/cm @ 25C.... 4090


Wanda Orso
Water Lab Supervisor



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 21063601

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REFINERY REM
CLIENT I.D. : 9210081255 GBR-19
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 10/08/92
DATE RECEIVED : 10/09/92
DATE EXTRACTED : N/A
DATE ANALYZED : 10/16/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
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BENZENE	28.1
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	0.8
1,2-DICHLOROETHANE	2.7
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	2.7
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	0.9
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	2.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	1.0
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	95
BROMOFLUOROBENZENE (%)	82



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 21063701

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFF SITE
CLIENT I.D. : 9210081339 SHS-3
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 10/08/92
DATE RECEIVED : 10/09/92
DATE EXTRACTED : N/A
DATE ANALYZED : 10/20/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS

RESULTS

BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	88
BROMOFLUOROBENZENE (%)	101



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 21063702

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFF SITE
CLIENT I.D. : 9210081438 SHS-6
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 10/08/92
DATE RECEIVED : 10/09/92
DATE EXTRACTED : N/A
DATE ANALYZED : 10/20/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	0.4
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	90
BROMOFLUOROBENZENE (%)	95



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 21063703

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFF SITE
CLIENT I.D. : 9210081528 SHS-10
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 10/08/92
DATE RECEIVED : 10/09/92
DATE EXTRACTED : N/A
DATE ANALYZED : 10/20/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS

RESULTS

BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	13.3
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	1.0
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	99
BROMOFLUOROBENZENE (%)	91

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 21065701

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFF SITE
CLIENT I.D. : 9210091312 SHS-12
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 10/09/92
DATE RECEIVED : 10/10/92
DATE EXTRACTED : N/A
DATE ANALYZED : 10/19/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
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BENZENE	0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	4.9
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	10.6
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	100
BROMOFLUOROBENZENE (%)	89

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 21065702

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT	: GIANT REFINING, FARMINGTON	DATE SAMPLED	: 10/09/92
PROJECT #	: 9002-67	DATE RECEIVED	: 10/10/92
PROJECT NAME	: OFF SITE	DATE EXTRACTED	: N/A
CLIENT I.D.	: 9210091325 SHS-18	DATE ANALYZED	: 10/22/92
SAMPLE MATRIX	: AQUEOUS	UNITS	: UG/L
		DILUTION FACTOR	: 2

COMPOUNDS	RESULTS
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BENZENE	9
BROMODICHLOROMETHANE	<0.4
BROMOFORM	<0.4
BROMOMETHANE	<0.4
CARBON TETRACHLORIDE	<0.4
CHLOROBENZENE	<1.0
CHLOROETHANE	<0.4
CHLOROFORM	<0.4
CHLOROMETHANE	<0.4
DIBROMOCHLOROMETHANE	<0.4
2-CHLOROETHYL VINYL ETHER	<1.0
1,3-DICHLOROBENZENE	<1.0
1,2 & 1,4-DICHLOROBENZENE	<1.0
DICHLORODIFLUOROMETHANE	<0.4
1,1-DICHLOROETHANE	<0.4
1,2-DICHLOROETHANE	0.4
1,1-DICHLOROETHENE	<0.4
1,2-DICHLOROETHENE (TOTAL)	<0.4
1,2-DICHLOROPROPANE	<0.4
CIS-1,3-DICHLOROPROPENE	<0.4
TRANS-1,3-DICHLOROPROPENE	<0.4
ETHYLBENZENE	76
METHYLENE CHLORIDE	<4.0
1,1,2,2-TETRACHLOROETHANE	<0.4
TETRACHLOROETHENE	<0.4
TOLUENE	<1.0
1,1,1-TRICHLOROETHANE	<0.4
1,1,2-TRICHLOROETHANE	<0.4
TRICHLOROETHENE	<0.4
TRICHLOROFLUOROMETHANE	<1.0
VINYL CHLORIDE	<0.4
TOTAL XYLENES	150
TRICHLOROTRIFLUOROETHANE	<4.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	81
BROMOFLUOROBENZENE (%)	82



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 21065703

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFF SITE
CLIENT I.D. : 9210091430 SHS-13
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 10/09/92
DATE RECEIVED : 10/10/92
DATE EXTRACTED : N/A
DATE ANALYZED : 10/20/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
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BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	1.5
1,2-DICHLOROETHANE	4.7
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	0.6
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	82
BROMOFLUOROBENZENE (%)	98



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 21065704

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFF SITE
CLIENT I.D. : 9210091528 SHS-15
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 10/09/92
DATE RECEIVED : 10/10/92
DATE EXTRACTED : N/A
DATE ANALYZED : 10/19/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
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BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	3.3
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	92
BROMOFLUOROBENZENE (%)	91



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 21065705

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT	: GIANT REFINING, FARMINGTON	DATE SAMPLED	: 10/09/92
PROJECT #	: 9002-67	DATE RECEIVED	: 10/10/92
PROJECT NAME	: OFF SITE	DATE EXTRACTED	: N/A
CLIENT I.D.	: 9210091555 STRIPPER EFFLUENT	DATE ANALYZED	: 10/19/92
SAMPLE MATRIX	: AQUEOUS	UNITS	: UG/L
		DILUTION FACTOR	: 1

COMPOUNDS

RESULTS

BENZENE	2.2
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	0.6
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	2.1
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	1.8
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	2.0
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	104
BROMOFLUOROBENZENE (%)	102



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 21068401

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REFINERY REM
CLIENT I.D. : 9210121450 STRIPPER INFLUENT
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 10/12/92
DATE RECEIVED : 10/13/92
DATE EXTRACTED : N/A
DATE ANALYZED : 10/17/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
BENZENE	19.3
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	0.4
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	3.0
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	11.2
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	90
BROMOFLUOROBENZENE (%)	95



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 21068501

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFF SITE
CLIENT I.D. : 9210121315 SHS-16
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 10/12/92
DATE RECEIVED : 10/13/92
DATE EXTRACTED : N/A
DATE ANALYZED : 10/19/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS

RESULTS

BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	99
ROMOFLUOROBENZENE (%)	96



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 21068502

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFF SITE
CLIENT I.D. : 9210121415 SHS-17
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 10/12/92
DATE RECEIVED : 10/13/92
DATE EXTRACTED : N/A
DATE ANALYZED : 10/19/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
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BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	96
ROMOFLUOROBENZENE (%)	88

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 12/04/92
ID: Stripper Effluent
SITE: 9211231320 DATE RECEIVED: 11/23/92
LAB NO: F1348 DATE COLLECTED: 11/23/92

Lab pH (s.u.)..... 7.12
Lab Conductivity, umhos/cm @ 25C.... 3600
Lab Resistivity, ohm-m..... 2.78
Total Dissolved Solids (180C), mg/L. 2650
Total Dissolved Solids (calc), mg/L. 2570
Total Alkalinity as CaCO₃, mg/L..... 344
Total Hardness as CaCO₃, mg/L..... 988
Sodium Adsorption Ratio..... 6.62

	mg/L	meq/L
Bicarbonate as HCO ₃	420	6.88
Carbonate as CO ₃	<0.10	<0.01
Chloride.....	410	11.6
Sulfate.....	1100	23
Calcium.....	325	16.2
Magnesium.....	43.3	3.56
Potassium.....	2.52	0.06
Sodium.....	478	20.8
Major Cations.....		40.6
Major Anions.....		41.4
Cation/Anion Difference.....		1.01 %


Wanda Orso
Water Lab Supervisor

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 12/03/92
ID: Stripper Influent
SITE: 9211160855 DATE RECEIVED: 11/16/92
LAB NO: F1311 DATE COLLECTED: 11/16/92

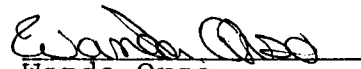
Lab pH (s.u.).....	7.55
Lab Conductivity, umhos/cm @ 25C....	3550
Lab Resistivity, ohm-m.....	2.82
Total Dissolved Solids (180C), mg/L.	2670
Total Dissolved Solids (calc), mg/L.	2510
Total Alkalinity as CaCO ₃ , mg/L.....	408
Total Hardness as CaCO ₃ , mg/L.....	991
Sodium Adsorption Ratio.....	6.72

	mg/L	meq/L
Bicarbonate as HCO ₃	498	8.16
Carbonate as CO ₃	<0.10	<0.01
Chloride.....	365	10.3
Sulfate.....	1120	23.4
Calcium.....	137	6.82
Magnesium.....	158	13
Potassium.....	2.51	0.06
Sodium.....	486	21.1
Major Cations.....		41
Major Anions.....		41.8
Cation/Anion Difference.....		0.98 %


Wanda Orso
Water Lab Supervisor

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 12/03/92
ID: RW 13
SITE: 9211161377 DATE RECEIVED: 11/16/92
LAB NO: F1312 DATE COLLECTED: 11/16/92

Lab Conductivity, umhos/cm @ 25C.... 4180


Wanda Orso
Water Lab Supervisor

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 21174201

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT	: GIANT REFINING, FARMINGTON	DATE SAMPLED	: 11/16/92
PROJECT #	: 9834	DATE RECEIVED	: 11/17/92
PROJECT NAME	: REFINERY REM	DATE EXTRACTED	: N/A
CLIENT I.D.	: 921116855 STRIPPER INFLUENT	DATE ANALYZED	: 11/18/92
SAMPLE MATRIX	: AQUEOUS	UNITS	: UG/L
		DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
BENZENE	30.0
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	0.7
1,2-DICHLOROETHANE	0.5
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	3.3
ETHYLBENZENE	13.9
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	16
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	88
BROMOFLUOROBENZENE (%)	110



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 21186801

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REFINER REMED
CLIENT I.D. : 9211231320 STRIPPER EFFLUENT
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 11/23/92
DATE RECEIVED : 11/24/92
DATE EXTRACTED : N/A
DATE ANALYZED : 12/04/92
UNITS : UG/L
DILUTION FACTOR : 1

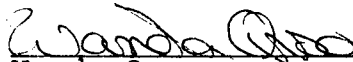
COMPOUNDS	RESULTS
BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	0.3
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	113
BROMOFLUOROBENZENE (%)	111

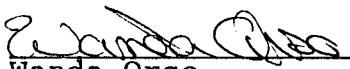
CLIENT: Giant Bloomfield Refinery DATE REPORTED: 12/08/92
ID: RW 13
SITE: 9212071600 DATE RECEIVED: 12/07/92
LAB NO: F1418 DATE COLLECTED: 12/07/92

Lab Conductivity, umhos/cm @ 25C.... 4440


Wanda Orso
Water Lab Supervisor

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 12/08/92
ID: Stripper Effluent
SITE: 9212071605 DATE RECEIVED: 12/07/92
LAB NO: F1419 DATE COLLECTED: 12/07/92

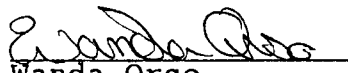
Lab Conductivity, umhos/cm @ 25C.... 3610


Wanda Orso
Water Lab Supervisor

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 12/21/92
ID: 9212091305
SITE: Stripper Influent DATE RECEIVED: 12/09/92
LAB NO: F1440 DATE COLLECTED: 12/09/92

Lab pH (s.u.)..... 8.03
Lab Conductivity, umhos/cm @ 25C.... 3550
Lab Resistivity, ohm-m..... 2.82
Total Dissolved Solids (180C), mg/L. 2690
Total Dissolved Solids (calc), mg/L. 2520
Total Alkalinity as CaCO₃, mg/L..... 299
Total Hardness as CaCO₃, mg/L..... 991
Sodium Adsorption Ratio..... 6.63

	mg/L	meq/L
Bicarbonate as HCO ₃	365	5.98
Carbonate as CO ₃	<0.10	<0.01
Chloride.....	353	9.95
Sulfate.....	1150	23.9
Calcium.....	299	14.9
Magnesium.....	59.7	4.91
Potassium.....	2.51	0.06
Sodium.....	480	20.9
Major Cations.....		40.8
Major Anions.....		39.9
Cation/Anion Difference.....		1.1 %


Wanda Orso
Water Lab Supervisor

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 21264501

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REFINERY REM
CLIENT I.D. : 9212071605 STRIPPER EFFLUENT
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 12/07/92
DATE RECEIVED : 12/08/92
DATE EXTRACTED : N/A
DATE ANALYZED : 12/12/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
-----------	---------

BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
1-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL.)	0.3
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	97
BROMOFLUOROBENZENE (%)	98

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 21270301

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REFINERY REM
CLIENT I.D. : 9212091305 STRIPPER INFLUENT
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 12/09/92
DATE RECEIVED : 12/10/92
DATE EXTRACTED : N/A
DATE ANALYZED : 12/16/92
UNITS : UG/L
DILUTION FACTOR : 5

COMPOUNDS

RESULTS

BENZENE	30
BROMODICHLOROMETHANE	<1.0
BROMOFORM	<1.0
BROMOMETHANE	<1.0
CARBON TETRACHLORIDE	<1.0
CHLOROBENZENE	<2.5
CHLOROETHANE	<1.0
CHLOROFORM	<1.0
CHLOROMETHANE	<1.0
DIBROMOCHLOROMETHANE	<1.0
2-CHLOROETHYL VINYL ETHER	<2.5
1,3-DICHLOROBENZENE	<2.5
1,2 & 1,4-DICHLOROBENZENE	<2.5
DICHLORODIFLUOROMETHANE	<1.0
1,1-DICHLOROETHANE	<1.0
1,2-DICHLOROETHANE	<1.0
1,1-DICHLOROETHENE	<1.0
1,2-DICHLOROETHENE (TOTAL)	1
1,2-DICHLOROPROPANE	<1.0
CIS-1,3-DICHLOROPROPENE	<1.0
TRANS-1,3-DICHLOROPROPENE	<1.0
ETHYLBENZENE	<2.5
METHYLENE CHLORIDE	<10.0
1,1,2,2-TETRACHLOROETHANE	<1.0
TETRACHLOROETHENE	<1.0
TOLUENE	<2.5
1,1,1-TRICHLOROETHANE	<1.0
1,1,2-TRICHLOROETHANE	<1.0
TRICHLOROETHENE	<1.0
TRICHLOROFLUOROMETHANE	<2.5
VINYL CHLORIDE	<1.0
TOTAL XYLENES	11
TRICHLOROTRIFLUOROETHANE	<10.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	94
BROMOFLUOROBENZENE (%)	86

OIL CONSERVATION DIVISION
RECEIVED

'92 NOV 13 AM 8 59

GIANT
REFINING CO.

P.O. Box 256
Farmington, New Mexico
87499

505
632-3306

November 2, 1992

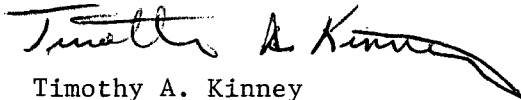
Mr. William Olson
New Mexico Oil Conservation Division
P. O. Box 2088
Santa Fe, NM 87504-2088

Dear Mr. Olson:

Enclosed is Giant Refining Company's quarterly report
for the Bloomfield Refinery Remediation Project for the
third quarter of 1992.

Please contact me if you have any questions.

Sincerely,



Timothy A. Kinney
Remediation Project Manager

/dm

Enclosure

cc Carl Shook
Kim Bullerdick
Debbie Smith

QUARTERLY DATA REPORT
GIANT BLOOMFIELD REFINERY
THIRD QUARTER, 1992

Prepared By:

GIANT REFINING COMPANY
5764 U. S. Highway 64
P. O. Box 256
Farmington, NM 87499
(505) 632-3306
FAX (505) 632-2487

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Introduction and Summary.....	Section 1
Quarterly Analytical Results.....	Section 2
Potentiometric Surface Maps	Section 3
Total Volume History	Section 4
Specific Conductance Tracking	Section 5
Construction/Completion of SHS-17 and SHS-18	Section 6

INTRODUCTION AND SUMMARY QUARTERLY REPORT THIRD QUARTER, 1992

INTRODUCTION

Some changes were made to the remediation system during the third quarter of 1992. Treated water is being split between the two infiltration galleries in the refinery. Recovery well SHS-11, part of the offsite recovery well network, has been replaced by SHS-18, which is now an operational recovery well. SHS-7 is in the process of being converted to a recovery well. It should be operational in the fourth quarter of 1992. Monitor well SHS-17 has been completed, and the results of its water analysis, as well as its lithologic and completion information, are included.

SUMMARY

Section 2

Section 2 contains a summary of the quarterly analytical results. Raw data, as received from the laboratory, is available on request as a supplement to the quarterly report.

Section 3

A quarterly potentiometric surface map, as well as the adjusted water surface elevation and product thickness for each well, is included in Section 3.

Section 4

Section 4 illustrates the volume history for the quarter. Total volume pumped from each well, as well as current tank volumes and the reinjection volume, is reported. Additional detail, on a weekly basis, is also available if desired. Tanks 27, 32, 34, 35, and 37 have been emptied and taken out of service.

Section 5

Specific conductance tracking for GRW-13 is included in this section.

Section 6

Details of the construction and completion of SHS-17 and SHS-18 are included in this section.

SECTION 2

The following pages show the quarterly analytical data for the Giant Refining Remediation Project. The data is broken down into units as described below.

	Unit of <u>Measure</u>
Total dissolved solids (180)	mg/l
Total dissolved solids (calc)	mg/l
Total alkalinity as CaCO ₃	mg/l
Total hardness as CaCO ₃	mg/l
Bicarbonate as HCO ₃	mg/l
Carbonate as CO ₃	mg/l
Chloride	mg/l
Sulfate	mg/l
Calcium	mg/l
Magnesium	mg/l
Potassium	mg/l
Sodium	mg/l

The remainder of the data is measured in ug/l.

GIANT REFINING COMPANY
 ONSITE REMEDIATION PROJECT
 QUARTERLY ANALYTICAL DATA SUMMARY
 THIRD QUARTER, 1992

STRIPPER INFLUENT

	7/92	8/92	9/92
GENERAL WATER CHEMISTRY			
Lab pH (s.u.)	6.41	6.58	
Lab conductivity, umhos/cm	3190.00	3170.00	
Lab resistivity, ohm-m	3.13	3.15	
Total dissolved solids (180)	2700.00	2760.00	
Total dissolved solids (calc)	2680.00	2650.00	
Total alkalinity as CaCO3	252.00	263.00	
Total hardness as CaCO3	969.00	986.00	
Sodium absorption ratio	7.60	7.20	
Bicarbonate as HCO3	307.00	321.00	
Carbonate as CO3	<.10	<.10	
Chloride	427.00	470.00	
Sulfate	1190.00	1120.00	
Calcium	337.00	335.00	
Magnesium	31.30	36.60	
Potassium	3.10	5.08	
Sodium	544.00	520.00	
HALOCARBONS			
Bromodichloromethane	ND	ND	
Bromoform	ND	ND	
Bromomethane	ND	ND	
Carbon tetrachloride	ND	ND	
Chloroethane	ND	1.20	
2-Chloroethylvinylether	ND	ND	
Chloroform	ND	ND	
Chloromethane	ND	ND	
Dibromochloromethane	ND	ND	
1,2-Dichlorobenzene	ND	ND	
1,3-Dichlorobenzene	ND	ND	
1,4-Dichlorobenzene	ND	ND	
1,1-Dichloroethane	0.80	0.80	
1,2-Dichloroethane	0.40	0.40	
1,1-Dichloroethene	ND	ND	
1,2-Dichloroethene	1.80	1.20	
trans-1,2-Dichloroethene	ND	ND	
1,2-Dichloropropane	ND	ND	
cis-1,3-Dichloropropene	ND	ND	
trans-1,3-Dichloropropene	ND	ND	
Methylene chloride	ND	ND	
1,1,2,2-Tetrachloroethane	ND	ND	
Tetrachloroethene	ND	ND	

STRIPPER INFLUENT (Continued)

	7/92	8/92	9/92
1,1,1-Trichloroethane	ND	ND	
1,1,2-Trichloroethane	ND	ND	
Trichloroethene	ND	ND	
Trichlorofluoromethane	ND	ND	
Vinyl chloride	ND	ND	

AROMATICS

Benzene	11.70	15.60	
Chlorobenzene	ND	ND	
1,2-Dichlorobenzene	ND	ND	
1,3-Dichlorobenzene	ND	ND	
1,4-Dichlorobenzene	ND	ND	
Ethylbenzene	3.30	4.40	
Toluene	ND	ND	
Xylenes	3.30	5.40	
Trichlorotrifluoroethane	ND		

STRIPPER EFFLUENT

	7/92	8/92	9/92
GENERAL WATER CHEMISTRY			
Lab pH (s.u.)	7.32	6.92	
Lab conductivity, umhos/cm	3320.00	3670.00	
Lab resistivity, ohm-m	3.02	2.72	
Total dissolved solids (180)	2780.00	2820.00	
Total dissolved solids (calc)	2620.00	2630.00	
Total alkalinity as CaCO3	113.00	33.30	
Total hardness as CaCO3	1030.00	931.00	
Sodium absorption ratio	6.23	6.85	
Bicarbonate as HCO3	138.00	40.90	
Carbonate as CO3	<.10	<.10	
Chloride	545.00	599.00	
Sulfate	1160.00	1130.00	
Calcium	327.00	310.00	
Magnesium	52.40	38.20	
Potassium	2.74	53.60	
Sodium	460.00	480.00	

HALOCARBONS

Bromodichloromethane	ND	ND
Bromoform	ND	ND
Bromomethane	ND	ND
Carbon tetrachloride	ND	ND
Chloroethane	ND	ND
Chloroethane	ND	ND
2-Chloroethylvinylether	ND	ND
Chloroform	ND	ND
Chloromethane	ND	ND
Dibromochloromethane	ND	ND
1,2-Dichlorobenzene	ND	ND
1,3-Dichlorobenzene	ND	ND
1,4-Dichlorobenzene	ND	ND
1,1-Dichloroethane	ND	ND
1,2-Dichloroethane	ND	ND
1,2-Dichloroethene	ND	ND
cis-1,2-Dic anthracene	ND	ND
trans-1,2-Dichloroethene	ND	ND
1,2-Dichloropropane	ND	ND
cis-1,3-Dichloropropene	ND	ND
trans-1,3-Dichloropropene	ND	ND
Methylene chloride	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND
Tetrachloroethene	ND	ND
1,1,1-Trichloroethane	ND	ND
1,1,2-Trichloroethane	ND	ND
Trichloroethene	ND	ND
Trichlorofluoromethane	ND	ND
Vinyl chloride	ND	ND

STRIPPER EFFLUENT (Continued)

	7/92	8/92	9/92
AROMATICS			
Benzene	ND	ND	
Chlorobenzene	ND	ND	
1,2-Dichlorobenzene	ND	ND	
1,3-Dichlorobenzene	ND	ND	
1,4-Dichlorobenzene	ND	ND	
Ethylbenzene	ND	ND	
Toluene	ND	ND	
Xylenes	ND	ND	
Trichlorotrifluoroethane	ND	ND	

GRW-2

GENERAL WATER CHEMISTRY
Nitrate

7/92

8/92

9/92

ND

GBR-15

7/92

8/92

9/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.48
Lab conductivity, umhos/cm	4400.00
Lab resistivity, ohm-m	2.27
Total dissolved solids (180)	3450.00
Total dissolved solids (calc)	3340.00
Total alkalinity as CaCO ₃	270.00
Total hardness as CaCO ₃	1050.00
Sodium absorption ratio	9.89
Bicarbonate as HCO ₃	329.00
Carbonate as CO ₃	<.10
Chloride	650.00
Sulfate	1390.00
Calcium	369.00
Magnesium	32.00
Potassium	5.00
Sodium	737.00

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	ND
1,2-Dichloroethane	23.30
1,1-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

GBR-15 (Continued)

7/92

8/92

9/92

AROMATICS

Benzene	2.50
Chlorobenzene	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
Ethylbenzene	ND
Toluene	ND
Xylenes	ND
Trichlorotrifluoroethane	ND

PAH

Acenaphthene
Acenaphthylene
Anthracene
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthene
Benzo(g,h,i)perylene
Benzo(k)fluoranthene
Chrysene
Dibenzo(a,h)anthracene
Fluoranthene
Fluorene
Indeno(1,2,3-cd)pyrene
Naphthalene
Phenanthrene
Pyrene

GBR-17

7/92

8/92

9/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.22
Lab conductivity, umhos/cm	2580.00
Lab resistivity, ohm-m	3.87
Total dissolved solids (180)	2300.00
Total dissolved solids (calc)	2190.00
Total alkalinity as CaCO ₃	226.00
Total hardness as CaCO ₃	912.00
Sodium absorption ratio	5.11
Bicarbonate as HCO ₃	276.00
Carbonate as CO ₃	<.10
Chloride	58.00
Sulfate	1300.00
Calcium	317.00
Magnesium	29.60
Potassium	0.78
Sodium	355.00

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chlorobenzene	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	ND
1,2-Dichloroethane	ND
1,1-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

GBR-17 (Continued)

	7/92	8/92	9/92
AROMATICS			
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		
Trichlorotrifluoroethane	ND		
PAH			
Acenaphthene			
Acenaphthylene			
Anthracene			
Benzo(a)anthracene			
Benzo(a)pyrene			
Benzo(b)fluoranthene			
Benzo(g,h,i)perylene			
Benzo(k)fluoranthene			
Chrysene			
Dibenzo(a,h)anthracene			
Fluoranthene			
Fluorene			
Indeno(1,2,3-cd)pyrene			
Naphthalene			
Phenanthrene			
Pyrene			

GBR-24-D

7/92

8/92

9/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.64
Lab conductivity, umhos/cm	4260.00
Lab resistivity, ohm-m	2.35
Total dissolved solids (180)	3880.00
Total dissolved solids (calc)	3750.00
Total alkalinity as CaCO ₃	234.00
Total hardness as CaCO ₃	1800.00
Sodium absorption ratio	5.51
Bicarbonate as HCO ₃	285.00
Carbonate as CO ₃	<.10
Chloride	741.00
Sulfate	1660.00
Calcium	579.00
Magnesium	85.40
Potassium	6.00
Sodium	537.00

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	1.40
1,1-Dichloroethane	0.80
1,2-Dichloroethane	36.60
1,1-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	0.50
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	0.30
Trichlorofluoromethane	ND
Vinyl chloride	ND

GBR-24D (Continued)

	7/92	8/92	9/92
AROMATICS			
Benzene	47.60		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	5.80		
Toluene	2.60		
Xylenes	ND		
Trichlorotrifluoroethane	ND		
PAH			
Acenaphthene			
Acenaphthylene			
Anthracene			
Benzo(a)anthracene			
Benzo(a)pyrene			
Benzo(b)fluoranthene			
Benzo(g,h,i)perylene			
Benzo(k)fluoranthene			
Chrysene			
Dibenzo(a,h)anthracene			
Fluoranthene			
Fluorene			
Indeno(1,2,3-cd)pyrene			
Naphthalene			
Phenanthrene			
Pyrene			

GBR-30

7/92

8/92

9/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	6.90
Lab conductivity, umhos/cm	3690.00
Lab resistivity, ohm-m	2.71
Total dissolved solids (180)	2950.00
Total dissolved solids (calc)	2940.00
Total alkalinity as CaCO ₃	201.00
Total hardness as CaCO ₃	1110.00
Sodium absorption ratio	7.58
Bicarbonate as HCO ₃	245.00
Carbonate as CO ₃	<.10
Chloride	590.00
Sulfate	1230.00
Calcium	381.00
Magnesium	38.50
Potassium	3.10
Sodium	580.00

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	ND
1,2-Dichloroethane	ND
1,1-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

GBR-30 (Continued)

	7/92	8/92	9/92
AROMATICS			
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		
Trichlorotrifluoroethane	ND		
PAH			
Acenaphthene			
Acenaphthylene			
Anthracene			
Benzo(a)anthracene			
Benzo(a)pyrene			
Benzo(b)fluoranthene			
Benzo(g,h,i)perylene			
Benzo(k)fluoranthene			
Chrysene			
Dibenzo(a,h)anthracene			
Fluoranthene			
Fluorene			
Indeno(1,2,3-cd)pyrene			
Naphthalene			
Phenanthrene			
Pyrene			

GBR-31

7/92

8/92

9/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	6.97
Lab conductivity, umhos/cm	3740.00
Lab resistivity, ohm-m	2.67
Total dissolved solids (180)	2940.00
Total dissolved solids (calc)	2860.00
Total alkalinity as CaCO ₃	167.00
Total hardness as CaCO ₃	1020.00
Sodium absorption ratio	7.65
Bicarbonate as HCO ₃	203.00
Carbonate as CO ₃	<.10
Chloride	578.00
Sulfate	1230.00
Calcium	351.00
Magnesium	36.20
Potassium	2.70
Sodium	563.00

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	ND
1,2-Dichloroethane	ND
1,2-Dichloroethene	ND
1,1-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

GBR-31 (Continued)

	7/92	8/92	9/92
AROMATICS			
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		

GBR-32

7/92

8/92

9/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.34
Lab conductivity, umhos/cm	4870.00
Lab resistivity, ohm-m	2.05
Total dissolved solids (180)	3990.00
Total dissolved solids (calc)	3910.00
Total alkalinity as CaCO3	363.00
Total hardness as CaCO3	1220.00
Sodium absorption ratio	10.70
Bicarbonate as HCO3	443.00
Carbonate as CO3	<.10
Chloride	497.00
Sulfate	1880.00
Calcium	411.00
Magnesium	47.20
Potassium	4.30
Sodium	856.00

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	3.70
1,2-Dichloroethane	ND
1,2-Dichloroethene	100D
1,1-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	5.60
1,1,1-Trichloroethane	0.30
1,1,2-Trichloroethane	ND
Trichloroethene	4.20
Trichlorofluoromethane	ND
Vinyl chloride	ND

GBR-32 (Continued)

	7/92	8/92	9/92
AROMATICS			
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		

GBR-48

7/92

8/92

9/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.21
Lab conductivity, umhos/cm	5300.00
Lab resistivity, ohm-m	1.89
Total dissolved solids (180)	4300.00
Total dissolved solids (calc)	4100.00
Total alkalinity as CaCO ₃	344.00
Total hardness as CaCO ₃	1350.00
Sodium absorption ratio	10.20
Bicarbonate as HCO ₃	420.00
Carbonate as CO ₃	<.10
Chloride	726.00
Sulfate	1800.00
Calcium	449.00
Magnesium	55.90
Potassium	5.08
Sodium	858.00

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	4.00
1,2-Dichloroethane	ND
1,2-Dichloroethene	120.00
1,1-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	7.00
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	5.00
Trichlorofluoromethane	ND
Vinyl chloride	ND

GBR-48 (Continued)

	7/92	8/92	9/92
AROMATICS			
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		

GBR-49

7/92

8/92

9/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.63
Lab conductivity, umhos/cm	4530.00
Lab resistivity, ohm-m	2.21
Total dissolved solids (180)	3740.00
Total dissolved solids (calc)	3660.00
Total alkalinity as CaCO ₃	372.00
Total hardness as CaCO ₃	1094.00
Sodium absorption ratio	10.70
Bicarbonate as HCO ₃	454.00
Carbonate as CO ₃	<.10
Chloride	459.00
Sulfate	1760.00
Calcium	357.00
Magnesium	49.60
Potassium	3.91
Sodium	810.00

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	2.90
1,2-Dichloroethane	ND
1,2-Dichloroethene	74D
1,1-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	4.60
1,1,1-Trichloroethane	0.20
1,1,2-Trichloroethane	ND
Trichloroethene	3.60
Trichlorofluoromethane	ND
Vinyl chloride	ND

GBR-49 (Continued)

	7/92	8/92	9/92
AROMATICS			
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		

GBR-50

7/92

8/92

9/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.21
Lab conductivity, umhos/cm	2800.00
Lab resistivity, ohm-m	3.57
Total dissolved solids (180)	2750.00
Total dissolved solids (calc)	2650.00
Total alkalinity as CaCO ₃	196.00
Total hardness as CaCO ₃	960.00
Sodium absorption ratio	6.85
Bicarbonate as HCO ₃	239.00
Carbonate as CO ₃	<.10
Chloride	39.30
Sulfate	1640.00
Calcium	331.00
Magnesium	32.80
Potassium	2.74
Sodium	488.00

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	ND
1,2-Dichloroethane	ND
1,2-Dichloroethene	0.50
1,1-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	0.30
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

GBR-50 (Continued)

	7/92	8/92	9/92
AROMATICS			
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		

OFFSITE WELLS

SHS-3

	7/92	8/92	9/92
GENERAL WATER CHEMISTRY			
Lab pH (s.u.)	6.69		
Lab conductivity, umhos/cm	4290.00		
Lab resistivity, ohm-m	2.33		
Total dissolved solids (180)	3850.00		
Total dissolved solids (calc)	3780.00		
Total alkalinity as CaCO3	209.00		
Total hardness as CaCO3	1750.00		
Sodium absorption ratio	5.28		
Bicarbonate as HCO3	256.00		
Carbonate as CO3	>.10		
Chloride	352.00		
Sulfate	2130.00		
Calcium	579.00		
Magnesium	74.40		
Potassium	9.00		
Sodium	508.00		

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	ND
1,2-Dichloroethane	ND
1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

SHS-3 (Continued)

7/92

8/92

9/92

AROMATICS

Benzene	ND
Chlorobenzene	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
Ethylbenzene	ND
Toluene	ND
Xylenes	ND
Trichlorotrifluoroethane	ND

SHS-4

7/92

8/92

9/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)
 Lab conductivity, umhos/cm
 Lab resistivity, ohm-m
 Total dissolved solids (180)
 Total dissolved solids (calc)
 Total alkalinity as CaCO₃
 Total hardness as CaCO₃
 Sodium absorption ratio
 Bicarbonate as HCO₃
 Carbonate as CO₃
 Chloride
 Sulfate
 Calcium
 Magnesium
 Potassium
 Sodium

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	ND
1,2-Dichloroethane	ND
1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

SHS-4 (Continued)

	7/92	8/92	9/92
AROMATICS			
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		
Trichlorotrifluoroethane	ND		

SHS-6

7/92

8/92

9/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.05
Lab conductivity, umhos/cm	2790.00
Lab resistivity, ohm-m	3.58
Total dissolved solids (180)	2440.00
Total dissolved solids (calc)	2390.00
Total alkalinity as CaCO ₃	271.00
Total hardness as CaCO ₃	1050.00
Sodium absorption ratio	4.88
Bicarbonate as HCO ₃	331.00
Carbonate as CO ₃	<.10
Chloride	108.00
Sulfate	1350.00
Calcium	369.00
Magnesium	32.60
Potassium	3.50
Sodium	364.00

SHS-10

7/92

8/92

9/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	6.83
Lab conductivity, umhos/cm	2060.00
Lab resistivity, ohm-m	4.85
Total dissolved solids (180)	1620.00
Total dissolved solids (calc)	1650.00
Total alkalinity as CaCO ₃	293.00
Total hardness as CaCO ₃	514.00
Sodium absorption ratio	6.69
Bicarbonate as HCO ₃	357.00
Carbonate as CO ₃	<.10
Chloride	56.50
Sulfate	867.00
Calcium	164.00
Magnesium	25.30
Potassium	8.99
Sodium	349.00

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	ND
1,2-Dichloroethane	ND
1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	0.20
1,1,1-Trichloroethane	0.20
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

SHS-10 (Continued)

	7/92	8/92	9/92
AROMATICS			
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	19.20		
Toluene	ND		
Xylenes	ND		
Trichlorotrifluoroethane	ND		

SHS-12

7/92

8/92

9/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.17
Lab conductivity, umhos/cm	2420.00
Lab resistivity, ohm-m	4.13
Total dissolved solids (180)	2440.00
Total dissolved solids (calc)	2420.00
Total alkalinity as CaCO ₃	266.00
Total hardness as CaCO ₃	1260.00
Sodium absorption ratio	3.23
Bicarbonate as HCO ₃	325.00
Carbonate as CO ₃	<.10
Chloride	113.00
Sulfate	1400.00
Calcium	430.00
Magnesium	45.60
Potassium	3.04
Sodium	263.00

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	0.70
1,2-Dichloroethane	0.40
1,2-Dichloroethene	1.60
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	0.60
1,1,1-Trichloroethane	0.60
1,1,2-Trichloroethane	ND
Trichloroethene	0.20
Trichlorofluoromethane	ND
Vinyl chloride	ND

SHS-12 (Continued)

	7/92	8/92	9/92
AROMATICS			
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		
Trichlorotrifluoroethane	ND		

SHS-13

7/92

8/92

9/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.19
Lab conductivity, umhos/cm	3500.00
Lab resistivity, ohm-m	2.86
Total dissolved solids (180)	2250.00
Total dissolved solids (calc)	2250.00
Total alkalinity as CaCO ₃	824.00
Total hardness as CaCO ₃	692.00
Sodium absorption ratio	9.99
Bicarbonate as HCO ₃	1010.00
Carbonate as CO ₃	<.10
Chloride	539.00
Sulfate	359.00
Calcium	222.00
Magnesium	33.30
Potassium	2.35
Sodium	604.00

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	0.90
1,2-Dichloroethane	3.10
1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

SHS-13 (Continued)

	7/92	8/92	9/92
AROMATICS			
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		
Trichlorotrifluoroethane	ND		

SHS-15

7/92

8/92

9/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.23
Lab conductivity, umhos/cm	3690.00
Lab resistivity, ohm-m	2.71
Total dissolved solids (180)	2700.00
Total dissolved solids (calc)	2660.00
Total alkalinity as CaCO ₃	381.00
Total hardness as CaCO ₃	997.00
Sodium absorption ratio	7.16
Bicarbonate as HCO ₃	465.00
Carbonate as CO ₃	<.10
Chloride	455.00
Sulfate	1070.00
Calcium	349.00
Magnesium	30.90
Potassium	2.35
Sodium	520.00

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	11.70
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	ND
1,2-Dichloroethane	ND
1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

SHS-15 (Continued)

	7/92	8/92	9/92
AROMATICS			
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		
Trichlorotrifluoroethane	ND		

SHS-16

7/92

8/92

9/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.16
Lab conductivity, umhos/cm	1940.00
Lab resistivity, ohm-m	5.16
Total dissolved solids (180)	1620.00
Total dissolved solids (calc)	1570.00
Total alkalinity as CaCO ₃	258.00
Total hardness as CaCO ₃	800.00
Sodium absorption ratio	2.97
Bicarbonate as HCO ₃	315.00
Carbonate as CO ₃	<.10
Chloride	31.90
Sulfate	893.00
Calcium	259.00
Magnesium	37.60
Potassium	3.13
Sodium	193.00

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	ND
1,2-Dichloroethane	ND
1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

SHS-16 (Continued)

	7/92	8/92	9/92
AROMATICS			
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		
Trichlorotrifluoroethane	ND		

SHS-17

7/92

8/92

9/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)
 Lab conductivity, umhos/cm
 Lab resistivity, ohm-m
 Total dissolved solids (180)
 Total dissolved solids (calc)
 Total alkalinity as CaCO₃
 Total hardness as CaCO₃
 Sodium absorption ratio
 Bicarbonate as HCO₃
 Carbonate as CO₃
 Chloride
 Sulfate
 Calcium
 Magnesium
 Potassium
 Sodium

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	ND
1,2-Dichloroethane	ND
1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

SHS-17 (Continued)

	7/92	8/92	9/92
AROMATICS			
Benzene		ND	
Chlorobenzene		ND	
1,2-Dichlorobenzene		ND	
1,3-Dichlorobenzene		ND	
1,4-Dichlorobenzene		ND	
Ethylbenzene		ND	
Toluene		ND	
Xylenes		ND	
Trichlorotrifluoroethane		ND	

SHS-18

7/92

8/92

9/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)
 Lab conductivity, umhos/cm
 Lab resistivity, ohm-m
 Total dissolved solids (180)
 Total dissolved solids (calc)
 Total alkalinity as CaCO₃
 Total hardness as CaCO₃
 Sodium absorption ratio
 Bicarbonate as HCO₃
 Carbonate as CO₃
 Chloride
 Sulfate
 Calcium
 Magnesium
 Potassium
 Sodium

HALOCARBONS

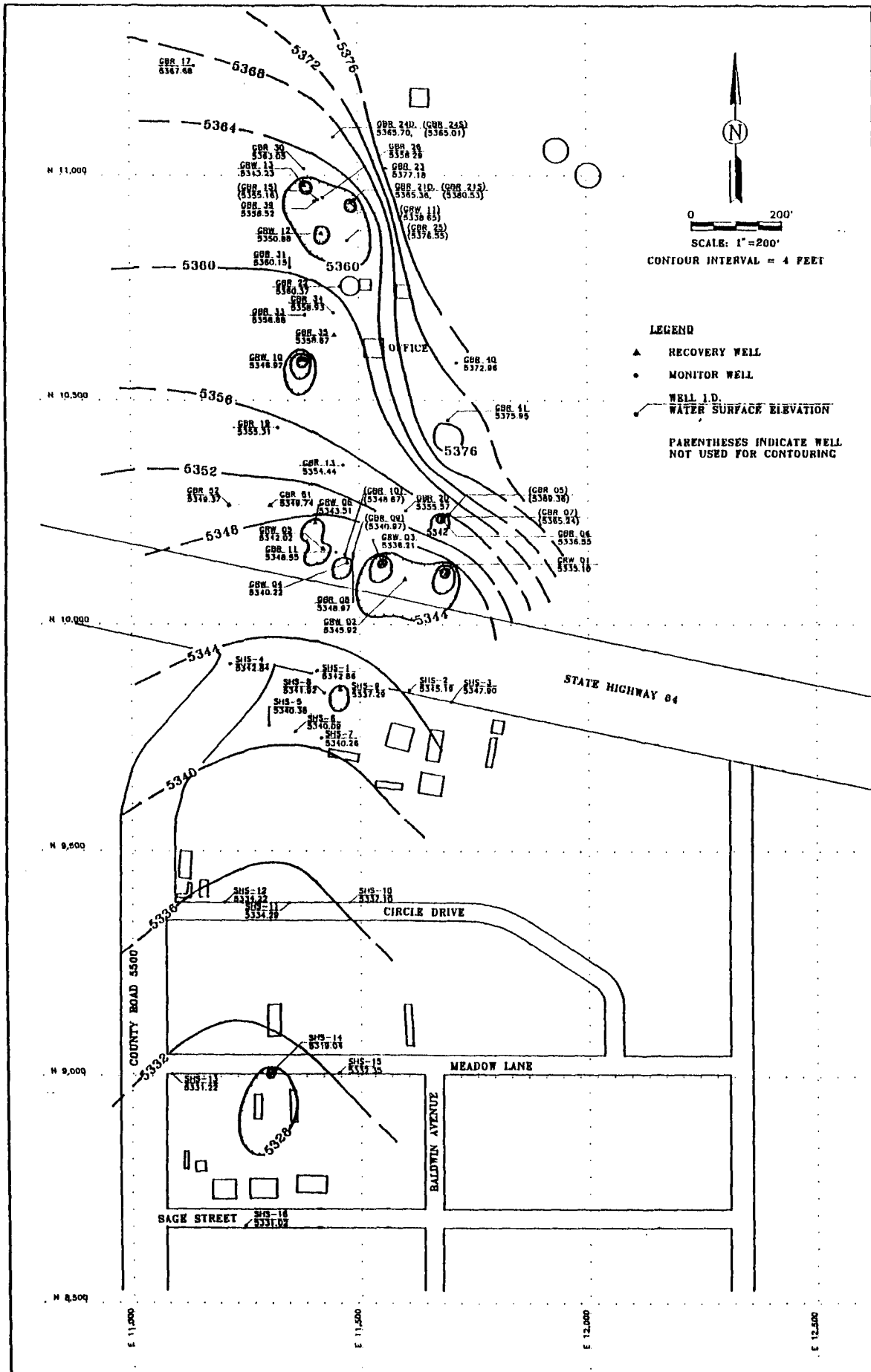
Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	0.30
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	0.60
1,1-Dichloroethane	ND
1,2-Dichloroethane	0.60
1,2-Dichloroethene	0.60
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

SHS-18 (Continued)

	7/92	8/92	9/92
AROMATICS			
Benzene		2.40	
Chlorobenzene		ND	
1,2-Dichlorobenzene		ND	
1,3-Dichlorobenzene		ND	
1,4-Dichlorobenzene		ND	
Ethylbenzene		8.90	
Toluene		ND	
Xylenes		10.90	
Trichlorotrifluoroethane		ND	

*ND - Not detected at specified detection limit

July 1992, Water Surface Contour Map
Giant-Bloomfield Refinery



GIANT REFINING BLOOMFIELD REFINERY
QUARTERLY POTENTIOMETRIC SURFACE

JULY, 1992

WELL #	WELLHEAD ELEVATION IN FEET	DEPTH TO WATER IN FEET	DEPTH TO PRODUCT IN FEET	PRODUCT THICKNESS IN FEET	ADJUSTED WSEL* IN FEET
GRW-1	5394.30	59.20	59.20	0.00	5335.10
GRW-2	5391.28	45.36	45.36	0.00	5345.92
GRW-3	5388.77	52.56	52.56	0.00	5336.21
GRW-4	5390.02	49.80	49.80	0.00	5340.22
GRW-5	5390.56	48.54	48.54	0.00	5342.02
GRW-6	5390.81	47.30	47.30	0.00	5343.51
GRW-10	5395.02	48.10	48.10	0.00	5346.92
GRW-11	5397.85	59.20	59.20	0.00	5338.65
GRW-12	5397.24	46.36	46.36	0.00	5350.88
GRW-13	5396.90	53.67	53.67	0.00	5343.23
GBR-5	5395.07	26.75	25.45	1.30	5369.36
GBR-6	5395.70	59.15	59.15	0.00	5336.55
GBR-7	5395.85	31.13	30.48	0.65	5365.24
GBR-8	5390.50	41.54	41.53	0.01	5348.97
GBR-9	5389.92	48.95	48.95	0.00	5340.97
GBR-10	5390.57	41.90	41.90	0.00	5348.67
GBR-11	5389.43	41.62	40.70	0.92	5348.55
GBR-13	5393.04	38.60	38.60	0.00	5354.44
GBR-15	5397.99	42.83	42.83	0.00	5355.16
GBR-17	5402.69	35.01	35.01	0.00	5367.68
GBR-18	5421.68	25.24	25.24	0.00	5396.44
GBR-19	5393.83	38.52	38.52	0.00	5355.31
GBR-20	5393.47	38.30	37.80	0.50	5355.57
GBR-21S	5400.65	20.16	20.11	0.05	5380.53
GBR-21D	5400.19	34.83	34.83	0.00	5365.36
GBR-22	5395.91	36.58	35.28	1.30	5360.37
GBR-23	5403.72	22.66	22.66	0.00	5377.18
GBR-24S	5396.08	26.54	26.54	0.00	5365.01
GBR-24D	5396.77	31.07	31.07	0.00	5365.70
GBR-25	5396.72	20.17	20.17	0.00	5376.55
GBR-26	5395.59	37.30	37.30	0.00	5358.29
GBR-30	5396.58	33.53	33.53	0.00	5363.05
GBR-31	5394.86	34.71	34.71	0.00	5360.15
GBR-33	5396.28	37.40	37.40	0.00	5358.88
GBR-34	5394.00	35.35	35.00	0.35	5358.93
GBR-35	5393.66	35.53	34.85	0.68	5358.67
GBR-39	5397.55	39.03	39.03	0.00	5358.52
GBR-40	5400.76	27.80	27.80	0.00	5372.96
GBR-41	5396.35	20.40	20.40	0.00	5375.95
GBR-51	5389.68	39.94	39.94	0.00	5349.74
GBR-52	5387.74	38.37	38.37	0.00	5349.37

* WSEL - WATER SURFACE ELEVATION ADJUSTED FOR PRODUCT DEPTH

GIANT REFINING BLOOMFIELD REFINERY
 QUARTERLY POTENTIOMETRIC SURFACE
 JULY, 1992
 Page 2

WELL #	WELLHEAD ELEVATION IN FEET	DEPTH TO WATER IN FEET	DEPTH TO PRODUCT IN FEET	PRODUCT THICKNESS IN FEET	ADJUSTED WSEL* IN FEET
SHS-1	5383.54	40.68	40.68	0.00	5342.86
SHS-2	5381.66	36.47	36.47	0.00	5345.19
SHS-3	5383.33	35.43	35.43	0.00	5347.90
SHS-4	5383.62	40.78	40.78	0.00	5342.84
SHS-5	5378.36	37.98	37.98	0.00	5340.38
SHS-6	5378.17	38.08	38.08	0.00	5340.09
SHS-7	5378.77	38.78	38.44	0.34	5340.26
SHS-8	5380.25	38.33	38.33	0.00	5341.92
SHS-9	5380.79	43.50	43.50	0.00	5337.29
SHS-10	5373.80	36.70	36.70	0.00	5337.10
SHS-11	5373.17	38.88	38.88	0.00	5334.29
SHS-12	5373.94	39.72	39.72	0.00	5334.22
SHS-13	5367.81	36.59	36.59	0.00	5331.22
SHS-14	5367.07	48.03	48.03	0.00	5319.04
SHS-15	5366.21	33.86	33.86	0.00	5332.35
SHS-16	5362.58	31.56	31.56	0.00	5331.02

* WSEL - WATER SURFACE ELEVATION ADJUSTED FOR PRODUCT DEPTH

Giant Refining Co. Bloomfield Refinery
Quarterly Net Tank
Volume Change

Third Quarter, 1992

Tank Number	Beginning Volume	Ending Volume	Net Change
102	14369	14369	0
106	8010	8010	0
21	362743	363474	731
22	258239	259158	919
27	0	0	0
32	0	0	0
34	0	0	0
35	0	0	0
37	0	0	0
Total Net Volume Change			1650

Giant Refining Co. Bloomfield Refinery
Quarterly Recovery Well
Volume Tabulation

Third Quarter, 1992

=====				
Well	Month #1	Month #2	Month #3	Total
=====				
GRW-1	13850	12980	16490	43320
GRW-2	6510	12010	5257	23777
GRW-3	5400	8470	8890	22760
GRW-4	28540	26300	32330	87170
GRW-5	52210	55400	72190	179800
GRW-6	32890	24370	43080	100340
GRW-9	10450	10730	13360	34540
GRW-10	267800	223680	275790	767270
GRW-11	81960	67780	84280	234020
GRW-12	15230	12610	17280	45120
GRW-13	17730	50	3800	21580
SHS-9	17268	14193	19700	51161
SHS-14	184521	149285	174998	508804
SHS-18	0	62450	67409	129859
=====				
Total Volume Pumped In Gallons				2249521

Giant Refining Co. Bloomfield Refinery
Total Volume Summary

Third Quarter, 1992

=====

Total Volume Of Water Recovered	2249521
Net Change In Storage Volume	1650

Total Water Pumped To The Infiltration Gallery	2311134
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Difference	63263
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Comments: The approximately 3% difference
can be accounted for in meter
inaccuracy.

GRW-13

7/92

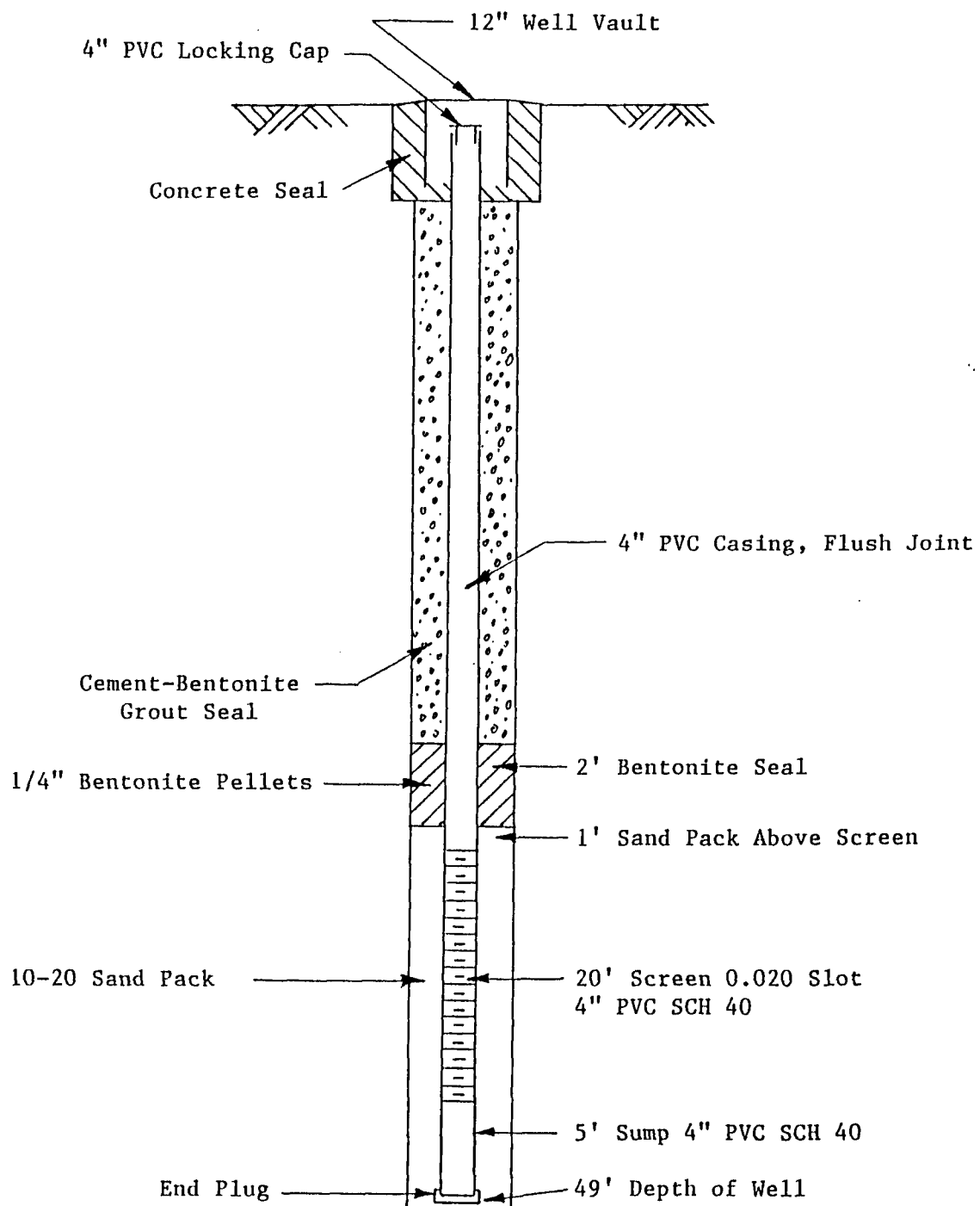
8/92

9/92

GENERAL WATER CHEMISTRY

Lab conductivity, umhos/cm

4110.00



MONITOR WELL
SHS - 17

Prepared by L. E. Cynova/WT

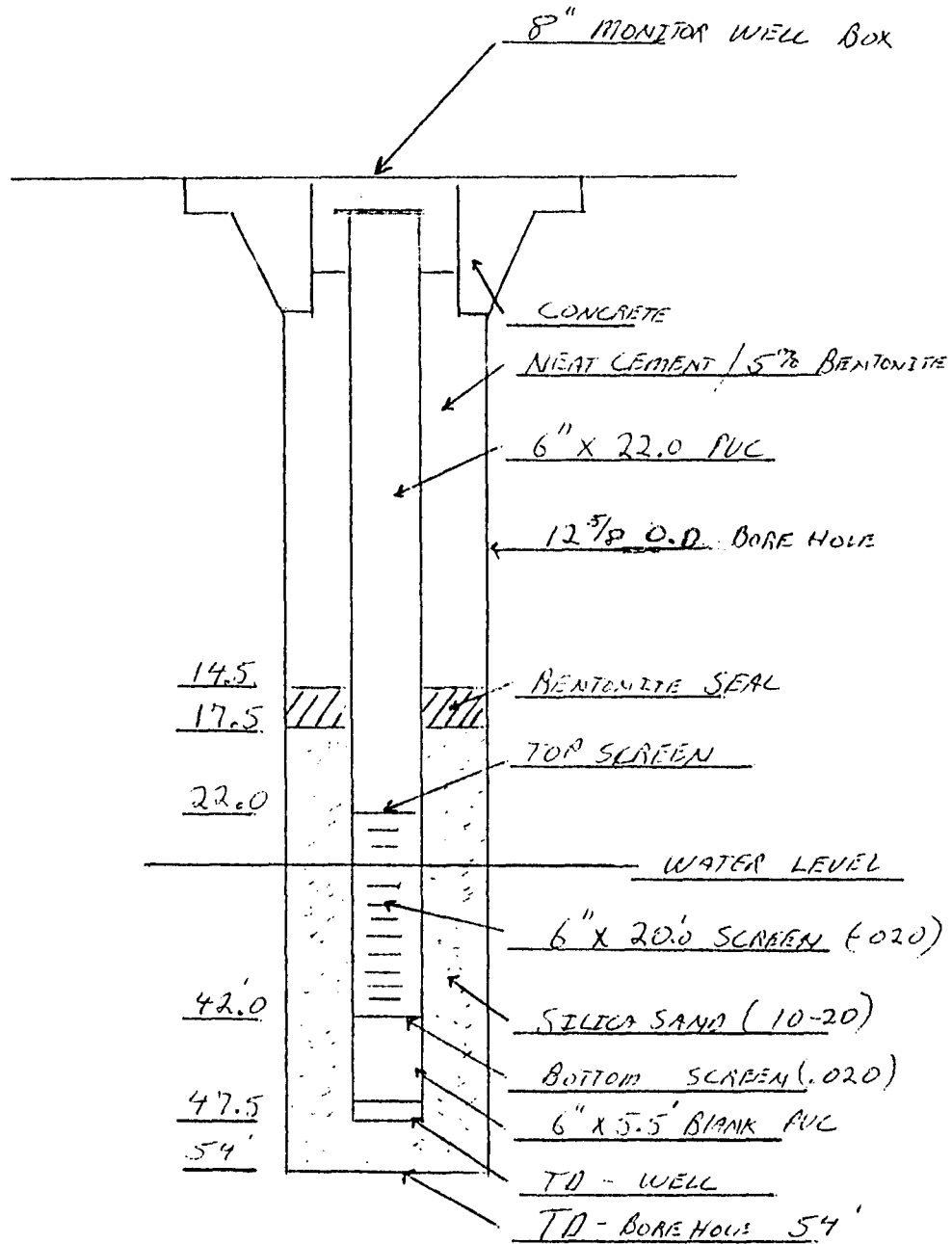
client Giant Refining Company

Job No. 2132J032

Plate 1



WESTERN WATER WLLA
TERRY G. HOOD
721 OLD AZTEC HWY.
FLORA VISTA, NEW MEXICO 87415



SHS-18



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20761501

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFF SITE
CLIENT I.D. : 920708940 SHS-10
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 07/08/92
DATE RECEIVED : 07/09/92
DATE EXTRACTED : N/A
DATE ANALYZED : 07/13/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS

RESULTS

BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	19.2
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	106
BROMOFLUOROBENZENE (%)	117



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20761502

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFF SITE
CLIENT I.D. : 9207081050 SHS-12
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 07/08/92
DATE RECEIVED : 07/09/92
DATE EXTRACTED : N/A
DATE ANALYZED : 07/13/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
-----------	---------

BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	0.7
1,2-DICHLOROETHANE	0.4
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	1.6
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	0.6
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	0.6
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	106
BROMOFLUOROBENZENE (%)	103



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20761503

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFF SITE
CLIENT I.D. : 9207081210 SHS-13
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 07/08/92
DATE RECEIVED : 07/09/92
DATE EXTRACTED : N/A
DATE ANALYZED : 07/13/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
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BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	0.9
1,2-DICHLOROETHANE	3.1
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	102
BROMOFLUOROBENZENE (%)	101



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20761504

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFF SITE
CLIENT I.D. : 9207081323 SHS-15
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 07/08/92
DATE RECEIVED : 07/09/92
DATE EXTRACTED : N/A
DATE ANALYZED : 07/13/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	11.7
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	103
BROMOFLUOROBENZENE (%)	104



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20761505

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFF SITE
CLIENT I.D. : 9207081435 SHS-16
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 07/08/92
DATE RECEIVED : 07/09/92
DATE EXTRACTED : N/A
DATE ANALYZED : 07/13/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
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BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	96
BROMOFLUOROBENZENE (%)	109

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20776701

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT	: HYGIENETICS/GEOSCIENCE CONSULTANTS	DATE SAMPLED	: 07/15/92
PROJECT #	: C.O.C. 5467	DATE RECEIVED	: 07/17/92
PROJECT NAME	: GIANT	DATE EXTRACTED	: N/A
CLIENT I.D.	: 9207151720 GBR-49	DATE ANALYZED	: 07/17/92
SAMPLE MATRIX	: AQUEOUS	UNITS	: UG/L
		DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	2.9
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	74 D
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	4.6
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	3.6
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	81
BROMOFLUOROBENZENE (%)	100



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GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20776702

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT	: HYGIENETICS/GEOSCIENCE CONSULTANTS	DATE SAMPLED	: 07/15/92
PROJECT #	: C.O.C. 5467	DATE RECEIVED	: 07/17/92
PROJECT NAME	: GIANT	DATE EXTRACTED	: N/A
CLIENT I.D.	: 9207151345 GBR-32	DATE ANALYZED	: 07/17/92
SAMPLE MATRIX	: AQUEOUS	UNITS	: UG/L
		DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
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BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	3.7
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	100 D
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	5.6
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	0.3
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	4.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	83
BROMOFLUOROBENZENE (%)	98



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20776703

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT	: HYGIENETICS/GEOSCIENCE CONSULTANTS	DATE SAMPLED	: 07/15/92
PROJECT #	: C.O.C. 5467	DATE RECEIVED	: 07/17/92
PROJECT NAME	: GIANT	DATE EXTRACTED	: N/A
CLIENT I.D.	: 9207151607 GBR-50	DATE ANALYZED	: 07/20/92
SAMPLE MATRIX	: AQUEOUS	UNITS	: UG/L
		DILUTION FACTOR	: 1

COMPOUNDS

RESULTS

BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	0.5
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	0.3
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	98
BROMOFLUOROBENZENE (%)	99



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20776704

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT	: HYGIENETICS/GEOSCIENCE CONSULTANTS	DATE SAMPLED	: 07/15/92
PROJECT #	: 54029.01	DATE RECEIVED	: 07/17/92
PROJECT NAME	: GIANT	DATE EXTRACTED	: N/A
CLIENT I.D.	: 9207151800 GBR-48	DATE ANALYZED	: 07/20/92
SAMPLE MATRIX	: AQUEOUS	UNITS	: UG/L
		DILUTION FACTOR	: 5

COMPOUNDS	RESULTS
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BENZENE	<2.5
BROMODICHLOROMETHANE	<1.0
BROMOFORM	<1.0
BROMOMETHANE	<1.0
CARBON TETRACHLORIDE	<1.0
CHLOROBENZENE	<2.5
CHLOROETHANE	<1.0
CHLOROFORM	<1.0
CHLOROMETHANE	<1.0
DIBROMOCHLOROMETHANE	<1.0
2-CHLOROETHYL VINYL ETHER	<2.5
1,3-DICHLOROBENZENE	<2.5
1,2 & 1,4-DICHLOROBENZENE	<2.5
DICHLORODIFLUOROMETHANE	<1.0
1,1-DICHLOROETHANE	4
1,2-DICHLOROETHANE	<1.0
1,1-DICHLOROETHENE	<1.0
1,2-DICHLOROETHENE (TOTAL)	120
1,2-DICHLOROPROPANE	<1.0
CIS-1,3-DICHLOROPROPENE	<1.0
TRANS-1,3-DICHLOROPROPENE	<1.0
ETHYLBENZENE	<2.5
METHYLENE CHLORIDE	<10.0
1,1,2,2-TETRACHLOROETHANE	<1.0
TETRACHLOROETHENE	7
TOLUENE	<2.5
1,1,1-TRICHLOROETHANE	<1.0
1,1,2-TRICHLOROETHANE	<1.0
TRICHLOROETHENE	5
TRICHLOROFLUOROMETHANE	<2.5
VINYL CHLORIDE	<1.0
TOTAL XYLENES	<2.5
TRICHLOROTRIFLUOROETHANE	<10.0

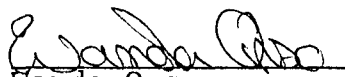
SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	96
BROMOFLUOROBENZENE (%)	101

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 07/09/92
ID: Stripper Effluent
SITE: 9206180805 DATE RECEIVED: 06/18/92
LAB NO: F9027 DATE COLLECTED: 06/18/92

Lab pH (s.u.).....	3.44
Lab Conductivity, umhos/cm @ 25C....	3870
Lab Resistivity, ohm-m.....	2.58
Total Dissolved Solids (180C), mg/L.	2890
Total Dissolved Solids (calc), mg/L.	2700
Total Alkalinity as CaCO ₃ , mg/L.....	<0.1
Total Hardness as CaCO ₃ , mg/L.....	964
Sodium Adsorption Ratio.....	7.25

	mg/L	meq/L
Bicarbonate as HCO ₃	<0.1	<0.10
Carbonate as CO ₃	<0.1	<0.10
Chloride.....	718	20.3
Sulfate.....	1090	22.8
Calcium.....	331	16.5
Magnesium.....	33.7	2.77
Potassium.....	5.87	0.15
Sodium.....	517	22.5
Major Cations.....		41.9
Major Anions.....		43
Cation/Anion Difference.....		1.3 %


Wanda Orso
Water Lab Supervisor

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 07/22/92
ID: GBR-17
SITE: 9207071000 DATE RECEIVED: 07/07/92
LAB NO: F9108 DATE COLLECTED: 07/07/92

Lab pH (s.u.).....	7.22
Lab Conductivity, umhos/cm @ 25C....	2580
Lab Resistivity, ohm-m.....	3.87
Total Dissolved Solids (180C), mg/L.	2300
Total Dissolved Solids (calc), mg/L.	2190
Total Alkalinity as CaCO ₃ , mg/L.....	226
Total Hardness as CaCO ₃ , mg/L.....	912
Sodium Adsorption Ratio.....	5.11

	mg/L	meq/L
Bicarbonate as HCO ₃	276	4.53
Carbonate as CO ₃	<0.10	<0.01
Chloride.....	58.0	1.64
Sulfate.....	1300	27.0
Calcium.....	317	15.8
Magnesium.....	29.6	2.44
Potassium.....	0.78	0.02
Sodium.....	355	15.4
Major Cations.....		33.7
Major Anions.....		33.2
Cation/Anion Difference.....		0.74 %


Wanda Orso
Water Lab Supervisor

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 07/22/92
ID: GBR-15
SITE: 9207071115 DATE RECEIVED: 07/07/92
LAB NO: F9109 DATE COLLECTED: 07/07/92

Lab pH (s.u.).....	7.48
Lab Conductivity, umhos/cm @ 25C....	4400
Lab Resistivity, ohm-m.....	2.27
Total Dissolved Solids (180C), mg/L.	3450
Total Dissolved Solids (calc), mg/L.	3340
Total Alkalinity as CaCO ₃ , mg/L.....	270
Total Hardness as CaCO ₃ , mg/L.....	1050
Sodium Adsorption Ratio.....	9.89

	mg/L	meq/L
Bicarbonate as HC03.....	329	5.4
Carbonate as C03.....	<0.10	<0.01
Chloride.....	650	18.3
Sulfate.....	1390	28.9
Calcium.....	369	18.4
Magnesium.....	32.0	2.63
Potassium.....	5.00	0.13
Sodium.....	737	32.1
Major Cations.....		53.2
Major Anions.....		52.6
Cation/Anion Difference.....		0.56 %


Wanda Orso
Water Lab Supervisor



2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 07/22/92
ID: GBR-30
SITE: 9207071150 DATE RECEIVED: 07/07/92
LAB NO: F9110 DATE COLLECTED: 07/07/92

Lab pH (s.u.).....	6.90
Lab Conductivity, umhos/cm @ 25C....	3690
Lab Resistivity, ohm-m.....	2.71
Total Dissolved Solids (180C), mg/L.	2950
Total Dissolved Solids (calc), mg/L.	2940
Total Alkalinity as CaCO ₃ , mg/L.....	201
Total Hardness as CaCO ₃ , mg/L.....	1110
Sodium Adsorption Ratio.....	7.58

	mg/L	meq/L
Bicarbonate as HCO ₃	245	4.01
Carbonate as CO ₃	<0.10	<0.01
Chloride.....	590	16.6
Sulfate.....	1230	25.6
Calcium.....	381	19.0
Magnesium.....	38.5	3.16
Potassium.....	3.10	0.08
Sodium.....	580	25.2
Major Cations.....		47.5
Major Anions.....		46.3
Cation/Anion Difference.....		1.3 %


Wanda Orso
Water Lab Supervisor

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 07/22/92
ID: GBR-24D
SITE: 9207071235 DATE RECEIVED: 07/07/92
LAB NO: F9111 DATE COLLECTED: 07/07/92

Lab pH (s.u.).....	7.64
Lab Conductivity, umhos/cm @ 25C....	4260
Lab Resistivity, ohm-m.....	2.35
Total Dissolved Solids (180C), mg/L.	3880
Total Dissolved Solids (calc), mg/L.	3750
Total Alkalinity as CaCO ₃ , mg/L.....	234
Total Hardness as CaCO ₃ , mg/L.....	1800
Sodium Adsorption Ratio.....	5.51

	mg/L	meq/L
Bicarbonate as HCO ₃	285	4.68
Carbonate as CO ₃	<0.10	<0.01
Chloride.....	741	20.9
Sulfate.....	1660	34.6
Calcium.....	579	28.9
Magnesium.....	85.4	7.02
Potassium.....	6.00	0.15
Sodium.....	537	23.4
Major Cations.....		59.4
Major Anions.....		60.2
Cation/Anion Difference.....		0.62 %


Wanda Orso
Water Lab Supervisor

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 07/22/92
ID: GBR-31
SITE: 9207071324 DATE RECEIVED: 07/07/92
LAB NO: F9112 DATE COLLECTED: 07/07/92

Lab pH (s.u.).....	6.97
Lab Conductivity, umhos/cm @ 25C....	3740
Lab Resistivity, ohm-m.....	2.67
Total Dissolved Solids (180C), mg/L.	2940
Total Dissolved Solids (calc), mg/L.	2860
Total Alkalinity as CaCO ₃ , mg/L.....	167
Total Hardness as CaCO ₃ , mg/L.....	1020
Sodium Adsorption Ratio.....	7.65

	mg/L	meq/L
Bicarbonate as HC0 ₃	203	3.33
Carbonate as C0 ₃	<0.10	<0.01
Chloride.....	578	16.3
Sulfate.....	1230	25.6
Calcium.....	351	17.5
Magnesium.....	36.2	2.97
Potassium.....	2.70	0.07
Sodium.....	563	24.5
Major Cations.....		45
Major Anions.....		45.3
Cation/Anion Difference.....		0.26 %


Wanda Orso
Water Lab Supervisor

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 07/28/92
ID: 9207200805
SITE: Stripper Effluent DATE RECEIVED: 07/20/92
LAB NO: F9287 DATE COLLECTED: 07/20/92

Lab pH (s.u.).....	7.32
Lab Conductivity, umhos/cm @ 25C....	3320
Lab Resistivity, ohm-m.....	3.02
Total Dissolved Solids (180C), mg/L.	2780
Total Dissolved Solids (calc), mg/L.	2620
Total Alkalinity as CaCO ₃ , mg/L.....	113
Total Hardness as CaCO ₃ , mg/L.....	1030
Sodium Adsorption Ratio.....	6.23

	mg/L	meq/L
Bicarbonate as HCO ₃	138	2.26
Carbonate as CO ₃	<0.10	<0.01
Chloride.....	545	15.4
Sulfate.....	1160	24.2
Calcium.....	327	16.3
Magnesium.....	52.4	4.31
Potassium.....	2.74	0.07
Sodium.....	460	20.0
Major Cations.....		40.7
Major Anions.....		41.8
Cation/Anion Difference.....		1.39 %

Trace Metals by ICAP (Total Concentration), mg/L

	Analytical Result:	Detection Limit:
Iron (Fe).....	1.63	<0.05

ND - Analyte "not detected" at the stated detection limit.


Wanda Orso
Water Lab Supervisor

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 07/20/92
ID: 9207090940
SITE: RW-2 DATE RECEIVED: 07/09/92
LAB NO: F9155 DATE COLLECTED: 07/09/92

Nitrate, mg/L..... <0.02
Nitrite, mg/L..... <0.02


Wanda Orso
Water Lab Supervisor

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 07/22/92
ID: Stripper Influent
SITE: 9207071340 DATE RECEIVED: 07/07/92
LAB NO: F9113 DATE COLLECTED: 07/07/92

Lab pH (s.u.).....	6.41
Lab Conductivity, umhos/cm @ 25C....	3190
Lab Resistivity, ohm-m.....	3.13
Total Dissolved Solids (180C), mg/L.	2700
Total Dissolved Solids (calc), mg/L.	2680
Total Alkalinity as CaCO ₃ , mg/L.....	252
Total Hardness as CaCO ₃ , mg/L.....	969
Sodium Adsorption Ratio.....	7.60

	mg/L	meq/L
Bicarbonate as HCO ₃	307	5.04
Carbonate as CO ₃	<0.10	<0.01
Chloride.....	427	12.0
Sulfate.....	1190	24.7
Calcium.....	337	16.8
Magnesium.....	31.3	2.58
Potassium.....	3.10	0.08
Sodium.....	544	23.7
Major Cations.....		43.1
Major Anions.....		41.8
Cation/Anion Difference.....		1.58 %

Trace Metals by ICAP (Total Concentration), mg/L

	Analytical Result:	Detection Limit:
Iron (Fe).....	0.64	<0.05

ND - Analyte "not detected" at the stated detection limit.


Wanda Orso
Water Lab Supervisor



2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 07/22/92
ID: GBR-24D Lab Split 9111
SITE: 9207071235 DATE RECEIVED: 07/07/92
LAB NO: F9116 DATE COLLECTED: 07/07/92

Lab pH (s.u.).....	7.61
Lab Conductivity, umhos/cm @ 25C....	4500
Lab Resistivity, ohm-m.....	2.22
Total Dissolved Solids (180C), mg/L.	3920
Total Dissolved Solids (calc), mg/L.	3670
Total Alkalinity as CaCO ₃ , mg/L.....	239
Total Hardness as CaCO ₃ , mg/L.....	1820
Sodium Adsorption Ratio.....	5.38

	mg/L	meq/L
Bicarbonate as HC0 ₃	291	4.77
Carbonate as C0 ₃	<0.10	<0.01
Chloride.....	733	20.7
Sulfate.....	1590	33.1
Calcium.....	587	29.3
Magnesium.....	85.7	7.04
Potassium.....	5.50	0.14
Sodium.....	527	22.9
Major Cations.....		59.4
Major Anions.....		58.5
Cation/Anion Difference.....		0.75 %


Wanda Orso
Water Lab Supervisor



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20781101

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REF. REMEDI.
CLIENT I.D. : 920720805 STRIPPER EFFLUENT
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 07/20/92
DATE RECEIVED : 07/21/92
DATE EXTRACTED : N/A
DATE ANALYZED : 07/21/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
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BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)
BROMOFLUOROBENZENE (%)

84
100

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20759201

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REF REMED
CLIENT I.D. : 9207071000 GBR-17
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 07/07/92
DATE RECEIVED : 07/08/92
DATE EXTRACTED : N/A
DATE ANALYZED : 07/11/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS

RESULTS

BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	86
BROMOFLUOROBENZENE (%)	120

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20759202

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REF REMED
CLIENT I.D. : 9207071115 GBR-15
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 07/07/92
DATE RECEIVED : 07/08/92
DATE EXTRACTED : N/A
DATE ANALYZED : 07/13/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS

RESULTS

BENZENE	2.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
?-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	23.3
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	102
BROMOFLUOROBENZENE (%)	107



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20759203

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REF REMED
CLIENT I.D. : 9207071150 GBR-30
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 07/07/92
DATE RECEIVED : 07/08/92
DATE EXTRACTED : N/A
DATE ANALYZED : 07/11/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS

RESULTS

BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	91
BROMOFLUOROBENZENE (%)	97



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20759204

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REF REMED
CLIENT I.D. : 9207071235 GBR-24D
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 07/07/92
DATE RECEIVED : 07/08/92
DATE EXTRACTED : N/A
DATE ANALYZED : 07/13/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS

RESULTS

BENZENE	47.6
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
?-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	1.4
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	0.8
1,2-DICHLOROETHANE	36.6
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	5.8
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	0.5
TOLUENE	2.6
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	0.3
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	112
BROMOFLUOROBENZENE (%)	86



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20759205

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REF REMED
CLIENT I.D. : 9207071324 GBR-31
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 07/07/92
DATE RECEIVED : 07/08/92
DATE EXTRACTED : N/A
DATE ANALYZED : 07/11/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS

RESULTS

BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	91
BROMOFLUOROBENZENE (%)	106



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20759206

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REF REMED
CLIENT I.D. : 9207071340 STRIPPER INFLUENT
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 07/07/92
DATE RECEIVED : 07/08/92
DATE EXTRACTED : N/A
DATE ANALYZED : 07/11/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS

RESULTS

BENZENE	11.7
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	0.8
1,2-DICHLOROETHANE	0.4
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	1.8
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	3.3
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	3.3
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	90
BROMOFLUOROBENZENE (%)	94



GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20759101

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFF SITE
CLIENT I.D. : 9207071425 SHS-3
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 07/07/92
DATE RECEIVED : 07/08/92
DATE EXTRACTED : N/A
DATE ANALYZED : 07/11/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
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BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	92
BROMOFLUOROBENZENE (%)	111



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20759102

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT	: GIANT REFINING, FARMINGTON	DATE SAMPLED	: 07/07/92
PROJECT #	: 9002-67	DATE RECEIVED	: 07/08/92
PROJECT NAME	: OFF SITE	DATE EXTRACTED	: N/A
CLIENT I.D.	: 9207071515 SHS-4	DATE ANALYZED	: 07/11/92
SAMPLE MATRIX	: AQUEOUS	UNITS	: UG/L
		DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	94
BROMOFLUOROBENZENE (%)	101

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 07/29/92
ID: 9207080940
SITE: SHS-10 DATE RECEIVED: 07/08/92
LAB NO: F9121 DATE COLLECTED: 07/08/92

Lab pH (s.u.).....	6.83
Lab Conductivity, umhos/cm @ 25C....	2060
Lab Resistivity, ohm-m.....	4.85
Total Dissolved Solids (180C), mg/L.	1620 *
Total Dissolved Solids (calc), mg/L.	1650
Total Alkalinity as CaCO ₃ , mg/L.....	293
Total Hardness as CaCO ₃ , mg/L.....	514
Sodium Adsorption Ratio.....	6.69

	mg/L	meq/L
Bicarbonate as HCO ₃	357	5.86
Carbonate as CO ₃	<0.10	<0.01
Chloride.....	56.5	1.60
Sulfate.....	867	18.1
Calcium.....	164	8.20
Magnesium.....	25.3	2.08
Potassium.....	8.99	0.23
Sodium.....	349	15.2
Major Cations.....		25.7
Major Anions.....		25.5
Cation/Anion Difference.....		0.3 %

* Sample reanalyzed with no significant change.


Wanda Orso
Water Lab Supervisor

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 07/29/92
ID: 9207081050
SITE: SHS-12 DATE RECEIVED: 07/08/92
LAB NO: F9122 DATE COLLECTED: 07/08/92

Lab pH (s.u.).....	7.17
Lab Conductivity, umhos/cm @ 25C....	2420
Lab Resistivity, ohm-m.....	4.13
Total Dissolved Solids (180C), mg/L.	2440
Total Dissolved Solids (calc), mg/L.	2420
Total Alkalinity as CaCO ₃ , mg/L.....	266
Total Hardness as CaCO ₃ , mg/L.....	1260
Sodium Adsorption Ratio.....	3.23

	mg/L	meq/L
Bicarbonate as HCO ₃	325	5.32
Carbonate as CO ₃	<0.10	<0.01
Chloride.....	113	3.19
Sulfate.....	1400	29.2
Calcium.....	430	21.4
Magnesium.....	45.6	3.75
Potassium.....	3.04	0.08
Sodium.....	263	11.5
Major Cations.....		36.7
Major Anions.....		37.7
Cation/Anion Difference.....		1.3 %


Wanda Orso
Water Lab Supervisor

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 07/29/92
ID: 9207081210
SITE: SHS-13 DATE RECEIVED: 07/08/92
LAB NO: F9123 DATE COLLECTED: 07/08/92

Lab pH (s.u.).....	7.19
Lab Conductivity, umhos/cm @ 25C....	3500
Lab Resistivity, ohm-m.....	2.86
Total Dissolved Solids (180C), mg/L.	2250
Total Dissolved Solids (calc), mg/L.	2250
Total Alkalinity as CaCO ₃ , mg/L.....	824
Total Hardness as CaCO ₃ , mg/L.....	692
Sodium Adsorption Ratio.....	9.99

	mg/L	meq/L
Bicarbonate as HCO ₃	1010	16.5
Carbonate as CO ₃	<0.10	<0.01
Chloride.....	539	15.2
Sulfate.....	359	7.48
Calcium.....	222	11.1
Magnesium.....	33.3	2.74
Potassium.....	2.35	0.06
Sodium.....	604	26.3
Major Cations.....		40.2
Major Anions.....		39.2
Cation/Anion Difference.....		1.27 %


Wanda Orso
Water Lab Supervisor

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 07/29/92
ID: 9207081323
SITE: SHS-15 DATE RECEIVED: 07/08/92
LAB NO: F9124 DATE COLLECTED: 07/08/92

Lab pH (s.u.).....	7.23
Lab Conductivity, umhos/cm @ 25C....	3690
Lab Resistivity, ohm-m.....	2.71
Total Dissolved Solids (180C), mg/L.	2700
Total Dissolved Solids (calc), mg/L.	2660
Total Alkalinity as CaCO ₃ , mg/L.....	381
Total Hardness as CaCO ₃ , mg/L.....	997
Sodium Adsorption Ratio.....	7.16

	mg/L	meq/L
Bicarbonate as HCO ₃	465	7.62
Carbonate as CO ₃	<0.10	<0.01
Chloride.....	455	12.8
Sulfate.....	1070	22.3
Calcium.....	349	17.4
Magnesium.....	30.9	2.54
Potassium.....	2.35	0.06
Sodium.....	520	22.6
Major Cations.....		42.6
Major Anions.....		42.8
Cation/Anion Difference.....		0.18 %


Wanda Orso
Water Lab Supervisor

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 07/29/92
ID: 9207081435
SITE: SHS-16 DATE RECEIVED: 07/08/92
LAB NO: F9125 DATE COLLECTED: 07/08/92

Lab pH (s.u.).....	7.16
Lab Conductivity, umhos/cm @ 25C....	1940
Lab Resistivity, ohm-m.....	5.16
Total Dissolved Solids (180C), mg/L.	1620
Total Dissolved Solids (calc), mg/L.	1570
Total Alkalinity as CaCO ₃ , mg/L.....	258
Total Hardness as CaCO ₃ , mg/L.....	800
Sodium Adsorption Ratio.....	2.97

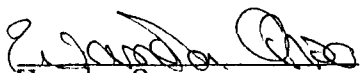
	mg/L	meq/L
Bicarbonate as HCO ₃	315	5.16
Carbonate as CO ₃	<0.10	<0.01
Chloride.....	31.9	0.90
Sulfate.....	893	18.6
Calcium.....	259	12.9
Magnesium.....	37.6	3.09
Potassium.....	3.13	0.08
Sodium.....	193	8.39
Major Cations.....		24.5
Major Anions.....		24.7
Cation/Anion Difference.....		0.42 %


Wanda Orso
Water Lab Supervisor

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 07/29/92
ID: 9207081210 Split 9123
SITE: SHS-16 DATE RECEIVED: 07/08/92
LAB NO: F9126 DATE COLLECTED: 07/08/92

Lab pH (s.u.)..... 7.18
Lab Conductivity, umhos/cm @ 25C.... 3390
Lab Resistivity, ohm-m..... 2.95
Total Dissolved Solids (180C), mg/L. 2250
Total Dissolved Solids (calc), mg/L. 2230
Total Alkalinity as CaCO₃, mg/L..... 820
Total Hardness as CaCO₃, mg/L..... 684
Sodium Adsorption Ratio..... 9.97

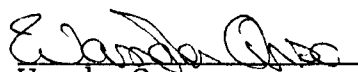
	mg/L	meq/L
Bicarbonate as HCO ₃	1000	16.4
Carbonate as CO ₃	<0.10	<0.01
Chloride.....	540	15.2
Sulfate.....	344	7.17
Calcium.....	219	10.9
Magnesium.....	33.8	2.78
Potassium.....	1.56	0.04
Sodium.....	600	26.1
Major Cations.....		39.8
Major Anions.....		38.8
Cation/Anion Difference.....		1.27 %


Wanda Orso
Water Lab Supervisor

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 07/22/92
ID: SHS-3
SITE: 9207071425 DATE RECEIVED: 07/07/92
LAB NO: F9114 DATE COLLECTED: 07/07/92

Lab pH (s.u.).....	6.69
Lab Conductivity, umhos/cm @ 25C....	4290
Lab Resistivity, ohm-m.....	2.33
Total Dissolved Solids (180C), mg/L.	3850
Total Dissolved Solids (calc), mg/L.	3780
Total Alkalinity as CaCO ₃ , mg/L.....	209
Total Hardness as CaCO ₃ , mg/L.....	1750
Sodium Adsorption Ratio.....	5.28

	mg/L	meq/L
Bicarbonate as HCO ₃	256	4.19
Carbonate as CO ₃	<0.10	<0.01
Chloride.....	352	9.93
Sulfate.....	2130	44.4
Calcium.....	579	28.9
Magnesium.....	74.4	6.12
Potassium.....	9.00	0.23
Sodium.....	508	22.1
Major Cations.....		57.4
Major Anions.....		58.5
Cation/Anion Difference.....		1 %


Wanda Orso
Water Lab Supervisor



2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 07/22/92
ID: SHS-6
SITE: 9207071515 DATE RECEIVED: 07/07/92
LAB NO: F9115 DATE COLLECTED: 07/07/92

Lab pH (s.u.).....	7.05
Lab Conductivity, umhos/cm @ 25C....	2790
Lab Resistivity, ohm-m.....	3.58
Total Dissolved Solids (180C), mg/L.	2440
Total Dissolved Solids (calc), mg/L.	2390
Total Alkalinity as CaCO ₃ , mg/L.....	271
Total Hardness as CaCO ₃ , mg/L.....	1050
Sodium Adsorption Ratio.....	4.88

	mg/L	meq/L
Bicarbonate as HCO ₃	331	5.42
Carbonate as CO ₃	<0.10	<0.01
Chloride.....	108	3.04
Sulfate.....	1350	28.1
Calcium.....	369	18.4
Magnesium.....	32.6	2.68
Potassium.....	3.50	0.09
Sodium.....	364	15.8
Major Cations.....		37
Major Anions.....		36.5
Cation/Anion Difference.....		0.67 %


Wanda Orso
Water Lab Supervisor

RECEIVED JUL 27 1992

CLIENT: H + GCL
ID: GBR-50
SITE: 9207151608
LAB NO: F9231DATE REPORTED: 07/23/92
DATE RECEIVED: 07/16/92
DATE COLLECTED: 07/15/92

Lab pH (s.u.).....	7.21
Lab Conductivity, umhos/cm @ 25C....	2800
Lab Resistivity, ohm-m.....	3.57
Total Dissolved Solids (180C), mg/L.	2750
Total Dissolved Solids (calc), mg/L.	2650
Total Alkalinity as CaCO ₃ , mg/L.....	196
Total Hardness as CaCO ₃ , mg/L.....	960
Sodium Adsorption Ratio.....	6.85

	mg/L	meq/L
Bicarbonate as HCO ₃	239	3.92
Carbonate as CO ₃	<0.10	<0.01
Chloride.....	39.3	1.11
Sulfate.....	1640	34.2
Calcium.....	331	16.5
Magnesium.....	32.8	2.69
Potassium.....	2.74	0.07
Sodium.....	488	21.2
Major Cations.....		40.5
Major Anions.....		39.2
Cation/Anion Difference.....		1.63 %


Wanda Orso
Water Lab Supervisor

CLIENT: H + GCL
ID: GBR-48
SITE: 9207151801
LAB NO: F9232

DATE REPORTED: 07/23/92
DATE RECEIVED: 07/16/92
DATE COLLECTED: 07/15/92

Lab pH (s.u.).....	7.21
Lab Conductivity, umhos/cm @ 25C....	5300
Lab Resistivity, ohm-m.....	1.89
Total Dissolved Solids (180C), mg/L.	4300
Total Dissolved Solids (calc), mg/L.	4100
Total Alkalinity as CaCO ₃ , mg/L.....	344
Total Hardness as CaCO ₃ , mg/L.....	1350
Sodium Adsorption Ratio.....	10.2

	mg/L	meq/L
Bicarbonate as HCO ₃	420	6.88
Carbonate as CO ₃	<0.10	<0.01
Chloride.....	726	20.5
Sulfate.....	1800	37.5
Calcium.....	449	22.4
Magnesium.....	55.9	4.60
Potassium.....	5.08	0.13
Sodium.....	858	37.3
Major Cations.....		64.4
Major Anions.....		64.9
Cation/Anion Difference.....		0.33 %


Wanda Orso
Water Lab Supervisor

CLIENT: H + GCL
ID: GBR-32
SITE: 9207151346
LAB NO: F9233

DATE REPORTED: 07/23/92
DATE RECEIVED: 07/16/92
DATE COLLECTED: 07/15/92

Lab pH (s.u.).....	7.34
Lab Conductivity, umhos/cm @ 25C....	4870
Lab Resistivity, ohm-m.....	2.05
Total Dissolved Solids (180C), mg/L.	3990
Total Dissolved Solids (calc), mg/L.	3910
Total Alkalinity as CaCO ₃ , mg/L.....	363
Total Hardness as CaCO ₃ , mg/L.....	1220
Sodium Adsorption Ratio.....	10.7

	mg/L	meq/L
Bicarbonate as HCO ₃	443	7.26
Carbonate as CO ₃	<0.10	<0.01
Chloride.....	497	14.0
Sulfate.....	1880	39.1
Calcium.....	411	20.5
Magnesium.....	47.2	3.88
Potassium.....	4.30	0.11
Sodium.....	856	37.2
Major Cations.....		61.7
Major Anions.....		60.4
Cation/Anion Difference.....		1.1 %


Wanda Orso
Water Lab Supervisor

CLIENT: H + GCL
ID: GBR-49
SITE: 9207151721
LAB NO: F9234

DATE REPORTED: 07/23/92
DATE RECEIVED: 07/16/92
DATE COLLECTED: 07/15/92

Lab pH (s.u.).....	7.63
Lab Conductivity, umhos/cm @ 25C....	4530
Lab Resistivity, ohm-m.....	2.21
Total Dissolved Solids (180C), mg/L.	3740
Total Dissolved Solids (calc), mg/L.	3660
Total Alkalinity as CaCO ₃ , mg/L.....	372
Total Hardness as CaCO ₃ , mg/L.....	1094
Sodium Adsorption Ratio.....	10.7

	mg/L	meq/L
Bicarbonate as HCO ₃	454	7.44
Carbonate as CO ₃	<0.10	<0.01
Chloride.....	459	12.9
Sulfate.....	1760	36.7
Calcium.....	357	17.8
Magnesium.....	49.6	4.08
Potassium.....	3.91	0.10
Sodium.....	810	35.2
Major Cations.....		57.2
Major Anions.....		57.1
Cation/Anion Difference.....		0.11 %

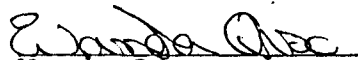

Wanda Orso
Water Lab Supervisor

CLIENT: H + GCL
ID: GBR-48
SITE: 9207151801
LAB NO: F9232

DATE REPORTED: 07/23/92
DATE RECEIVED: 07/16/92
DATE COLLECTED: 07/15/92

Lab pH (s.u.).....	7.21
Lab Conductivity, umhos/cm @ 25C....	5300
Lab Resistivity, ohm-m.....	1.89
Total Dissolved Solids (180C), mg/L.	4300
Total Dissolved Solids (calc), mg/L.	4100
Total Alkalinity as CaCO ₃ , mg/L.....	344
Total Hardness as CaCO ₃ , mg/L.....	1350
Sodium Adsorption Ratio.....	10.2

	mg/L	meq/L
Bicarbonate as HCO ₃	420	6.88
Carbonate as CO ₃	<0.10	<0.01
Chloride.....	726	20.5
Sulfate.....	1800	37.5
Calcium.....	449	22.4
Magnesium.....	55.9	4.60
Potassium.....	5.08	0.13
Sodium.....	858	37.3
Major Cations.....		64.4
Major Anions.....		64.9
Cation/Anion Difference.....		0.33 %

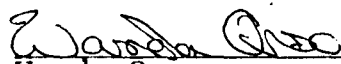

Wanda Orso
Water Lab Supervisor

CLIENT: H + GCL
ID: GBR-32
SITE: 9207151346
LAB NO: F9233

DATE REPORTED: 07/23/92
DATE RECEIVED: 07/16/92
DATE COLLECTED: 07/15/92

Lab pH (s.u.).....	7.34
Lab Conductivity, umhos/cm @ 25C....	4870
Lab Resistivity, ohm-m.....	2.05
Total Dissolved Solids (180C), mg/L.	3990
Total Dissolved Solids (calc), mg/L.	3910
Total Alkalinity as CaCO ₃ , mg/L.....	363
Total Hardness as CaCO ₃ , mg/L.....	1220
Sodium Adsorption Ratio.....	10.7

	mg/L	meq/L
Bicarbonate as HCO ₃	443	7.26
Carbonate as CO ₃	<0.10	<0.01
Chloride.....	497	14.0
Sulfate.....	1880	39.1
Calcium.....	411	20.5
Magnesium.....	47.2	3.88
Potassium.....	4.30	0.11
Sodium.....	856	37.2
Major Cations.....		61.7
Major Anions.....		60.4
Cation/Anion Difference.....		1.1 %

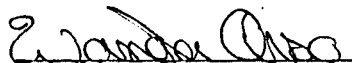

Wanda Orso
Water Lab Supervisor

CLIENT: H + GCL
ID: GBR-49
SITE: 9207151721
LAB NO: F9234

DATE REPORTED: 07/23/92
DATE RECEIVED: 07/16/92
DATE COLLECTED: 07/15/92

Lab pH (s.u.).....	7.63
Lab Conductivity, umhos/cm @ 25C....	4530
Lab Resistivity, ohm-m.....	2.21
Total Dissolved Solids (180C), mg/L.	3740
Total Dissolved Solids (calc), mg/L.	3660
Total Alkalinity as CaCO ₃ , mg/L.....	372
Total Hardness as CaCO ₃ , mg/L.....	1094
Sodium Adsorption Ratio.....	10.7

	mg/L	meq/L
Bicarbonate as HCO ₃	454	7.44
Carbonate as CO ₃	<0.10	<0.01
Chloride.....	459	12.9
Sulfate.....	1760	36.7
Calcium.....	357	17.8
Magnesium.....	49.6	4.08
Potassium.....	3.91	0.10
Sodium.....	810	35.2
Major Cations.....		57.2
Major Anions.....		57.1
Cation/Anion Difference.....		0.11 %


Wanda Orso
Water Lab Supervisor

CLIENT: H + GCL
ID: GBR-50
SITE: 9207151608
LAB NO: F9231

DATE REPORTED: 07/23/92
DATE RECEIVED: 07/16/92
DATE COLLECTED: 07/15/92

Lab pH (s.u.).....	7.21
Lab Conductivity, umhos/cm @ 25C....	2800
Lab Resistivity, ohm-m.....	3.57
Total Dissolved Solids (180C), mg/L.	2750
Total Dissolved Solids (calc), mg/L.	2650
Total Alkalinity as CaCO ₃ , mg/L.....	196
Total Hardness as CaCO ₃ , mg/L.....	960
Sodium Adsorption Ratio.....	6.85

	mg/L	meq/L
Bicarbonate as HCO ₃	239	3.92
Carbonate as CO ₃	<0.10	<0.01
Chloride.....	39.3	1.11
Sulfate.....	1640	34.2
Calcium.....	331	16.5
Magnesium.....	32.8	2.69
Potassium.....	2.74	0.07
Sodium.....	488	21.2
Major Cations.....		40.5
Major Anions.....		39.2
Cation/Anion Difference.....		1.63 %


Wanda Orso
Water Lab Supervisor



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20865601

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFFSITE
CLIENT I.D. : 9208101058 SHS-18
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 08/10/92
DATE RECEIVED : 08/11/92
DATE EXTRACTED : N/A
DATE ANALYZED : 08/20/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS

RESULTS

BENZENE	2.4
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	0.3
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	0.6
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	0.6
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	0.6
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	8.9
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	10.9
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	107
BROMOFLUOROBENZENE (%)	100



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20865501

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REF.REMEDIAT
CLIENT I.D. : 920810835 STRIPPER INFLUENT
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 08/10/92
DATE RECEIVED : 08/11/92
DATE EXTRACTED : N/A
DATE ANALYZED : 08/21/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
BENZENE	15.6
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	1.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	0.8
1,2-DICHLOROETHANE	0.4
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	1.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	4.4
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	5.4
TRICHLOROTRIFLUOROETHANE	<2.0

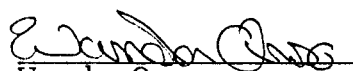
SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	85
BROMOFLUOROBENZENE (%)	95

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 08/12/92
ID: Stripper Effluent
SITE: 9208030840 DATE RECEIVED: 08/03/92
LAB NO: F9413 DATE COLLECTED: 08/03/92

Lab pH (s.u.).....	6.92
Lab Conductivity, umhos/cm @ 25C....	3670
Lab Resistivity, ohm-m.....	2.72
Total Dissolved Solids (180C), mg/L.	2820
Total Dissolved Solids (calc), mg/L.	2630
Total Alkalinity as CaCO ₃ , mg/L.....	33.3
Total Hardness as CaCO ₃ , mg/L.....	931
Sodium Adsorption Ratio.....	6.85

	mg/L	meq/L
Bicarbonate as HCO ₃	40.9	0.67
Carbonate as CO ₃	<0.10	<0.01
Chloride.....	599	16.9
Sulfate.....	1130	23.5
Calcium.....	310	15.5
Magnesium.....	38.2	3.14
Potassium.....	53.6	1.37
Sodium.....	480	20.9
Major Cations.....		40.9
Major Anions.....		41.1
Cation/Anion Difference.....		0.28 %


Wanda Orso
Water Lab Supervisor

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 08/12/92
ID: 9208031415
SITE: RW-13 DATE RECEIVED: 08/03/92
LAB NO: F9414 DATE COLLECTED: 08/03/92

Lab Conductivity, umhos/cm @ 25C.... 4110


Wanda Orso
Water Lab Supervisor

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 08/19/92
ID: Stripper Influent
SITE: 9208100835 DATE RECEIVED: 08/10/92
LAB NO: F9442 DATE COLLECTED: 08/10/92

Lab pH (s.u.).....	6.58
Lab Conductivity, umhos/cm @ 25C....	3170
Lab Resistivity, ohm-m.....	3.15
Total Dissolved Solids (180C), mg/L.	2760
Total Dissolved Solids (calc), mg/L.	2650
Total Alkalinity as CaCO ₃ , mg/L.....	263
Total Hardness as CaCO ₃ , mg/L.....	986
Sodium Adsorption Ratio.....	7.20

	mg/L	meq/L
Bicarbonate as HCO ₃	321	5.26
Carbonate as CO ₃	<0.10	<0.01
Chloride.....	470	13.3
Sulfate.....	1120	23.4
Calcium.....	335	16.7
Magnesium.....	36.6	3.01
Potassium.....	5.08	0.13
Sodium.....	520	22.6
Major Cations.....		42.4
Major Anions.....		41.9
Cation/Anion Difference.....		0.6 %


Wanda Orso
Water Lab Supervisor

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 07/09/92
ID: 9206180800
SITE: RW-13 DATE RECEIVED: 06/18/92
LAB NO: F9028 DATE COLLECTED: 06/18/92

Lab Conductivity, umhos/cm @ 25C.... 3800


Wanda Orso
Water Lab Supervisor



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20851901

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REF. REMEDIA
CLIENT I.D. : 920803840 STRIPPER EFFLUENT
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 08/03/92
DATE RECEIVED : 08/04/92
DATE EXTRACTED : N/A
DATE ANALYZED : 08/11/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
-----------	---------

BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	96
BROMOFLUOROBENZENE (%)	108

OIL CONSERVATION DIVISION
RECEIVED

'92 AUG 5 AM 9 10

GIANT
REFINING CO.

P.O. Box 256
Farmington, New Mexico
87499

505
632-3306

August 5, 1992

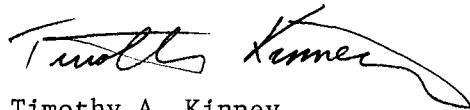
Mr. William Olson
Hydrogeologist
New Mexico Oil Conservation Division
Environmental Bureau
P. O. Box 2088
Santa Fe, NM 87504-2088

Dear Mr. Olson:

Enclosed you will find the quarterly report for Giant Refining Company's Bloomfield Refinery for the second quarter of 1992.

Please contact me if you have any questions.

Sincerely,



Timothy A. Kinney
Remediation Project Manager

/dm

Enclosure

cc w/enc.: Carl Shook - Giant
Kim Bullerdick - Giant
Debbie Smith - Giant
Bruce Davis - BLM
Dale Doremus - EID
Martin Nee - GCL
Bill Baggett - SJC
Monica Chapa - EPA
Maurie West - ATSDR
Chris Shuey - SWRIC

QUARTERLY DATA REPORT
GIANT BLOOMFIELD REFINERY
SECOND QUARTER, 1992

Prepared By:

GIANT REFINING COMPANY
5764 U. S. Highway 64
P. O. Box 256
Farmington, NM 87499
(505) 632-3306
FAX (505) 632-2487

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Introduction and Summary	Section 1
Quarterly Analytical Results	Section 2
Potentiometric Surface Maps	Section 3
Total Volume History	Section 4
Specific Conductance Tracking	Section 5

INTRODUCTION AND SUMMARY QUARTERLY REPORT SECOND QUARTER, 1992

INTRODUCTION

No significant changes were made to the remediation system during the second quarter of 1992. All treated water is being directed toward the infiltration gallery in the old stormwater containment area of the refinery. We continue to monitor its effect on the system. Recovery well SHS-11, part of the offsite recovery well network, has sanded in and is no longer operable. Replacement is scheduled for the third quarter of 1992.

SUMMARY

Section 2

Section 2 contains a summary of the quarterly analytical results. Raw data, as received from the laboratory, is available on request as a supplement to the quarterly report. Also included is the recently approved, revised sampling matrix for the project.

Section 3

A potentiometric surface map, as well as the adjusted water surface elevation and product thickness for each well, is included in Section 3.

Section 4

Section 4 illustrates the volume history for the quarter. Total volume pumped from each well, as well as current tank volumes and the reinjection volume, is reported. Additional detail, on a weekly basis, is also available if desired.

Section 5

Specific conductance tracking for GRW-13 is included in this section.

SECTION 2

The following pages show the quarterly analytical data for the Giant Refining Remediation Project. The data is broken down into units as described below.

	Unit of <u>Measure</u>
Total dissolved solids (180)	mg/l
Total dissolved solids (calc)	mg/l
Total alkalinity as CaCO ₃	mg/l
Total hardness as CaCO ₃	mg/l
Bicarbonate as HCO ₃	mg/l
Carbonate as CO ₃	mg/l
Chloride	mg/l
Sulfate	mg/l
Calcium	mg/l
Magnesium	mg/l
Potassium	mg/l
Sodium	mg/l

The remainder of the data is measured in ug/l.

GIANT BLOOMFIELD REFINERY
SAMPLE MATRIXRevised
6-29-92

<u>LOCATION</u>	<u>MONTHLY</u>	<u>QUARTERLY</u>	<u>SEMI ANNUALLY</u>	<u>ANNUALLY</u>
Stripper Influent	601 602 GWC	601 602 GWC	601 602 GWC	601 602 GWC
Stripper Effluent	601 602 GWC	601 602 GWC	601 602 GWC	601 602 GWC Metals PAH
GRW-3				601 602 GWC PAH
GRW-6				601 602 GWC PAH
GRW-13				601 602 GWC PAH
GBR-15			601 602 GWC	601 602 GWC
GBR-17			601 602 GWC	601 602 GWC PAH
GBR-24D			601 602 GWC	601 602 GWC PAH

GIANT BLOOMFIELD REFINERY SAMPLE MATRIX

<u>LOCATION</u>	<u>MONTHLY</u>	<u>QUARTERLY</u>	<u>SEMI ANNUALLY</u>	<u>ANNUALLY</u>
GBR-30			601 602 GWC	601 602 GWC PAH
GBR-31			601 602 GWC	601 602 GWC PAH
SHS-3		601 602	601 602 GWC	601 602 GWC
SHS-6		601 602	601 602 GWC	601 602 GWC
SHS-10		601 602	601 602 GWC	601 602 GWC
SHS-12		601 602	601 602 GWC	601 602 GWC
SHS-13		601 602	601 602 GWC	601 602 GWC
SHS-15		601 602	601 602 GWC	601 602 GWC
SHS-16		601 602	601 602 GWC	601 602 GWC

GIANT BLOOMFIELD REFINERY SAMPLE MATRIX

<u>LOCATION</u>	<u>MONTHLY</u>	<u>QUARTERLY</u>	<u>SEMI ANNUALLY</u>	<u>ANNUALLY</u>
SHS-7			601 602 GWC	601 602 GWC
SHS-9			601 602 GWC	601 602 GWC
SHS-11			601 602 GWC	601 602 GWC
Tank 21				601 602 GWC Metals PAH
Tank 27				
Offsite Stream				601 602 GWC Metals PAH

Notes

All wells will have water and free product elevations determined on a monthly basis.

Wells exhibiting free product will not be sampled.

GIANT REFINING COMPANY
 ONSITE REMEDIATION PROJECT
 QUARTERLY ANALYTICAL DATA SUMMARY
 SECOND QUARTER, 1992

STRIPPER INFLUENT

	4/92	5/92	6/92
GENERAL WATER CHEMISTRY			
Lab pH (s.u.)	6.83	6.55	5.86
Lab conductivity, umhos/cm	3750.00	3430.00	3450.00
Lab resistivity, ohm-m	2.67	2.92	2.90
Total dissolved solids (180	2740.00	2810.00	2670.00
Total dissolved solids (cal	2770.00	2710.00	2620.00
Total alkalinity as CaCO ₃	218.00	156.00	54.00
Total hardness as CaCO ₃	1200.00	1060.00	853.00
Sodium absorption ratio	5.77	6.72	8.23
Bicarbonate as HCO ₃	267.00	190.00	65.90
Carbonate as CO ₃	0.00	0.00	0.00
Chloride	470.00	506.00	556.00
Sulfate	1250.00	1190.00	1160.00
Calcium	421.00	405.00	289.00
Magnesium	36.20	12.90	32.30
Potassium	2.07	2.52	0.60
Sodium	460.00	504.00	553.00

HALOCARBONS

Bromodichloromethane	ND	ND
Bromoform	ND	ND
Bromomethane	ND	ND
Carbon tetrachloride	ND	ND
Chloroethane	ND	ND
2-Chloroethylvinylether	ND	ND
Chloroform	ND	0.50
Chloromethane	ND	ND
Dibromochloromethane	ND	ND
1,2-Dichlorobenzene	ND	ND
1,3-Dichlorobenzene	ND	ND
1,4-Dichlorobenzene	ND	ND
1,1-Dichloroethane	0.60	0.60
1,2-Dichloroethane	0.50	0.60
1,1-Dichloroethene	ND	ND
1,2-Dichloroethene	1.30	1.30
trans-1,2-Dichloroethene	ND	ND
1,2-Dichloropropane	ND	ND
cis-1,3-Dichloropropene	ND	ND
trans-1,3-Dichloropropene	ND	ND
Methylene chloride	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND
Tetrachloroethene	ND	0.30

STRIPPER INFLUENT (Continued)

	4/92	5/92	6/92
1,1,1-Trichloroethane		ND	0.30
1,1,2-Trichloroethane		ND	ND
Trichloroethene		ND	0.30
Trichlorofluoromethane		ND	ND
Vinyl chloride		ND	ND
AROMATICS			
Benzene	12.00	5.10	5.30
Chlorobenzene	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND
Ethylbenzene	2.90	0.60	0.70
Toluene	ND	ND	ND
Xylenes	4.10	4.80	3.80
Trichlorotrifluoroethane	ND	ND	ND

STRIPPER EFFLUENT

	4/92	5/92	6/92
GENERAL WATER CHEMISTRY			
Lab pH (s.u.)		7.16	
Lab conductivity, umhos/cm		3270.00	
Lab resistivity, ohm-m		3.06	
Total dissolved solids (180)		2780.00	
Total dissolved solids (calc)		2740.00	
Total alkalinity as CaCO ₃		51.70	
Total hardness as CaCO ₃		981.00	
Sodium absorption ratio		7.01	
Bicarbonate as HCO ₃		62.80	
Carbonate as CO ₃		0.00	
Chloride		594.00	
Sulfate		1220.00	
Calcium		373.00	
Magnesium		12.50	
Potassium		2.10	
Sodium		505.00	

HALOCARBONS			
Bromodichloromethane	ND	ND	ND
Bromoform	ND	ND	ND
Bromomethane	ND	ND	ND
Carbon tetrachloride	ND	ND	ND
Chloroethane	ND	ND	ND
Chloroethane	ND	ND	ND
2-Chloroethylvinylether	ND	ND	ND
Chloroform	ND	ND	ND
Chloromethane	ND	ND	ND
Dibromochloromethane	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND
1,2-Dichloroethene	ND	ND	ND
cis-1,2-Danthracene	ND	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND
Methylene chloride	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND
Tetrachloroethene	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND
Trichloroethene	ND	ND	ND
Trichlorofluoromethane	ND	ND	ND
Vinyl chloride	ND	ND	ND

STRIPPER EFFLUENT (Continued)

	4/92	5/92	6/92
AROMATICS			
Benzene	ND	ND	ND
Chlorobenzene	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND
Ethylbenzene	ND	ND	ND
Toluene	ND	ND	ND
Xylenes	ND	ND	ND
Trichlorotrifluoroethane	ND	ND	ND

GRW-3

4/92

5/92

6/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.35
Lab conductivity, umhos/cm	3440.00
Lab resistivity, ohm-m	2.90
Total dissolved solids (180	2410.00
Total dissolved solids (cal	2410.00
Total alkalinity as CaCO ₃	934.00
Total hardness as CaCO ₃	711.00
Sodium absorption ratio	10.60
Bicarbonate as HCO ₃	1140.00
Carbonate as CO ₃	0.00
Chloride	428.00
Sulfate	505.00
Calcium	237.00
Magnesium	29.00
Potassium	2.09
Sodium	648.00

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	0.80
1,2-Dichloroethane	0.50
1,2-Dichloroethene	0.50
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

GRW-3 (Continued)

	4/92	5/92	6/92
AROMATICS			
Benzene	27.00		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	44.00		
Toluene	0.70		
Xylenes	10.00		
Trichlorotrifluoroethane	ND		
PAH			
Acenaphthene	ND		
Acenaphthylene	ND		
Anthracene	ND		
Benzo(a)anthracene	ND		
Benzo(a)pyrene	ND		
Benzo(b)fluoranthene	ND		
Benzo(g,h,i)perylene	ND		
Benzo(k)fluoranthene	ND		
Chrysene	ND		
Dibenzo(a,h)anthracene	ND		
Fluoranthene	ND		
Fluorene	4.30		
Indeno(1,2,3-cd)pyrene	ND		
Naphthalene	ND		
Phenanthrene	2.30		
Pyrene	ND		
1-Methylnaphthalene	8.30		
2-Methylnaphthalene	ND		

GRW-4

4/92

5/92

6/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.20
Lab conductivity, umhos/cm	3370.00
Lab resistivity, ohm-m	2.96
Total dissolved solids (180	2290.00
Total dissolved solids (cal	2270.00
Total alkalinity as CaCO ₃	828.00
Total hardness as CaCO ₃	795.00
Sodium absorption ratio	8.43
Bicarbonate as HCO ₃	1010.00
Carbonate as CO ₃	0.00
Chloride	518.00
Sulfate	405.00
Calcium	270.00
Magnesium	29.70
Potassium	1.74
Sodium	547.00

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	1.60
1,2-Dichloroethane	1.00
1,1-Dichloroethene	ND
1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND

GRW-4 (Continued)	5/92	5/92	6/92
1,1,1-Trichloroethane	ND		
1,1,2-Trichloroethane	ND		
Trichloroethene	0.40		
Trichlorofluoromethane	ND		
Vinyl chloride	ND		
AROMATICS			
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		
Trichlorotrifluoroethane	ND		
PAH			
Acenaphthene	ND		
Acenaphthylene	ND		
Anthracene	ND		
Benzo(a)anthracene	ND		
Benzo(a)pyrene	ND		
Benzo(b)fluoranthene	ND		
Benzo(g,h,i)perylene	ND		
Benzo(k)fluoranthene	ND		
Chrysene	ND		
Dibenzo(a,h)anthracene	ND		
Fluoranthene	1.90		
Fluorene	5.80		
Indeno(1,2,3-cd)pyrene	ND		
Naphthalene	ND		
Phenanthrene	ND		
Pyrene	ND		
1-Methylnaphthalene	9.80		
2-Methylnaphthalene	ND		

GRW-6

4/92

5/92

6/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.20
Lab conductivity, umhos/cm	3700.00
Lab resistivity, ohm-m	2.70
Total dissolved solids (180)	2330.00
Total dissolved solids (calc)	2560.00
Total alkalinity as CaCO ₃	718.00
Total hardness as CaCO ₃	833.00
Sodium absorption ratio	9.46
Bicarbonate as HCO ₃	878.00
Carbonate as CO ₃	0.00
Chloride	625.00
Sulfate	562.00
Calcium	287.00
Magnesium	28.70
Potassium	0.97
Sodium	628.00

PAH

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(g,h,i)perylene	ND
Benzo(k)fluoranthene	0.01
Chrysene	ND
Dibenzo(a,h)anthracene	ND
Fluoranthene	0.22
Fluorene	ND
Indeno(1,2,3-cd)pyrene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

AROMATICS

Benzene	ND
Chlorobenzene	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
Ethylbenzene	ND
Toluene	ND
Xylenes	ND
Trichlorotrifluoroethane	ND

GBR-15

4/92

5/92

6/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.40
Lab conductivity, umhos/cm	4360.00
Lab resistivity, ohm-m	2.29
Total dissolved solids (180)	3350.00
Total dissolved solids (calc)	3390.00
Total alkalinity as CaCO ₃	253.00
Total hardness as CaCO ₃	1160.00
Sodium absorption ratio	8.72
Bicarbonate as HCO ₃	309.00
Carbonate as CO ₃	0.00
Chloride	646.00
Sulfate	1450.00
Calcium	414.00
Magnesium	31.60
Potassium	3.91
Sodium	684.00

AROMATICS

Benzene	3.50
Chlorobenzene	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
Ethylbenzene	ND
Toluene	ND
Xylenes	ND
Trichlorotrifluoroethane	ND

GBR-17

4/92

5/92

6/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.07
Lab conductivity, umhos/cm	2670.00
Lab resistivity, ohm-m	3.75
Total dissolved solids (180)	2150.00
Total dissolved solids (calc)	2160.00
Total alkalinity as CaCO ₃	234.00
Total hardness as CaCO ₃	942.00
Sodium absorption ratio	4.51
Bicarbonate as HCO ₃	285.00
Carbonate as CO ₃	0.00
Chloride	63.10
Sulfate	1280.00
Calcium	331.00
Magnesium	28.40
Potassium	0.10
Sodium	318.00

AROMATICS

Benzene	0.80
Chlorobenzene	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
Ethylbenzene	ND
Toluene	ND
Xylenes	ND
Trichlorotrifluoroethane	ND

GBR-24-D

	4/92	5/92	6/92
GENERAL WATER CHEMISTRY			
Lab pH (s.u.)	7.23		
Lab conductivity, umhos/cm	5210.00		
Lab resistivity, ohm-m	1.92		
Total dissolved solids (180)	3820.00		
Total dissolved solids (calc)	3740.00		
Total alkalinity as CaCO3	210.00		
Total hardness as CaCO3	1930.00		
Sodium absorption ratio	4.69		
Bicarbonate as HCO3	257.00		
Carbonate as CO3	0.00		
Chloride	822.00		
Sulfate	1590.00		
Calcium	632.00		
Magnesium	85.70		
Potassium	5.09		
Sodium	474.00		
AROMATICS			
Benzene	24.00		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	7.00		
Toluene	ND		
Xylenes	ND		
Trichlorotrifluoroethane	ND		

GBR-30

4/92

5/92

6/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.10
Lab conductivity, umhos/cm	3670.00
Lab resistivity, ohm-m	2.73
Total dissolved solids (180)	2880.00
Total dissolved solids (calc)	2820.00
Total alkalinity as CaCO ₃	179.00
Total hardness as CaCO ₃	1140.00
Sodium absorption ratio	6.33
Bicarbonate as HCO ₃	218.00
Carbonate as CO ₃	0.00
Chloride	531.00
Sulfate	1250.00
Calcium	402.00
Magnesium	34.20
Potassium	0.88
Sodium	492.00

AROMATICS

Benzene	ND
Chlorobenzene	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
Ethylbenzene	ND
Toluene	ND
Xylenes	ND
Trichlorotrifluoroethane	ND

GBR-31

	4/92	5/92	6/92
GENERAL WATER CHEMISTRY			
Lab pH (s.u.)	7.25		
Lab conductivity, umhos/cm	3720.00		
Lab resistivity, ohm-m	2.69		
Total dissolved solids (180)	2890.00		
Total dissolved solids (calc)	2850.00		
Total alkalinity as CaCO3	177.00		
Total hardness as CaCO3	1100.00		
Sodium absorption ratio	7.19		
Bicarbonate as HCO3	216.00		
Carbonate as CO3	0.00		
Chloride	536.00		
Sulfate	1240.00		
Calcium	382.00		
Magnesium	35.20		
Potassium	1.65		
Sodium	548.00		
AROMATICS			
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		

*ND - Not detected at specified detection limit

OFFSITE WELLS

SHS-3

4/92

5/92

6/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)
 Lab conductivity, umhos/cm
 Lab resistivity, ohm-m
 Total dissolved solids (180)
 Total dissolved solids (calc)
 Total alkalinity as CaCO3
 Total hardness as CaCO3
 Sodium absorption ratio
 Bicarbonate as HCO3
 Carbonate as CO3
 Chloride
 Sulfate
 Calcium
 Magnesium
 Potassium
 Sodium

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	ND
1,2-Dichloroethane	ND
1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

SHS-3 (Continued)

4/92

5/92

6/92

AROMATICS

Benzene	ND
Chlorobenzene	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
Ethylbenzene	ND
Toluene	ND
Xylenes	ND
Trichlorotrifluoroethane	ND

SHS-6

4/92

5/92

6/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)
Lab conductivity, umhos/cm
Lab resistivity, ohm-m
Total dissolved solids (180)
Total dissolved solids (calc)
Total alkalinity as CaCO₃
Total hardness as CaCO₃
Sodium absorption ratio
Bicarbonate as HCO₃
Carbonate as CO₃
Chloride
Sulfate
Calcium
Magnesium
Potassium
Sodium

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	ND
1,2-Dichloroethane	ND
1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

SHS-6 (Continued)

	4/92	5/92	6/92
AROMATICS			
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		
Trichlorotrifluoroethane	ND		

SHS-10

4/92

5/92

6/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)
Lab conductivity, umhos/cm
Lab resistivity, ohm-m
Total dissolved solids (180)
Total dissolved solids (calc)
Total alkalinity as CaCO₃
Total hardness as CaCO₃
Sodium absorption ratio
Bicarbonate as HCO₃
Carbonate as CO₃
Chloride
Sulfate
Calcium
Magnesium
Potassium
Sodium

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	ND
1,2-Dichloroethane	ND
1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

SHS-10 (Continued)

	4/92	5/92	6/92
AROMATICS			
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	27.00		
Toluene	ND		
Xylenes	ND		
Trichlorotrifluoroethane			

GENERAL WATER CHEMISTRY

Lab pH (s.u.)
Lab conductivity, umhos/cm
Lab resistivity, ohm-m
Total dissolved solids (180)
Total dissolved solids (calc)
Total alkalinity as CaCO₃
Total hardness as CaCO₃
Sodium absorption ratio
Bicarbonate as HCO₃
Carbonate as CO₃
Chloride
Sulfate
Calcium
Magnesium
Potassium
Sodium

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	0.70
1,2-Dichloroethane	0.40
1,2-Dichloroethene	3.70
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	0.70
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	0.20
Trichlorofluoromethane	ND
Vinyl chloride	ND

SHS-12 (Continued)

	4/92	5/92	6/92
AROMATICS			
Benzene	0.60		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		
Trichlorotrifluoroethane	ND		

SHS-13

4/92

5/92

6/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)
 Lab conductivity, umhos/cm
 Lab resistivity, ohm-m
 Total dissolved solids (180)
 Total dissolved solids (calc)
 Total alkalinity as CaCO₃
 Total hardness as CaCO₃
 Sodium absorption ratio
 Bicarbonate as HCO₃
 Carbonate as CO₃
 Chloride
 Sulfate
 Calcium
 Magnesium
 Potassium
 Sodium

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	1.00
1,2-Dichloroethane	3.10
1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

SHS-13 (Continued)

	4/92	5/92	6/92
AROMATICS			
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		
Trichlorotrifluoroethane	ND		

SHS-15

4/92

5/92

6/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)

Lab conductivity, umhos/cm

Lab resistivity, ohm-m

Total dissolved solids (180)

Total dissolved solids (calc)

Total alkalinity as CaCO₃Total hardness as CaCO₃

Sodium absorption ratio

Bicarbonate as HCO₃Carbonate as CO₃

Chloride

Sulfate

Calcium

Magnesium

Potassium

Sodium

HALOCARBONS

Bromodichloromethane

0.30

Bromoform

ND

Bromomethane

ND

Carbon tetrachloride

ND

Chloroethane

ND

2-Chloroethylvinylether

ND

Chloroform

6.50

Chloromethane

ND

Dibromochloromethane

ND

1,2-Dichlorobenzene

ND

1,3-Dichlorobenzene

ND

1,4-Dichlorobenzene

ND

1,1-Dichloroethane

ND

1,2-Dichloroethane

ND

1,2-Dichloroethene

ND

cis-1,2-Dichloroethene

ND

trans-1,2-Dichloroethene

ND

1,2-Dichloropropane

ND

cis-1,3-Dichloropropene

ND

trans-1,3-Dichloropropene

ND

Methylene chloride

ND

1,1,2,2-Tetrachloroethane

ND

Tetrachloroethene

ND

1,1,1-Trichloroethane

ND

1,1,2-Trichloroethane

ND

Trichloroethene

ND

Trichlorofluoromethane

ND

Vinyl chloride

ND

SHS-15 (Continued)

	4/92	5/92	6/92
AROMATICS			
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		
Trichlorotrifluoroethane	ND		

SHS-16

4/92

5/92

6/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)
Lab conductivity, umhos/cm
Lab resistivity, ohm-m
Total dissolved solids (180)
Total dissolved solids (calc)
Total alkalinity as CaCO₃
Total hardness as CaCO₃
Sodium absorption ratio
Bicarbonate as HCO₃
Carbonate as CO₃
Chloride
Sulfate
Calcium
Magnesium
Potassium
Sodium

HALOCARBONS

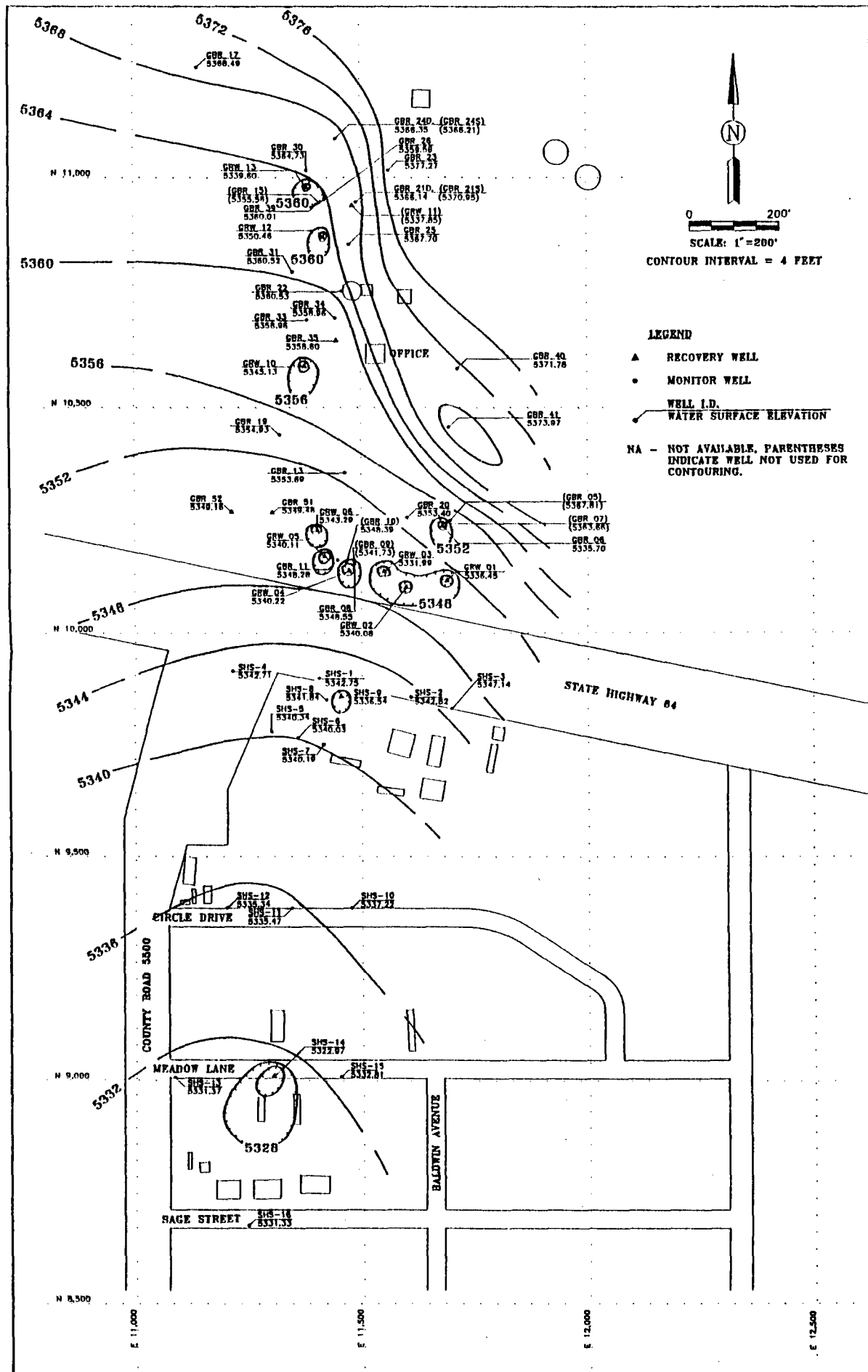
Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	ND
1,2-Dichloroethane	ND
1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

SHS-16 (Continued)

	4/92	5/92	6/92
AROMATICS			
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		
Trichlorotrifluoroethane	ND		

*ND - Not detected at specified detection limit

April 1992, Water Surface Contour Map
Giant-Bloomfield Refinery



GIANT REFINING BLOOMFIELD REFINERY
QUARTERLY POTENTIOMETRIC SURFACE

APRIL, 1992

WELL #	WELLHEAD ELEVATION IN FEET	DEPTH TO WATER IN FEET	DEPTH TO PRODUCT IN FEET	PRODUCT THICKNESS IN FEET	ADJUSTED WSEL* IN FEET
GRW-1	5394.30	57.85	57.85	0.00	5336.45
GRW-2	5391.28	51.20	51.20	0.00	5340.08
GRW-3	5388.77	56.78	56.78	0.00	5331.99
GRW-4	5390.02	49.80	49.80	0.00	5340.22
GRW-5	5390.56	50.45	50.45	0.00	5340.11
GRW-6	5390.81	47.52	47.52	0.00	5343.29
GRW-10	5395.02	53.44	49.00	4.44	5345.13
GRW-11	5397.85	60.00	60.00	0.00	5337.85
GRW-12	5397.24	46.78	46.78	0.00	5350.46
GRW-13	5396.90	57.30	57.30	0.00	5339.60
GBR-5	5395.07	28.30	27.00	1.30	5367.81
GBR-6	5395.70	60.00	60.00	0.00	5335.70
GBR-7	5395.85	32.70	32.06	0.64	5363.66
GBR-8	5390.50	41.97	41.95	0.02	5348.55
GBR-9	5389.92	48.19	48.19	0.00	5341.73
GBR-10	5390.57	42.18	42.18	0.00	5348.39
GBR-11	5389.43	42.10	40.91	1.19	5348.28
GBR-13	5393.04	39.15	39.15	0.00	5353.89
GBR-15	5397.99	42.43	42.43	0.00	5355.56
GBR-17	5402.69	34.20	34.20	0.00	5368.49
GBR-18	5421.68	24.24	24.24	0.00	5397.44
GBR-19	5393.83	38.90	38.90	0.00	5354.93
GBR-20	5393.47	42.09	39.57	2.52	5353.40
GBR-21S	5400.65	29.72	29.70	0.02	5370.95
GBR-21D	5400.19	34.05	34.05	0.00	5366.14
GBR-22	5395.91	36.33	35.14	1.19	5360.53
GBR-23	5403.72	42.12	42.12	0.00	5377.27
GBR-24S	5396.08	26.45	25.76	0.69	5366.21
GBR-24D	5396.77	30.42	30.42	0.00	5366.35
GBR-25	5396.72	29.02	29.02	0.00	5367.70
GBR-26	5395.59	36.03	36.03	0.00	5359.56
GBR-30	5396.58	31.85	31.85	0.00	5364.73
GBR-31	5394.86	34.34	34.34	0.00	5360.52
GBR-33	5396.28	37.32	37.32	0.00	5358.96
GBR-34	5394.00	35.20	35.00	0.20	5358.96
GBR-35	5393.66	35.72	34.90	0.82	5358.60
GBR-39	5397.55	37.54	37.54	0.00	5360.01
GBR-40	5400.76	28.98	28.98	0.00	5371.78
GBR-41	5396.35	22.38	22.38	0.00	5373.97
GBR-51	5389.68	40.22	40.22	0.00	5349.46
GBR-52	5387.74	38.58	38.58	0.00	5349.16

* WSEL - WATER SURFACE ELEVATION ADJUSTED FOR PRODUCT DEPTH

Giant Refining Co. Bloomfield Refinery
Total Volume Summary

Second Quarter, 1992

```
=====
Total Volume Of Water Recovered      2135065
Net Change In Storage Volume         -229208

Total Water Pumped To The            2260272
Infiltration Gallery

=====
Difference                           -104001
```

Comments: The approximately 5% difference
can be accounted for in meter
inaccuracy.

Giant Refining Co. Bloomfield Refinery
Quarterly Net Tank
Volume Change

Second Quarter, 1992

Tank Number	Beginning Volume	Ending Volume	Net Change
102	17468	14369	-3099
106	8010	8010	0
21	134430	362743	228313
22	215965	258239	42274
27	182470	0	-182470
32	88634	0	-88634
34	87541	0	-87541
35	0	0	0
37	138051	0	-138051
Total Net Volume Change			-229208

Giant Refining Co. Bloomfield Refinery
Quarterly Recovery Well
Volume Tabulation

Second Quarter, 1992

	Well	Month #1	Month #2	Month #3	Total
	GRW-1	12450	10540	12210	35200
	GRW-2	5120	1280	14970	21370
	GRW-3	9830	11610	12660	34100
	GRW-4	25750	22340	25540	73630
	GRW-5	51560	41050	50110	142720
	GRW-6	36860	29260	30860	96980
	GRW-9	10420	9780	9640	29840
	GRW-10	352760	260280	217050	830090
	GRW-11	121420	34680	78430	234530
	GRW-12	26220	18470	18430	63120
	GRW-13	31050	22410	24820	78280
	SHS-9	13892	943	6098	20933
	SHS-11	0	0	0	0
	SHS-14	181083	163391	129798	474272
Total Volume Pumped In Gallons					2135065

GRW-13

4/92

5/92

6/92

GENERAL WATER CHEMISTRY

Lab conductivity, umhos/cm

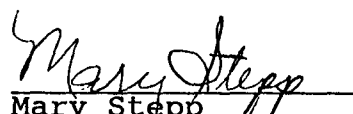
4040.00

3625.00

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 04/29/92
ID: GBR-24D
SITE: 9204091320 DATE RECEIVED: 04/09/92
LAB NO: F8626 DATE COLLECTED: 04/09/92

Lab pH (s.u.).....	7.23
Lab Conductivity, umhos/cm @ 25C....	5210
Lab Resistivity, ohm-m.....	1.92
Total Dissolved Solids (180C), mg/L.	3820
Total Dissolved Solids (calc), mg/L.	3740
Total Alkalinity as CaCO ₃ , mg/L.....	210
Total Hardness as CaCO ₃ , mg/L.....	1930
Sodium Adsorption Ratio.....	4.69

	mg/L	meq/L
Bicarbonate as HCO ₃	257	4.21
Carbonate as CO ₃	0	0
Chloride.....	822	23.2
Sulfate.....	1590	33.2
Calcium.....	632	31.5
Magnesium.....	85.7	7.04
Potassium.....	5.09	0.13
Sodium.....	474	20.6
Major Cations.....		59.3
Major Anions.....		60.6
Cation/Anion Difference.....		1.04 %


Mary Stepp
Lab Director

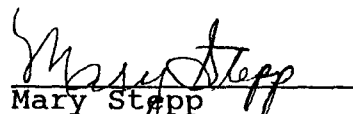

Wanda Orso
Water Lab Supervisor

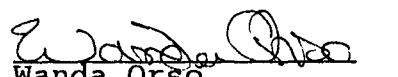
CLIENT: Giant Bloomfield Refinery DATE REPORTED: 04/29/92
ID: GBR-15
SITE: 9204091222 DATE RECEIVED: 04/09/92
LAB NO: F8625 DATE COLLECTED: 04/09/92

Lab pH (s.u.)..... 7.40
Lab Conductivity, umhos/cm @ 25C.... 4360
Lab Resistivity, ohm-m..... 2.29
Total Dissolved Solids (180C), mg/L. 3350 *
Total Dissolved Solids (calc), mg/L. 3390
Total Alkalinity as CaCO₃, mg/L..... 253
Total Hardness as CaCO₃, mg/L..... 1160
Sodium Adsorption Ratio..... 8.72

	mg/L	meq/L
Bicarbonate as HCO ₃	309	5.06
Carbonate as CO ₃	0	0
Chloride.....	646	18.2
Sulfate.....	1450	30.3
Calcium.....	414	20.7
Magnesium.....	31.6	2.60
Potassium.....	3.91	0.10
Sodium.....	684	29.8
Major Cations.....		53.1
Major Anions.....		53.6
Cation/Anion Difference.....		0.44 %

* Reanalyzed with no significant change.


Mary Stepp
Lab Director


Wanda Orso
Water Lab Supervisor

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 04/29/92
ID: GBR-17
SITE: 9204091105 DATE RECEIVED: 04/09/92
LAB NO: F8624 DATE COLLECTED: 04/09/92

Lab pH (s.u.).....	7.07
Lab Conductivity, umhos/cm @ 25C....	2670
Lab Resistivity, ohm-m.....	3.75
Total Dissolved Solids (180C), mg/L.	2150 *
Total Dissolved Solids (calc), mg/L.	2160
Total Alkalinity as CaCO ₃ , mg/L.....	234
Total Hardness as CaCO ₃ , mg/L.....	942
Sodium Adsorption Ratio.....	4.51

	mg/L	meq/L
Bicarbonate as HCO ₃	285	4.67
Carbonate as CO ₃	0	0
Chloride.....	63.1	1.78
Sulfate.....	1280	26.6
Calcium.....	331	16.5
Magnesium.....	28.4	2.33
Potassium.....	0.10	<0.01
Sodium.....	318	13.8
Major Cations.....		32.7
Major Anions.....		33.1
Cation/Anion Difference.....		0.62 %

* Reanalyzed with no significant change.


Mary Stepp
Lab Director

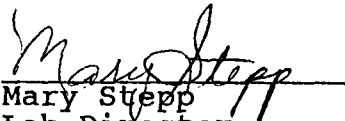

Wanda Orso
Water Lab Supervisor

CLIENT: Giant Refinery Bloomfield DATE REPORTED: 04/23/92
ID: RW-3
SITE: 9204081445 DATE RECEIVED: 04/09/92
LAB NO: F8613 DATE COLLECTED: 04/08/92

Lab pH (s.u.)..... 7.35
Lab Conductivity, umhos/cm @ 25C.... 3440
Lab Resistivity, ohm-m..... 2.9
Total Dissolved Solids (180C), mg/L. 2410 *
Total Dissolved Solids (calc), mg/L. 2410
Total Alkalinity as CaCO₃, mg/L..... 934
Total Hardness as CaCO₃, mg/L..... 711
Sodium Adsorption Ratio..... 10.6

	mg/L	meq/L
Bicarbonate as HCO ₃	1140	18.7
Carbonate as CO ₃	0	0
Chloride.....	428	12.1
Sulfate.....	505	10.5
Calcium.....	237	11.8
Magnesium.....	29.0	2.38
Potassium.....	2.09	0.05
Sodium.....	648	28.2
Major Cations.....		42.5
Major Anions.....		41.3
Cation/Anion Difference.....		1.42 %

* Reanalyzed with no significant change.


Mary Stepp
Lab Director


Wanda Orso
Water Lab Supervisor

CLIENT: Giant Refinery Bloomfield DATE REPORTED: 04/23/92
ID: RW-4
SITE: 9204081428 DATE RECEIVED: 04/09/92
LAB NO: F8612 DATE COLLECTED: 04/08/92

Lab pH (s.u.).....	7.20
Lab Conductivity, umhos/cm @ 25C....	3370
Lab Resistivity, ohm-m.....	2.96
Total Dissolved Solids (180C), mg/L.	2290
Total Dissolved Solids (calc), mg/L.	2270
Total Alkalinity as CaCO ₃ , mg/L.....	828
Total Hardness as CaCO ₃ , mg/L.....	795
Sodium Adsorption Ratio.....	8.43

	mg/L	meq/L
Bicarbonate as HCO ₃	1010	16.6
Carbonate as CO ₃	0	0
Chloride.....	518	14.6
Sulfate.....	405	8.44
Calcium.....	270	13.5
Magnesium.....	29.7	2.44
Potassium.....	1.74	0.04
Sodium.....	547	23.8
Major Cations.....		39.7
Major Anions.....		39.6
Cation/Anion Difference.....		0.14 %


Mary Stepp
Lab Director


Wanda Orso
Water Lab Supervisor

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20461701

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REFINE REMED
CLIENT I.D. : 9204081428 RW-4 (602-43)
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 04/08/92
DATE RECEIVED : 04/09/92
DATE EXTRACTED : N/A
DATE ANALYZED : 04/11/92
UNITS : UG/L
DILUTION FACTOR : 2

COMPOUNDS	RESULTS
BENZENE	<1.0
BROMODICHLOROMETHANE	<0.4
BROMOFORM	<0.4
BROMOMETHANE	<0.4
CARBON TETRACHLORIDE	<0.4
CHLOROBENZENE	<1.0
CHLOROETHANE	<0.4
CHLOROFORM	<0.4
CHLOROMETHANE	<0.4
DIBROMOCHLOROMETHANE	<0.4
CHLOROETHYL VINYL ETHER	<1.0
1,3-DICHLOROBENZENE	<1.0
1,2 & 1,4-DICHLOROBENZENE	<1.0
DICHLORODIFLUOROMETHANE	<0.4
1,1-DICHLOROETHANE	1.6
1,2-DICHLOROETHANE	1.0
1,1-DICHLOROETHENE	<0.4
1,2-DICHLOROETHENE (TOTAL)	<0.4
1,2-DICHLOROPROPANE	<0.4
CIS-1,3-DICHLOROPROPENE	<0.4
TRANS-1,3-DICHLOROPROPENE	<0.4
ETHYLBENZENE	<1.0
METHYLENE CHLORIDE	<4.0
1,1,2,2-TETRACHLOROETHANE	<0.4
TETRACHLOROETHENE	<0.4
TOLUENE	<1.0
1,1,1-TRICHLOROETHANE	<0.4
1,1,2-TRICHLOROETHANE	<0.4
TRICHLOROETHENE	0.4
TRICHLOROFLUOROMETHANE	<1.0
VINYL CHLORIDE	<0.4
TOTAL XYLENES	<1.0
TRICHLOROTRIFLUOROETHANE	<4.0

SURROGATE PERCENT RECOVERIES

1,1,1-TRICHLOROETHANE (%)	97
BROMOFLUOROBENZENE (%)	83



GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20461702

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REFINE REMED
CLIENT I.D. : 9204081445 RW-3 (GDR-27)
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 04/08/92
DATE RECEIVED : 04/09/92
DATE EXTRACTED : N/A
DATE ANALYZED : 04/11/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
BENZENE	27
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	0.8
1,2-DICHLOROETHANE	0.5
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	0.5
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	44
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	0.7
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	10
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

DIBROMOCHLOROMETHANE (%)	103
BROMOFLUOROBENZENE (%)	105



GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20461701

TEST : POLYNUCLEAR AROMATICS (EPA 610)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REFINE REMED
CLIENT I.D. : 9204081428 RW-4
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 04/08/92
DATE RECEIVED : 04/09/92
DATE EXTRACTED : 04/11/92
DATE ANALYZED : 04/13/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS

RESULTS

NAPHTHALENE	<0.30
ACENAPHTHYLENE	<0.30
ACENAPHTHENE	<0.50
FLUORENE	5.8 D
PHENANTHRENE	<0.03
ANTHRACENE	<0.01
FLUORANTHENE	1.9
PYRENE	<0.04
BENZO (A) ANTHRACENE	<0.01
CHRYSENE	<0.02
BENZO (B) FLUORANTHENE	<0.01
BENZO (K) FLUORANTHENE	<0.01
BENZO (A) PYRENE	<0.01
DIBENZ (a, h) ANTHRACENE	<0.10
BENZO (g, h, i) PERYLENE	<0.04
INDENO (1, 2, 3 - CD) PYRENE	<0.03
1-METHYLNAPHTHALENE	9.8
2-METHYLNAPHTHALENE	<0.30

SURROGATE PERCENT RECOVERIES

2-CHLOROANTHRACENE (%)

71



GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20461702

TEST : POLYNUCLEAR AROMATICS (EPA 610)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REFINE REMED
CLIENT I.D. : 9204081445 RW-3
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 04/08/92
DATE RECEIVED : 04/09/92
DATE EXTRACTED : 04/11/92
DATE ANALYZED : 04/13/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
NAPHTHALENE	<0.30
ACENAPHTHYLENE	<0.30
ACENAPHTHENE	<0.50
FLUORENE	4.3 D
PHENANTHRENE	2.3 D
ANTHRACENE	<0.01
FLUORANTHENE	<0.03
PYRENE	<0.04
BENZO (A) ANTHRACENE	<0.01
CHRYSENE	<0.02
BENZO (B) FLUORANTHENE	<0.01
BENZO (K) FLUORANTHENE	<0.01
BENZO (A) PYRENE	<0.01
DIBENZ (a, h) ANTHRACENE	<0.10
BENZO (g, h, i) PERYLENE	<0.04
INDENO (1, 2, 3-CD) PYRENE	<0.03
1-METHYLNAPHTHALENE	8.3
2-METHYLNAPHTHALENE	<0.30

SURROGATE PERCENT RECOVERIES

2-CHLOROANTHRACENE (%) 76

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 04/29/92
ID: GBR-30
SITE: 9204091413 DATE RECEIVED: 04/09/92
LAB NO: F8627 DATE COLLECTED: 04/09/92

Lab pH (s.u.).....	7.10
Lab Conductivity, umhos/cm @ 25C....	3670
Lab Resistivity, ohm-m.....	2.73
Total Dissolved Solids (180C), mg/L.	2880
Total Dissolved Solids (calc), mg/L.	2820
Total Alkalinity as CaCO ₃ , mg/L.....	179
Total Hardness as CaCO ₃ , mg/L.....	1140
Sodium Adsorption Ratio.....	6.33

	mg/L	meq/L
Bicarbonate as HCO ₃	218	3.57
Carbonate as CO ₃	0	0
Chloride.....	531	15.0
Sulfate.....	1250	26.1
Calcium.....	402	20.0
Magnesium.....	34.2	2.82
Potassium.....	0.88	0.02
Sodium.....	492	21.4
Major Cations.....		44.3
Major Anions.....		44.6
Cation/Anion Difference.....		0.36 %

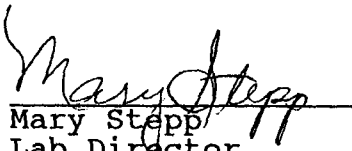

Mary Stepp
Lab Director


Wanda Orso
Water Lab Supervisor

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 04/29/92
ID: RW-13
SITE: 9204091446 DATE RECEIVED: 04/09/92
LAB NO: F8628 DATE COLLECTED: 04/09/92

Lab pH (s.u.).....	7.00
Lab Conductivity, umhos/cm @ 25C....	4040
Lab Resistivity, ohm-m.....	2.47
Total Dissolved Solids (180C), mg/L.	3180
Total Dissolved Solids (calc), mg/L.	3170
Total Alkalinity as CaCO ₃ , mg/L.....	203
Total Hardness as CaCO ₃ , mg/L.....	1270
Sodium Adsorption Ratio.....	7.02

	mg/L	meq/L
Bicarbonate as HCO ₃	248	4.06
Carbonate as CO ₃	0	0
Chloride.....	561	15.8
Sulfate.....	1430	29.7
Calcium.....	452	22.57
Magnesium.....	34.1	2.81
Potassium.....	2.92	0.07
Sodium.....	575	25.0
Major Cations.....		50.4
Major Anions.....		49.6
Cation/Anion Difference.....		0.86 %

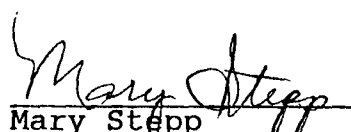

Mary Stepp
Lab Director


Wanda Orso
Water Lab Supervisor

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 04/29/92
ID: GBR-31
SITE: 9204091525 DATE RECEIVED: 04/09/92
LAB NO: F8629 DATE COLLECTED: 04/09/92

Lab pH (s.u.).....	7.25
Lab Conductivity, umhos/cm @ 25C....	3720
Lab Resistivity, ohm-m.....	2.69
Total Dissolved Solids (180C), mg/L.	2890
Total Dissolved Solids (calc), mg/L.	2850
Total Alkalinity as CaCO ₃ , mg/L.....	177
Total Hardness as CaCO ₃ , mg/L.....	1100
Sodium Adsorption Ratio.....	7.19

	mg/L	meq/L
Bicarbonate as HCO ₃	216	3.54
Carbonate as CO ₃	0	0
Chloride.....	536	15.1
Sulfate.....	1240	25.8
Calcium.....	382	19.1
Magnesium.....	35.2	2.90
Potassium.....	1.65	0.04
Sodium.....	548	23.8
Major Cations.....		45.8
Major Anions.....		44.4
Cation/Anion Difference.....		1.57 %


Mary Stepp
Lab Director


Wanda Orso
Water Lab Supervisor

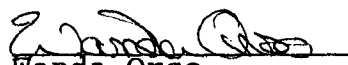
CLIENT: Giant Bloomfield Refinery DATE REPORTED: 04/29/92
ID: RW-6
SITE: 9204091542 DATE RECEIVED: 04/09/92
LAB NO: F8630 DATE COLLECTED: 04/09/92

Lab pH (s.u.).....	7.20
Lab Conductivity, umhos/cm @ 25C....	3700
Lab Resistivity, ohm-m.....	2.7
Total Dissolved Solids (180C), mg/L.	2330 *
Total Dissolved Solids (calc), mg/L.	2560
Total Alkalinity as CaCO ₃ , mg/L.....	718
Total Hardness as CaCO ₃ , mg/L.....	833
Sodium Adsorption Ratio.....	9.46

	mg/L	meq/L
Bicarbonate as HCO ₃	878	14.4
Carbonate as CO ₃	0	0
Chloride.....	625	17.6
Sulfate.....	562	11.7
Calcium.....	287	14.3
Magnesium.....	28.7	2.36
Potassium.....	0.97	0.02
Sodium.....	628	27.3
Major Cations.....		44
Major Anions.....		43.7
Cation/Anion Difference.....		0.31 %

* Reanalyzed with no significant change.


Mary Stepp
Lab Director

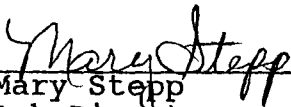

Wanda Orso
Water Lab Supervisor

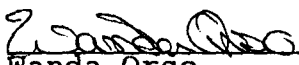
CLIENT: Giant Bloomfield Refinery DATE REPORTED: 04/29/92
ID: Stripper Influent
SITE: 9204091622 DATE RECEIVED: 04/09/92
LAB NO: F8631 DATE COLLECTED: 04/09/92

Lab pH (s.u.).....	6.83
Lab Conductivity, umhos/cm @ 25C....	3750
Lab Resistivity, ohm-m.....	2.67
Total Dissolved Solids (180C), mg/L.	2740 *
Total Dissolved Solids (calc), mg/L.	2770
Total Alkalinity as CaCO ₃ , mg/L.....	218
Total Hardness as CaCO ₃ , mg/L.....	1200
Sodium Adsorption Ratio.....	5.77

	mg/L	meq/L
Bicarbonate as HCO ₃	267	4.37
Carbonate as CO ₃	0	0
Chloride.....	470	13.3
Sulfate.....	1250	26.1
Calcium.....	421	21.0
Magnesium.....	36.2	2.98
Potassium.....	2.07	0.05
Sodium.....	460	20.0
Major Cations.....		44
Major Anions.....		43.7
Cation/Anion Difference.....		0.33 %

* Reanalyzed with no significant change.


Mary Stepp
Lab Director


Wanda Orso
Water Lab Supervisor

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20467301

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFF SITE
CLIENT I.D. : 920410940 SHS-3
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 04/10/92
DATE RECEIVED : 04/11/92
DATE EXTRACTED : N/A
DATE ANALYZED : 04/16/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
CHLOROETHYL VINYL ETHER	<0.5
1,2-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

1,2-DICHLOROBENZENE (%)	85
1,2-DICHLOROBENZENE (%)	101



GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20467302

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFF SITE
CLIENT I.D. : 9204101025 SHS-6
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 04/10/92
DATE RECEIVED : 04/11/92
DATE EXTRACTED : N/A
DATE ANALYZED : 04/16/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS

RESULTS

BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

1,1,2,2-TETRACHLOROETHANE (%)	82
BROMOFLUOROBENZENE (%)	98



GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20467303

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFF SITE
CLIENT I.D. : 9204101130 SHS-10
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 04/10/92
DATE RECEIVED : 04/11/92
DATE EXTRACTED : N/A
DATE ANALYZED : 04/17/92
UNITS : UG/L
DILUTION FACTOR : 5

COMPOUNDS	RESULTS
BENZENE	<2.5
BROMODICHLOROMETHANE	<1.0
BROMOFORM	<1.0
BROMOMETHANE	<1.0
CARBON TETRACHLORIDE	<1.0
CHLOROBENZENE	<2.5
CHLOROETHANE	<1.0
CHLOROFORM	<1.0
CHLOROMETHANE	<1.0
DIBROMOCHLOROMETHANE	<1.0
1-CHLOROETHYL VINYL ETHER	<2.5
3-DICHLOROBENZENE	<2.5
1,2 & 1,4-DICHLOROBENZENE	<2.5
DICHLORODIFLUOROMETHANE	<1.0
1,1-DICHLOROETHANE	<1.0
1,2-DICHLOROETHANE	<1.0
1,1-DICHLOROETHENE	<1.0
1,2-DICHLOROETHENE (TOTAL)	<1.0
1,2-DICHLOROPROPANE	<1.0
CIS-1,3-DICHLOROPROPENE	<1.0
TRANS-1,3-DICHLOROPROPENE	<1.0
ETHYLBENZENE	27
METHYLENE CHLORIDE	<10.0
1,1,2,2-TETRACHLOROETHANE	<1.0
TETRACHLOROETHENE	<1.0
TOLUENE	<2.5
1,1,1-TRICHLOROETHANE	<1.0
1,1,2-TRICHLOROETHANE	<1.0
TRICHLOROETHENE	<1.0
TRICHLOROFLUOROMETHANE	<2.5
VINYL CHLORIDE	<1.0
TOTAL XYLENES	<2.5
TRICHLOROTRIFLUOROETHANE	<10.0

SURROGATE PERCENT RECOVERIES

1,1-DIBROMOCHLOROMETHANE (%)	92
BROMOFLUOROBENZENE (%)	106

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20467304

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFF SITE
CLIENT I.D. : 9204101230 SHS-12
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 04/10/92
DATE RECEIVED : 04/11/92
DATE EXTRACTED : N/A
DATE ANALYZED : 04/17/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS

RESULTS

BENZENE	0.6
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
CHLOROETHYL VINYL ETHER	<0.5
3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	0.7
1,2-DICHLOROETHANE	0.4
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	3.7
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	0.7
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

OMOCHLOROMETHANE (%)	95
BROMOFLUOROBENZENE (%)	112



GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20467305

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFF SITE
CLIENT I.D. : 9204101340 SHS-13
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 04/10/92
DATE RECEIVED : 04/11/92
DATE EXTRACTED : N/A
DATE ANALYZED : 04/17/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
1,3-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	1.0
1,2-DICHLOROETHANE	3.1
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	105
BROMOFLUOROBENZENE (%)	104



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20467306

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFF SITE
CLIENT I.D. : 9204101440 SHS-15
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 04/10/92
DATE RECEIVED : 04/11/92
DATE EXTRACTED : N/A
DATE ANALYZED : 04/17/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
BENZENE	<0.5
BROMODICHLOROMETHANE	0.3
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	6.5
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	88
BROMOFLUOROBENZENE (%)	97



GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20467307

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFF SITE
CLIENT I.D. : 9204101540 SHS-16
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 04/10/92
DATE RECEIVED : 04/11/92
DATE EXTRACTED : N/A
DATE ANALYZED : 04/17/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
1,3-DICHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	95
BROMOFLUOROBENZENE (%)	97



GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20469201

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REFINE.REMED
CLIENT I.D. : 920413830 STRIPPER EFFLUENT
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 04/13/92
DATE RECEIVED : 04/14/92
DATE EXTRACTED : N/A
DATE ANALYZED : 04/17/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS

RESULTS

BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

1,1,2,2-TETRACHLOROETHANE (%)	99
BROMOFLUOROBENZENE (%)	106

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20469202

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REFINE.REMED
CLIENT I.D. : 920413910 RW-7
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 04/13/92
DATE RECEIVED : 04/14/92
DATE EXTRACTED : N/A
DATE ANALYZED : 04/17/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS

RESULTS

BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
1-CHLOROETHYL VINYL ETHER	<0.5
3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	0.4
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

1,1-DIBROMOCHLOROMETHANE (%)	101
BROMOFLUOROBENZENE (%)	107



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GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20464801

TEST : VOLATILE AROMATICS (EPA METHOD 602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REF.REMED.
CLIENT I.D. : 9204091105 GBR-17
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 04/09/92
DATE RECEIVED : 04/10/92
DATE EXTRACTED : N/A
DATE ANALYZED : 04/16/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS

RESULTS

BENZENE	0.8
TOLUENE	<0.5
CHLOROBENZENE	<0.5
ETHYLBENZENE	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 AND 1,4-DICHLOROBENZENE	<0.5
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE (%)	107
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GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20464802

TEST : VOLATILE AROMATICS (EPA METHOD 602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REF.REMED.
CLIENT I.D. : 9204091222 GBR-15
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 04/09/92
DATE RECEIVED : 04/10/92
DATE EXTRACTED : N/A
DATE ANALYZED : 04/16/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS

RESULTS

BENZENE	3.5
TOLUENE	<0.5
CHLOROBENZENE	<0.5
ETHYLBENZENE	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 AND 1,4-DICHLOROBENZENE	<0.5
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE (%)

93



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GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20464803

TEST : VOLATILE AROMATICS (EPA METHOD 602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REF.REMED.
CLIENT I.D. : 9204091320 GBR-24D
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 04/09/92
DATE RECEIVED : 04/10/92
DATE EXTRACTED : N/A
DATE ANALYZED : 04/20/92
UNITS : UG/L
DILUTION FACTOR : 5

COMPOUNDS

RESULTS

BENZENE	24
TOLUENE	<2.5
CHLOROBENZENE	<2.5
ETHYLBENZENE	7
1,3-DICHLOROBENZENE	<2.5
1,2 AND 1,4-DICHLOROBENZENE	<2.5
TOTAL XYLENES	<2.5

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE (%)	80
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GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20464804

TEST : VOLATILE AROMATICS (EPA METHOD 602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REF.REMED.
CLIENT I.D. : 9204091413 GBR-30
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 04/09/92
DATE RECEIVED : 04/10/92
DATE EXTRACTED : N/A
DATE ANALYZED : 04/16/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDSRESULTS

BENZENE	<0.5
TOLUENE	<0.5
CHLOROBENZENE	<0.5
ETHYLBENZENE	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 AND 1,4-DICHLOROBENZENE	<0.5
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE (%)

104



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GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20464805

TEST : VOLATILE AROMATICS (EPA METHOD 602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REF.REMED.
CLIENT I.D. : 9204091446 RW-13 (GPR-14)
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 04/09/92
DATE RECEIVED : 04/10/92
DATE EXTRACTED : N/A
DATE ANALYZED : 04/16/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS

RESULTS

BENZENE	<0.5
TOLUENE	<0.5
CHLOROBENZENE	<0.5
ETHYLBENZENE	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 AND 1,4-DICHLOROBENZENE	<0.5
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE (%)	100
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GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20464806

TEST : VOLATILE AROMATICS (EPA METHOD 602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REF.REMED.
CLIENT I.D. : 9204091525 GBR-31
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 04/09/92
DATE RECEIVED : 04/10/92
DATE EXTRACTED : N/A
DATE ANALYZED : 04/16/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS

RESULTS

BENZENE	<0.5
TOLUENE	<0.5
CHLOROBENZENE	<0.5
ETHYLBENZENE	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 AND 1,4-DICHLOROBENZENE	<0.5
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE (%) 110



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GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20464807

TEST : VOLATILE AROMATICS (EPA METHOD 602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REF.REMED.
CLIENT I.D. : 9204091542 RW-6 (GBR-44)
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 04/09/92
DATE RECEIVED : 04/10/92
DATE EXTRACTED : N/A
DATE ANALYZED : 04/16/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS

RESULTS

BENZENE	<0.5
TOLUENE	<0.5
CHLOROBENZENE	<0.5
ETHYLBENZENE	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 AND 1,4-DICHLOROBENZENE	<0.5
TOTAL XYLENES	<0.5

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE (%)

120



GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20464808

TEST : VOLATILE AROMATICS (EPA METHOD 602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REF.REMED.
CLIENT I.D. : 9204091622 STRIPPER INFLUENT
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 04/09/92
DATE RECEIVED : 04/10/92
DATE EXTRACTED : N/A
DATE ANALYZED : 04/16/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDSRESULTS

BENZENE	12
TOLUENE	<0.5
CHLOROBENZENE	<0.5
ETHYLBENZENE	2.9
1,3-DICHLOROBENZENE	<0.5
1,2 AND 1,4-DICHLOROBENZENE	<0.5
TOTAL XYLENES	4.1

SURROGATE PERCENT RECOVERIES

BROMOFLUOROBENZENE (%)	83
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GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20464805

TEST : POLYNUCLEAR AROMATICS (EPA 610)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REF.REMED.
CLIENT I.D. : 9204091446 RW-13
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 04/09/92
DATE RECEIVED : 04/10/92
DATE EXTRACTED : 04/11/92
DATE ANALYZED : 04/14/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
NAPHTHALENE	<0.30
ACENAPHTHYLENE	<0.30
ACENAPHTHENE	<0.50
FLUORENE	<0.04
PHENANTHRENE	<0.03
ANTHRACENE	<0.01
FLUORANTHENE	<0.03
PYRENE	<0.04
BENZO (A) ANTHRACENE	<0.01
CHRYSENE	<0.02
BENZO (B) FLUORANTHENE	<0.01
BENZO (K) FLUORANTHENE	0.01 B
BENZO (A) PYRENE	<0.01
DIBENZ (a, h) ANTHRACENE	<0.10
BENZO (g, h, i) PERYLENE	<0.04
INDENO (1, 2, 3 - CD) PYRENE	<0.03
1-METHYLNAPHTHALENE	<0.30
2-METHYLNAPHTHALENE	<0.30

SURROGATE PERCENT RECOVERIES

2-CHLOROANTHRACENE (%) 87



GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20464807

TEST : POLYNUCLEAR AROMATICS (EPA 610)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REF.REMED.
CLIENT I.D. : 9204091542 RW-6
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 04/09/92
DATE RECEIVED : 04/10/92
DATE EXTRACTED : 04/11/92
DATE ANALYZED : 04/14/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDSRESULTS

NAPHTHALENE	<0.30
ACENAPHTHYLENE	<0.30
ACENAPHTHENE	<0.50
FLUORENE	<0.04
PHENANTHRENE	<0.03
ANTHRACENE	<0.01
FLUORANTHENE	0.22
PYRENE	<0.04
BENZO (A) ANTHRACENE	<0.01
CHRYSENE	<0.02
BENZO (B) FLUORANTHENE	<0.01
BENZO (K) FLUORANTHENE	0.01 B
BENZO (A) PYRENE	<0.01
DIBENZ (a, h) ANTHRACENE	<0.10
BENZO (g, h, i) PERYLENE	<0.04
INDENO (1, 2, 3-CD) PYRENE	<0.03
1-METHYLNAPHTHALENE	<0.30
2-METHYLNAPHTHALENE	<0.30

SURROGATE PERCENT RECOVERIES

2-CHLOROANTHRACENE (%)	85
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GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20568801

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REF.REMEDIAT
CLIENT I.D. : 920508950 STRIPPER INFLUENT
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 05/08/92
DATE RECEIVED : 05/09/92
DATE EXTRACTED : N/A
DATE ANALYZED : 05/14/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS

RESULTS

BENZENE	5.1
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	0.6
1,2-DICHLOROETHANE	0.5
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	1.3
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	0.6
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	4.8
TRICHLOROTRIFLUOROETHANE	<2.0

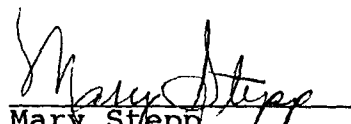
SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	101
BROMOFLUOROBENZENE (%)	104

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 05/20/92
ID: Stripper Effluent
SITE: 9205130800 DATE RECEIVED: 05/13/92
LAB NO: F8833 DATE COLLECTED: 05/13/92

Lab pH (s.u.).....	7.16
Lab Conductivity, umhos/cm @ 25C....	3270
Lab Resistivity, ohm-m.....	3.06
Total Dissolved Solids (180C), mg/L.	2780
Total Dissolved Solids (calc), mg/L.	2740
Total Alkalinity as CaCO ₃ , mg/L.....	51.7
Total Hardness as CaCO ₃ , mg/L.....	981
Sodium Adsorption Ratio.....	7.01

	mg/L	meq/L
Bicarbonate as HCO ₃	62.8	1.03
Carbonate as CO ₃	0	0
Chloride.....	594	16.8
Sulfate.....	1220	25.4
Calcium.....	373	18.6
Magnesium.....	12.5	1.03
Potassium.....	2.10	0.05
Sodium.....	505	22.0
Major Cations.....		41.6
Major Anions.....		43.2
Cation/Anion Difference.....		1.79 %


Mary Stepp
Lab Director

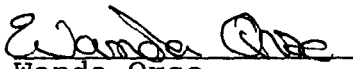

Wanda Orso
Water Lab Supervisor

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 05/20/92
ID: 9205080950
SITE: Stripper Influent DATE RECEIVED: 05/08/92
LAB NO: F8825 DATE COLLECTED: 05/08/92

Lab pH (s.u.).....	6.55
Lab Conductivity, umhos/cm @ 25C....	3430
Lab Resistivity, ohm-m.....	2.92
Total Dissolved Solids (180C), mg/L.	2810
Total Dissolved Solids (calc), mg/L.	2710
Total Alkalinity as CaCO ₃ , mg/L.....	156
Total Hardness as CaCO ₃ , mg/L.....	1060
Sodium Adsorption Ratio.....	6.72

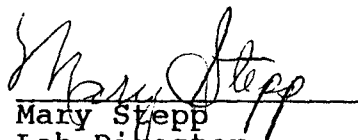
	mg/L	meq/L
Bicarbonate as HCO ₃	190	3.12
Carbonate as CO ₃	0	0
Chloride.....	506	14.3
Sulfate.....	1190	24.8
Calcium.....	405	20.2
Magnesium.....	12.9	1.06
Potassium.....	2.52	0.06
Sodium.....	504	21.9
Major Cations.....		43.3
Major Anions.....		42.2
Cation/Anion Difference.....		1.29 %

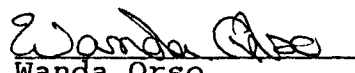

Mary Stepp
Lab Director


Wanda Orso
Water Lab Supervisor

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 05/20/92
ID: 9205081050
SITE: RW-13 DATE RECEIVED: 05/08/92
LAB NO: F8826 DATE COLLECTED: 05/08/92

Lab Conductivity, umhos/cm @ 25C.... 3625


Mary Stepp
Lab Director


Wanda Orso
Water Lab Supervisor



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20577701

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REF.REMEDIAT
CLIENT I.D. : 920513800 STRIPPER EFFLUENT
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 05/13/92
DATE RECEIVED : 05/14/92
DATE EXTRACTED : N/A
DATE ANALYZED : 05/22/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS

RESULTS

BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	86
BROMOFLUOROBENZENE (%)	110

CLIENT: Giant Bloomfield Refinery DATE REPORTED: 06/22/92
ID: 9206051418
SITE: Stripper Influent DATE RECEIVED: 06/05/92
LAB NO: F8935 DATE COLLECTED: 06/05/92

Lab pH (s.u.).....	5.86
Lab Conductivity, umhos/cm @ 25C....	3450
Lab Resistivity, ohm-m.....	2.9
Total Dissolved Solids (180C), mg/L.	2670
Total Dissolved Solids (calc), mg/L.	2620
Total Alkalinity as CaCO ₃ , mg/L.....	54
Total Hardness as CaCO ₃ , mg/L.....	853
Sodium Adsorption Ratio.....	8.23

	mg/L	meq/L
Bicarbonate as HCO ₃	65.9	1.08
Carbonate as CO ₃	0	0
Chloride.....	556	15.7
Sulfate.....	1160	24.1
Calcium.....	289	14.4
Magnesium.....	32.3	2.66
Potassium.....	0.60	0.02
Sodium.....	553	24.1
Major Cations.....		41.1
Major Anions.....		40.9
Cation/Anion Difference.....		0.33 %


Wanda Orso
Water Lab Supervisor

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20662501

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT	: GIANT REFINING, FARMINGTON	DATE SAMPLED	: 06/05/92
PROJECT #	: 9834	DATE RECEIVED	: 06/06/92
PROJECT NAME	: REFINERY REM	DATE EXTRACTED	: N/A
CLIENT I.D.	: 9206051418 STRIPPER INFLUENT	DATE ANALYZED	: 06/11/92
SAMPLE MATRIX	: AQUEOUS	UNITS	: UG/L
		DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
-----------	---------

BENZENE	5.3
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	0.5
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	0.6
1,2-DICHLOROETHANE	0.6
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	1.3
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	0.7
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	0.3
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	0.3
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	0.3
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	3.8
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	106
BROMOFLUOROBENZENE (%)	101



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20687201

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REFINE REMED
CLIENT I.D. : 920618805 STRIPPER EFFLUENT
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 06/18/92
DATE RECEIVED : 06/19/92
DATE EXTRACTED : N/A
DATE ANALYZED : 06/19/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS

RESULTS

BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	103
BROMOFLUOROBENZENE (%)	81



P.O. Box 256
Farmington, New Mexico
87499

505
632-3306

May 20, 1992

Mr. William Olson
Hydrogeologist
New Mexico Oil Conservation Division
Environmental Bureau
P. O. Box 2088
Santa Fe, NM 87504-2088

Dear Mr. Olson:

Enclosed you will find the quarterly report for Giant Refining Company's Bloomfield Refinery for the first quarter of 1992.

Please contact me if you have any questions.

Sincerely,

A handwritten signature in dark ink, appearing to read "Timothy A. Kinney", with a stylized flourish at the end.

Timothy A. Kinney
Remediation Project Manager

/dm

Enclosure

cc w/enc.: Carl Shook - Giant
Kim Bullerdick - Giant
Debbie Smith - Giant
William Murphy - BLM
Dale Doremus - EID
Chris Shuey - SWRIC
Martin Nee - GCL
Bill Baggett - SJC
Monica Chapa - EPA
Joe Gaetano - Mission National
Corinne Johnston - American Re-Insurance
Kim Kiharo - Industrial Risk
William Potter - Firemans Fund
Rosemary McCue - Home Insurance
T. B. Darby - USF&G
Gary Barton - AIG
Monte Hensley - Frontier Adjusters
William Charles - Alexander and Alexander

QUARTERLY DATA REPORT
GIANT BLOOMFIELD REFINERY
FIRST QUARTER, 1992

Prepared By:

GIANT REFINING COMPANY
5764 U. S. Highway 64
P. O. Box 256
Farmington, NM 87499
(505) 632-3306
FAX (505) 632-2487

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Quarterly Analytical Results	Section 2
Potentiometric Surface Maps	Section 3
Total Volume History	Section 4
Specific Conductance Tracking	Section 5

INTRODUCTION AND SUMMARY QUARTERLY REPORT FIRST QUARTER, 1992

INTRODUCTION

No significant changes were made to the remediation system during the first quarter of 1992. All treated water is being directed toward the infiltration gallery in the old stormwater containment area of the refinery. We continue to monitor its effect on the system. Recovery well SHS-11, part of the offsite recovery well network, has sanded in and is no longer operable. Replacement or repair is on hold pending review and approval of the offsite report.

SUMMARY

Section 2

Section 2 contains a summary of the quarterly analytical results. Raw data, as received from the laboratory, is available on request as a supplement to the quarterly report.

Section 3

Potentiometric surface maps, as well as the adjusted water surface elevations and product thicknesses, are included in Section 3.

Section 4

Section 4 illustrates the volume history for the quarter. Total volume pumped from each well, as well as current tank volumes and the reinjection volume, is reported. Additional detail on a weekly basis is also available if desired.

Section 5

Specific conductance tracking for GRW-13 is included in this section.

SECTION 2

The following pages show the quarterly analytical data for the Giant Refining Remediation Project. The data is broken down into units as described below.

	Unit of <u>Measure</u>
Total dissolved solids (180)	mg/l
Total dissolved solids (calc)	mg/l
Total alkalinity as CaCO ₃	mg/l
Total hardness as CaCO ₃	mg/l
Bicarbonate as HCO ₃	mg/l
Carbonate as CO ₃	mg/l
Chloride	mg/l
Sulfate	mg/l
Calcium	mg/l
Magnesium	mg/l
Potassium	mg/l
Sodium	mg/l

The remainder of the data is measured in ug/l.

GIANT REFINING COMPANY
ONSITE REMEDIATION PROJECT
QUARTERLY ANALYTICAL DATA SUMMARY
FIRST QUARTER, 1992

STRIPPER INFLUENT

	1/92	2/92	3/92
GENERAL WATER CHEMISTRY			
Lab pH (s.u.)	6.85	7.02	6.98
Lab conductivity, umhos/cm	3570.00	3560.00	3500.00
Lab resistivity, ohm-m	2.80	2.81	2.86
Total dissolved solids (180)	2750.00	2700.00	2750.00
Total dissolved solids (calc)	2720.00	2700.00	2780.00
Total alkalinity as CaCO3	256.00	301.00	251.00
Total hardness as CaCO3	1010.00	1110.00	1060.00
Sodium absorption ratio	6.86	6.22	7.00
Bicarbonate as HCO3	312.00	367.00	306.00
Carbonate as CO3	0.00	0.00	0.00
Chloride	418.00	379.00	388.00
Sulfate	1250.00	1240.00	1320.00
Calcium	382.00	385.00	368.00
Magnesium	14.10	37.30	33.60
Potassium	2.63	2.48	2.64
Sodium	501.00	477.00	523.00

HALOCARBONS

Bromodichloromethane	ND	ND	ND
Bromoform	ND	ND	ND
Bromomethane	ND	ND	ND
Carbon tetrachloride	ND	ND	ND
Chloroethane	ND	ND	ND
2-Chloroethylvinylether	ND	ND	ND
Chloroform	ND	ND	ND
Chloromethane	ND	ND	ND
Dibromochloromethane	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND
1,1-Dichloroethane	0.80	0.80	1.00
1,2-Dichloroethane	0.70	0.60	0.60
1,1-Dichloroethene	ND	ND	ND
1,2-Dichloroethene	2.80	2.80	2.90
trans-1,2-Dichloroethene	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND
trans-1,3-Dichloropropene	ND	0.60	ND
Methylene chloride	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND
Tetrachloroethene	0.20	0.20	ND

STRIPPER INFLUENT (Continued)

	1/92	2/92	3/92
1,1,1-Trichloroethane	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND
Trichloroethene	ND	ND	ND
Trichlorofluoromethane	ND	ND	ND
Vinyl chloride	ND	ND	ND
AROMATICS			
Benzene	11.00	11.00	9.80
Chlorobenzene	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND
Ethylbenzene	1.50	1.50	1.50
Toluene	ND	ND	ND
Xylenes	ND	1.70	2.20
Trichlorotrifluoroethane	ND	ND	ND

STRIPPER EFFLUENT

	1/92	2/92	3/92
GENERAL WATER CHEMISTRY			
Lab pH (s.u.)	7.42	7.08	7.48
Lab conductivity, umhos/cm	3630.00	3620.00	3290.00
Lab resistivity, ohm-m	2.75	2.76	3.04
Total dissolved solids (180)	2790.00	2850.00	2760.00
Total dissolved solids (calc)	2710.00	2740.00	2720.00
Total alkalinity as CaCO ₃	106.00	40.70	136.00
Total hardness as CaCO ₃	1010.00	1110.00	1070.00
Sodium absorption ratio	6.79	6.18	6.39
Bicarbonate as HCO ₃	129.00	49.40	166.00
Carbonate as CO ₃	0.00	0.00	0.00
Chloride	529.00	551.00	516.00
Sulfate	1230.00	1260.00	1230.00
Calcium	360.00	395.00	371.00
Magnesium	27.90	31.20	34.90
Potassium	2.67	2.51	4.85
Sodium	497.00	474.00	480.00
HALOCARBONS			
Bromodichloromethane	ND	ND	ND
Bromoform	ND	ND	ND
Bromomethane	ND	ND	ND
Carbon tetrachloride	ND	ND	ND
Chloroethane	ND	ND	ND
Chloroethane	ND	ND	ND
2-Chloroethylvinylether	ND	ND	ND
Chloroform	ND	ND	ND
Chloromethane	ND	ND	ND
Dibromochloromethane	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND
1,2-Dichloroethane	ND	ND	0.30
1,2-Dichloroethene	ND	ND	0.30
cis-1,2-Dichloroethene	ND	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND
Methylene chloride	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND
Tetrachloroethene	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND
Trichloroethene	ND	ND	ND
Trichlorofluoromethane	ND	ND	ND
Vinyl chloride	ND	ND	ND

STRIPPER EFFLUENT (Continued)

	1/92	2/92	3/92
AROMATICS			
Benzene	ND	ND	ND
Chlorobenzene	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND
Ethylbenzene	ND	ND	ND
Toluene	ND	ND	ND
Xylenes	ND	ND	ND
Trichlorotrifluoroethane	ND	ND	ND

GRW-3

	1/92	2/92	3/92
GENERAL WATER CHEMISTRY			
Lab pH (s.u.)	7.68		
Lab conductivity, umhos/cm	4190.00		
Lab resistivity, ohm-m	2.39		
Total dissolved solids (180)	3620.00		
Total dissolved solids (calc)	3570.00		
Total alkalinity as CaCO ₃	538.00		
Total hardness as CaCO ₃	1520.00		
Sodium absorption ratio	6.27		
Bicarbonate as HCO ₃	659.00		
Carbonate as CO ₃	0.00		
Chloride	316.00		
Sulfate	1780.00		
Calcium	536.00		
Magnesium	45.10		
Potassium	4.00		
Sodium	562.00		
PAH			
Acenaphthene	ND		
Acenaphthylene	ND		
Anthracene	ND		
Benzo(a)anthracene	ND		
Benzo(a)pyrene	ND		
Benzo(b)fluoranthene	ND		
Benzo(g,h,i)perylene	ND		
Benzo(k)fluoranthene	ND		
Chrysene	ND		
Dibenzo(a,h)anthracene	ND		
Fluoranthene	ND		
Fluorene	6.20		
Indeno(1,2,3-cd)pyrene	ND		
Naphthalene	ND		
Phenanthrene	13.00		
Pyrene	ND		
HALOCARBONS			
Bromodichloromethane	ND		
Bromoform	ND		
Bromomethane	ND		
Carbon tetrachloride	ND		
Chloroethane	ND		
2-Chloroethylvinylether	ND		
Chloroform	ND		
Chloromethane	ND		
Dibromochloromethane	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		

GRW-3 (Continued)

	1/92	2/92	3/92
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		
1,1-Dichloroethene	ND		
cis-1,2-Dichloroethene	ND		
trans-1,2-Dichloroethene	ND		
1,2-Dichloropropane	ND		
cis-1,3-Dichloropropene	ND		
trans-1,3-Dichloropropene	ND		
Methylene chloride	ND		
1,1,2,2-Tetrachloroethane	ND		
Tetrachloroethene	ND		
1,1,1-Trichloroethane	ND		
1,1,2-Trichloroethane	ND		
Trichloroethene	ND		
Trichlorofluoromethane	ND		
Vinyl chloride	ND		
AROMATICS			
Benzene	27.00		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	17.00		
Toluene	ND		
Xylenes	4.00		

GRW-4

1/92

2/92

3/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.56
Lab conductivity, umhos/cm	3390.00
Lab resistivity, ohm-m	2.95
Total dissolved solids (180)	2180.00
Total dissolved solids (calc)	2180.00
Total alkalinity as CaCO ₃	956.00
Total hardness as CaCO ₃	759.00
Sodium absorption ratio	8.57
Bicarbonate as HCO ₃	1170.00
Carbonate as CO ₃	0.00
Chloride	503.00
Sulfate	255.00
Calcium	303.00
Magnesium	0.91
Potassium	2.10
Sodium	543.00

PAH

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(g,h,i)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenzo(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	6.10
Indeno(1,2,3-cd)pyrene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND

GRW-4 (Continued)

	1/92	2/92	3/92
1,1-Dichloroethane	0.40		
1,2-Dichloroethane	0.90		
1,1-Dichloroethene	ND		
1,2-Dichloroethene	1.20		
trans-1,2-Dichloroethene	ND		
1,2-Dichloropropane	ND		
cis-1,3-Dichloropropene	ND		
trans-1,3-Dichloropropene	ND		
Methylene chloride	ND		
1,1,2,2-Tetrachloroethane	0.30		
Tetrachloroethene	ND		
1,1,1-Trichloroethane	ND		
1,1,2-Trichloroethane	ND		
Trichloroethene	0.40		
Trichlorofluoromethane	ND		
Vinyl chloride	ND		
AROMATICS			
Benzene	22.00		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	2.30		
Toluene	ND		
Xylenes	1.30		

GRW-6

	1/92	2/92	3/92
GENERAL WATER CHEMISTRY			
Lab pH (s.u.)	7.31		
Lab conductivity, umhos/cm	3660.00		
Lab resistivity, ohm-m	2.73		
Total dissolved solids (180)	2440.00		
Total dissolved solids (calc)	2450.00		
Total alkalinity as CaCO ₃	750.00		
Total hardness as CaCO ₃	817.00		
Sodium absorption ratio	9.00		
Bicarbonate as HCO ₃	915.00		
Carbonate as CO ₃	0.00		
Chloride	498.00		
Sulfate	592.00		
Calcium	300.00		
Magnesium	16.90		
Potassium	2.10		
Sodium	591.00		

PAH

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(g,h,i)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenzo(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	0.76
Indeno(1,2,3-cd)pyrene	ND
Naphthalene	ND
Phenanthrene	ND
Pyrene	ND

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND

GRW-6 (Continued)

	1/92	2/92	3/92
1,1-Dichloroethane	0.60		
1,2-Dichloroethane	1.20		
1,2-Dichloroethene	2.10		
trans-1,2-Dichloroethene	ND		
1,2-Dichloropropane	ND		
cis-1,3-Dichloropropene	ND		
trans-1,3-Dichloropropene	ND		
Methylene chloride	ND		
1,1,2,2-Tetrachloroethane	ND		
Tetrachloroethene	0.50		
1,1,1-Trichloroethane	ND		
1,1,2-Trichloroethane	ND		
Trichloroethene	0.50		
Trichlorofluoromethane	ND		
Vinyl chloride	ND		
AROMATICS			
Benzene	20.00		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	1.60		
Toluene	ND		
Xylenes	ND		
Trichlorotrifluoroethane	ND		

GBR-15

	1/92	2/92	3/92
GENERAL WATER CHEMISTRY			
Lab pH (s.u.)	7.72		
Lab conductivity, umhos/cm	3780.00		
Lab resistivity, ohm-m	2.65		
Total dissolved solids (180)	3150.00		
Total dissolved solids (calc)	3060.00		
Total alkalinity as CaCO ₃	282.00		
Total hardness as CaCO ₃	1020.00		
Sodium absorption ratio	8.36		
Bicarbonate as HCO ₃	344.00		
Carbonate as CO ₃	0.00		
Chloride	526.00		
Sulfate	1340.00		
Calcium	387.00		
Magnesium	13.60		
Potassium	3.84		
Sodium	614.00		

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	ND
1,2-Dichloroethane	16.00
1,1-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

GBR-15 (Continued)

	1/92	2/92	3/92
AROMATICS			
Benzene	0.60		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	2.40		
Xylenes	ND		
Trichlorotrifluoroethane	ND		
PAH			
Acenaphthene	ND		
Acenaphthylene	ND		
Anthracene	ND		
Benzo(a)anthracene	ND		
Benzo(a)pyrene	ND		
Benzo(b)fluoranthene	ND		
Benzo(g,h,i)perylene	ND		
Benzo(k)fluoranthene	ND		
Chrysene	ND		
Dibenzo(a,h)anthracene	ND		
Fluoranthene	ND		
Fluorene	ND		
Indeno(1,2,3-cd)pyrene	ND		
Naphthalene	ND		
Phenanthrene	ND		
Pyrene	ND		

GBR-17

	1/92	2/92	3/92
GENERAL WATER CHEMISTRY			
Lab pH (s.u.)	7.88		
Lab conductivity, umhos/cm	2540.00		
Lab resistivity, ohm-m	3.94		
Total dissolved solids (180)	2170.00		
Total dissolved solids (calc)	2180.00		
Total alkalinity as CaCO ₃	232.00		
Total hardness as CaCO ₃	1020.00		
Sodium absorption ratio	4.19		
Bicarbonate as HCO ₃	283.00		
Carbonate as CO ₃	0.00		
Chloride	65.20		
Sulfate	1260.00		
Calcium	396.00		
Magnesium	6.38		
Potassium	0.49		
Sodium	307.00		
HALOCARBONS			
Bromodichloromethane	ND		
Bromoform	ND		
Bromomethane	ND		
Carbon tetrachloride	ND		
Chlorobenzene	ND		
Chloroethane	ND		
2-Chloroethylvinylether	ND		
Chloroform	ND		
Chloromethane	ND		
Dibromochloromethane	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		
1,1-Dichloroethene	ND		
cis-1,2-Dichloroethene	ND		
trans-1,2-Dichloroethene	ND		
1,2-Dichloropropane	ND		
cis-1,3-Dichloropropene	ND		
trans-1,3-Dichloropropene	ND		
Methylene chloride	ND		
1,1,2,2-Tetrachloroethane	ND		
Tetrachloroethene	ND		
1,1,1-Trichloroethane	ND		
1,1,2-Trichloroethane	ND		
Trichloroethene	ND		
Trichlorofluoromethane	ND		
Vinyl chloride	ND		

GBR-17 (Continued)

	1/92	2/92	3/92
AROMATICS			
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		
Trichlorotrifluoroethane	ND		
PAH			
Acenaphthene	ND		
Acenaphthylene	ND		
Anthracene	ND		
Benzo(a)anthracene	ND		
Benzo(a)pyrene	ND		
Benzo(b)fluoranthene	ND		
Benzo(g,h,i)perylene	ND		
Benzo(k)fluoranthene	ND		
Chrysene	ND		
Dibenzo(a,h)anthracene	ND		
Fluoranthene	ND		
Fluorene	ND		
Indeno(1,2,3-cd)pyrene	ND		
Naphthalene	ND		
Phenanthrene	ND		
Pyrene	ND		

GBR-24-D

	1/92	2/92	3/92
GENERAL WATER CHEMISTRY			
Lab pH (s.u.)	7.54		
Lab conductivity, umhos/cm	4480.00		
Lab resistivity, ohm-m	2.23		
Total dissolved solids (180)	3780.00		
Total dissolved solids (calc)	3600.00		
Total alkalinity as CaCO3	224.00		
Total hardness as CaCO3	1820.00		
Sodium absorption ratio	4.76		
Bicarbonate as HCO3	273.00		
Carbonate as CO3	0.00		
Chloride	618.00		
Sulfate	1700.00		
Calcium	606.00		
Magnesium	74.10		
Potassium	4.67		
Sodium	466.00		
HALOCARBONS			
Bromodichloromethane	ND		
Bromoform	ND		
Bromomethane	ND		
Carbon tetrachloride	ND		
Chloroethane	ND		
2-Chloroethylvinylether	ND		
Chloroform	ND		
Chloromethane	ND		
Dibromochloromethane	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		
1,1-Dichloroethene	ND		
cis-1,2-Dichloroethene	ND		
trans-1,2-Dichloroethene	ND		
1,2-Dichloropropane	ND		
cis-1,3-Dichloropropene	ND		
trans-1,3-Dichloropropene	ND		
Methylene chloride	ND		
1,1,2,2-Tetrachloroethane	ND		
Tetrachloroethene	ND		
1,1,1-Trichloroethane	ND		
1,1,2-Trichloroethane	ND		
Trichloroethene	ND		
Trichlorofluoromethane	ND		
Vinyl chloride	ND		

GBR-24D (Continued)

	1/92	2/92	3/92
AROMATICS			
Benzene	47.00		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	13.00		
Toluene	3.50		
Xylenes	ND		
Trichlorotrifluoroethane	ND		
PAH			
Acenaphthene	ND		
Acenaphthylene	ND		
Anthracene	ND		
Benzo(a)anthracene	ND		
Benzo(a)pyrene	ND		
Benzo(b)fluoranthene	ND		
Benzo(g,h,i)perylene	ND		
Benzo(k)fluoranthene	ND		
Chrysene	ND		
Dibenzo(a,h)anthracene	ND		
Fluoranthene	ND		
Fluorene	3.70		
Indeno(1,2,3-cd)pyrene	ND		
Naphthalene	ND		
Phenanthrene	0.80		
Pyrene	ND		

GBR-30

	1/92	2/92	3/92
GENERAL WATER CHEMISTRY			
Lab pH (s.u.)	7.26		
Lab conductivity, umhos/cm	3730.00		
Lab resistivity, ohm-m	2.68		
Total dissolved solids (180)	2910.00		
Total dissolved solids (calc)	2780.00		
Total alkalinity as CaCO ₃	228.00		
Total hardness as CaCO ₃	1090.00		
Sodium absorption ratio	6.44		
Bicarbonate as HCO ₃	279.00		
Carbonate as CO ₃	0.00		
Chloride	515.00		
Sulfate	1220.00		
Calcium	395.00		
Magnesium	24.40		
Potassium	2.07		
Sodium	488.00		
HALOCARBONS			
Bromodichloromethane	ND		
Bromoform	ND		
Bromomethane	ND		
Carbon tetrachloride	ND		
Chloroethane	ND		
2-Chloroethylvinylether	ND		
Chloroform	ND		
Chloromethane	ND		
Dibromochloromethane	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		
1,1-Dichloroethene	ND		
cis-1,2-Dichloroethene	ND		
trans-1,2-Dichloroethene	ND		
1,2-Dichloropropane	ND		
cis-1,3-Dichloropropene	ND		
trans-1,3-Dichloropropene	ND		
Methylene chloride	ND		
1,1,2,2-Tetrachloroethane	ND		
Tetrachloroethene	ND		
1,1,1-Trichloroethane	ND		
1,1,2-Trichloroethane	ND		
Trichloroethene	ND		
Trichlorofluoromethane	ND		
Vinyl chloride	ND		

GBR-30 (Continued)

	1/92	2/92	3/92
AROMATICS			
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		
Trichlorotrifluoroethane	ND		
PAH			
Acenaphthene	ND		
Acenaphthylene	ND		
Anthracene	ND		
Benzo(a)anthracene	ND		
Benzo(a)pyrene	ND		
Benzo(b)fluoranthene	ND		
Benzo(g,h,i)perylene	ND		
Benzo(k)fluoranthene	ND		
Chrysene	ND		
Dibenzo(a,h)anthracene	ND		
Fluoranthene	ND		
Fluorene	ND		
Indeno(1,2,3-cd)pyrene	ND		
Naphthalene	ND		
Phenanthrene	0.04		
Pyrene	ND		

GBR-31

1/92

2/92

3/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.56
Lab conductivity, umhos/cm	3590.00
Lab resistivity, ohm-m	2.79
Total dissolved solids (180)	2950.00
Total dissolved solids (calc)	2850.00
Total alkalinity as CaCO ₃	212.00
Total hardness as CaCO ₃	1060.00
Sodium absorption ratio	6.86
Bicarbonate as HCO ₃	258.00
Carbonate as CO ₃	0.00
Chloride	490.00
Sulfate	1300.00
Calcium	393.00
Magnesium	19.50
Potassium	2.07
Sodium	514.00

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	ND
1,2-Dichloroethane	0.20
1,2-Dichloroethene	2.70
1,1-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	0.30
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

GBR-31 (Continued)

	1/92	2/92	3/92
AROMATICS			
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		
PAH			
Acenaphthene	ND		
Acenaphthylene	ND		
Anthracene	ND		
Benzo(a)anthracene	ND		
Benzo(a)pyrene	ND		
Benzo(b)fluoranthene	ND		
Benzo(g,h,i)perylene	ND		
Benzo(k)fluoranthene	ND		
Chrysene	ND		
Dibenzo(a,h)anthracene	ND		
Fluoranthene	ND		
Fluorene	ND		
Indeno(1,2,3-cd)pyrene	ND		
Naphthalene	ND		
Phenanthrene	ND		
Pyrene	ND		

*ND - Not detected at specified detection limit

OFFSITE WELLS

SHS-3

	1/92	2/92	3/92
GENERAL WATER CHEMISTRY			
Lab pH (s.u.)	7.34		
Lab conductivity, umhos/cm	4140.00		
Lab resistivity, ohm-m	2.42		
Total dissolved solids (180)	3870.00		
Total dissolved solids (calc)	3760.00		
Total alkalinity as CaCO3	239.00		
Total hardness as CaCO3	1760.00		
Sodium absorption ratio	5.01		
Bicarbonate as HCO3	292.00		
Carbonate as CO3	0.00		
Chloride	298.00		
Sulfate	2150.00		
Calcium	638.00		
Magnesium	40.70		
Potassium	11.40		
Sodium	483.00		
HALOCARBONS			
Bromodichloromethane	ND		
Bromoform	ND		
Bromomethane	ND		
Carbon tetrachloride	ND		
Chloroethane	ND		
2-Chloroethylvinylether	ND		
Chloroform	ND		
Chloromethane	ND		
Dibromochloromethane	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		
1,2-Dichloroethene	ND		
cis-1,2-Dichloroethene	ND		
trans-1,2-Dichloroethene	ND		
1,2-Dichloropropane	ND		
cis-1,3-Dichloropropene	ND		
trans-1,3-Dichloropropene	ND		
Methylene chloride	ND		
1,1,2,2-Tetrachloroethane	ND		
Tetrachloroethene	ND		
1,1,1-Trichloroethane	ND		
1,1,2-Trichloroethane	ND		
Trichloroethene	ND		
Trichlorofluoromethane	ND		
Vinyl chloride	ND		

SHS-3 (Continued)

1/92

2/92

3/92

AROMATICS

Benzene	ND
Chlorobenzene	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
Ethylbenzene	ND
Toluene	ND
Xylenes	ND
Trichlorotrifluoroethane	ND

SHS-6

1/92

2/92

3/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.65
Lab conductivity, umhos/cm	2990.00
Lab resistivity, ohm-m	3.34
Total dissolved solids (180)	2460.00
Total dissolved solids (calc)	2470.00
Total alkalinity as CaCO ₃	268.00
Total hardness as CaCO ₃	1230.00
Sodium absorption ratio	4.03
Bicarbonate as HCO ₃	328.00
Carbonate as CO ₃	0.00
Chloride	141.00
Sulfate	1380.00
Calcium	411.00
Magnesium	48.90
Potassium	3.42
Sodium	324.00

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	ND
1,2-Dichloroethane	ND
1,2-Dichloroethene	1.20
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

SHS-6 (Continued)

	1/92	2/92	3/92
AROMATICS			
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		
Trichlorotrifluoroethane	ND		

SHS-9

	1/92	2/92	3/92
GENERAL WATER CHEMISTRY			
Lab pH (s.u.)	7.57		
Lab conductivity, umhos/cm	3400.00		
Lab resistivity, ohm-m	2.94		
Total dissolved solids (180)	2070.00		
Total dissolved solids (calc)	2050.00		
Total alkalinity as CaCO ₃	1130.00		
Total hardness as CaCO ₃	559.00		
Sodium absorption ratio	11.30		
Bicarbonate as HCO ₃	1380.00		
Carbonate as CO ₃	0.00		
Chloride	376.00		
Sulfate	158.00		
Calcium	209.00		
Magnesium	8.92		
Potassium	1.00		
Sodium	614.00		

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	ND
1,2-Dichloroethane	ND
1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	160.00
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

SHS-9 (Continued)

	1/92	2/92	3/92
AROMATICS			
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		
Trichlorotrifluoroethane	ND		

SHS-10

1/92

2/92

3/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	6.85
Lab conductivity, umhos/cm	2180.00
Lab resistivity, ohm-m	4.59
Total dissolved solids (180)	1640.00
Total dissolved solids (calc)	1620.00
Total alkalinity as CaCO ₃	284.00
Total hardness as CaCO ₃	600.00
Sodium absorption ratio	5.20
Bicarbonate as HCO ₃	346.00
Carbonate as CO ₃	0.00
Chloride	70.40
Sulfate	858.00
Calcium	201.00
Magnesium	23.80
Potassium	7.98
Sodium	293.00

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	ND
1,2-Dichloroethane	ND
1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	27.00
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

SHS-10 (Continued)

	1/92	2/92	3/92
AROMATICS			
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		
Trichlorotrifluoroethane			

SHS-12

1/92

2/92

3/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.45
Lab conductivity, umhos/cm	3690.00
Lab resistivity, ohm-m	2.71
Total dissolved solids (180)	2750.00
Total dissolved solids (calc)	2750.00
Total alkalinity as CaCO ₃	359.00
Total hardness as CaCO ₃	1070.00
Sodium absorption ratio	6.42
Bicarbonate as HCO ₃	438.00
Carbonate as CO ₃	0.00
Chloride	364.00
Sulfate	1270.00
Calcium	383.00
Magnesium	28.10
Potassium	2.37
Sodium	483.00

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	0.80
1,2-Dichloroethane	0.40
1,2-Dichloroethene	5.10
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	0.70
Tetrachloroethene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	0.30
Trichlorofluoromethane	ND
Vinyl chloride	ND

SHS-12 (Continued)

	1/92	2/92	3/92
AROMATICS			
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		
Trichlorotrifluoroethane	ND		

SHS-13

	1/92	2/92	3/92
GENERAL WATER CHEMISTRY			
Lab pH (s.u.)	7.46		
Lab conductivity, umhos/cm	4740.00		
Lab resistivity, ohm-m	2.11		
Total dissolved solids (180)	3860.00		
Total dissolved solids (calc)	3820.00		
Total alkalinity as CaCO ₃	552.00		
Total hardness as CaCO ₃	1870.00		
Sodium absorption ratio	5.27		
Bicarbonate as HCO ₃	671.00		
Carbonate as CO ₃	0.00		
Chloride	481.00		
Sulfate	1770.00		
Calcium	659.00		
Magnesium	54.40		
Potassium	3.24		
Sodium	524.00		
HALOCARBONS			
Bromodichloromethane	ND		
Bromoform	ND		
Bromomethane	ND		
Carbon tetrachloride	ND		
Chloroethane	ND		
2-Chloroethylvinylether	ND		
Chloroform	ND		
Chloromethane	ND		
Dibromochloromethane	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
1,1-Dichloroethane	1.70		
1,2-Dichloroethane	11.00		
1,2-Dichloroethene	0.90		
cis-1,2-Dichloroethene	ND		
trans-1,2-Dichloroethene	ND		
1,2-Dichloropropane	ND		
cis-1,3-Dichloropropene	ND		
trans-1,3-Dichloropropene	ND		
Methylene chloride	ND		
1,1,2,2-Tetrachloroethane	ND		
Tetrachloroethene	ND		
1,1,1-Trichloroethane	ND		
1,1,2-Trichloroethane	ND		
Trichloroethene	0.20		
Trichlorofluoromethane	ND		
Vinyl chloride	ND		

SHS-13 (Continued)

	1/92	2/92	3/92
AROMATICS			
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		
Trichlorotrifluoroethane	ND		

SHS-14

1/92

2/92

3/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.61
Lab conductivity, umhos/cm	2300.00
Lab resistivity, ohm-m	4.35
Total dissolved solids (180)	1960.00
Total dissolved solids (calc)	1950.00
Total alkalinity as CaCO ₃	290.00
Total hardness as CaCO ₃	1110.00
Sodium absorption ratio	2.59
Bicarbonate as HCO ₃	354.00
Carbonate as CO ₃	0.00
Chloride	54.90
Sulfate	1090.00
Calcium	395.00
Magnesium	29.60
Potassium	2.10
Sodium	198.00

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	ND
1,2-Dichloroethane	ND
1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	440.00
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

SHS-14 (Continued)

	1/92	2/92	3/92
AROMATICS			
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		
Trichlorotrifluoroethane	ND		

SHS-15

	1/92	2/92	3/92
GENERAL WATER CHEMISTRY			
Lab pH (s.u.)	7.64		
Lab conductivity, umhos/cm	2260.00		
Lab resistivity, ohm-m	4.42		
Total dissolved solids (180)	1950.00		
Total dissolved solids (calc)	1950.00		
Total alkalinity as CaCO ₃	265.00		
Total hardness as CaCO ₃	1120.00		
Sodium absorption ratio	2.13		
Bicarbonate as HCO ₃	323.00		
Carbonate as CO ₃	0.00		
Chloride	39.30		
Sulfate	1150.00		
Calcium	406.00		
Magnesium	25.70		
Potassium	2.39		
Sodium	164.00		
HALOCARBONS			
Bromodichloromethane	ND		
Bromoform	ND		
Bromomethane	ND		
Carbon tetrachloride	ND		
Chloroethane	ND		
2-Chloroethylvinylether	ND		
Chloroform	0.60		
Chloromethane	ND		
Dibromochloromethane	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
1,1-Dichloroethane	ND		
1,2-Dichloroethane	ND		
1,2-Dichloroethene	ND		
cis-1,2-Dichloroethene	ND		
trans-1,2-Dichloroethene	ND		
1,2-Dichloropropane	ND		
cis-1,3-Dichloropropene	ND		
trans-1,3-Dichloropropene	ND		
Methylene chloride	ND		
1,1,2,2-Tetrachloroethane	ND		
Tetrachloroethene	ND		
1,1,1-Trichloroethane	ND		
1,1,2-Trichloroethane	ND		
Trichloroethene	ND		
Trichlorofluoromethane	ND		
Vinyl chloride	ND		

SHS-15 (Continued)

1/92

2/92

3/92

AROMATICS

Benzene

Chlorobenzene

1,2-Dichlorobenzene

1,3-Dichlorobenzene

1,4-Dichlorobenzene

Ethylbenzene

Toluene

Xylenes

Trichlorotrifluoroethane

SHS-16

1/92

2/92

3/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.75
Lab conductivity, umhos/cm	2660.00
Lab resistivity, ohm-m	3.76
Total dissolved solids (180)	2330.00
Total dissolved solids (calc)	2330.00
Total alkalinity as CaCO ₃	280.00
Total hardness as CaCO ₃	1310.00
Sodium absorption ratio	2.64
Bicarbonate as HCO ₃	342.00
Carbonate as CO ₃	0.00
Chloride	44.50
Sulfate	1400.00
Calcium	458.00
Magnesium	41.00
Potassium	2.50
Sodium	220.00

HALOCARBONS

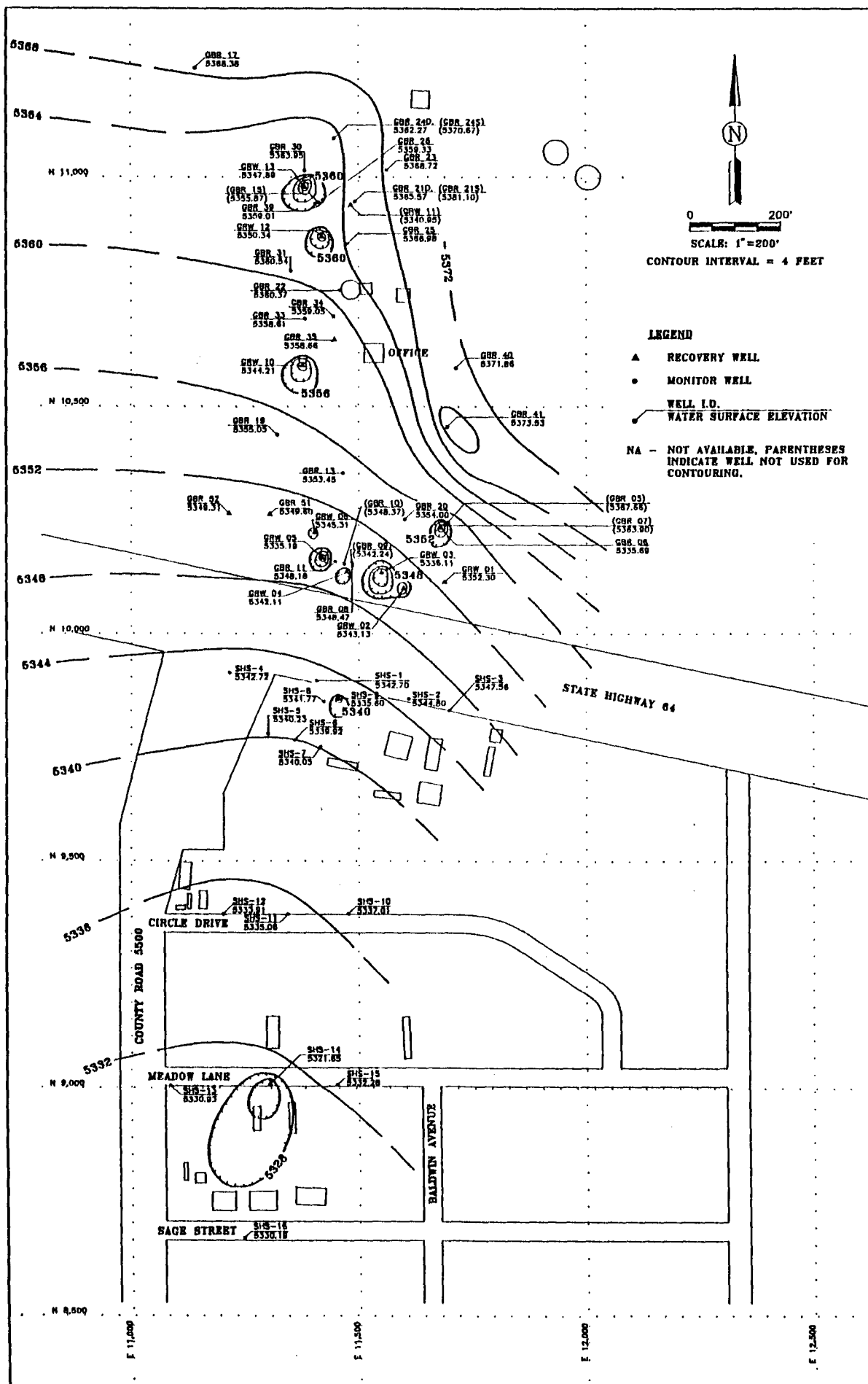
Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	ND
1,2-Dichloroethane	ND
1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

SHS-16 (Continued)

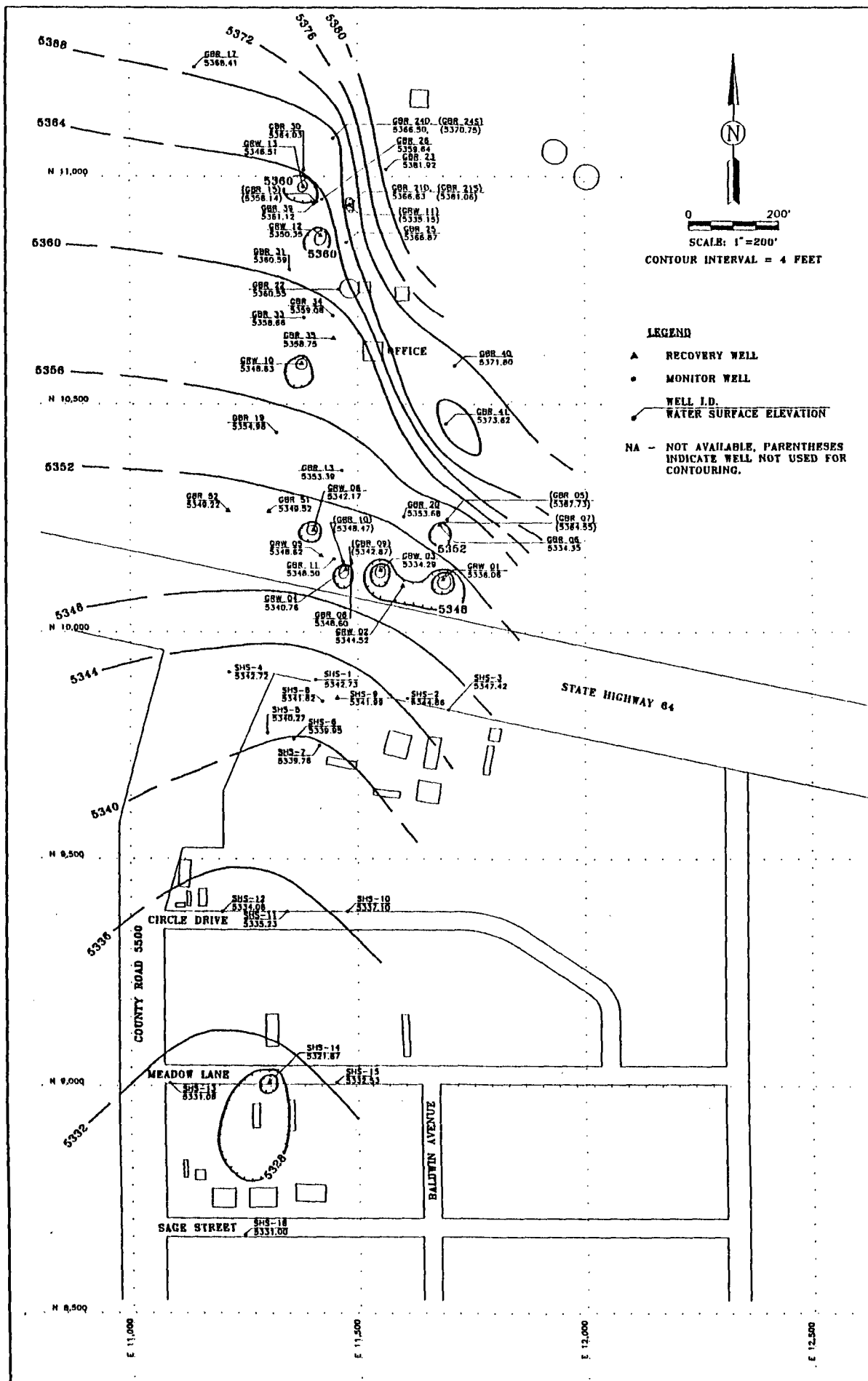
	1/92	2/92	3/92
AROMATICS			
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	ND		
Xylenes	ND		
Trichlorotrifluoroethane	ND		

*ND - Not detected at specified detection limit

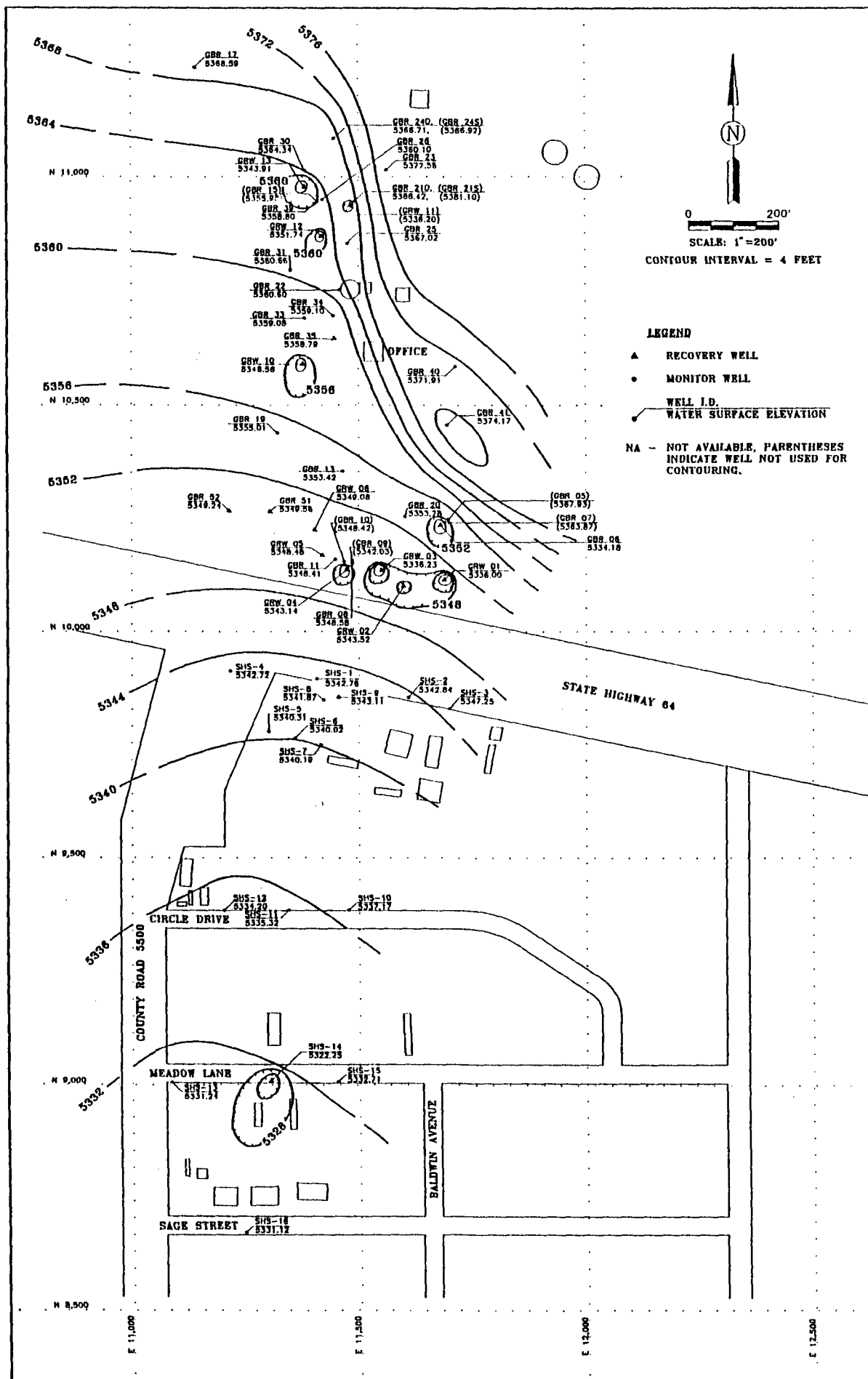
January 1992, Water Surface Contour Map
Giant-Bloomfield Refinery



February 1992, Water Surface Contour Map
Giant-Bloomfield Refinery



March 1992, Water Surface Contour Map
Giant-Bloomfield Refinery



Giant Refining Co. Bloomfield Refinery
Total Volume Summary

First Quarter, 1992

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Total Volume Of Water Recovered	2095700
Net Change In Storage Volume	-136580

Total Water Pumped To The Infiltration Gallery	2079756
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=====

Difference	-152524
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Comments: The approximately 7% difference
can be accounted for in meter
inaccuracy.

Giant Refining Co. Bloomfield Refinery
Quarterly Recovery Well
Volume Tabulation

First Quarter, 1992

Well	Month #1	Month #2	Month #3	Total
GRW-1	11380	10740	10590	32710
GRW-2	7240	7910	11240	26390
GRW-3	16100	12610	10830	39540
GRW-4	24270	19860	20530	64660
GRW-5	49920	30510	36320	116750
GRW-6	30950	26930	28150	86030
GRW-9	8400	6880	7020	22300
GRW-10	370030	252770	274430	897230
GRW-11	42290	42120	65000	149410
GRW-12	24950	21350	20950	67250
GRW-13	33300	26500	26060	85860
SHS-9	4091	6175	2221	12487
SHS-11	0	0	0	0
SHS-14	196956	146514	151613	495083
Total Volume Pumped In Gallons				2095700

Giant Refining Co. Bloomfield Refinery
Quarterly Net Tank
Volume Change

First Quarter, 1992

Tank Number	Beginning Volume	Ending Volume	Net Change
102	15073	17468	2395
106	8010	8010	0
21	247673	134430	-113243
22	241697	215965	-25732
27	182470	182470	0
32	88634	88634	0
34	87541	87541	0
35	0	0	0
37	138051	138051	0
Total Net Volume Change			-136580

GRW-13

GENERAL WATER CHEMISTRY

Lab conductivity, umhos/cm

1/92

2/92

3/92

4200.00

4160.00

4060.00

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20160604

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
 PROJECT # : 9002-67
 PROJECT NAME : OFF SITE
 CLIENT I.D. : 9201091125 SHS-12
 SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 01/09/92
 DATE RECEIVED : 01/10/92
 DATE EXTRACTED : N/A
 DATE ANALYZED : 01/13/92
 UNITS : UG/L
 DILUTION FACTOR : 1

COMPOUNDS	RESULTS
BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	0.8
1,2-DICHLOROETHANE	0.4
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	5.1
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	0.7
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	0.3
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	95
BROMOFLUOROBENZENE (%)	103

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20160601

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFF SITE
CLIENT I.D. : 920109905 SHS-3
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 01/09/92
DATE RECEIVED : 01/10/92
DATE EXTRACTED : N/A
DATE ANALYZED : 01/13/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

DIBROMOCHLOROMETHANE (%)	95
BROMOFLUOROBENZENE (%)	105



GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20160602

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFF SITE
CLIENT I.D. : 9201091000 SHS-6
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 01/09/92
DATE RECEIVED : 01/10/92
DATE EXTRACTED : N/A
DATE ANALYZED : 01/13/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS

RESULTS

BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	1.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	101
BROMOFLUOROBENZENE (%)	98



GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20160603

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFF SITE
CLIENT I.D. : 9201091107 SHS-10
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 01/09/92
DATE RECEIVED : 01/10/92
DATE EXTRACTED : N/A
DATE ANALYZED : 01/13/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS

RESULTS

BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	27
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	93
BROMOFLUOROBENZENE (%)	118

GAS CHROMATOGRAPHY - RESULTS

ATTI I.D. : 20160605

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFF SITE
CLIENT I.D. : 9201091217 SHS-13
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 01/09/92
DATE RECEIVED : 01/10/92
DATE EXTRACTED : N/A
DATE ANALYZED : 01/13/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS

RESULTS

BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	1.7
1,2-DICHLOROETHANE	11
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	0.9
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	93
BROMOFLUOROBENZENE (%)	113



GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20160606

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFF SITE
CLIENT I.D. : 9201091315 SHS-15
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 01/09/92
DATE RECEIVED : 01/10/92
DATE EXTRACTED : N/A
DATE ANALYZED : 01/14/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS

RESULTS

BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	0.6
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	102
BROMOFLUOROBENZENE (%)	94

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20160607

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFF SITE
CLIENT I.D. : 9201091332 SHS-16
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 01/09/92
DATE RECEIVED : 01/10/92
DATE EXTRACTED : N/A
DATE ANALYZED : 01/13/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	86
BROMOFLUOROBENZENE (%)	105



GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20160608

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFF SITE
CLIENT I.D. : 9201091405 SHS-14
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 01/09/92
DATE RECEIVED : 01/10/92
DATE EXTRACTED : N/A
DATE ANALYZED : 01/13/92
UNITS : UG/L
DILUTION FACTOR : 10

COMPOUNDS	RESULTS
BENZENE	<5.0
BROMODICHLOROMETHANE	<2.0
BROMOFORM	<2.0
BROMOMETHANE	<2.0
CARBON TETRACHLORIDE	<2.0
CHLOROBENZENE	<5.0
CHLOROETHANE	<2.0
CHLOROFORM	<2.0
CHLOROMETHANE	<2.0
DIBROMOCHLOROMETHANE	<2.0
2-CHLOROETHYL VINYL ETHER	<5.0
,3-DICHLOROBENZENE	<5.0
1,2 & 1,4-DICHLOROBENZENE	<5.0
DICHLORODIFLUOROMETHANE	<2.0
1,1-DICHLOROETHANE	<2.0
1,2-DICHLOROETHANE	<2.0
1,1-DICHLOROETHENE	<2.0
1,2-DICHLOROETHENE (TOTAL)	<2.0
1,2-DICHLOROPROPANE	<2.0
CIS-1,3-DICHLOROPROPENE	<2.0
TRANS-1,3-DICHLOROPROPENE	<2.0
ETHYLBENZENE	<5.0
METHYLENE CHLORIDE	440
1,1,2,2-TETRACHLOROETHANE	<2.0
TETRACHLOROETHENE	<2.0
TOLUENE	<5.0
1,1,1-TRICHLOROETHANE	<2.0
1,1,2-TRICHLOROETHANE	<2.0
TRICHLOROETHENE	<2.0
TRICHLOROFLUOROMETHANE	<5.0
VINYL CHLORIDE	<2.0
TOTAL XYLENES	<5.0
TRICHLOROTRIFLUOROETHANE	<20.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)
BROMOFLUOROBENZENE (%)

97
88

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20160609

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFF SITE
CLIENT I.D. : 9201091415 SHS-9
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 01/09/92
DATE RECEIVED : 01/10/92
DATE EXTRACTED : N/A
DATE ANALYZED : 01/13/92
UNITS : UG/L
DILUTION FACTOR : 10

COMPOUNDS	RESULTS
BENZENE	<5.0
BROMODICHLOROMETHANE	<2.0
BROMOFORM	<2.0
BROMOMETHANE	<2.0
CARBON TETRACHLORIDE	<2.0
CHLOROBENZENE	<5.0
CHLOROETHANE	<2.0
CHLOROFORM	<2.0
CHLOROMETHANE	<2.0
DIBROMOCHLOROMETHANE	<2.0
2-CHLOROETHYL VINYL ETHER	<5.0
1,3-DICHLOROBENZENE	<5.0
1,2 & 1,4-DICHLOROBENZENE	<5.0
DICHLORODIFLUOROMETHANE	<2.0
1,1-DICHLOROETHANE	<2.0
1,2-DICHLOROETHANE	<2.0
1,1-DICHLOROETHENE	<2.0
1,2-DICHLOROETHENE (TOTAL)	<2.0
1,2-DICHLOROPROPANE	<2.0
CIS-1,3-DICHLOROPROPENE	<2.0
TRANS-1,3-DICHLOROPROPENE	<2.0
ETHYLBENZENE	<5.0
METHYLENE CHLORIDE	160
1,1,2,2-TETRACHLOROETHANE	<2.0
TETRACHLOROETHENE	<2.0
TOLUENE	<5.0
1,1,1-TRICHLOROETHANE	<2.0
1,1,2-TRICHLOROETHANE	<2.0
TRICHLOROETHENE	<2.0
TRICHLOROFLUOROMETHANE	<5.0
VINYL CHLORIDE	<2.0
TOTAL XYLENES	<5.0
TRICHLOROTRIFLUOROETHANE	<20.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	103
BROMOFLUOROBENZENE (%)	100

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20156101

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
 PROJECT # : 9834
 PROJECT NAME : REF. REMED.
 CLIENT I.D. : 9201071432 RW-3 (GAR-29)
 SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 01/07/92
 DATE RECEIVED : 01/08/92
 DATE EXTRACTED : N/A
 DATE ANALYZED : 01/08/92
 UNITS : UG/L
 DILUTION FACTOR : 5

COMPOUNDS	RESULTS
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BENZENE	27
BROMODICHLOROMETHANE	<1.0
BROMOFORM	<1.0
BROMOMETHANE	<1.0
CARBON TETRACHLORIDE	<1.0
CHLOROBENZENE	<2.5
CHLOROETHANE	<1.0
CHLOROFORM	<1.0
CHLOROMETHANE	<1.0
DIBROMOCHLOROMETHANE	<1.0
2-CHLOROETHYL VINYL ETHER	<2.5
1,3-DICHLOROBENZENE	<2.5
1,2 & 1,4-DICHLOROBENZENE	<2.5
DICHLORODIFLUOROMETHANE	<1.0
1,1-DICHLOROETHANE	<1.0
1,2-DICHLOROETHANE	<1.0
1,1-DICHLOROETHENE	<1.0
1,2-DICHLOROETHENE (TOTAL)	<1.0
1,2-DICHLOROPROPANE	<1.0
CIS-1,3-DICHLOROPROPENE	<1.0
TRANS-1,3-DICHLOROPROPENE	<1.0
ETHYLBENZENE	17
METHYLENE CHLORIDE	<10.0
1,1,2,2-TETRACHLOROETHANE	<1.0
TETRACHLOROETHENE	<1.0
TOLUENE	<2.5
1,1,1-TRICHLOROETHANE	<1.0
1,1,2-TRICHLOROETHANE	<1.0
TRICHLOROETHENE	<1.0
TRICHLOROFLUOROMETHANE	<2.5
VINYL CHLORIDE	<1.0
TOTAL XYLENES	4
TRICHLOROTRIFLUOROETHANE	<10.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	95
BROMOFLUOROBENZENE (%)	98



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20156102

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REF. REMED.
CLIENT I.D. : 9201071437 RW-4 (GDR-42)
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 01/07/92
DATE RECEIVED : 01/08/92
DATE EXTRACTED : N/A
DATE ANALYZED : 01/08/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS

RESULTS

BENZENE	22
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	0.4
1,2-DICHLOROETHANE	0.9
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	1.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	2.3
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	0.3
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	0.4
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	1.3
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	95
BROMOFLUOROBENZENE (%)	109



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20156103

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REF. REMED.
CLIENT I.D. : 9201071441 RW-6
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 01/07/92
DATE RECEIVED : 01/08/92
DATE EXTRACTED : N/A
DATE ANALYZED : 01/08/92
UNITS : UG/L
DILUTION FACTOR : 1

(602-44)

COMPOUNDS

RESULTS

BENZENE	20
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	0.6
1,2-DICHLOROETHANE	1.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	2.1
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	1.6
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	0.5
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	0.5
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	91
BROMOFLUOROBENZENE (%)	98



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20156104

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REF. REMED.
CLIENT I.D. : 9201071459 RW-13 (6BR-14)
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 01/07/92
DATE RECEIVED : 01/08/92
DATE EXTRACTED : N/A
DATE ANALYZED : 01/08/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
BENZENE	2.4
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	6.6
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	0.6
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	90
BROMOFLUOROBENZENE (%)	90



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20156101

TEST : POLYNUCLEAR AROMATICS (EPA 8310)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REF. REMED.
CLIENT I.D. : 9201071432 RW-3
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 01/07/92
DATE RECEIVED : 01/08/92
DATE EXTRACTED : 01/09/92
DATE ANALYZED : 01/13/92
UNITS : UG/L
DILUTION FACTOR : 20

COMPOUNDS	RESULTS
NAPHTHALENE	<6.0
ACENAPHTHYLENE	<6.0
ACENAPHTHENE	<10
FLUORENE	6.2
PHENANTHRENE	13
ANTHRACENE	<0.20
FLUORANTHENE	<0.60
PYRENE	<0.80
BENZO(A)ANTHRACENE	<0.20
CHRYSENE	<0.40
BENZO(B)FLUORANTHENE	<0.20
BENZO(K)FLUORANTHENE	<0.20
BENZO(A)PYRENE	<0.20
DIBENZ(a,h)ANTHRACENE	<2.0
BENZO(g,h,i)PERYLENE	<0.80
INDENO(1,2,3-CD)PYRENE	<0.60

SURROGATE PERCENT RECOVERIES

2-CHLOROANTHRACENE (%)	96
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GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20156102

TEST : POLYNUCLEAR AROMATICS (EPA 8310)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REF. REMED.
CLIENT I.D. : 9201071437 RW-4
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 01/07/92
DATE RECEIVED : 01/08/92
DATE EXTRACTED : 01/09/92
DATE ANALYZED : 01/13/92
UNITS : UG/L
DILUTION FACTOR : 10

COMPOUNDS RESULTS

NAPHTHALENE	<3.0
ACENAPHTHYLENE	<3.0
ACENAPHTHENE	<5.0
FLUORENE	6.1
PHENANTHRENE	<0.30
ANTHRACENE	<0.10
FLUORANTHENE	<0.30
PYRENE	<0.40
BENZO(A)ANTHRACENE	<0.10
CHRYSENE	<0.20
BENZO(B)FLUORANTHENE	<0.10
BENZO(K)FLUORANTHENE	<0.10
BENZO(A)PYRENE	<0.10
DIBENZ(a,h)ANTHRACENE	<1.0
BENZO(g,h,i)PERYLENE	<0.40
INDENO(1,2,3-CD)PYRENE	<0.30

SURROGATE PERCENT RECOVERIES

2-CHLOROANTHRACENE (%)	96
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GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20156103

TEST : POLYNUCLEAR AROMATICS (EPA 8310)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REF. REMED.
CLIENT I.D. : 9201071441 RW-6
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 01/07/92
DATE RECEIVED : 01/08/92
DATE EXTRACTED : 01/09/92
DATE ANALYZED : 01/10/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
NAPHTHALENE	<0.30
ACENAPHTHYLENE	<0.30
ACENAPHTHENE	<0.50
FLUORENE	0.76
PHENANTHRENE	<0.03
ANTHRACENE	<0.01
FLUORANTHENE	<0.03
PYRENE	<0.04
BENZO(A)ANTHRACENE	<0.01
CHRYSENE	<0.02
BENZO(B)FLUORANTHENE	<0.01
BENZO(K)FLUORANTHENE	<0.01
BENZO(A)PYRENE	<0.01
DIBENZ(a,h)ANTHRACENE	<0.10
BENZO(g,h,i)PERYLENE	<0.04
INDENO(1,2,3-CD)PYRENE	<0.03

SURROGATE PERCENT RECOVERIES

2-CHLOROANTHRACENE (%) 77



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20156104

TEST : POLYNUCLEAR AROMATICS (EPA 8310)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REF. REMED.
CLIENT I.D. : 9201071459 RW-13
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 01/07/92
DATE RECEIVED : 01/08/92
DATE EXTRACTED : 01/09/92
DATE ANALYZED : 01/10/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
NAPHTHALENE	<0.30
ACENAPHTHYLENE	<0.30
ACENAPHTHENE	<0.50
FLUORENE	<0.04
PHENANTHRENE	<0.03
ANTHRACENE	<0.01
FLUORANTHENE	<0.03
PYRENE	<0.04
BENZO(A)ANTHRACENE	<0.01
CHRYSENE	<0.02
BENZO(B)FLUORANTHENE	<0.01
BENZO(K)FLUORANTHENE	<0.01
BENZO(A)PYRENE	<0.01
DIBENZ(a,h)ANTHRACENE	<0.10
BENZO(g,h,i)PERYLENE	<0.04
INDENO(1,2,3-CD)PYRENE	<0.03

SURROGATE PERCENT RECOVERIES

2-CHLOROANTHRACENE (%) 88

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20160703

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT	: GIANT REFINING, FARMINGTON	DATE SAMPLED	: 01/09/92
PROJECT #	: 9834	DATE RECEIVED	: 01/10/92
PROJECT NAME	: REFINERY REM	DATE EXTRACTED	: N/A
CLIENT I.D.	: 9201091456 STRIPPER INFLUENT	DATE ANALYZED	: 01/13/92
SAMPLE MATRIX	: AQUEOUS	UNITS	: UG/L
		DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
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BENZENE	11
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	0.8
1,2-DICHLOROETHANE	0.7
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	2.8
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	1.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	98
BROMOFLUOROBENZENE (%)	80

CLIENT: Giant Refinery
ID: 1048
SITE: Tank 27
LAB NO: F8043

DATE REPORTED: 02/03/92
DATE RECEIVED: 01/27/92
DATE COLLECTED: 01/27/92

Lab pH (s.u.).....	7.92
Lab Conductivity, umhos/cm @ 25C....	4560
Lab Resistivity, ohm-m.....	2.19
Total Dissolved Solids (180C), mg/L.	3530
Total Dissolved Solids (calc), mg/L.	3420
Total Alkalinity as CaCO ₃ , mg/L.....	239
Total Hardness as CaCO ₃ , mg/L.....	1270
Sodium Adsorption Ratio.....	8.60

	mg/L	meq/L
Bicarbonate as HCO ₃	292	4.79
Carbonate as CO ₃	0	0
Chloride.....	785	22.1
Sulfate.....	1300	27.2
Calcium.....	427	21.3
Magnesium.....	49.9	4.11
Potassium.....	2.60	0.07
Sodium.....	705	30.7
Major Cations.....		56.1
Major Anions.....		54.1
Cation/Anion Difference.....		1.87 %


Mary Stepp
Lab Director


Wanda Orso
Water Lab Supervisor



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20158501

TEST : POLYNUCLEAR AROMATICS (EPA 8310)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFF-SITE
CLIENT I.D. : 9201081030 GBR-17
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 01/08/92
DATE RECEIVED : 01/09/92
DATE EXTRACTED : 01/10/92
DATE ANALYZED : 01/14/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS

RESULTS

NAPHTHALENE	<0.30
ACENAPHTHYLENE	<0.30
ACENAPHTHENE	<0.50
FLUORENE	<0.04
PHENANTHRENE	<0.03
ANTHRACENE	<0.01
FLUORANTHENE	<0.03
PYRENE	<0.04
BENZO(A)ANTHRACENE	<0.01
CHRYSENE	<0.02
BENZO(B)FLUORANTHENE	<0.01
BENZO(K)FLUORANTHENE	<0.01
BENZO(A)PYRENE	<0.01
DIBENZ(a,h)ANTHRACENE	<0.10
BENZO(g,h,i)PERYLENE	<0.04
INDENO(1,2,3-CD)PYRENE	<0.03
1-METHYLNAPHTHALENE	<0.30
2-METHYLNAPHTHALENE	<0.30

SURROGATE PERCENT RECOVERIES

2-CHLOROANTHRACENE (%)

60



GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20158502

TEST : POLYNUCLEAR AROMATICS (EPA 8310)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFF-SITE
CLIENT I.D. : 9201081140 GBR-31
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 01/08/92
DATE RECEIVED : 01/09/92
DATE EXTRACTED : 01/10/92
DATE ANALYZED : 01/14/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
NAPHTHALENE	<0.30
ACENAPHTHYLENE	<0.30
ACENAPHTHENE	<0.50
FLUORENE	<0.04
PHENANTHRENE	<0.03
ANTHRACENE	<0.01
FLUORANTHENE	<0.03
PYRENE	<0.04
BENZO(A)ANTHRACENE	<0.01
CHRYSENE	<0.02
BENZO(B)FLUORANTHENE	<0.01
BENZO(K)FLUORANTHENE	<0.01
BENZO(A)PYRENE	<0.01
DIBENZ(a,h)ANTHRACENE	<0.10
BENZO(g,h,i)PERYLENE	<0.04
INDENO(1,2,3-CD)PYRENE	<0.03
1-METHYLNAPHTHALENE	<0.30
2-METHYLNAPHTHALENE	<0.30

SURROGATE PERCENT RECOVERIES

2-CHLOROANTHRACENE (%) 64



GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20158503

TEST : POLYNUCLEAR AROMATICS (EPA 8310)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFF-SITE
CLIENT I.D. : 9201081255 STRIPPER EFFLUENT
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 01/08/92
DATE RECEIVED : 01/09/92
DATE EXTRACTED : 01/10/92
DATE ANALYZED : 01/14/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
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NAPHTHALENE	<0.30
ACENAPHTHYLENE	<0.30
ACENAPHTHENE	<0.50
FLUORENE	<0.04
PHENANTHRENE	<0.03
ANTHRACENE	<0.01
FLUORANTHENE	<0.03
PYRENE	0.05
BENZO(A)ANTHRACENE	<0.01
CHRYSENE	<0.02
BENZO(B)FLUORANTHENE	<0.01
BENZO(K)FLUORANTHENE	<0.01
BENZO(A)PYRENE	<0.01
DIBENZ(a,h)ANTHRACENE	<0.10
BENZO(g,h,i)PERYLENE	<0.04
INDENO(1,2,3-CD)PYRENE	<0.03
1-METHYLNAPHTHALENE	<0.30
2-METHYLNAPHTHALENE	<0.30

SURROGATE PERCENT RECOVERIES

2-CHLOROANTHRACENE (%)

73



GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20158504

TEST : POLYNUCLEAR AROMATICS (EPA 8310)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFF-SITE
CLIENT I.D. : 9201081330 GBR-15
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 01/08/92
DATE RECEIVED : 01/09/92
DATE EXTRACTED : 01/10/92
DATE ANALYZED : 01/17/92
UNITS : UG/L
DILUTION FACTOR : 10

COMPOUNDS

RESULTS

NAPHTHALENE	<3.0
ACENAPHTHYLENE	<3.0
ACENAPHTHENE	1.3
FLUORENE	5.0
PHENANTHRENE	<0.30
ANTHRACENE	<0.10
FLUORANTHENE	<0.30
PYRENE	<0.40
BENZO(A)ANTHRACENE	<0.10
CHRYSENE	<0.20
BENZO(B)FLUORANTHENE	<0.10
BENZO(K)FLUORANTHENE	<0.10
BENZO(A)PYRENE	<0.10
DIBENZ(a,h)ANTHRACENE	<1.0
BENZO(g,h,i)PERYLENE	<0.40
INDENO(1,2,3-CD)PYRENE	<0.30
1-METHYLNAPHTHALENE	<3.0
2-METHYLNAPHTHALENE	<3.0

SURROGATE PERCENT RECOVERIES

2-CHLOROANTHRACENE (%)

82



GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20158505

TEST : POLYNUCLEAR AROMATICS (EPA 8310)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFF-SITE
CLIENT I.D. : 9201081350 GBR-30
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 01/08/92
DATE RECEIVED : 01/09/92
DATE EXTRACTED : 01/10/92
DATE ANALYZED : 01/14/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS

RESULTS

NAPHTHALENE	<0.30
ACENAPHTHYLENE	<0.30
ACENAPHTHENE	<0.50
FLUORENE	<0.04
PHENANTHRENE	0.04
ANTHRACENE	<0.01
FLUORANTHENE	<0.03
PYRENE	<0.04
BENZO(A)ANTHRACENE	<0.01
CHRYSENE	<0.02
BENZO(B)FLUORANTHENE	<0.01
BENZO(K)FLUORANTHENE	<0.01
BENZO(A)PYRENE	<0.01
DIBENZ(a,h)ANTHRACENE	<0.10
BENZO(g,h,i)PERYLENE	<0.04
INDENO(1,2,3-CD)PYRENE	<0.03
1-METHYLNAPHTHALENE	<0.30
2-METHYLNAPHTHALENE	<0.30

SURROGATE PERCENT RECOVERIES

2-CHLOROANTHRACENE (%)

72



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GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20158506

TEST : POLYNUCLEAR AROMATICS (EPA 8310)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9002-67
PROJECT NAME : OFF-SITE
CLIENT I.D. : 9201081445 GBR-24D
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 01/08/92
DATE RECEIVED : 01/09/92
DATE EXTRACTED : 01/10/92
DATE ANALYZED : 01/14/92
UNITS : UG/L
DILUTION FACTOR : 10

COMPOUNDS

RESULTS

NAPHTHALENE	<3.0
ACENAPHTHYLENE	<3.0
ACENAPHTHENE	<5.0
FLUORENE	3.7
PHENANTHRENE	0.80
ANTHRACENE	<0.10
FLUORANTHENE	<0.30
PYRENE	<0.40
BENZO(A)ANTHRACENE	<0.10
CHRYSENE	<0.20
BENZO(B)FLUORANTHENE	<0.10
BENZO(K)FLUORANTHENE	<0.10
BENZO(A)PYRENE	<0.10
DIBENZ(a,h)ANTHRACENE	<1.0
BENZO(g,h,i)PERYLENE	<0.40
INDENO(1,2,3-CD)PYRENE	<0.30
1-METHYLNAPHTHALENE	<3.0
2-METHYLNAPHTHALENE	<3.0

SURROGATE PERCENT RECOVERIES

2-CHLOROANTHRACENE (%)

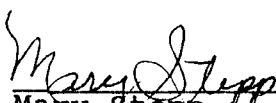
85

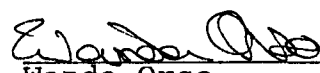
CLIENT: Giant Refinery
ID: 0905
SITE: SHS-3
LAB NO: F7878

DATE REPORTED: 01/21/92
DATE RECEIVED: 01/09/92
DATE COLLECTED: 01/09/92

Lab pH (s.u.).....	7.34
Lab Conductivity, umhos/cm @ 25C....	4140
Lab Resistivity, ohm-m.....	2.42
Total Dissolved Solids (180C), mg/L.	3870
Total Dissolved Solids (calc), mg/L.	3760
Total Alkalinity as CaCO ₃ , mg/L.....	239
Total Hardness as CaCO ₃ , mg/L.....	1760
Sodium Adsorption Ratio.....	5.01

	mg/L	meq/L
Bicarbonate as HCO ₃	292	4.79
Carbonate as CO ₃	0	0
Chloride.....	298	8.40
Sulfate.....	2150	44.7
Calcium.....	638	31.9
Magnesium.....	40.7	3.35
Potassium.....	11.4	0.29
Sodium.....	483	21.0
Major Cations.....		56.5
Major Anions.....		57.9
Cation/Anion Difference.....		1.20 %


Mary Stepp
Lab Director

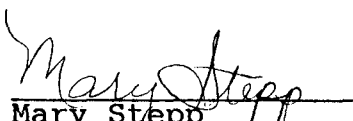

Wanda Orso
Water Lab Supervisor

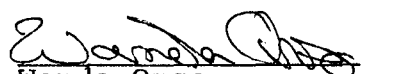
CLIENT: Giant Refinery
ID: 1000
SITE: SHS-6
LAB NO: F7879

DATE REPORTED: 01/21/92
DATE RECEIVED: 01/09/92
DATE COLLECTED: 01/09/92

Lab pH (s.u.).....	7.65
Lab Conductivity, umhos/cm @ 25C....	2990
Lab Resistivity, ohm-m.....	3.34
Total Dissolved Solids (180C), mg/L.	2460
Total Dissolved Solids (calc), mg/L.	2470
Total Alkalinity as CaCO ₃ , mg/L.....	268
Total Hardness as CaCO ₃ , mg/L.....	1230
Sodium Adsorption Ratio.....	4.03

	mg/L	meq/L
Bicarbonate as HCO ₃	328	5.37
Carbonate as CO ₃	0	0
Chloride.....	141	3.99
Sulfate.....	1380	28.7
Calcium.....	411	20.5
Magnesium.....	48.9	4.02
Potassium.....	3.42	0.09
Sodium.....	324	14.1
Major Cations.....		38.7
Major Anions.....		38.1
Cation/Anion Difference.....		0.82 %


Mary Stepp
Lab Director

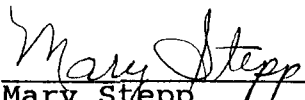

Wanda Orso
Water Lab Supervisor

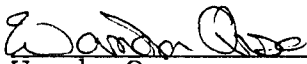
CLIENT: Giant Refinery
ID: 1107
SITE: SHS-10
LAB NO: F7880

DATE REPORTED: 01/21/92
DATE RECEIVED: 01/09/92
DATE COLLECTED: 01/09/92

Lab pH (s.u.).....	6.85
Lab Conductivity, umhos/cm @ 25C....	2180
Lab Resistivity, ohm-m.....	4.59
Total Dissolved Solids (180C), mg/L.	1640
Total Dissolved Solids (calc), mg/L.	1620
Total Alkalinity as CaCO ₃ , mg/L.....	284
Total Hardness as CaCO ₃ , mg/L.....	600
Sodium Adsorption Ratio.....	5.20

	mg/L	meq/L
Bicarbonate as HCO ₃	346	5.67
Carbonate as CO ₃	0	0
Chloride.....	70.4	1.99
Sulfate.....	858	17.9
Calcium.....	201	10.0
Magnesium.....	23.8	1.96
Potassium.....	7.98	0.20
Sodium.....	293	12.7
Major Cations.....		24.9
Major Anions.....		25.5
Cation/Anion Difference.....		1.17 %


Mary Stepp
Lab Director


Wanda Orso
Water Lab Supervisor

CLIENT: Giant Refinery
ID: 1125
SITE: SHS-12
LAB NO: F7881

DATE REPORTED: 01/21/92
DATE RECEIVED: 01/09/92
DATE COLLECTED: 01/09/92

Lab pH (s.u.).....	7.45
Lab Conductivity, umhos/cm @ 25C....	3690
Lab Resistivity, ohm-m.....	2.71
Total Dissolved Solids (180C), mg/L.	2750
Total Dissolved Solids (calc), mg/L.	2750
Total Alkalinity as CaCO ₃ , mg/L.....	359
Total Hardness as CaCO ₃ , mg/L.....	1070
Sodium Adsorption Ratio.....	6.42

	mg/L	meq/L
Bicarbonate as HCO ₃	438	7.18
Carbonate as CO ₃	0	0
Chloride.....	364	10.3
Sulfate.....	1270	26.5
Calcium.....	383	19.1
Magnesium.....	28.1	2.31
Potassium.....	2.37	0.06
Sodium.....	483	21.0
Major Cations.....		42.5
Major Anions.....		44.0
Cation/Anion Difference.....		1.69 %


Mary Stepp
Lab Director

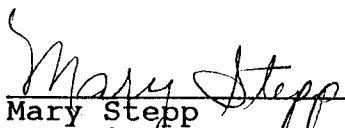

Wanda Orso
Water Lab Supervisor

CLIENT: Giant Refinery
ID: 1217
SITE: SHS-13
LAB NO: F7882

DATE REPORTED: 01/21/92
DATE RECEIVED: 01/09/92
DATE COLLECTED: 01/09/92

Lab pH (s.u.).....	7.46
Lab Conductivity, umhos/cm @ 25C....	4740
Lab Resistivity, ohm-m.....	2.11
Total Dissolved Solids (180C), mg/L.	3860
Total Dissolved Solids (calc), mg/L.	3820
Total Alkalinity as CaCO ₃ , mg/L.....	552
Total Hardness as CaCO ₃ , mg/L.....	1870
Sodium Adsorption Ratio.....	5.27

	mg/L	meq/L
Bicarbonate as HCO ₃	671	11
Carbonate as CO ₃	0	0
Chloride.....	481	13.6
Sulfate.....	1770	36.9
Calcium.....	659	32.9
Magnesium.....	54.4	4.47
Potassium.....	3.24	0.08
Sodium.....	524	22.8
Major Cations.....		60.2
Major Anions.....		61.5
Cation/Anion Difference.....		1.01 %


Mary Stepp
Lab Director

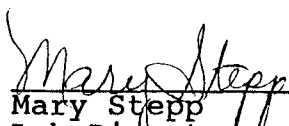

Wanda Orso
Water Lab Supervisor

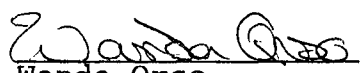
CLIENT: Giant Refinery
ID: 1315
SITE: SHS-15
LAB NO: F7883

DATE REPORTED: 01/21/92
DATE RECEIVED: 01/09/92
DATE COLLECTED: 01/09/92

Lab pH (s.u.)..... 7.64
Lab Conductivity, umhos/cm @ 25C.... 2260
Lab Resistivity, ohm-m..... 4.42
Total Dissolved Solids (180C), mg/L. 1950
Total Dissolved Solids (calc), mg/L. 1950
Total Alkalinity as CaCO₃, mg/L..... 265
Total Hardness as CaCO₃, mg/L..... 1120
Sodium Adsorption Ratio..... 2.13

	mg/L	meq/L
Bicarbonate as HC03.....	323	5.3
Carbonate as C03.....	0	0
Chloride.....	39.3	1.11
Sulfate.....	1150	24.0
Calcium.....	406	20.3
Magnesium.....	25.7	2.12
Potassium.....	2.39	0.06
Sodium.....	164	7.13
Major Cations.....		29.6
Major Anions.....		30.4
Cation/Anion Difference.....		1.43 %


Mary Stepp
Lab Director

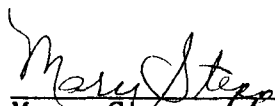

Wanda Orso
Water Lab Supervisor

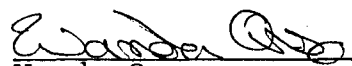
CLIENT: Giant Refinery
ID: 1332
SITE: SHS-16
LAB NO: F7884

DATE REPORTED: 01/21/92
DATE RECEIVED: 01/09/92
DATE COLLECTED: 01/09/92

Lab pH (s.u.).....	7.75
Lab Conductivity, umhos/cm @ 25C....	2660
Lab Resistivity, ohm-m.....	3.76
Total Dissolved Solids (180C), mg/L.	2330
Total Dissolved Solids (calc), mg/L.	2330
Total Alkalinity as CaCO ₃ , mg/L.....	280
Total Hardness as CaCO ₃ , mg/L.....	1310
Sodium Adsorption Ratio.....	2.64

	mg/L	meq/L
Bicarbonate as HC0 ₃	342	5.6
Carbonate as C0 ₃	0	0
Chloride.....	44.5	1.26
Sulfate.....	1400	29.1
Calcium.....	458	22.8
Magnesium.....	41	3.37
Potassium.....	2.50	0.06
Sodium.....	220	9.57
Major Cations.....		35.8
Major Anions.....		36.0
Cation/Anion Difference.....		0.2 %


Mary Stepp
Lab Director

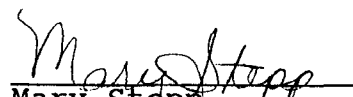

Wanda Orso
Water Lab Supervisor

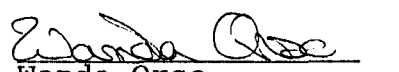
CLIENT: Giant Refinery
ID: 1405
SITE: SHS-14
LAB NO: F7885

DATE REPORTED: 01/21/92
DATE RECEIVED: 01/09/92
DATE COLLECTED: 01/09/92

Lab pH (s.u.).....	7.61
Lab Conductivity, umhos/cm @ 25C....	2300
Lab Resistivity, ohm-m.....	4.35
Total Dissolved Solids (180C), mg/L.	1960
Total Dissolved Solids (calc), mg/L.	1950
Total Alkalinity as CaCO ₃ , mg/L.....	290
Total Hardness as CaCO ₃ , mg/L.....	1110
Sodium Adsorption Ratio.....	2.59

	mg/L	meq/L
Bicarbonate as HCO ₃	354	5.8
Carbonate as CO ₃	0	0
Chloride.....	54.9	1.55
Sulfate.....	1090	22.8
Calcium.....	395	19.7
Magnesium.....	29.6	2.43
Potassium.....	2.10	0.05
Sodium.....	198	8.61
Major Cations.....		30.8
Major Anions.....		30.1
Cation/Anion Difference.....		1.11 %


Mary Stepp
Lab Director

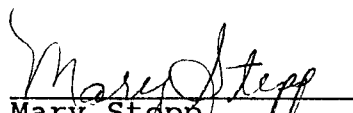

Wanda Orso
Water Lab Supervisor

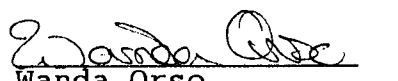
CLIENT: Giant Refinery
ID: 1415
SITE: SHS-9
LAB NO: F7886

DATE REPORTED: 01/21/92
DATE RECEIVED: 01/09/92
DATE COLLECTED: 01/09/92

Lab pH (s.u.).....	7.57
Lab Conductivity, umhos/cm @ 25C....	3400
Lab Resistivity, ohm-m.....	2.94
Total Dissolved Solids (180C), mg/L.	2070
Total Dissolved Solids (calc), mg/L.	2050
Total Alkalinity as CaCO ₃ , mg/L.....	1130
Total Hardness as CaCO ₃ , mg/L.....	559
Sodium Adsorption Ratio.....	11.3

	mg/L	meq/L
Bicarbonate as HCO ₃	1380	22.6
Carbonate as CO ₃	0	0
Chloride.....	376	10.6
Sulfate.....	158	3.29
Calcium.....	209	10.5
Magnesium.....	8.92	0.73
Potassium.....	1.00	0.03
Sodium.....	614	26.7
Major Cations.....		37.9
Major Anions.....		36.5
Cation/Anion Difference.....		1.86 %


Mary Stepp
Lab Director

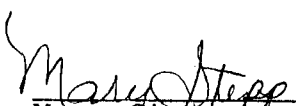

Wanda Orso
Water Lab Supervisor

CLIENT: Giant Refinery
ID: 1550
SITE: Off Site Stream
LAB NO: F7887

DATE REPORTED: 01/21/92
DATE RECEIVED: 01/09/92
DATE COLLECTED: 01/09/92

Lab pH (s.u.).....	7.90
Lab Conductivity, umhos/cm @ 25C....	2300
Lab Resistivity, ohm-m.....	4.35
Total Dissolved Solids (180C), mg/L.	1980
Total Dissolved Solids (calc), mg/L.	1910
Total Alkalinity as CaCO ₃ , mg/L.....	288
Total Hardness as CaCO ₃ , mg/L.....	1120
Sodium Adsorption Ratio.....	2.24

	mg/L	meq/L
Bicarbonate as HCO ₃	352	5.77
Carbonate as CO ₃	0	0
Chloride.....	35.7	1.01
Sulfate.....	1100	22.9
Calcium.....	397	19.8
Magnesium.....	32.3	2.66
Potassium.....	2.15	0.06
Sodium.....	173	7.53
Major Cations.....		30.1
Major Anions.....		29.7
Cation/Anion Difference.....		0.61 %


Mary Stepp
Lab Director

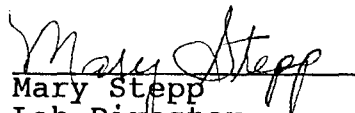

Wanda Orso
Water Lab Supervisor

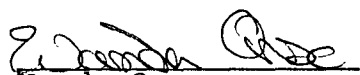
CLIENT: Giant Refinery
ID: Lab Split
SITE: SHS-16
LAB NO: F7889

DATE REPORTED: 01/21/92
DATE RECEIVED: 01/09/92
DATE COLLECTED: 01/09/92

Lab pH (s.u.).....	7.91
Lab Conductivity, umhos/cm @ 25C....	2590
Lab Resistivity, ohm-m.....	3.86
Total Dissolved Solids (180C), mg/L.	2330
Total Dissolved Solids (calc), mg/L.	2320
Total Alkalinity as CaCO ₃ , mg/L.....	284
Total Hardness as CaCO ₃ , mg/L.....	1350
Sodium Adsorption Ratio.....	2.61

	mg/L	meq/L
Bicarbonate as HCO ₃	347	5.69
Carbonate as CO ₃	0	0
Chloride.....	43.5	1.23
Sulfate.....	1360	28.3
Calcium.....	496	24.8
Magnesium.....	26.6	2.19
Potassium.....	2.50	0.06
Sodium.....	220	9.57
Major Cations.....		36.6
Major Anions.....		35.2
Cation/Anion Difference.....		1.86 %


Mary Stepp
Lab Director


Wanda Orso
Water Lab Supervisor

CLIENT: Giant Refinery
ID: 1030
SITE: GBR-17
LAB NO: F7888

DATE REPORTED: 01/21/92
DATE RECEIVED: 01/09/92
DATE COLLECTED: 01/09/92

Lab pH (s.u.).....	7.88
Lab Conductivity, umhos/cm @ 25C....	2540
Lab Resistivity, ohm-m.....	3.94
Total Dissolved Solids (180C), mg/L.	2170
Total Dissolved Solids (calc), mg/L.	2180
Total Alkalinity as CaCO ₃ , mg/L.....	232
Total Hardness as CaCO ₃ , mg/L.....	1020
Sodium Adsorption Ratio.....	4.19

	mg/L	meq/L
Bicarbonate as HCO ₃	283	4.64
Carbonate as CO ₃	0	0
Chloride.....	65.2	1.84
Sulfate.....	1260	26.3
Calcium.....	396	19.8
Magnesium.....	6.38	0.52
Potassium.....	0.49	0.01
Sodium.....	307	13.4
Major Cations.....		33.7
Major Anions.....		32.8
Cation/Anion Difference.....		1.38 %


Mary Stepp
Lab Director

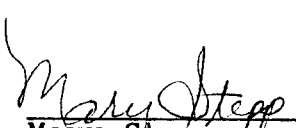

Wanda Orso
Water Lab Supervisor

CLIENT: Giant Refinery
ID: 1459
SITE: RW-13
LAB NO: F7861

DATE REPORTED: 01/20/92
DATE RECEIVED: 01/07/92
DATE COLLECTED: 01/07/92

Lab pH (s.u.).....	7.52
Lab Conductivity, umhos/cm @ 25C....	4200
Lab Resistivity, ohm-m.....	2.38
Total Dissolved Solids (180C), mg/L.	3360
Total Dissolved Solids (calc), mg/L.	3230
Total Alkalinity as CaCO ₃ , mg/L.....	111
Total Hardness as CaCO ₃ , mg/L.....	1170
Sodium Adsorption Ratio.....	7.78

	mg/L	meq/L
Bicarbonate as HCO ₃	135	2.22
Carbonate as CO ₃	0	0
Chloride.....	494	13.9
Sulfate.....	1600	33.3
Calcium.....	444	22.1
Magnesium.....	14.8	1.22
Potassium.....	4.60	0.12
Sodium.....	611	26.6
Major Cations.....		50.1
Major Anions.....		49.5
Cation/Anion Difference.....		0.56 %


Mary Stepp
Lab Director

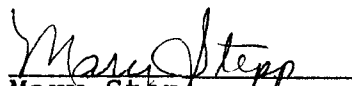

Wanda Orso
Water Lab Supervisor

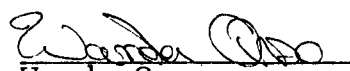
CLIENT: Giant Refinery
ID: 1432
SITE: RW-3
LAB NO: F7858

DATE REPORTED: 01/20/92
DATE RECEIVED: 01/07/92
DATE COLLECTED: 01/07/92

Lab pH (s.u.)..... 7.68
Lab Conductivity, umhos/cm @ 25C.... 4190
Lab Resistivity, ohm-m..... 2.39
Total Dissolved Solids (180C), mg/L. 3620
Total Dissolved Solids (calc), mg/L. 3570
Total Alkalinity as CaCO₃, mg/L..... 538
Total Hardness as CaCO₃, mg/L..... 1520
Sodium Adsorption Ratio..... 6.27

	mg/L	meq/L
Bicarbonate as HCO ₃	659	10.8
Carbonate as CO ₃	0	0
Chloride.....	316	8.92
Sulfate.....	1780	37.2
Calcium.....	536	26.7
Magnesium.....	45.1	3.71
Potassium.....	4.00	0.10
Sodium.....	562	24.4
Major Cations.....		55.0
Major Anions.....		56.8
Cation/Anion Difference.....		1.67 %


Mary Stepp
Lab Director

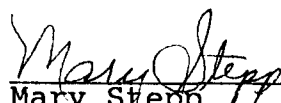

Wanda Orso
Water Lab Supervisor

CLIENT: Giant Refinery
ID: 1437
SITE: RW-4
LAB NO: F7859

DATE REPORTED: 01/20/92
DATE RECEIVED: 01/07/92
DATE COLLECTED: 01/07/92

Lab pH (s.u.)..... 7.56
Lab Conductivity, umhos/cm @ 25C.... 3390
Lab Resistivity, ohm-m..... 2.95
Total Dissolved Solids (180C), mg/L. 2180
Total Dissolved Solids (calc), mg/L. 2180
Total Alkalinity as CaCO₃, mg/L..... 956
Total Hardness as CaCO₃, mg/L..... 759
Sodium Adsorption Ratio..... 8.57

	mg/L	meq/L
Bicarbonate as HCO ₃	1170	19.1
Carbonate as CO ₃	0	0
Chloride.....	503	14.2
Sulfate.....	255	5.32
Calcium.....	303	15.1
Magnesium.....	0.91	0.07
Potassium.....	2.10	0.05
Sodium.....	543	23.6
Major Cations.....		38.8
Major Anions.....		38.6
Cation/Anion Difference.....		0.29 %


Mary Stepp
Lab Director


Wanda Orso
Water Lab Supervisor

CLIENT: Giant Refinery
ID: 1441
SITE: RW-6
LAB NO: F7860

DATE REPORTED: 01/20/92
DATE RECEIVED: 01/07/92
DATE COLLECTED: 01/07/92

Lab pH (s.u.)..... 7.31
Lab Conductivity, umhos/cm @ 25C.... 3660
Lab Resistivity, ohm-m..... 2.73
Total Dissolved Solids (180C), mg/L. 2440
Total Dissolved Solids (calc), mg/L. 2450
Total Alkalinity as CaCO₃, mg/L..... 750
Total Hardness as CaCO₃, mg/L..... 817
Sodium Adsorption Ratio..... 9.00

	mg/L	meq/L
Bicarbonate as HCO ₃	915	15
Carbonate as CO ₃	0	0
Chloride.....	498	14.1
Sulfate.....	592	12.3
Calcium.....	300	14.9
Magnesium.....	16.9	1.39
Potassium.....	2.10	0.05
Sodium.....	591	25.7
Major Cations.....		42.1
Major Anions.....		41.4
Cation/Anion Difference.....		0.86 %


Mary Stepp
Lab Director


Wanda Orso
Water Lab Supervisor

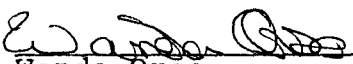
CLIENT: Giant Refinery
ID: 1330
SITE: GBR-15
LAB NO: F7865

DATE REPORTED: 01/20/92
DATE RECEIVED: 01/08/92
DATE COLLECTED: 01/08/92

Lab pH (s.u.).....	7.72
Lab Conductivity, umhos/cm @ 25C....	3780
Lab Resistivity, ohm-m.....	2.65
Total Dissolved Solids (180C), mg/L.	3150
Total Dissolved Solids (calc), mg/L.	3060
Total Alkalinity as CaCO ₃ , mg/L.....	282
Total Hardness as CaCO ₃ , mg/L.....	1020
Sodium Adsorption Ratio.....	8.36

	mg/L	meq/L
Bicarbonate as HCO ₃	344	5.64
Carbonate as CO ₃	0	0
Chloride.....	526	14.8
Sulfate.....	1340	28.0
Calcium.....	387	19.3
Magnesium.....	13.6	1.12
Potassium.....	3.84	0.10
Sodium.....	614	26.7
Major Cations.....		47.2
Major Anions.....		48.5
Cation/Anion Difference.....		1.30 %


Mary Stepp
Lab Director

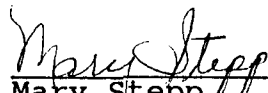

Wanda Orso
Water Lab Supervisor

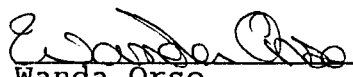
CLIENT: Giant Refinery
ID: 1445
SITE: GBR-24D
LAB NO: F7866

DATE REPORTED: 01/20/92
DATE RECEIVED: 01/08/92
DATE COLLECTED: 01/08/92

Lab pH (s.u.)..... 7.54
Lab Conductivity, umhos/cm @ 25C.... 4480
Lab Resistivity, ohm-m..... 2.23
Total Dissolved Solids (180C), mg/L. 3780
Total Dissolved Solids (calc), mg/L. 3600
Total Alkalinity as CaCO₃, mg/L..... 224
Total Hardness as CaCO₃, mg/L..... 1820
Sodium Adsorption Ratio..... 4.76

	mg/L	meq/L
Bicarbonate as HCO ₃	273	4.48
Carbonate as CO ₃	0	0
Chloride.....	618	17.4
Sulfate.....	1700	35.5
Calcium.....	606	30.2
Magnesium.....	74.1	6.09
Potassium.....	4.67	0.12
Sodium.....	466	20.3
Major Cations.....		56.7
Major Anions.....		57.4
Cation/Anion Difference.....		0.56 %


Mary Stepp
Lab Director


Wanda Orso
Water Lab Supervisor

CLIENT: Giant Refinery
ID: 1350
SITE: GBR-30
LAB NO: F7867

DATE REPORTED: 01/20/92
DATE RECEIVED: 01/08/92
DATE COLLECTED: 01/08/92

Lab pH (s.u.).....	7.26
Lab Conductivity, umhos/cm @ 25C....	3730
Lab Resistivity, ohm-m.....	2.68
Total Dissolved Solids (180C), mg/L.	2910
Total Dissolved Solids (calc), mg/L.	2780
Total Alkalinity as CaCO ₃ , mg/L.....	228
Total Hardness as CaCO ₃ , mg/L.....	1090
Sodium Adsorption Ratio.....	6.44

	mg/L	meq/L
Bicarbonate as HCO ₃	279	4.57
Carbonate as CO ₃	0	0
Chloride.....	515	14.5
Sulfate.....	1220	25.3
Calcium.....	395	19.7
Magnesium.....	24.4	2.01
Potassium.....	2.07	0.05
Sodium.....	488	21.2
Major Cations.....		43.0
Major Anions.....		44.4
Cation/Anion Difference.....		1.62 %


Mary Stepp
Lab Director

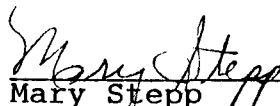

Wanda Orso
Water Lab Supervisor

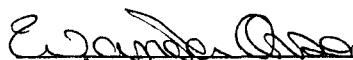
CLIENT: Giant Refinery
ID: 1140
SITE: GBR-31
LAB NO: F7868

DATE REPORTED: 01/20/92
DATE RECEIVED: 01/08/92
DATE COLLECTED: 01/08/92

Lab pH (s.u.).....	7.56
Lab Conductivity, umhos/cm @ 25C....	3590
Lab Resistivity, ohm-m.....	2.79
Total Dissolved Solids (180C), mg/L.	2950
Total Dissolved Solids (calc), mg/L.	2850
Total Alkalinity as CaCO ₃ , mg/L.....	212
Total Hardness as CaCO ₃ , mg/L.....	1060
Sodium Adsorption Ratio.....	6.86

	mg/L	meq/L
Bicarbonate as HCO ₃	258	4.23
Carbonate as CO ₃	0	0
Chloride.....	490	13.8
Sulfate.....	1300	27.1
Calcium.....	393	19.6
Magnesium.....	19.5	1.60
Potassium.....	2.07	0.05
Sodium.....	514	22.4
Major Cations.....		43.6
Major Anions.....		45.2
Cation/Anion Difference.....		1.76 %


Mary Stepp
Lab Director

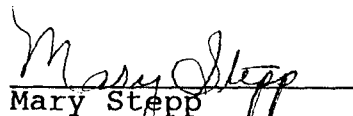

Wanda Orso
Water Lab Supervisor

CLIENT: Giant Refinery
ID: Lab Split
SITE: Stripper Effluent
LAB NO: F7869

DATE REPORTED: 01/20/92
DATE RECEIVED: 01/08/92
DATE COLLECTED: 01/08/92

Lab pH (s.u.).....	7.42
Lab Conductivity, umhos/cm @ 25C....	3630
Lab Resistivity, ohm-m.....	2.75
Total Dissolved Solids (180C), mg/L.	2790
Total Dissolved Solids (calc), mg/L.	2710
Total Alkalinity as CaCO ₃ , mg/L.....	106
Total Hardness as CaCO ₃ , mg/L.....	1010
Sodium Adsorption Ratio.....	6.79

	mg/L	meq/L
Bicarbonate as HCO ₃	129	2.12
Carbonate as CO ₃	0	0
Chloride.....	529	14.9
Sulfate.....	1230	25.6
Calcium.....	360	18.0
Magnesium.....	27.9	2.30
Potassium.....	2.67	0.07
Sodium.....	497	21.6
Major Cations.....		42.0
Major Anions.....		42.7
Cation/Anion Difference.....		0.86 %


Mary Stepp
Lab Director


Wanda Orso
Water Lab Supervisor



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20158301

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REFINERY REM
CLIENT I.D. : 9201081350 GBR-30
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 01/08/92
DATE RECEIVED : 01/09/92
DATE EXTRACTED : N/A
DATE ANALYZED : 01/13/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
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BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	97
BROMOFLUOROBENZENE (%)	99

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20158302

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REFINERY REM
CLIENT I.D. : 9201081330 GBR-15
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 01/08/92
DATE RECEIVED : 01/09/92
DATE EXTRACTED : N/A
DATE ANALYZED : 01/13/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS RESULTS

BENZENE	0.6
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	16
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	2.4
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	100
BROMOFLUOROBENZENE (%)	93



GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20158303

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REFINERY REM
CLIENT I.D. : 9201081030 GBR-17
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 01/08/92
DATE RECEIVED : 01/09/92
DATE EXTRACTED : N/A
DATE ANALYZED : 01/10/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
-----------	---------

BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	91
BROMOFLUOROBENZENE (%)	95



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20158304

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REFINERY REM
CLIENT I.D. : 9201081140 GBR-31
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 01/08/92
DATE RECEIVED : 01/09/92
DATE EXTRACTED : N/A
DATE ANALYZED : 01/10/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
-----------	---------

BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	2.7
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	0.3
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	99
BROMOFLUOROBENZENE (%)	94



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20158305

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REFINERY REM
CLIENT I.D. : 9201081255 STRIPPER EFFLUENT
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 01/08/92
DATE RECEIVED : 01/09/92
DATE EXTRACTED : N/A
DATE ANALYZED : 01/10/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS RESULTS

BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	100
BROMOFLUOROBENZENE (%)	93



GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20158306

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REFINERY REM
CLIENT I.D. : 9201081445 GBR-24D
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 01/08/92
DATE RECEIVED : 01/09/92
DATE EXTRACTED : N/A
DATE ANALYZED : 01/13/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
BENZENE	47
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	14
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	13
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	0.3
TOLUENE	3.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	0.3
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

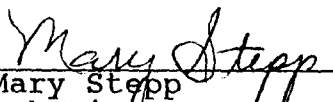
BROMOCHLOROMETHANE (%)	100
BROMOFLUOROBENZENE (%)	95

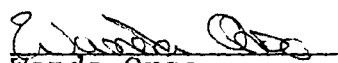
CLIENT: Giant Refinery
ID: 1330
SITE: Stripper Effluent
LAB NO: F8132

DATE REPORTED: 02/20/92
DATE RECEIVED: 02/07/92
DATE COLLECTED: 02/07/92

Lab pH (s.u.).....	7.08
Lab Conductivity, umhos/cm @ 25C....	3620
Lab Resistivity, ohm-m.....	2.76
Total Dissolved Solids (180C), mg/L.	2850
Total Dissolved Solids (calc), mg/L.	2740
Total Alkalinity as CaCO ₃ , mg/L.....	40.7
Total Hardness as CaCO ₃ , mg/L.....	1110
Sodium Adsorption Ratio.....	6.18

	mg/L	meq/L
Bicarbonate as HCO ₃	49.4	0.81
Carbonate as CO ₃	0	0
Chloride.....	551	15.5
Sulfate.....	1260	26.3
Calcium.....	395	19.7
Magnesium.....	31.2	2.57
Potassium.....	2.51	0.06
Sodium.....	474	20.6
Major Cations.....		42.9
Major Anions.....		42.7
Cation/Anion Difference.....		0.30 %


Mary Stepp
Lab Director


Wanda Orso
Water Lab Supervisor

CLIENT: Giant Refinery
ID: 1340
SITE: RW-13
LAB NO: F8133

DATE REPORTED: 02/20/92
DATE RECEIVED: 02/07/92
DATE COLLECTED: 02/07/92

Lab Conductivity, umhos/cm @ 25C.... 4160


Mary Stepp
Lab Director

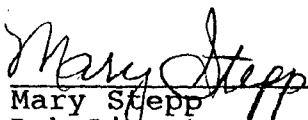

Wanda Orso
Water Lab Supervisor

CLIENT: Giant Refinery
ID: 0915
SITE: Stripper Influent
LAB NO: F8146

DATE REPORTED: 02/20/92
DATE RECEIVED: 02/10/92
DATE COLLECTED: 02/10/92

Lab pH (s.u.).....	7.02
Lab Conductivity, umhos/cm @ 25C....	3560
Lab Resistivity, ohm-m.....	2.81
Total Dissolved Solids (180C), mg/L.	2700
Total Dissolved Solids (calc), mg/L.	2700
Total Alkalinity as CaCO ₃ , mg/L.....	301
Total Hardness as CaCO ₃ , mg/L.....	1110
Sodium Adsorption Ratio.....	6.22

	mg/L	meq/L
Bicarbonate as HCO ₃	367	6.01
Carbonate as CO ₃	0	0
Chloride.....	379	10.7
Sulfate.....	1240	25.9
Calcium.....	385	19.2
Magnesium.....	37.3	3.07
Potassium.....	2.48	0.06
Sodium.....	477	20.7
Major Cations.....		43.1
Major Anions.....		42.6
Cation/Anion Difference.....		0.30 %


Mary Stepp
Lab Director


Wanda Orso
Water Lab Supervisor



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20265401

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REFINE REMED
CLIENT I.D. : 920210915 STRIPPER INFLUENT
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 02/10/92
DATE RECEIVED : 02/11/92
DATE EXTRACTED : N/A
DATE ANALYZED : 02/12/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
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BENZENE	11
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	0.8
1,2-DICHLOROETHANE	0.6
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	2.8
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	0.6
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	1.7
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	94
BROMOFLUOROBENZENE (%)	88



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20263101

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REF. REMED.
CLIENT I.D. : 9202071330 STRIPPER EFFLUENT
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 02/07/92
DATE RECEIVED : 02/08/92
DATE EXTRACTED : N/A
DATE ANALYZED : 02/11/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	<0.2
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	<0.2
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

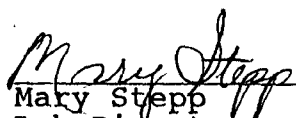
BROMOCHLOROMETHANE (%)	83
BROMOFLUOROBENZENE (%)	90

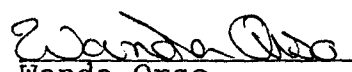
CLIENT: Giant Refinery
ID: 9203130808
SITE: Stripper Effluent
LAB NO: F8429

DATE REPORTED: 03/24/92
DATE RECEIVED: 03/13/92
DATE COLLECTED: 03/13/92

Lab pH (s.u.)..... 7.48
Lab Conductivity, umhos/cm @ 25C.... 3290
Lab Resistivity, ohm-m..... 3.04
Total Dissolved Solids (180C), mg/L. 2760
Total Dissolved Solids (calc), mg/L. 2720
Total Alkalinity as CaCO₃, mg/L..... 136
Total Hardness as CaCO₃, mg/L..... 1070
Sodium Adsorption Ratio..... 6.39

	mg/L	meq/L
Bicarbonate as HCO ₃	166	2.72
Carbonate as CO ₃	0	0
Chloride.....	516	14.6
Sulfate.....	1230	25.7
Calcium.....	371	18.5
Magnesium.....	34.9	2.87
Potassium.....	4.85	0.12
Sodium.....	480	20.9
Major Cations.....		42.4
Major Anions.....		42.9
Cation/Anion Difference.....		0.66 %


Mary Stepp
Lab Director


Wanda Orso
Water Lab Supervisor



GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20354401

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT	: GIANT REFINING, FARMINGTON	DATE SAMPLED	: 03/04/92
PROJECT #	: 9834	DATE RECEIVED	: 03/05/92
PROJECT NAME	: REF.REMED.	DATE EXTRACTED	: N/A
CLIENT I.D.	: 9203041429 - STRIPPER INFLUENT	DATE ANALYZED	: 03/05/92
SAMPLE MATRIX	: AQUEOUS	UNITS	: UG/L
		DILUTION FACTOR	: 1

COMPOUNDS	RESULTS
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BENZENE	9.8
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	1.0
1,2-DICHLOROETHANE	0.6
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	2.9
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	1.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	2.2
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	97
BROMOFLUOROBENZENE (%)	89



Analytical Technologies, Inc.

GAS CHROMATOGRAPHY - RESULTS

ATI I.D. : 20369501

TEST : VOLATILE HALOCARBONS/AROMATICS (EPA 601/602)

CLIENT : GIANT REFINING, FARMINGTON
PROJECT # : 9834
PROJECT NAME : REFINERY REM
CLIENT I.D. : 920313808 STRIPPER EFFLUENT
SAMPLE MATRIX : AQUEOUS

DATE SAMPLED : 03/13/92
DATE RECEIVED : 03/14/92
DATE EXTRACTED : N/A
DATE ANALYZED : 03/17/92
UNITS : UG/L
DILUTION FACTOR : 1

COMPOUNDS	RESULTS
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BENZENE	<0.5
BROMODICHLOROMETHANE	<0.2
BROMOFORM	<0.2
BROMOMETHANE	<0.2
CARBON TETRACHLORIDE	<0.2
CHLOROBENZENE	<0.5
CHLOROETHANE	<0.2
CHLOROFORM	<0.2
CHLOROMETHANE	<0.2
DIBROMOCHLOROMETHANE	<0.2
2-CHLOROETHYL VINYL ETHER	<0.5
1,3-DICHLOROBENZENE	<0.5
1,2 & 1,4-DICHLOROBENZENE	<0.5
DICHLORODIFLUOROMETHANE	<0.2
1,1-DICHLOROETHANE	<0.2
1,2-DICHLOROETHANE	0.3
1,1-DICHLOROETHENE	<0.2
1,2-DICHLOROETHENE (TOTAL)	0.3
1,2-DICHLOROPROPANE	<0.2
CIS-1,3-DICHLOROPROPENE	<0.2
TRANS-1,3-DICHLOROPROPENE	<0.2
ETHYLBENZENE	<0.5
METHYLENE CHLORIDE	<2.0
1,1,2,2-TETRACHLOROETHANE	<0.2
TETRACHLOROETHENE	<0.2
TOLUENE	<0.5
1,1,1-TRICHLOROETHANE	<0.2
1,1,2-TRICHLOROETHANE	<0.2
TRICHLOROETHENE	<0.2
TRICHLOROFLUOROMETHANE	<0.5
VINYL CHLORIDE	<0.2
TOTAL XYLENES	<0.5
TRICHLOROTRIFLUOROETHANE	<2.0

SURROGATE PERCENT RECOVERIES

BROMOCHLOROMETHANE (%)	94
BROMOFLUOROBENZENE (%)	100

CLIENT: Giant Refinery
ID: 9203041429
SITE: Stripper Influent
LAB NO: F8278

DATE REPORTED: 03/19/92
DATE RECEIVED: 03/04/92
DATE COLLECTED: 03/04/92

Lab pH (s.u.).....	6.98
Lab Conductivity, umhos/cm @ 25C....	3500
Lab Resistivity, ohm-m.....	2.86
Total Dissolved Solids (180C), mg/L.	2750 *
Total Dissolved Solids (calc), mg/L.	2780
Total Alkalinity as CaCO ₃ , mg/L.....	251
Total Hardness as CaCO ₃ , mg/L.....	1060
Sodium Adsorption Ratio.....	7.00

	mg/L	meq/L
Bicarbonate as HCO ₃	306	5.01
Carbonate as CO ₃	0	0
Chloride.....	388	10.9
Sulfate.....	1320	27.5
Calcium.....	368	18.4
Magnesium.....	33.6	2.76
Potassium.....	2.64	0.07
Sodium.....	523	22.7
Major Cations.....		43.9
Major Anions.....		43.4
Cation/Anion Difference.....		0.60 %

* Sample reanalyzed with no significant change.

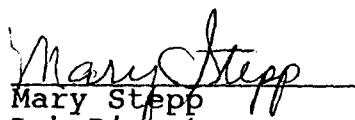

Mary Stepp
Lab Director


Wanda Orso
Water Lab Supervisor

CLIENT: Giant Refinery
ID: 9203041445
SITE: RW-13
LAB NO: F8279

DATE REPORTED: 03/19/92
DATE RECEIVED: 03/04/92
DATE COLLECTED: 03/04/92

Lab Conductivity, umhos/cm @ 25C.... 4060


Mary Stepp
Lab Director


Wanda Orso
Water Lab Supervisor