

GW - 40

MONITORING REPORTS

DATE:

1993



P.O. Box 256
Farmington, New Mexico
87499

505
632-3306

February 1, 1994

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 fourth quarter of 1993.

Please contact me if you have any questions.

Sincerely,

A handwritten signature in black ink that reads "Tim Kinney". The signature is fluid and cursive, with a long horizontal stroke at the end.

Tim Kinney
Remediation Project Manager

/dm

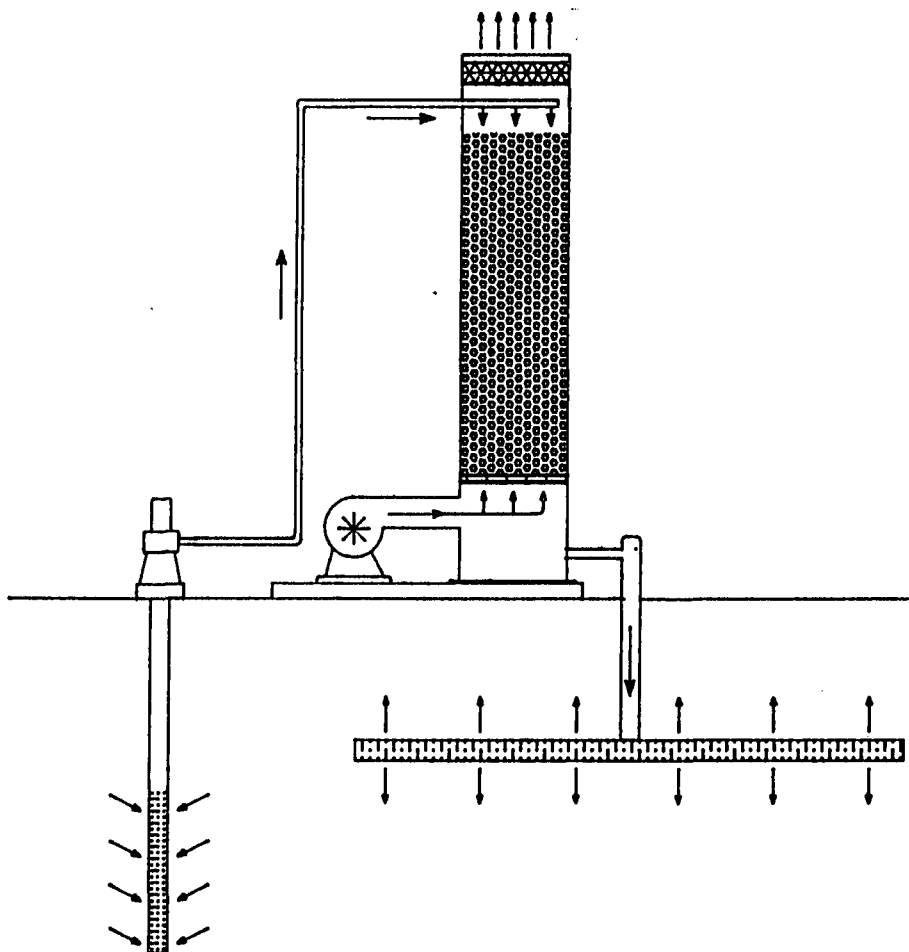
Enclosure

ccw/enc: Carl Shook-Giant
Kim Bullerdick-Giant
Debbie Smith-Giant
Stephanie Odell-BLM
Dale Doremus-EID
Chris Shuey-SWRIC
Valda Terauds-GCL
Jim Durrett-SJC
Herbert Gorrod-EPA
Denny Foust-OCD

GIANT

REFINING CO.

BLOOMFIELD REFINERY REMEDIATION PROJECT



Post Office Box 256
606 E. Highway 64
Farmington, New Mexico 87401

(505) 632-3306
FAX (505) 632-2487

QUARTERLY DATA REPORT
GIANT BLOOMFIELD REFINERY
FOURTH QUARTER, 1993

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 QUARTERLY REPORT FOURTH QUARTER, 1993

INTRODUCTION

Installation of the carbon filter system was completed in the fourth quarter. All water is currently carbon filtered prior to discharge.

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 6

Section 6 contains a summary of the quarterly analytical results for the Bioremediation Project. Raw data, as received from the laboratory, is available on request as a supplement to the quarterly report.

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, 1993

STRIPPER INFLUENT

	October	November	December
GENERAL WATER CHEMISTRY			
Lab pH (s.u.)	7.10	6.10	7.10
Lab conductivity, umhos/cm	3500.00	3620.00	3420.00
Total dissolved solids (180)	2620.00	2650.00	2560.00
Total dissolved solids (calc)	2100.00	2110.00	2460.00
Total alkalinity as CaCO ₃	337.00	112.00	306.00
Total hardness as CaCO ₃	999.00	1020.00	1000.00
Bicarbonate as HCO ₃	412.00	137.00	373.00
Carbonate as CO ₃	0.00	0.00	0.00
Hydroxide as OH	0.00	0.00	0.00
Chloride	357.00	516.00	350.00
Sulfate	1160.00	1140.00	1130.00
Calcium	341.00	346.00	319.00
Magnesium	36.00	37.00	51.00
Potassium	5.10	2.70	2.40
Sodium	3.00	1.60	433.00
Total Iron			0.93
Total Manganese			1.84
Dissolved Iron			0.58
Dissolved Manganese			1.78

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	ND	ND
1,2-Dichloroethane	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND
1,2-Dichloroethene	ND	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND
cis-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

STRIPPER INFLUENT (Continued)

	October	November	December
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	3.40	3.90	2.80
Chlorobenzene	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND
Ethylbenzene	4.90	11.00	57.00
Toluene	7.70	23.00	ND
Xylenes	ND	ND	110.00
Trichlorotrifluoroethane	ND	ND	ND

STRIPPER EFFLUENT

	October	November	December
GENERAL WATER CHEMISTRY			
Lab pH (s.u.)	6.20	5.70	7.10
Lab conductivity, umhos/cm	3580.00	3770.00	3610.00
Total dissolved solids (180)	2590.00	2630.00	2690.00
Total dissolved solids (calc)	2040.00	2560.00	2550.00
Total alkalinity as CaCO3	136.00	78.00	233.00
Total hardness as CaCO3	950.00	1010.00	1060.00
Bicarbonate as HCO3	166.00	95.00	284.00
Carbonate as CO3	0.00	0.00	0.00
Hydroxide as OH	0.00	0.00	0.00
Chloride	518.00	536.00	393.00
Sulfate	1080.00	1140.00	1190.00
Calcium	303.00	338.00	314.00
Magnesium	47.00	40.00	69.00
Potassium	7.80	2.70	4.00
Sodium	4.60	455.00	446.00
Total Iron			0.65
Total Manganese			1.64
Dissolved Iron			0.50
Dissolved Manganese			1.77

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	ND	ND
1,2-Dichloroethane	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND
1,2-Dichloroethene	ND	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND
cis-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

STRIPPER EFFLUENT (Continued)

	October	November	December
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	ND	2.20	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	18.00	ND
Toluene	ND	ND	ND
Xylenes	ND	36.00	ND
Trichlorotrifluoroethane	ND	ND	ND

FILTER DISCHARGE

	October	November	December
GENERAL WATER CHEMISTRY			
Lab pH (s.u.)	3.90		7.50
Lab conductivity, umhos/cm	3830.00		3610.00
Total dissolved solids (180)	2680.00		2800.00
Total dissolved solids (calc)	2570.00		2560.00
Total alkalinity as CaCO3	41.00		233.00
Total hardness as CaCO3	1000.00		1040.00
Bicarbonate as HCO3	0.00		284.00
Carbonate as CO3	0.00		0.00
Hydroxide as OH	0.00		0.00
Chloride	640.00		393.00
Sulfate	1100.00		1200.00
Calcium	310.00		316.00
Magnesium	44.00		61.00
Potassium	8.20		3.90
Sodium	466.00		453.00
Total Iron			ND
Total Manganese			1.73
Dissolved Iron			ND
Dissolved Manganese			1.65

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-Dichlor 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

FILTER DISCHARGE (Continued)

	October	November	December
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

PAH			
Naphthalene	ND	ND	ND
Acenaphthylene	ND	ND	ND
Acenaphthene	ND	ND	ND
Fluorene	ND	ND	ND
Phenanthrene	ND	ND	ND
Anthracene	ND	ND	ND
Fluoranthene	ND	ND	ND
Pyrene	ND	ND	ND
Benzo(A)Anthracene	ND	ND	ND
Chrysene	ND	ND	ND
Benzo(B)Fluoranthene	ND	ND	ND
Benzo(K)Fluoranthene	ND	ND	ND
Benzo(A)Pyrene	ND	ND	ND
Dibenzo(a,h)Anthracene	ND	ND	ND
Benzo(g,h,i)Perylene	ND	ND	ND
Indeno(1,2,3-CD)Pyrene	ND	ND	ND
1-Methylnaphthalene	ND	ND	ND
2-Methylnaphthalene	ND	ND	ND

TANK 102 DISCHARGE

	October	November	December
GENERAL WATER CHEMISTRY			
Lab pH (s.u.)			7.70
Lab conductivity, umhos/cm			3520.00
Total dissolved solids (180)			2660.00
Total dissolved solids (calc)			2530.00
Total alkalinity as CaCO ₃			341.00
Total hardness as CaCO ₃			1050.00
Bicarbonate as HCO ₃			415.00
Carbonate as CO ₃			0.00
Hydroxide as OH			0.00
Chloride			308.00
Sulfate			1160.00
Calcium			312.00
Magnesium			66.00
Potassium			4.10
Sodium			468.00
Total Iron			0.84
Total Manganese			1.77
Dissolved Iron			0.48
Dissolved Manganese			1.77

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.20
Lab conductivity, umhos/cm	2760.00
Total dissolved solids (180)	2260.00
Total dissolved solids (calc)	2230.00
Total alkalinity as CaCO ₃	218.00
Total hardness as CaCO ₃	998.00
Bicarbonate as HCO ₃	267.00
Carbonate as CO ₃	0.00
Hydroxide as OH	0.00
Chloride	67.00
Sulfate	1330.00
Calcium	303.00
Magnesium	58.00
Potassium	0.90
Sodium	338.00

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	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

GBR-17 (Continued)

	October	November	December
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

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.10
Lab conductivity, umhos/cm	5240.00
Total dissolved solids (180)	4120.00
Total dissolved solids (calc)	4050.00
Total alkalinity as CaCO ₃	352.00
Total hardness as CaCO ₃	1540.00
Bicarbonate as HCO ₃	429.00
Carbonate as CO ₃	0.00
Hydroxide as OH	0.00
Chloride	571.00
Sulfate	1980.00
Calcium	453.00
Magnesium	99.00
Potassium	3.80
Sodium	740.00

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	0.40
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	1.80
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	11.00
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	5.90
Trichlorofluoromethane	ND
Vinyl chloride	ND

GBR-32 (Continued)

	October	November	December
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

*(D)10=Diluted 10X

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.20
Lab conductivity, umhos/cm	5740.00
Total dissolved solids (180)	4550.00
Total dissolved solids (calc)	4460.00
Total alkalinity as CaCO ₃	272.00
Total hardness as CaCO ₃	1670.00
Bicarbonate as HCO ₃	332.00
Carbonate as CO ₃	0.00
Hydroxide as OH	0.00
Chloride	699.00
Sulfate	2110.00
Calcium	507.00
Magnesium	99.00
Potassium	4.40
Sodium	869.00

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	0.40
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	0.60
1,2-Dichloroethane	ND
1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	48.00
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	4.00
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	2.30
Trichlorofluoromethane	ND
Vinyl chloride	ND

GBR-48 (Continued)

OCTOBER NOVEMBER

DECEMBER

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

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.20
Lab conductivity, umhos/cm	4570.00
Total dissolved solids (180)	3600.00
Total dissolved solids (calc)	3580.00
Total alkalinity as CaCO ₃	352.00
Total hardness as CaCO ₃	1350.00
Bicarbonate as HCO ₃	429.00
Carbonate as CO ₃	0.00
Hydroxide as OH	0.00
Chloride	409.00
Sulfate	1800.00
Calcium	393.00
Magnesium	90.00
Potassium	3.80
Sodium	672.00

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	0.20
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	1.60
1,2-Dichloroethane	ND
1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	94 (D) 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	7.40
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	3.90
Trichlorofluoromethane	ND
Vinyl chloride	ND

GBR-49 (Continued)

	October	November	December
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

(D)10=Diluted 10X

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.30
Lab conductivity, umhos/cm	3120.00
Total dissolved solids (180)	2630.00
Total dissolved solids (calc)	2580.00
Total alkalinity as CaCO ₃	216.00
Total hardness as CaCO ₃	1080.00
Bicarbonate as HCO ₃	263.00
Carbonate as CO ₃	0.00
Hydroxide as OH	0.00
Chloride	43.00
Sulfate	1630.00
Calcium	318.00
Magnesium	70.00
Potassium	2.50
Sodium	395.00

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	ND
1,2-Dichloroethane	ND
1,2-Dichloroethene	ND
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	0.30
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

GBR-50 (Continued)

	October	November	December
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

OFFSITE WELLS

SHS-3

October

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

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

October

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

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

October

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

AROMATICS

Benzene	ND
Chlorobenzene	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
Ethylbenzene	9.00
Toluene	ND
Xylenes	ND
Trichlorotrifluoroethane	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
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

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

October

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	3.30
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

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

October

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	3.90
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

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

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

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

October

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

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

GIANT REFINING BLOOMFIELD REFINERY
QUARTERLY POTENTIOMETRIC SURFACE

OCTOBER, 1993

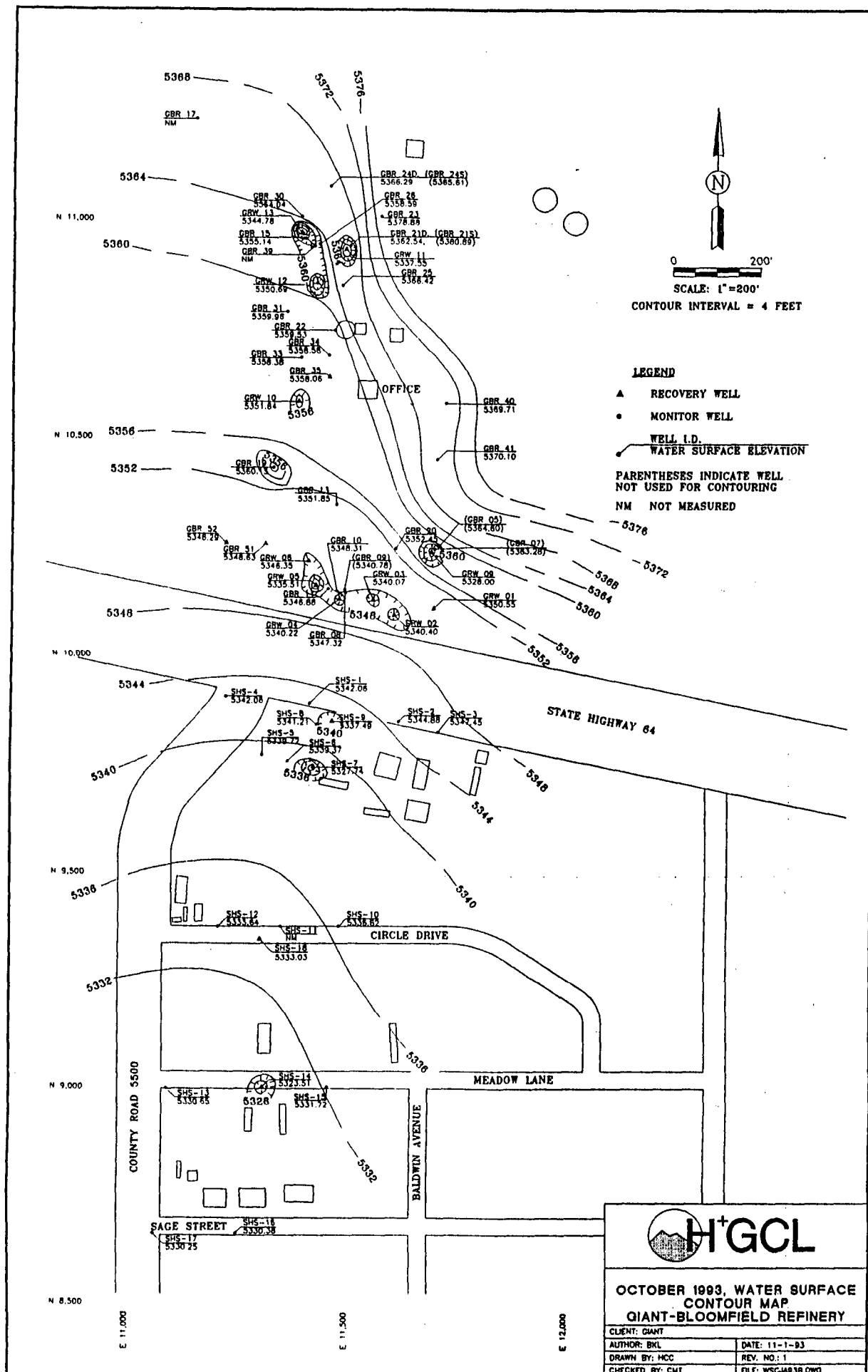
WELL #	WELLHEAD ELEVATION IN FEET	DEPTH TO WATER IN FEET	DEPTH TO PRODUCT IN FEET	PRODUCT THICKNESS IN FEET	ADJUSTED WSEL* IN FEET
GRW-1	5394.30	43.75	43.75	0.00	5350.55
GRW-2	5391.28	50.88	50.88	0.00	5340.40
GRW-3	5388.77	48.70	48.70	0.00	5340.07
GRW-4	5390.02	49.80	49.80	0.00	5340.22
GRW-5	5390.56	55.05	55.05	0.00	5335.51
GRW-6	5390.81	44.46	44.46	0.00	5346.35
GRW-10	5395.02	44.85	42.76	2.09	5351.84
GRW-11	5397.85	60.30	60.30	0.00	5337.55
GRW-12	5397.24	46.55	46.55	0.00	5350.69
GRW-13	5396.90	52.12	52.12	0.00	5344.78
GBR-5	5395.07	31.55	30.20	1.35	5364.60
GBR-6	5395.70	67.70	67.70	0.00	5328.00
GBR-7	5395.85	33.08	32.44	0.64	5363.28
GBR-8	5390.50	44.30	42.90	1.40	5347.32
GBR-9	5389.92	49.14	49.14	0.00	5340.78
GBR-10	5390.57	42.26	42.26	0.00	5348.31
GBR-11	5389.43	43.55	42.30	1.25	5346.88
GBR-13	5393.04	41.19	41.19	0.00	5351.85
GBR-15	5397.99	42.85	42.85	0.00	5355.14
GBR-18	5421.68	29.45	29.45	0.00	5392.23
GBR-19	5393.83	33.70	33.70	0.00	5360.13
GBR-20	5393.47	43.08	40.50	2.58	5352.45
GBR-21S	5400.65	19.77	19.76	0.01	5380.89
GBR-21D	5400.19	37.65	37.65	0.00	5362.54
GBR-22	5395.91	36.86	36.26	0.60	5359.53
GBR-23	5403.72	22.06	22.06	0.00	5378.88
GBR-24S	5396.08	24.85	24.84	0.01	5365.61
GBR-24D	5396.77	30.48	30.48	0.00	5366.29
GBR-25	5396.72	30.30	30.30	0.00	5366.42
GBR-26	5395.59	37.00	37.00	0.00	5358.59
GBR-30	5396.58	32.54	32.54	0.00	5364.04
GBR-31	5394.86	34.90	34.90	0.00	5359.96
GBR-33	5396.28	37.90	37.90	0.00	5358.38
GBR-34	5394.00	36.10	35.25	0.85	5358.58
GBR-35	5393.66	36.50	35.38	1.12	5358.06
GBR-39	5397.55	0.00	0.00	0.00	5397.55
GBR-40	5400.76	31.05	31.05	0.00	5369.71
GBR-41	5396.35	26.25	26.25	0.00	5370.10
GBR-51	5389.68	41.05	41.05	0.00	5348.63
GBR-52	5387.74	39.45	39.45	0.00	5348.29

* WSEL - WATER SURFACE ELEVATION ADJUSTED FOR PRODUCT DEPTH

GIANT REFINING BLOOMFIELD REFINERY
 QUARTERLY POTENTIOMETRIC SURFACE
 OCTOBER, 1993
 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	41.58	41.45	0.13	5342.06
SHS-2	5381.66	36.78	36.78	0.00	5344.88
SHS-3	5383.33	35.88	35.88	0.00	5347.45
SHS-4	5383.62	41.54	41.54	0.00	5342.08
SHS-5	5378.36	38.64	38.64	0.00	5339.72
SHS-6	5378.17	38.80	38.80	0.00	5339.37
SHS-7	5375.89	48.15	48.15	0.00	5327.74
SHS-8	5380.25	39.04	39.04	0.00	5341.21
SHS-9	5380.79	43.30	43.30	0.00	5337.49
SHS-10	5373.80	37.18	37.18	0.00	5336.62
SHS-12	5373.94	40.30	40.30	0.00	5333.64
SHS-13	5367.81	37.16	37.16	0.00	5330.65
SHS-14	5367.07	44.02	43.44	0.58	5323.51
SHS-15	5366.21	34.49	34.49	0.00	5331.72
SHS-16	5362.58	32.20	32.20	0.00	5330.38
SHS-17	5364.35	34.10	34.10	0.00	5330.25
SHS-18	5373.64	40.61	40.61	0.00	5333.03

* WSEL - WATER SURFACE ELEVATION ADJUSTED FOR PRODUCT DEPTH



Giant Refining Co. Bloomfield Refinery
Quarterly Net Tank
Volume Change

Fourth Quarter, 1993

Tank Number	Beginning Volume	Ending Volume	Net Change
102	10,847	15,777	4,930
106	8,010	8,010	0
21	149,042	61,370	-87,672
22	223,317	250,887	27,570
Total Net Volume Change			-55,172

Giant Refining Co. Bloomfield Refinery
Quarterly Recovery Well
Volume Tabulation

Fourth Quarter, 1993

Well	Month #1	Month #2	Month #3	Total
GRW-1	7,590	7,020	4,890	19,500
GRW-2	12,230	11,730	18,720	42,680
GRW-3	6,190	6,160	9,690	22,040
GRW-4	7,180	150	7,700	15,030
GRW-5	49,430	38,360	24,870	112,660
GRW-6	25,770	23,500	27,140	76,410
GRW-9	7,580	5,490	10,710	23,780
GRW-10	148,750	114,600	329,850	593,200
GRW-11	36,800	39,020	28,960	104,780
GRW-12	17,690	13,430	11,930	43,050
GRW-13	28,110	22,840	25,710	76,660
SHS-7	101	82	247	430
SHS-9	13,787	11,257	15,501	40,545
SHS-14	127,637	120,577	165,193	413,407
SHS-18	8,029	5,554	9,406	22,989
Total Volume Pumped In Gallons				1,607,161

Giant Refining Co. Bloomfield Refinery
Total Volume Summary

Fourth Quarter, 1993

=====

Total Volume Of Water Recovered	1,607,161
Net Change In Storage Volume	(55,172)

Total Water Pumped To The Infiltration Gallery	1,497,889
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Difference	(54,100)
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Comments: The approximately 3.6% difference
is due to meter inaccuracy.

SECTION 5

SPECIFIC CONDUCTANCE TRACKING

GRW-13

October November

December

Lab Conductivity	4020.00	4200.00
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SECTION 6

BIOREMEDIATION PROJECT

October November December

GBR-20

Lab pH, s.u.	8.30	7.80
Lab conductivity, umhos/cm	2950.00	2820.00
Dissolved Oxygen, mg/l	3.50	8.70
Benzene	22.00	97.90
Toluene	1.00	ND
Ethylbenzene	62.00	194.00
m,p-Xylenes		517.00
o-Xylene		93.40
Total Xylenes	110.00	
Iron	5600.00	9060.00
Manganese	430.00	980.00
Potassium	1200.00	390.00
Total Heterotrophic Bacteria 12/1/93		7.3×10^4
Total Heterotrophic Bacteria 12/16/93		8.3×10^5

GBR-41

Lab pH, s.u.	7.20
Lab conductivity, umhos/cm	3250.00
Dissolved Oxygen, mg/l	2.89
Orthophosphate	20.00
Ammonia	350.00
Nitrate	20.00
Potassium	1170.00
Iron	33800.00
Manganese	740.00
Benzene	232.00
Toluene	11.20
Ethylbenzene	1060.00
m,p-Xylenes	1050.00
o-Xylene	20.70
Total Heterotrophic Bacteria 12/1/93	8.8×10^3
Total Heterotrophic Bacteria 12/16/93	9.0×10^3

GRW-6

October November December

Lab pH, s.u.	7.40
Lab conductivity, umhos/cm	3500.00
Dissolved Oxygen, mg/l	3.15
Orthophosphate	10.00
Ammonia	100.00
Nitrate	120.00
Potassium	3510.00
Iron	810.00
Manganese	1030.00
Benzene	6.27
Toluene	ND
Ethylbenzene	3.15
m,p-Xylenes	2.32
o-Xylene	ND
Total Heterotrophic Bacteria 12/1/93	(2.8×10^5)
Total Heterotrophic Bacteria 12/16/93	(2.1×10^5)

GBR-40

Lab pH, s.u.	7.90
Lab conductivity, umhos/cm	2900.00
Dissolved Oxygen, mg/l	7.25
Orthophosphate	0.01
Ammonia	ND
Nitrate	0.10
Potassium	1.17
Iron	7.42
Manganese	0.63
Benzene	51.10
Toluene	0.70
Ethylbenzene	40.20
m,p-Xylenes	74.70
o-Xylene	ND

INFILTRATION GALLERY

Dissolved Oxygen	7.70
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QUARTERLY DATA REPORT
GIANT BLOOMFIELD REFINERY
THIRD QUARTER, 1993

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 THIRD QUARTER, 1993

INTRODUCTION

Installation of the carbon filter system was initiated in the third quarter. Completion is scheduled for the fourth quarter of 1993.

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
 THIRD QUARTER, 1993

STRIPPER INFLUENT

	7/93	8/93	9/93
GENERAL WATER CHEMISTRY			
Lab pH (s.u.)	7.20	6.50	6.30
Lab conductivity, umhos/cm	3470.00	3650.00	3800.00
Total dissolved solids (180)	2030.00	2590.00	2600.00
Total dissolved solids (calc)	2550.00	2550.00	2530.00
Total alkalinity as CaCO3	431.00	114.00	169.00
Total hardness as CaCO3	926.00	935.00	936.00
Bicarbonate as HCO3	526.00	139.00	206.00
Carbonate as CO3	0.00	0.00	0.00
Hydroxide as OH	0.00	0.00	0.00
Chloride	322.00	537.00	480.00
Sulfate	1110.00	1080.00	1120.00
Calcium	334.00	321.00	310.00
Magnesium	23.00	33.00	40.00
Potassium	2.50	14.00	3.90
Sodium	499.00	498.00	476.00

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	ND	ND
1,2-Dichloroethane	0.60	0.30	ND
1,1-Dichloroethene	ND	ND	ND
1,2-Dichloroethene	ND	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND
cis-1,2-Dichloroethene	1.20	0.80	0.30
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	0.30	ND

STRIPPER INFLUENT (Continued)

	7/93	8/93	9/93
1,1,1-Trichloroethane	0.40	ND	ND
1,1,2-Trichloroethane	ND	ND	ND
Trichloroethene	ND	ND	ND
Trichlorofluoromethane	ND	ND	ND
Vinyl chloride	ND	ND	ND
	ND	ND	ND
AROMATICS	ND	ND	ND
Benzene	9.40	9.20	4.60
Chlorobenzene	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND
Ethylbenzene	1.70	1.70	0.70
Toluene	ND	ND	ND
Xylenes	2.50	1.50	ND
Trichlorotrifluoroethane	ND	ND	ND

STRIPPER EFFLUENT

	7/93	8/93	9/93
GENERAL WATER CHEMISTRY			
Lab pH (s.u.)	7.30	7.30	5.80
Lab conductivity, umhos/cm	3540.00	3560.00	3580.00
Total dissolved solids (180)	2320.00	2560.00	2610.00
Total dissolved solids (calc)	2480.00	2500.00	2550.00
Total alkalinity as CaCO3	188.00	168.00	129.00
Total hardness as CaCO3	922.00	917.00	915.00
Bicarbonate as HCO3	229.00	205.00	158.00
Carbonate as CO3	0.00	0.00	0.00
Hydroxide as OH	0.00	0.00	0.00
Chloride	479.00	494.00	517.00
Sulfate	1050.00	1080.00	1080.00
Calcium	330.00	298.00	306.00
Magnesium	24.00	42.00	37.00
Potassium	2.70	3.00	7.40
Sodium	475.00	482.00	523.00
HALOCARBONS			
Bromodichloromethane	ND	ND	ND
Bromoform	ND	ND	ND
Bromomethane	ND	ND	ND
Carbon tetrachloride	ND	ND	ND
Chloroethane	ND	ND	ND
Chloroethane	ND	ND	ND
2-Chloroethylvinylether	ND	ND	ND
Chloroform	ND	ND	ND
Chloromethane	ND	0.30	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	0.20	ND
1,2-Dichloroethene	ND	0.80	ND
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)

	7/93	8/93	9/93
AROMATICS			
Benzene	ND	0.90	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

GBR-15

7/93

8/93

9/93

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.40
Lab conductivity, umhos/cm	4220.00
Total dissolved solids (180)	3060.00
Total dissolved solids (calc)	2970.00
Total alkalinity as CaCO ₃	375.00
Total hardness as CaCO ₃	1050.00
Bicarbonate as HCO ₃	457.00
Carbonate as CO ₃	0.00
Hydroxide as OH	0.00
Chloride	564.00
Sulfate	1220.00
Calcium	387.00
Magnesium	20.00
Potassium	4.60
Sodium	550.00

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	ND
1,2-Dichloroethane	11.00
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	0.30
1,1,1-Trichloroethane	0.50
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

GBR-15 (Continued)

	7/93	8/93	9/93
AROMATICS			
Benzene	5.60		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	4.40		
Xylenes	ND		
Trichlorotrifluoroethane	ND		

GBR-24D

7/93

8/93

9/93

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.20
Lab conductivity, umhos/cm	4560.00
Total dissolved solids (180)	3530.00
Total dissolved solids (calc)	3400.00
Total alkalinity as CaCO ₃	208.00
Total hardness as CaCO ₃	1640.00
Bicarbonate as HCO ₃	253.00
Carbonate as CO ₃	0.00
Hydroxide as OH	0.00
Chloride	690.00
Sulfate	1460.00
Calcium	540.00
Magnesium	72.00
Potassium	4.60
Sodium	515.00

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	ND
1,2-Dichloroethane	22.00
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	0.40
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

GBR-24D (Continued)

	7/93	8/93	9/93
AROMATICS			
Benzene	6.60		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	4.50		
Toluene	ND		
Xylenes	ND		
Trichlorotrifluoroethane	ND		

GBR-30

7/93

8/93

9/93

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.00
Lab conductivity, umhos/cm	3720.00
Total dissolved solids (180)	2660.00
Total dissolved solids (calc)	2650.00
Total alkalinity as CaCO ₃	226.00
Total hardness as CaCO ₃	996.00
Bicarbonate as HCO ₃	276.00
Carbonate as CO ₃	0.00
Hydroxide as OH	0.00
Chloride	504.00
Sulfate	1120.00
Calcium	362.00
Magnesium	23.00
Potassium	2.80
Sodium	500.00

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	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

GBR-30 (Continued)

	7/93	8/93	9/93
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		

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.30
Lab conductivity, umhos/cm	3510.00
Total dissolved solids (180)	2560.00
Total dissolved solids (calc)	2550.00
Total alkalinity as CaCO ₃	269.00
Total hardness as CaCO ₃	926.00
Bicarbonate as HCO ₃	328.00
Carbonate as CO ₃	0.00
Hydroxide as OH	0.00
Chloride	406.00
Sulfate	1120.00
Calcium	337.00
Magnesium	21.00
Potassium	2.50
Sodium	505.00

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	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

GBR-31 (Continued)

	7/93	8/93	9/93
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		

OFFSITE WELLS

SHS-3

7/93

8/93

9/93

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	6.90
Lab conductivity, umhos/cm	4470.00
Total dissolved solids (180)	3900.00
Total dissolved solids (calc)	3780.00
Total alkalinity as CaCO ₃	210.00
Total hardness as CaCO ₃	1880.00
Bicarbonate as HCO ₃	257.00
Carbonate as CO ₃	0.00
Hydroxide as OH	0.00
Chloride	386.00
Sulfate	2060.00
Calcium	616.00
Magnesium	83.00
Potassium	7.40
Sodium	500.00

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)

	7/93	8/93	9/93
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		

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.40
Lab conductivity, umhos/cm	2880.00
Total dissolved solids (180)	2380.00
Total dissolved solids (calc)	2340.00
Total alkalinity as CaCO ₃	279.00
Total hardness as CaCO ₃	936.00
Bicarbonate as HCO ₃	340.00
Carbonate as CO ₃	0.00
Hydroxide as OH	0.00
Chloride	85.00
Sulfate	1340.00
Calcium	348.00
Magnesium	17.00
Potassium	2.50
Sodium	378.00

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-6 (Continued)

	7/93	8/93	9/93
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

7/93

8/93

9/93

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.10
Lab conductivity, umhos/cm	2350.00
Total dissolved solids (180)	1790.00
Total dissolved solids (calc)	1800.00
Total alkalinity as CaCO ₃	317.00
Total hardness as CaCO ₃	691.00
Bicarbonate as HCO ₃	387.00
Carbonate as CO ₃	0.00
Hydroxide as OH	0.00
Chloride	70.00
Sulfate	951.00
Calcium	227.00
Magnesium	30.00
Potassium	7.80
Sodium	320.00

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	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

SHS-10 (Continued)

ND

7/93

8/93

9/93

AROMATICS

Benzene

0.60

Chlorobenzene

ND

1,2-Dichlorobenzene

ND

1,3-Dichlorobenzene

ND

1,4-Dichlorobenzene

ND

Ethylbenzene

11.00

Toluene

ND

Xylenes

1.30

Trichlorotrifluoroethane

ND

SHS-12

	7/93	8/93	9/93
GENERAL WATER CHEMISTRY			
	7.30		
Lab pH (s.u.)	3670.00		
Lab conductivity, umhos/cm	2510.00		
Total dissolved solids (180)	2710.00		
Total dissolved solids (calc)	1070.00		
Total alkalinity as CaCO ₃	883.00		
Total hardness as CaCO ₃	1310.00		
Bicarbonate as HCO ₃	0.00		
Carbonate as CO ₃	0.00		
Hydroxide as OH	504.00		
Chloride	694.00		
Sulfate	287.00		
Calcium	41.00		
Magnesium	2.00		
Potassium	540.00		
Sodium	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		
1,1-Dichloroethane	ND		
1,2-Dichloroethane	0.20		
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)

7/93

8/93

9/93

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

7/93

8/93

9/93

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.40
Lab conductivity, umhos/cm	3350.00
Total dissolved solids (180)	2070.00
Total dissolved solids (calc)	2040.00
Total alkalinity as CaCO ₃	909.00
Total hardness as CaCO ₃	700.00
Bicarbonate as HCO ₃	1110.00
Carbonate as CO ₃	0.00
Hydroxide as OH	0.00
Chloride	487.00
Sulfate	248.00
Calcium	211.00
Magnesium	42.00
Potassium	1.80
Sodium	507.00

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	2.00
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)

7/93

8/93

9/93

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

7/93

8/93

9/93

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.30
Lab conductivity, umhos/cm	1700.00
Total dissolved solids (180)	1260.00
Total dissolved solids (calc)	1290.00
Total alkalinity as CaCO ₃	260.00
Total hardness as CaCO ₃	677.00
Bicarbonate as HCO ₃	318.00
Carbonate as CO ₃	0.00
Hydroxide as OH	0.00
Chloride	29.00
Sulfate	700.00
Calcium	224.00
Magnesium	29.00
Potassium	2.00
Sodium	146.00

HALOCARBONS

Bromodichloromethane	1.20
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	15.00
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)

7/93

8/93

9/93

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

7/93

8/93

9/93

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.30
Lab conductivity, umhos/cm	2740.00
Total dissolved solids (180)	2490.00
Total dissolved solids (calc)	2310.00
Total alkalinity as CaCO ₃	262.00
Total hardness as CaCO ₃	1270.00
Bicarbonate as HCO ₃	319.00
Carbonate as CO ₃	0.00
Hydroxide as OH	0.00
Chloride	46.00
Sulfate	1400.00
Calcium	437.00
Magnesium	43.00
Potassium	2.40
Sodium	229.00

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)

7/93

8/93

9/93

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

7/93

8/93

9/93

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.40
Lab conductivity, umhos/cm	3380.00
Total dissolved solids (180)	2900.00
Total dissolved solids (calc)	2770.00
Total alkalinity as CaCO ₃	262.00
Total hardness as CaCO ₃	1320.00
Bicarbonate as HCO ₃	320.00
Carbonate as CO ₃	0.00
Hydroxide as OH	0.00
Chloride	114.00
Sulfate	1630.00
Calcium	447.00
Magnesium	51.00
Potassium	3.50
Sodium	363.00

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	0.30
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

SHS-17 (Continued)

	7/93	8/93	9/93
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

GIANT REFINING BLOOMFIELD REFINERY
QUARTERLY POTENTIOMETRIC SURFACE

JULY, 1993

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	58.36	58.36	0.00	5335.94
GRW-2	5391.28	50.84	50.84	0.00	5340.44
GRW-3	5388.77	48.28	48.28	0.00	5340.49
GRW-4	5390.02	49.80	49.80	0.00	5340.22
GRW-5	5390.56	45.40	45.40	0.00	5345.16
GRW-6	5390.81	45.80	45.80	0.00	5345.01
GRW-10	5395.02	54.30	46.92	7.38	5346.62
GRW-11	5397.85	60.05	60.05	0.00	5337.80
GRW-12	5397.24	45.30	45.30	0.00	5351.94
GRW-13	5396.90	53.75	53.75	0.00	5343.15
GBR-5	5395.07	30.80	29.45	1.35	5365.35
GBR-6	5395.70	56.15	56.15	0.00	5339.55
GBR-7	5395.85	32.68	32.04	0.64	5363.68
GBR-8	5390.50	43.63	42.50	1.13	5347.77
GBR-9	5389.92	48.90	48.90	0.00	5341.02
GBR-10	5390.57	42.22	42.22	0.00	5348.35
GBR-11	5389.43	42.05	41.85	0.20	5347.54
GBR-13	5393.04	40.78	40.78	0.00	5352.26
GBR-15	5397.99	43.20	43.20	0.00	5354.79
GBR-18	5421.68	39.17	39.17	0.00	5382.51
GBR-19	5393.83	35.56	35.56	0.00	5358.27
GBR-20	5393.47	42.75	40.14	2.61	5352.81
GBR-21S	5400.65	19.76	19.76	0.00	5380.89
GBR-21D	5400.19	36.02	36.02	0.00	5364.17
GBR-22	5395.91	35.44	35.44	0.00	5360.47
GBR-23	5403.72	22.15	22.15	0.00	5377.77
GBR-24S	5396.08	25.95	25.95	0.00	5364.92
GBR-24D	5396.77	31.16	31.16	0.00	5365.61
GBR-25	5396.72	30.77	30.77	0.00	5365.95
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	35.10	35.10	0.00	5359.76
GBR-33	5396.28	38.00	38.00	0.00	5358.28
GBR-34	5394.00	35.11	35.10	0.01	5358.90
GBR-35	5393.66	35.29	35.30	-0.01	5358.36
GBR-39	5397.55	40.85	40.85	0.00	5356.70
GBR-40	5400.76	30.60	30.60	0.00	5370.16
GBR-41	5396.35	25.56	25.56	0.00	5370.79
GBR-51	5389.68	40.80	40.80	0.00	5348.88
GBR-52	5387.74	39.17	39.17	0.00	5348.57

* WSEL - WATER SURFACE ELEVATION ADJUSTED FOR PRODUCT DEPTH

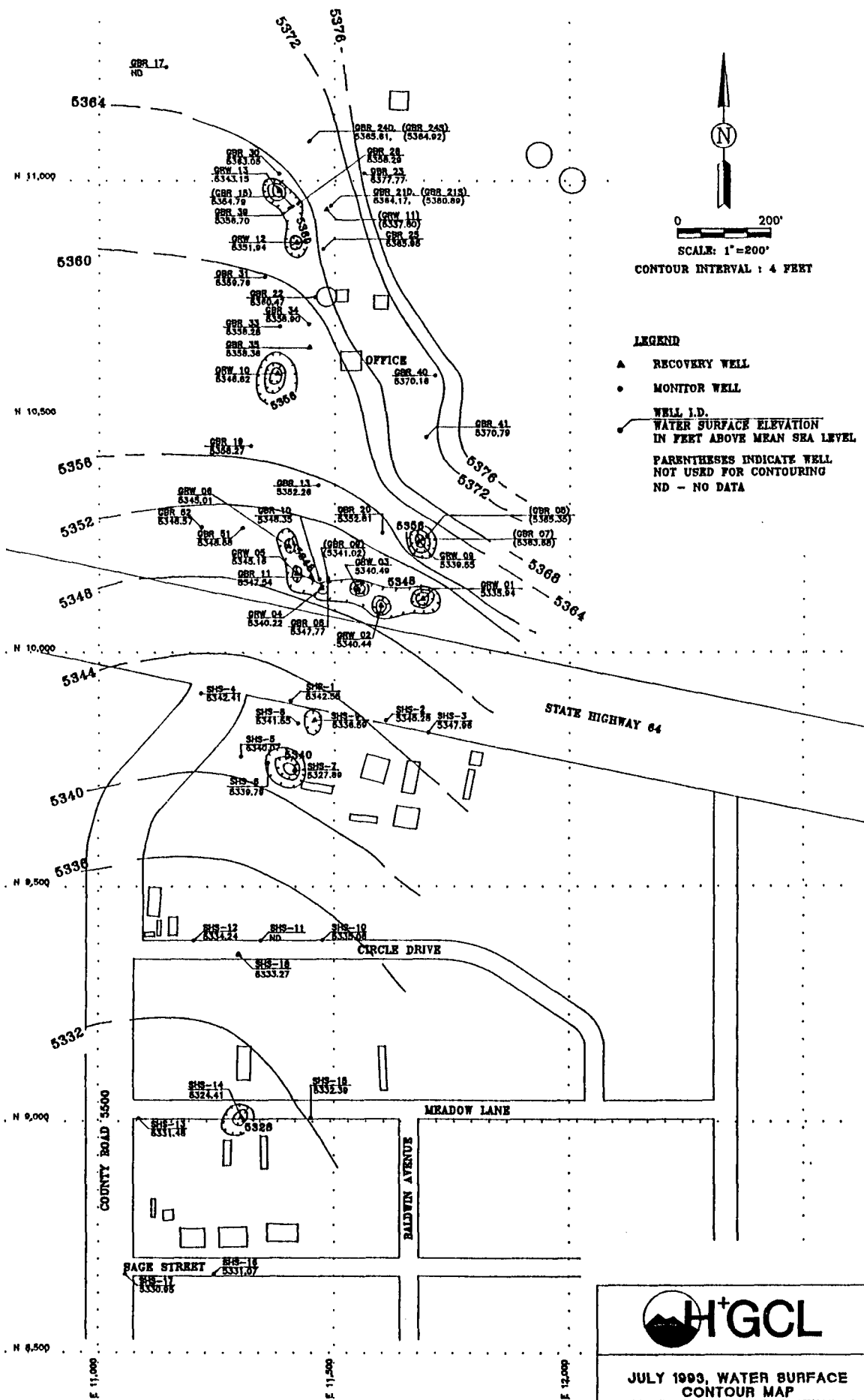
QUARTERLY POTENTIOMETRIC SURFACE

JULY, 1993

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	41.15	40.95	0.20	5342.55
SHS-2	5381.66	36.38	36.38	0.00	5345.28
SHS-3	5383.33	35.37	35.37	0.00	5347.96
SHS-4	5383.62	41.21	41.21	0.00	5342.41
SHS-5	5378.36	38.29	38.29	0.00	5340.07
SHS-6	5378.17	38.38	38.38	0.00	5339.79
SHS-7	5375.89	48.00	48.00	0.00	5327.89
SHS-8	5380.25	38.70	38.70	0.00	5341.55
SHS-9	5380.79	44.20	44.20	0.00	5336.59
SHS-10	5373.80	38.74	38.74	0.00	5335.06
SHS-12	5373.94	39.70	39.70	0.00	5334.24
SHS-13	5367.81	36.33	36.33	0.00	5331.48
SHS-14	5367.07	42.66	42.66	0.00	5324.41
SHS-15	5366.21	33.82	33.82	0.00	5332.39
SHS-16	5362.58	31.51	31.51	0.00	5331.07
SHS-17	5364.35	33.40	33.40	0.00	5330.95
SHS-18	5373.64	40.37	40.37	0.00	5333.27

* WSEL - WATER SURFACE ELEVATION ADJUSTED FOR PRODUCT DEPTH



LEGEND

- ▲ RECOVERY WELL
- MONITOR WELL
- WELL I.D.
- WATER SURFACE ELEVATION IN FEET ABOVE MEAN SEA LEVEL
- PARENTHESES INDICATE WELL NOT USED FOR CONTOURING
- ND - NO DATA



H+GCL

**JULY 1993, WATER SURFACE CONTOUR MAP
GIANT-BLOOMFIELD REFINERY**

CLIENT: GIANT	
AUTHOR: BKL	DATE: 10-21-93
DRAWN BY: HCC	REV. NO.: 1
CHECKED BY: CMT	FILE: WSCJAG93.DWG

Giant Refining Co. Bloomfield Refinery
Quarterly Net Tank
Volume Change

Third Quarter, 1993

Tank Number	Beginning Volume	Ending Volume	Net Change
102	17609	10847	-6762
106	8010	8010	0
21	404752	149042	-255710
22	223317	223317	0
Total Net Volume Change			-262472

Giant Refining Co. Bloomfield Refinery
Quarterly Recovery Well
Volume Tabulation

Third Quarter, 1993

Well	Month #1	Month #2	Month #3	Total
GRW-1	10520	8660	8770	27950
GRW-2	11460	10880	13310	35650
GRW-3	6890	6370	7100	20360
GRW-4	20710	18880	17080	56670
GRW-5	57670	46270	51310	155250
GRW-6	31950	26040	30220	88210
GRW-9	6340	9200	10940	26480
GRW-10	213740	207210	180780	601730
GRW-11	36210	16370	37260	89840
GRW-12	16260	17700	19600	53560
GRW-13	36340	36540	37150	110030
SHS-7	36	58	112	206
SHS-9	15484	14448	16515	46447
SHS-14	112474	89650	114882	317006
SHS-18	19355	7431	3155	29941
Total Volume Pumped In Gallons				1659330

Giant Refining Co. Bloomfield Refinery
Total Volume Summary

Third Quarter, 1993

=====

Total Volume Of Water Recovered	1,659,330
Net Change In Storage Volume	(262,472)
Total Water Pumped To The Infiltration Gallery	1,336,720

=====

Difference	(60,138)
------------	----------

Comments: The approximately 4.5% difference
is due to meter inaccuracy.

SECTION 5

SPECIFIC CONDUCTANCE TRACKING

GRW-13	7/93	8/93	9/93
Lab Conductivity	4040.00	3890.00	4310.00

QUARTERLY DATA REPORT
GIANT BLOOMFIELD REFINERY
SECOND QUARTER, 1993

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, 1993

INTRODUCTION

No changes were made to the operation during the second quarter. There was no significant downtime.

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
SECOND QUARTER, 1993**

STRIPPER INFLUENT

	4/93	5/93	6/93
GENERAL WATER CHEMISTRY			
Lab pH (s.u.)	7.30	6.80	
Lab conductivity, umhos/cm	3420.00	3460.00	
Total dissolved solids (180)	2560.00	2640.00	
Total dissolved solids (calc)	2540.00	2500.00	
Total alkalinity as CaCO ₃	369.00	311.00	
Total hardness as CaCO ₃	951.00	954.00	
Bicarbonate as HCO ₃	450.00	379.00	
Carbonate as CO ₃	0.00	0.00	
Hydroxide as OH	0.00	0.00	
Chloride	334.00	380.00	
Sulfate	1100.00	1110.00	
Calcium	357.00	304.00	
Magnesium	15.00	48.00	
Potassium	2.50	2.60	
Sodium	501.00	464.00	

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	0.30	ND	ND
1,2-Dichloroethane	0.50	ND	ND
1,1-Dichloroethene	ND	ND	ND
1,2-Dichloroethene	ND	ND	0.40
trans-1,2-Dichloroethene	ND	ND	ND
cis-1,2-Dichloroethene	1.50	0.50	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

STRIPPER INFLUENT (Continued)

	4/93	5/93	6/93
1,1,1-Trichloroethane	ND	ND	ND
1,1,2-Trichloroethane	0.30	ND	ND
Trichloroethene	0.20	ND	ND
Trichlorofluoromethane	ND	ND	ND
Vinyl chloride	ND	ND	ND
AROMATICS			
Benzene	16.00	12.00	5.50
Chlorobenzene	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND
Ethylbenzene	5.80	3.90	1.70
Toluene	0.20	ND	ND
Xylenes	6.50	ND	1.80
Trichlorotrifluoroethane	ND	ND	12.00

STRIPPER EFFLUENT

	4/93	5/93	6/93
GENERAL WATER CHEMISTRY			
Lab pH (s.u.)	7.00	7.80	6.70
Lab conductivity, umhos/cm	3490.00	3520.00	3500.00
Total dissolved solids (180)	2570.00	2620.00	2610.00
Total dissolved solids (calc)	2560.00	2500.00	2470.00
Total alkalinity as CaCO3	278.00	244.00	243.00
Total hardness as CaCO3	945.00	954.00	920.00
Bicarbonate as HCO3	339.00	298.00	297.00
Carbonate as CO3	0.00	0.00	0.00
Hydroxide as OH	0.00	0.00	0.00
Chloride	404.00	418.00	445.00
Sulfate	1110.00	1110.00	1070.00
Calcium	351.00	301.00	323.00
Magnesium	17.00	49.00	28.00
Potassium	2.40	2.30	2.40
Sodium	505.00	467.00	448.00

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	0.60
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	0.20	ND	ND
1,2-Dichloroethene	ND	ND	ND
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)

	4/93	5/93	6/93
AROMATICS			
Benzene	ND	3.40	1.80
Chlorobenzene	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND
Ethylbenzene	ND	1.40	1.20
Toluene	ND	ND	ND
Xylenes	ND	3.00	1.80
Trichlorotrifluoroethane	ND	ND	ND

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.40
Lab conductivity, umhos/cm	2630.00
Total dissolved solids (180)	3.80
Total dissolved solids (calc)	2090.00
Total alkalinity as CaCO ₃	239.00
Total hardness as CaCO ₃	950.00
Bicarbonate as HCO ₃	292.00
Carbonate as CO ₃	0.00
Hydroxide as OH	0.00
Chloride	54.00
Sulfate	1250.00
Calcium	346.00
Magnesium	21.00
Potassium	0.40
Sodium	270.00

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	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	0.50
1,1,2-Trichloroethane	ND
Trichloroethene	ND
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

GBR-32

4/93

5/93

6/93

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.20
Lab conductivity, umhos/cm	4980.00
Total dissolved solids (180)	2.01
Total dissolved solids (calc)	3790.00
Total alkalinity as CaCO3	363.00
Total hardness as CaCO3	1350.00
Bicarbonate as HCO3	443.00
Carbonate as CO3	0.00
Hydroxide as OH	0.00
Chloride	480.00
Sulfate	1920.00
Calcium	469.00
Magnesium	45.00
Potassium	4.10
Sodium	654.00

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	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	3.40
1,2-Dichloroethane	ND
1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	99.00
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	9.60
1,1,1-Trichloroethane	0.30
1,1,2-Trichloroethane	ND
Trichloroethene	6.40
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	0.50
Xylenes	ND
Trichlorotrifluoroethane	ND

GBR-48

4/93

5/93

6/93

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.10
Lab conductivity, umhos/cm	5730.00
Total dissolved solids (180)	1.75
Total dissolved solids (calc)	4240.00
Total alkalinity as CaCO ₃	328.00
Total hardness as CaCO ₃	1440.00
Bicarbonate as HCO ₃	400.00
Carbonate as CO ₃	0.00
Hydroxide as OH	0.00
Chloride	671.00
Sulfate	1980.00
Calcium	544.00
Magnesium	21.00
Potassium	5.50
Sodium	818.00

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	0.30
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	40.00
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	3.80
1,1,1-Trichloroethane	0.30
1,1,2-Trichloroethane	ND
Trichloroethene	2.40
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	0.50
Xylenes	ND
Trichlorotrifluoroethane	

GBR-49

4/93

5/93

6/93

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.30
Lab conductivity, umhos/cm	4230.00
Total dissolved solids (180)	2.36
Total dissolved solids (calc)	3260.00
Total alkalinity as CaCO ₃	375.00
Total hardness as CaCO ₃	1150.00
Bicarbonate as HCO ₃	457.00
Carbonate as CO ₃	0.00
Hydroxide as OH	0.00
Chloride	318.00
Sulfate	1680.00
Calcium	410.00
Magnesium	31.00
Potassium	3.70
Sodium	592.00

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	0.30
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	84.00
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	11.00
1,1,1-Trichloroethane	0.30
1,1,2-Trichloroethane	ND
Trichloroethene	6.50
Trichlorofluoromethane	ND
Vinyl chloride	ND

AROMATICS

Benzene	0.90
Chlorobenzene	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
Ethylbenzene	ND
Toluene	ND
Xylenes	ND
Trichlorotrifluoroethane	ND

GBR-50

4/93

5/93

6/93

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.40
Lab conductivity, umhos/cm	3110.00
Total dissolved solids (180)	3.22
Total dissolved solids (calc)	2520.00
Total alkalinity as CaCO ₃	228.00
Total hardness as CaCO ₃	980.00
Bicarbonate as HCO ₃	278.00
Carbonate as CO ₃	0.00
Hydroxide as OH	0.00
Chloride	42.00
Sulfate	1580.00
Calcium	369.00
Magnesium	15.00
Potassium	2.70
Sodium	382.00

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	ND
1,2-Dichloroethane	ND
1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	0.90
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	0.50
1,1,2-Trichloroethane	ND
Trichloroethene	ND
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

OFFSITE WELLS

SHS-3

4/93

5/93

6/93

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

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

4/93

5/93

6/93

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	0.80
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

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

4/93

5/93

6/93

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

AROMATICS

Benzene	ND
Chlorobenzene	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
Ethylbenzene	16.00
Toluene	ND
Xylenes	ND
Trichlorotrifluoroethane	ND

SHS-12

4/93

5/93

6/93

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	0.30
1,2-Dichloroethane	0.40
1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	0.40
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	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
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

SHS-13

4/93

5/93

6/93

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	0.30
1,1-Dichloroethane	ND
1,2-Dichloroethane	2.30
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

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

4/93

5/93

6/93

HALOCARBONS

Bromodichloromethane	0.50
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	7.90
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

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

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

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

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

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

GIANT REFINING BLOOMFIELD REFINERY
QUARTERLY POTENTIOMETRIC SURFACE

APRIL, 1993

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	59.56	59.56	0.00	5334.74
GRW-2	5391.28	42.15	42.15	0.00	5349.13
GRW-3	5388.77	47.02	47.02	0.00	5341.75
GRW-4	5390.02	48.96	48.96	0.00	5341.06
GRW-5	5390.56	42.16	42.16	0.00	5348.40
GRW-6	5390.81	48.95	48.95	0.00	5341.86
GRW-10	5395.02	60.25	46.30	13.95	5345.93
GRW-11	5397.85	59.10	59.10	0.00	5338.75
GRW-12	5397.24	46.55	46.55	0.00	5350.69
GRW-13	5396.90	50.45	50.45	0.00	5346.45
GBR-5	5395.07	29.76	28.50	1.26	5366.32
GBR-6	5395.70	57.80	57.80	0.00	5337.90
GBR-7	5395.85	31.94	31.28	0.66	5364.44
GBR-8	5390.50	42.40	42.25	0.15	5348.22
GBR-9	5389.92	47.69	47.69	0.00	5342.23
GBR-10	5390.57	42.25	42.25	0.00	5348.32
GBR-11	5389.43	41.25	41.17	0.08	5348.24
GBR-13	5393.04	40.20	40.20	0.00	5352.84
GBR-15	5397.99	43.42	43.42	0.00	5354.57
GBR-17	5402.69	35.40	35.40	0.00	5367.29
GBR-18	5421.68	27.69	27.69	0.00	5393.99
GBR-19	5393.83	39.34	39.34	0.00	5354.49
GBR-20	5393.47	42.40	39.81	2.59	5353.14
GBR-21S	5400.65	19.81	19.81	0.00	5380.84
GBR-21D	5400.19	37.10	37.10	0.00	5363.09
GBR-22	5395.91	36.53	35.67	0.86	5360.07
GBR-23	5403.72	22.25	22.25	0.00	5377.43
GBR-24S	5396.08	26.29	26.29	0.00	5364.80
GBR-24D	5396.77	31.28	31.28	0.00	5365.49
GBR-25	5396.72	30.76	30.76	0.00	5365.96
GBR-26	5395.59	37.93	37.93	0.00	5357.66
GBR-30	5396.58	33.56	33.56	0.00	5363.02
GBR-31	5394.86	35.09	35.09	0.00	5359.77
GBR-33	5396.28	37.89	37.87	0.02	5358.41
GBR-34	5394.00	36.75	35.44	1.31	5358.30
GBR-35	5393.66	37.04	35.38	1.66	5357.95
GBR-39	5397.55	41.29	41.29	0.00	5356.26
GBR-40	5400.76	29.92	29.92	0.00	5370.84
GBR-41	5396.35	24.46	24.46	0.00	5371.89
GBR-51	5389.68	40.51	40.51	0.00	5349.17
GBR-52	5387.74	38.92	38.92	0.00	5348.82

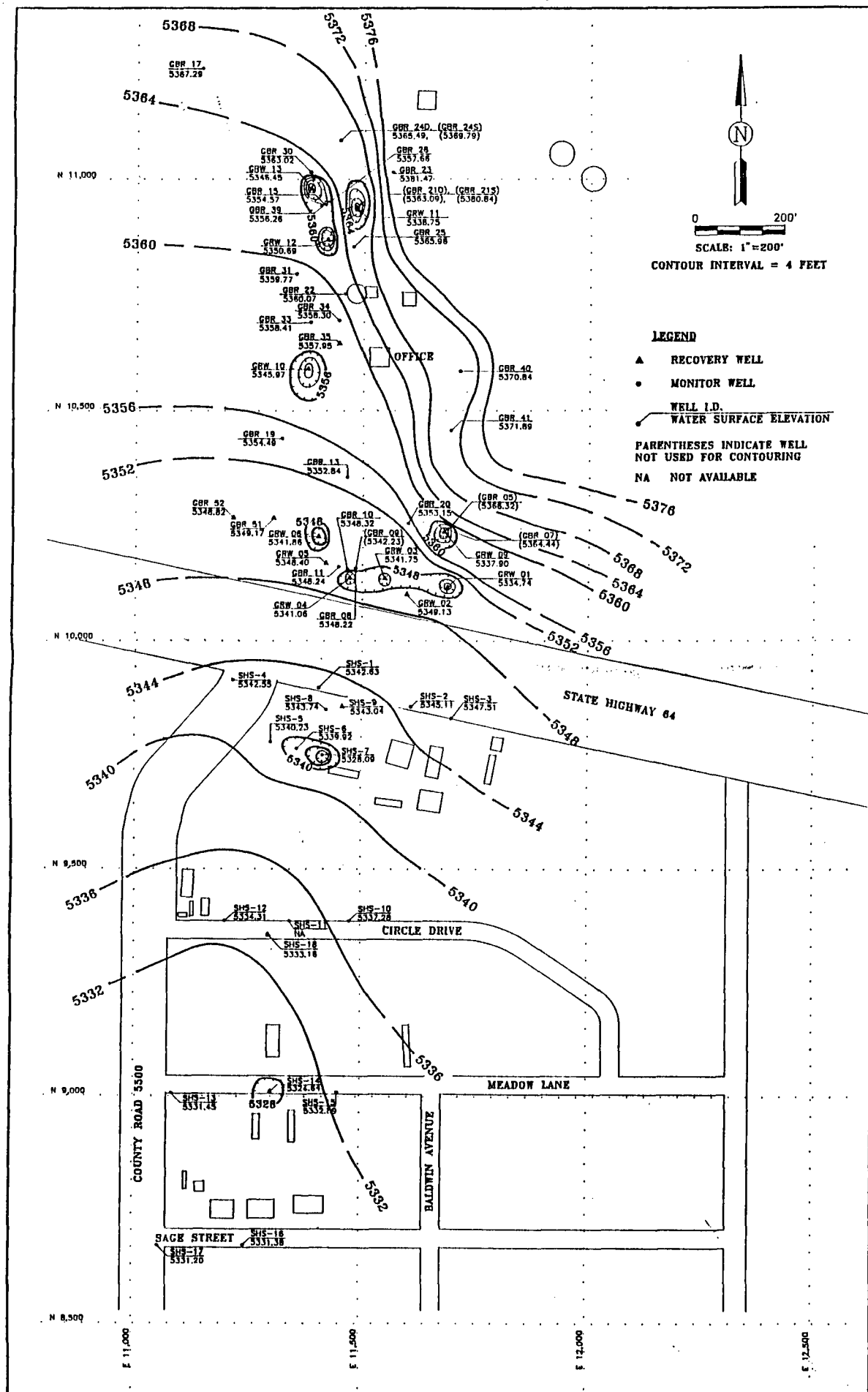
* WSEL - WATER SURFACE ELEVATION ADJUSTED FOR PRODUCT DEPTH

GIANT REFINING BLOOMFIELD REFINERY
 QUARTERLY POTENTIOMETRIC SURFACE
 APRIL, 1993
 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	40.93	40.91	0.02	5342.63
SHS-2	5381.66	36.55	36.55	0.00	5345.11
SHS-3	5383.33	35.82	35.82	0.00	5347.51
SHS-4	5383.62	41.07	41.07	0.00	5342.55
SHS-5	5378.36	38.13	38.13	0.00	5340.23
SHS-6	5378.17	38.25	38.25	0.00	5339.92
SHS-7	5375.89	47.80	47.80	0.00	5328.09
SHS-8	5380.25	36.51	36.51	0.00	5343.74
SHS-9	5380.79	37.75	37.75	0.00	5343.04
SHS-10	5373.80	36.52	36.52	0.00	5337.28
SHS-12	5373.94	39.63	39.63	0.00	5334.31
SHS-13	5367.81	36.36	36.36	0.00	5331.45
SHS-14	5367.07	42.43	42.43	0.00	5324.64
SHS-15	5366.21	33.32	33.32	0.00	5332.89
SHS-16	5362.58	31.20	31.20	0.00	5331.38
SHS-17	5364.35	33.15	33.15	0.00	5331.20
SHS-18	5373.64	40.48	40.48	0.00	5333.16

* WSEL - WATER SURFACE ELEVATION ADJUSTED FOR PRODUCT DEPTH

April 1993, Water Surface Contour Map
Giant-Bloomfield Refinery



Giant Refining Co. Bloomfield Refinery
Quarterly Net Tank
Volume Change

Second Quarter, 1993

Tank Number	Beginning Volume	Ending Volume	Net Change
102	13101	17609	4508
106	8010	8010	0
21	289683	404752	115069
22	217803	223317	5514
Total Net Volume Change			125091

Giant Refining Co. Bloomfield Refinery
Quarterly Recovery Well
Volume Tabulation

Second Quarter, 1993

Well	Month #1	Month #2	Month #3	Total
GRW-1	15400	10280	11870	37550
GRW-2	0	7920	10940	18860
GRW-3	11480	6680	7530	25690
GRW-4	26850	17450	20410	64710
GRW-5	28220	84330	63470	176020
GRW-6	42590	23930	36090	102610
GRW-9	8840	6410	6350	21600
GRW-10	263180	154250	173400	590830
GRW-11	50400	35620	42610	128630
GRW-12	18020	11990	15220	45230
GRW-13	34930	23890	33100	91920
SHS-7	104	119	100	323
SHS-9	20443	16297	21522	58262
SHS-14	166763	123171	165626	455560
SHS-18	69050	68730	35216	172996
Total Volume Pumped In Gallons				1990791

Giant Refining Co. Bloomfield Refinery
Total Volume Summary

Second Quarter, 1993

=====

Total Volume Of Water Recovered	1990791
Net Change In Storage Volume	125091
 Total Water Pumped To The	 1663704
Infiltration Gallery	

=====

Difference	-201996
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Comments: The approximately 10% difference
is due to meter inaccuracy.

SECTION 5

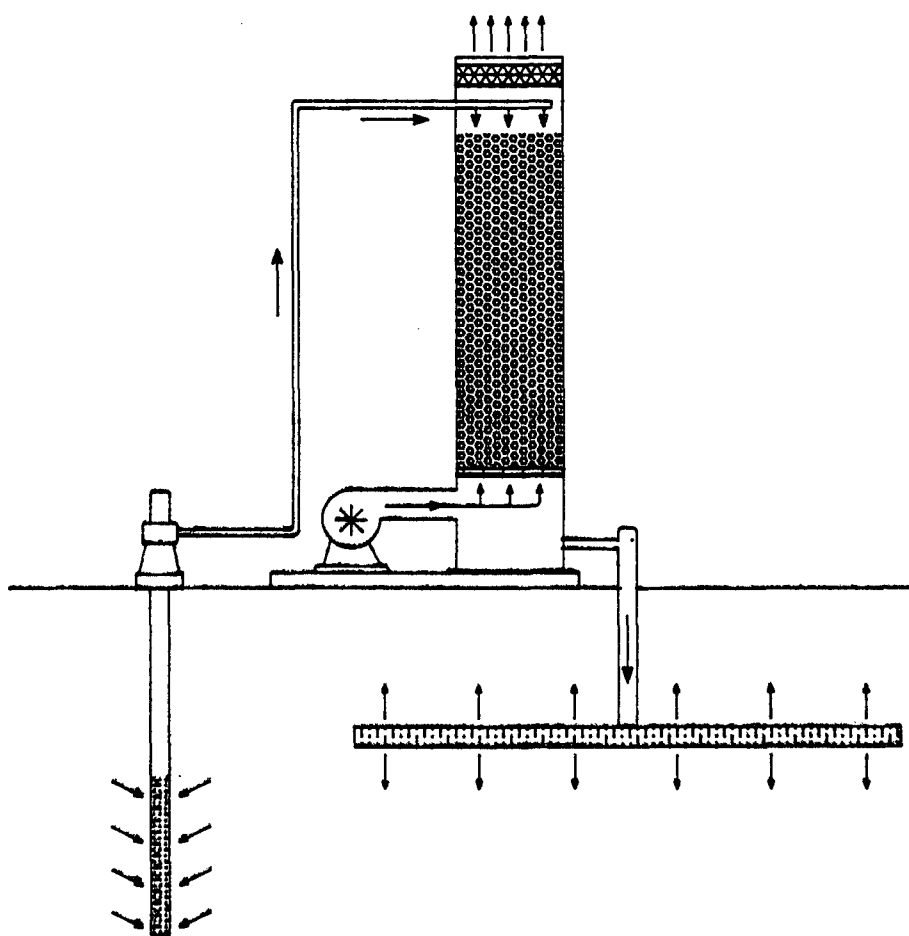
SPECIFIC CONDUCTANCE TRACKING

GRW-13	4/93	5/93	6/93
Lab Conductivity	4160.00	4140.00	4090.00

GIANT

REFINING CO.

BLOOMFIELD REFINERY
REMEDIATION PROJECT



Post Office Box 256
606 E. Highway 64
Farmington, New Mexico 87401

(505) 632-3306
FAX (505) 632-2487

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**OIL CONSERVATION DIV.
SANTA FE**

QUARTERLY DATA REPORT
GIANT BLOOMFIELD REFINERY
FIRST QUARTER, 1993

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 FIRST QUARTER, 1993

INTRODUCTION

No changes were made to the operation during the first quarter. There was no significant downtime.

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
 FIRST QUARTER, 1993

STRIPPER INFLUENT

	1/93	2/93	3/93
GENERAL WATER CHEMISTRY			
Lab pH (s.u.)	7.40	7.20	7.10
Lab conductivity, umhos/cm	3530.00	3480.00	3420.00
Total dissolved solids (180)	2620.00	2580.00	2560.00
Total dissolved solids (calc)	2540.00	2510.00	2510.00
Total alkalinity as CaCO3	309.00	324.00	411.00
Total hardness as CaCO3	970.00	959.00	950.00
Bicarbonate as HCO3	377.00	395.00	501.00
Carbonate as CO3	ND	ND	ND
Hydroxide as OH	ND	ND	ND
Chloride	389.00	370.00	333.00
Sulfate	1120.00	1130.00	1090.00
Calcium	325.00	305.00	329.00
Magnesium	39.00	48.00	31.00
Potassium	3.00	2.60	20.00
Sodium	477.00	467.00	452.00

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	0.80	ND
1,2-Dichloroethane	0.50	0.60	ND
1,1-Dichloroethene	ND	ND	ND
1,2-Dichloroethene	3.40	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND
cis-1,2-Dichloroethene	ND	ND	2.20
1,2-Dichloropropane	ND	3.20	ND
cis-1,3-Dichloropropene	ND	ND	ND
trans-1,3-Dichloropropene	17.60	ND	ND
Methylene chloride	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND
Tetrachloroethene	ND	ND	ND

✓

STRIPPER INFLUENT (Continued)

	1/93	2/93	3/93
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	14.90	17.00	18.00
Chlorobenzene	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND
Ethylbenzene	ND	15.00	17.00
Toluene	0.70	ND	ND
Xylenes	42.50	25.00	24.00
Trichlorotrifluoroethane	ND	ND	ND

STRIPPER EFFLUENT

	1/93	2/93	3/93
GENERAL WATER CHEMISTRY			
Lab pH (s.u.)	8.00	7.60	7.30
Lab conductivity, umhos/cm	3540.00	3570.00	3470.00
Total dissolved solids (180)	2610.00	2610.00	2590.00
Total dissolved solids (calc)	2540.00	2520.00	2520.00
Total alkalinity as CaCO3	264.00	229.00	341.00
Total hardness as CaCO3	959.00	963.00	948.00
Bicarbonate as HCO3	322.00	280.00	416.00
Carbonate as CO3	ND	ND	ND
Hydroxide as OH	ND	ND	ND
Chloride	420.00	450.00	377.00
Sulfate	1110.00	1090.00	1110.00
Calcium	323.00	333.00	319.00
Magnesium	37.00	32.00	37.00
Potassium	2.40	24.00	2.60
Sodium	490.00	460.00	475.00

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	0.40
1,2-Dichloroethene	1.00	1.00	0.50
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)

	1/93	2/93	3/93
AROMATICS			
Benzene	1.00	1.90	1.00
Chlorobenzene	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND
Ethylbenzene	1.00	2.50	1.20
Toluene	ND	ND	ND
Xylenes	5.00	7.10	2.10
Trichlorotrifluoroethane	ND	ND	ND
PAH			
Naphthalene	9.30		
Acenaphthylene	ND		
Acenapgthene	ND		
Fluorene	21.00		
Phenanthrene	33.00		
Anthracene	ND		
Fluoranthene	47.00		
Pyrene	ND		
Benzo(A)Anthracene	ND		
Chrysene	ND		
Benzo(B)Fluoranthene	ND		
Benzo(K)Fluoranthene	ND		
Benzo(A)Pyrene	ND		
Dibenzo(a,h)Anthracene	ND		
Benzo(g,h,i)Perylene	ND		
Indeno(1,2,3-CD)Pyrene	ND		
1-Methylnaphthalene	100.00		
2-Methylnaphthalene	33.00		

GRW-3

1/93

2/93

3/93

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.90
Lab conductivity, umhos/cm	4010.00
Total dissolved solids (180)	3100.00
Total dissolved solids (calc)	3020.00
Total alkalinity as CaCO ₃	506.00
Total hardness as CaCO ₃	1070.00
Bicarbonate as HCO ₃	617.00
Carbonate as CO ₃	ND
Hydroxide as OH	ND
Chloride	304.00
Sulfate	1400.00
Calcium	343.00
Magnesium	52.00
Potassium	3.80
Sodium	614.00

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

GRW-3 (Continued)

	1/93	2/93	3/93
AROMATICS			
Benzene	8.60		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	4.80		
Toluene	ND		
Xylenes	1.90		
Trichlorotrifluoroethane	ND		
PAH			
Naphthalene	ND		
Acenaphthylene	ND		
Acenapgthene	ND		
Fluorene	1.20		
Phenanthrene	ND		
Anthracene	ND		
Fluoranthene	ND		
Pyrene	ND		
Benzo(A)Anthracene	ND		
Chrysene	ND		
Benzo(B)Fluoranthene	ND		
Benzo(K)Fluoranthene	ND		
Benzo(A)Pyrene	ND		
Dibenzo(a,h)Anthracene	ND		
Benzo(g,h,i)Perylene	ND		
Indeno(1,2,3-CD)Pyrene	ND		
1-Methylnaphthalene	ND		
2-Methylnaphthalene	ND		

GRW-6

1/93

2/93

3/93

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	8.20
Lab conductivity, umhos/cm	3520.00
Total dissolved solids (180)	2260.00
Total dissolved solids (calc)	2180.00
Total alkalinity as CaCO ₃	691.00
Total hardness as CaCO ₃	593.00
Bicarbonate as HCO ₃	844.00
Carbonate as CO ₃	ND
Hydroxide as OH	ND
Chloride	495.00
Sulfate	444.00
Calcium	212.00
Magnesium	16.00
Potassium	2.10
Sodium	596.00

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	1.20
1,2-Dichloroethane	0.90
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

GRW-6 (Continued)

	1/93	2/93	3/93
AROMATICS			
Benzene	0.80		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	4.80		
Toluene	ND		
Xylenes	1.90		
Trichlorotrifluoroethane	ND		
PAH			
Naphthalene	ND		
Acenaphthylene	3.50		
Acenapgtene	ND		
Fluorene	0.91		
Phenanthrene	ND		
Anthracene	ND		
Fluoranthene	ND		
Pyrene	ND		
Benzo(A)Anthracene	ND		
Chrysene	ND		
Benzo(B)Fluoranthene	ND		
Benzo(K)Fluoranthene	ND		
Benzo(A)Pyrene	ND		
Dibenzo(a,h)Anthracene	ND		
Benzo(g,h,i)Perylene	ND		
Indeno(1,2,3-CD)Pyrene	ND		
1-Methylnaphthalene	ND		
2-Methylnaphthalene	ND		

GRW-13

	1/93	2/93	3/93
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	5.70		
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		

GRW-13 (Continued)

	1/93	2/93	3/93
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			
Naphthalene	ND		
Acenaphthylene	ND		
Acenapgtene	ND		
Fluorene	ND		
Phenanthrene	ND		
Anthracene	ND		
Fluoranthene	ND		
Pyrene	ND		
Benzo(A)Anthracene	ND		
Chrysene	ND		
Benzo(B)Fluoranthene	ND		
Benzo(K)Fluoranthene	ND		
Benzo(A)Pyrene	ND		
Dibenzo(a,h)Anthracene	ND		
Benzo(g,h,i)Perylene	ND		
Indeno(1,2,3-CD)Pyrene	ND		
1-Methylnaphthalene	ND		
2-Methylnaphthalene	ND		

GBR-15

1/93

2/93

3/93

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.70
Lab conductivity, umhos/cm	4540.00
Total dissolved solids (180)	3290.00
Total dissolved solids (calc)	3230.00
Total alkalinity as CaCO ₃	319.00
Total hardness as CaCO ₃	1120.00
Bicarbonate as HCO ₃	389.00
Carbonate as CO ₃	ND
Hydroxide as OH	ND
Chloride	607.00
Sulfate	1340.00
Calcium	389.00
Magnesium	37.00
Potassium	4.60
Sodium	667.00

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	16.60
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	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

GBR-15 (Continued)

	1/93	2/93	3/93
AROMATICS			
Benzene	1.00		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	0.60		
Toluene	2.10		
Xylenes	ND		
Trichlorotrifluoroethane	ND		

GBR-17

1/93

2/93

12/92

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	8.10
Lab conductivity, umhos/cm	2670.00
Total dissolved solids (180)	2180.00
Total dissolved solids (calc)	2140.00
Total alkalinity as CaCO ₃	218.00
Total hardness as CaCO ₃	922.00
Bicarbonate as HCO ₃	266.00
Carbonate as CO ₃	ND
Hydroxide as OH	ND
Chloride	59.00
Sulfate	1270.00
Calcium	315.00
Magnesium	33.00
Potassium	1.40
Sodium	337.00

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)

	1/93	2/93	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		
PAH			
Naphthalene	ND		
Acenaphthylene	ND		
Acenapgtene	ND		
Fluorene	ND		
Phenanthrene	ND		
Anthracene	ND		
Fluoranthene	ND		
Pyrene	ND		
Benzo(A)Anthracene	ND		
Chrysene	ND		
Benzo(B)Fluoranthene	ND		
Benzo(K)Fluoranthene	ND		
Benzo(A)Pyrene	ND		
Dibenzo(a,h)Anthracene	ND		
Benzo(g,h,i)Perylene	ND		
Indeno(1,2,3-CD)Pyrene	ND		
1-Methylnaphthalene	ND		
2-Methylnaphthalene	ND		

GBR-24D

	1/93	2/93	3/93
GENERAL WATER CHEMISTRY			
Lab pH (s.u.)	7.70	7.20	
Lab conductivity, umhos/cm	4890.00	3480.00	
Total dissolved solids (180)	3810.00	2580.00	
Total dissolved solids (calc)	3490.00	2510.00	
Total alkalinity as CaCO ₃	192.00	324.00	
Total hardness as CaCO ₃	1730.00	959.00	
Bicarbonate as HCO ₃	235.00	395.00	
Carbonate as CO ₃	ND	ND	
Hydroxide as OH	ND	ND	
Chloride	727.00	370.00	
Sulfate	1530.00	1130.00	
Calcium	569.00	305.00	
Magnesium	75.00	48.00	
Potassium	5.10	2.60	
Sodium	467.00	467.00	
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	23.60		
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		

GBR-24D (Continued)

	1/93	2/93	3/93
AROMATICS			
Benzene	6.90		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	3.20		
Toluene	3.20		
Xylenes	2.40		
Trichlorotrifluoroethane	ND		
PAH			
Naphthalene	ND		
Acenaphthylene	ND		
Acenapgtene	ND		
Fluorene	1.60		
Phenanthrene	0.20		
Anthracene	ND		
Fluoranthene	ND		
Pyrene	ND		
Benzo(A)Anthracene	ND		
Chrysene	ND		
Benzo(B)Fluoranthene	ND		
Benzo(K)Fluoranthene	ND		
Benzo(A)Pyrene	ND		
Dibenzo(a,h)Anthracene	ND		
Benzo(g,h,i)Perylene	ND		
Indeno(1,2,3-CD)Pyrene	ND		
1-Methylnaphthalene	ND		
2-Methylnaphthalene	ND		

GBR-30

1/93

2/93

3/93

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.50
Lab conductivity, umhos/cm	3650.00
Total dissolved solids (180)	2700.00
Total dissolved solids (calc)	2580.00
Total alkalinity as CaCO ₃	259.00
Total hardness as CaCO ₃	1020.00
Bicarbonate as HCO ₃	315.00
Carbonate as CO ₃	ND
Hydroxide as OH	ND
Chloride	435.00
Sulfate	1150.00
Calcium	333.00
Magnesium	45.00
Potassium	2.60
Sodium	457.00

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
1,2-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

GBR-30 (Continued)

	1/93	2/93	3/93
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			
Naphthalene	ND		
Acenaphthylene	ND		
Acenapgthene	ND		
Fluorene	ND		
Phenanthrene	ND		
Anthracene	ND		
Fluoranthene	ND		
Pyrene	ND		
Benzo(A)Anthracene	ND		
Chrysene	ND		
Benzo(B)Fluoranthene	ND		
Benzo(K)Fluoranthene	ND		
Benzo(A)Pyrene	ND		
Dibenzo(a,h)Anthracene	ND		
Benzo(g,h,i)Perylene	ND		
Indeno(1,2,3-CD)Pyrene	ND		
1-Methylnaphthalene	ND		
2-Methylnaphthalene	ND		

GBR-31

1/93

2/93

3/93

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.90
Lab conductivity, umhos/cm	3700.00
Total dissolved solids (180)	2770.00
Total dissolved solids (calc)	2660.00
Total alkalinity as CaCO ₃	266.00
Total hardness as CaCO ₃	1020.00
Bicarbonate as HCO ₃	324.00
Carbonate as CO ₃	ND
Hydroxide as OH	ND
Chloride	431.00
Sulfate	1190.00
Calcium	337.00
Magnesium	43.00
Potassium	3.10
Sodium	502.00

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
1,2-Dichloroethene	5.20
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	0.30
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

GBR-31 (Continued)

	1/93	2/93	3/93
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			
Naphthalene	ND		
Acenaphthylene	ND		
Acenapgtene	ND		
Fluorene	ND		
Phenanthrene	ND		
Anthracene	ND		
Fluoranthene	ND		
Pyrene	ND		
Benzo(A)Anthracene	ND		
Chrysene	ND		
Benzo(B)Fluoranthene	ND		
Benzo(K)Fluoranthene	ND		
Benzo(A)Pyrene	ND		
Dibenzo(a,h)Anthracene	ND		
Benzo(g,h,i)Perylene	ND		
Indeno(1,2,3-CD)Pyrene	ND		
1-Methylnaphthalene	ND		
2-Methylnaphthalene	ND		

OFFSITE WELLS

SHS-3

	1/93	2/93	3/93
GENERAL WATER CHEMISTRY			
Lab pH (s.u.)	7.20		
Lab conductivity, umhos/cm	4520.00		
Total dissolved solids (180)	3920.00		
Total dissolved solids (calc)	3690.00		
Total alkalinity as CaCO3	201.00		
Total hardness as CaCO3	1870.00		
Bicarbonate as HCO3	245.00		
Carbonate as CO3	ND		
Hydroxide as OH	ND		
Chloride	379.00		
Sulfate	2080.00		
Calcium	579.00		
Magnesium	103.00		
Potassium	7.00		
Sodium	425.00		
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)

1/93

2/93

3/93

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

1/93

2/93

3/93

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.30
Lab conductivity, umhos/cm	3050.00
Total dissolved solids (180)	2470.00
Total dissolved solids (calc)	2400.00
Total alkalinity as CaCO ₃	268.00
Total hardness as CaCO ₃	1050.00
Bicarbonate as HCO ₃	327.00
Carbonate as CO ₃	ND
Hydroxide as OH	ND
Chloride	148.00
Sulfate	1330.00
Calcium	353.00
Magnesium	41.00
Potassium	2.80
Sodium	364.00

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	0.60
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	0.20
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

SHS-6 (Continued)

1/93

2/93

3/93

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

1/93

2/93

3/93

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.70
Lab conductivity, umhos/cm	2250.00
Total dissolved solids (180)	1690.00
Total dissolved solids (calc)	1680.00
Total alkalinity as CaCO ₃	288.00
Total hardness as CaCO ₃	642.00
Bicarbonate as HCO ₃	351.00
Carbonate as CO ₃	ND
Hydroxide as OH	ND
Chloride	61.00
Sulfate	905.00
Calcium	208.00
Magnesium	30.00
Potassium	7.90
Sodium	299.00

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	0.60
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	

SHS-10 (Continued)

	1/93	2/93	3/93
AROMATICS			
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	21.00		
Toluene	ND		
Xylenes	ND		
Trichlorotrifluoroethane	ND		

SHS-12

1/93

2/93

3/93

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.60
Lab conductivity, umhos/cm	3730.00
Total dissolved solids (180)	2660.00
Total dissolved solids (calc)	2580.00
Total alkalinity as CaCO ₃	577.00
Total hardness as CaCO ₃	941.00
Bicarbonate as HCO ₃	704.00
Carbonate as CO ₃	ND
Hydroxide as OH	ND
Chloride	417.00
Sulfate	937.00
Calcium	325.00
Magnesium	32.00
Potassium	4.50
Sodium	517.00

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	0.30
1,2-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	0.40
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	0.40
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

SHS-12 (Continued)

	1/93	2/93	3/93
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

1/93

2/93

3/93

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.90
Lab conductivity, umhos/cm	4870.00
Total dissolved solids (180)	4000.00
Total dissolved solids (calc)	3830.00
Total alkalinity as CaCO ₃	650.00
Total hardness as CaCO ₃	1850.00
Bicarbonate as HCO ₃	793.00
Carbonate as CO ₃	ND
Hydroxide as OH	ND
Chloride	502.00
Sulfate	1700.00
Calcium	601.00
Magnesium	86.00
Potassium	3.70
Sodium	546.00

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	12.00
1,2-Dichloroethene	0.60
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	0.20
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
1,1,1-Trichloroethane	0.20
1,1,2-Trichloroethane	ND
Trichloroethene	0.40
Trichlorofluoromethane	ND
Vinyl chloride	ND

SHS-13 (Continued)

	1/93	2/93	3/93
AROMATICS			
Benzene	ND		
Chlorobenzene	ND		
1,2-Dichlorobenzene	ND		
1,3-Dichlorobenzene	ND		
1,4-Dichlorobenzene	ND		
Ethylbenzene	ND		
Toluene	0.30		
Xylenes	ND		
Trichlorotrifluoroethane	ND		

SHS-15

1/93

2/93

3/93

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.90
Lab conductivity, umhos/cm	2230.00
Total dissolved solids (180)	1880.00
Total dissolved solids (calc)	1800.00
Total alkalinity as CaCO ₃	273.00
Total hardness as CaCO ₃	1020.00
Bicarbonate as HCO ₃	334.00
Carbonate as CO ₃	0.00
Hydroxide as OH	0.00
Chloride	44.00
Sulfate	1040.00
Calcium	343.00
Magnesium	41.00
Potassium	2.00
Sodium	168.00

HALOCARBONS

HALOCARBONS	ND
Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	0.40
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)

	1/93	2/93	3/93
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

1/93

2/93

3/93

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	8.10
Lab conductivity, umhos/cm	2610.00
Total dissolved solids (180)	2260.00
Total dissolved solids (calc)	2170.00
Total alkalinity as CaCO ₃	277.00
Total hardness as CaCO ₃	1180.00
Bicarbonate as HCO ₃	338.00
Carbonate as CO ₃	0.00
Hydroxide as OH	0.00
Chloride	42.00
Sulfate	1300.00
Calcium	389.00
Magnesium	51.00
Potassium	2.50
Sodium	224.00

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)

1/93

2/93

3/93

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

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.90
Lab conductivity, umhos/cm	3130.00
Total dissolved solids (180)	2630.00
Total dissolved solids (calc)	2520.00
Total alkalinity as CaCO ₃	272.00
Total hardness as CaCO ₃	1180.00
Bicarbonate as HCO ₃	331.00
Carbonate as CO ₃	0.00
Hydroxide as OH	0.00
Chloride	97.00
Sulfate	1480.00
Calcium	375.00
Magnesium	60.00
Potassium	4.20
Sodium	345.00

HALOCARBONS

HALOCARBONS	ND
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)

1/93

2/93

3/93

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

*ND - Not detected at specified detection limit

GIANT REFINING BLOOMFIELD REFINERY
QUARTERLY POTENTIOMETRIC SURFACE

JANUARY, 1993

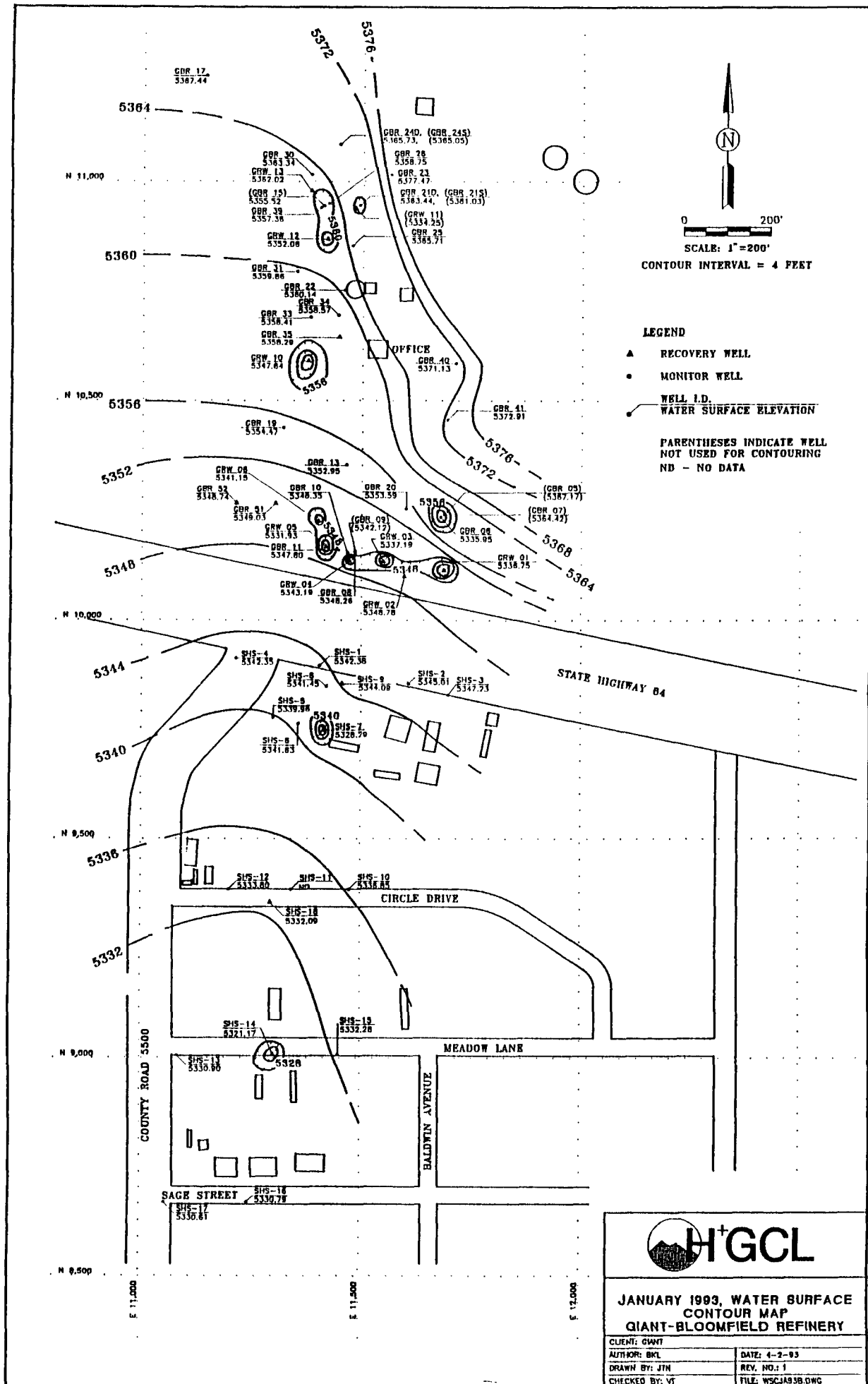
WELL #	WELLHEAD ELEVATION IN FEET	DEPTH TO WATER IN FEET	DEPTH TO PRODUCT IN FEET	PRODUCT THICKNESS IN FEET	ADJUSTED WSEL* IN FEET
GRW-1	5394.30	57.55	57.55	0.00	5336.75
GRW-2	5391.28	42.50	42.50	0.00	5348.78
GRW-3	5388.77	51.58	51.58	0.00	5337.19
GRW-4	5390.02	46.83	46.83	0.00	5343.19
GRW-5	5390.56	58.63	58.63	0.00	5331.93
GRW-6	5390.81	49.66	49.66	0.00	5341.15
GRW-10	5395.02	47.40	47.37	0.03	5347.64
GRW-11	5397.85	63.60	63.60	0.00	5334.25
GRW-12	5397.24	45.18	45.18	0.00	5352.06
GRW-13	5396.90	34.88	34.88	0.00	5362.02
GBR-5	5395.07	28.92	27.65	1.27	5367.17
GBR-6	5395.70	59.75	59.75	0.00	5335.95
GBR-7	5395.85	31.44	31.43	0.01	5364.42
GBR-8	5390.50	42.26	42.24	0.02	5348.26
GBR-9	5389.92	47.80	47.80	0.00	5342.12
GBR-10	5390.57	42.22	42.22	0.00	5348.35
GBR-11	5389.43	41.64	41.63	0.01	5347.80
GBR-13	5393.04	40.09	40.09	0.00	5352.95
GBR-15	5397.99	42.47	42.47	0.00	5355.52
GBR-17	5402.69	35.25	35.25	0.00	5367.44
GBR-18	5421.68	26.27	26.27	0.00	5395.41
GBR-19	5393.83	39.36	39.36	0.00	5354.47
GBR-20	5393.47	39.90	39.88	0.02	5353.59
GBR-21S	5400.65	19.62	19.62	0.00	5381.03
GBR-21D	5400.19	36.75	36.75	0.00	5363.44
GBR-22	5395.91	35.78	35.77	0.01	5360.14
GBR-23	5403.72	22.22	22.22	0.00	5377.47
GBR-24S	5396.08	26.25	26.24	0.01	5365.05
GBR-24D	5396.77	31.04	31.04	0.00	5365.73
GBR-25	5396.72	31.01	31.01	0.00	5365.71
GBR-26	5395.59	36.84	36.84	0.00	5358.75
GBR-30	5396.58	33.24	33.24	0.00	5363.34
GBR-31	5394.86	35.00	35.00	0.00	5359.86
GBR-33	5396.28	37.87	37.87	0.00	5358.41
GBR-34	5394.00	35.45	35.43	0.02	5358.57
GBR-35	5393.66	35.37	35.37	0.00	5358.29
GBR-39	5397.55	40.17	40.17	0.00	5357.38
GBR-40	5400.76	29.63	29.63	0.00	5371.13
GBR-41	5396.35	23.44	23.44	0.00	5372.91
GBR-51	5389.68	40.65	40.65	0.00	5349.03
GBR-52	5387.74	39.00	39.00	0.00	5348.74

* WSEL - WATER SURFACE ELEVATION ADJUSTED FOR PRODUCT DEPTH

GIANT REFINING BLOOMFIELD REFINERY
 QUARTERLY POTENTIOMETRIC SURFACE
 JANUARY, 1993
 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	41.16	41.16	0.00	5342.38
SHS-2	5381.66	36.65	36.65	0.00	5345.01
SHS-3	5383.33	36.10	36.10	0.00	5347.23
SHS-4	5383.62	41.27	41.27	0.00	5342.35
SHS-5	5378.36	38.40	38.40	0.00	5339.96
SHS-6	5378.17	36.54	36.54	0.00	5341.63
SHS-7	5375.89	47.60	47.60	0.00	5328.29
SHS-8	5380.25	38.80	38.80	0.00	5341.45
SHS-9	5380.79	36.70	36.70	0.00	5344.09
SHS-10	5373.80	36.95	36.95	0.00	5336.85
SHS-12	5373.94	40.14	40.14	0.00	5333.80
SHS-13	5367.81	36.91	36.91	0.00	5330.90
SHS-14	5367.07	45.90	45.90	0.00	5321.17
SHS-15	5366.21	33.93	33.93	0.00	5332.28
SHS-16	5362.58	31.79	31.79	0.00	5330.79
SHS-17	5364.35	33.74	33.74	0.00	5330.61
SHS-18	5373.64	41.55	41.55	0.00	5332.09

* WSEL - WATER SURFACE ELEVATION ADJUSTED FOR PRODUCT DEPTH



Giant Refining Co. Bloomfield Refinery
Quarterly Net Tank
Volume Change

First Quarter, 1993

Tank Number	Beginning Volume	Ending Volume	Net Change
102	14509	13101	-1408
106	8010	8010	0
21	260459	289683	29224
22	250887	217803	-33084
Total Net Volume Change			-5268

Giant Refining Co. Bloomfield Refinery
Quarterly Recovery Well
Volume Tabulation

First Quarter, 1993

Well	Month #1	Month #2	Month #3	Total
GRW-1	8870	9460	14470	32800
GRW-2	2030	10760	60	12850
GRW-3	13790	12520	12650	38960
GRW-4	23110	22360	26610	72080
GRW-5	48800	31270	46480	126550
GRW-6	48280	51680	43220	143180
GRW-9	6720	7220	12010	25950
GRW-10	257450	232000	237820	727270
GRW-11	37320	37070	54450	128840
GRW-12	14850	15950	20000	50800
GRW-13	18270	19670	27490	65430
SHS-7	337	227	92	656
SHS-9	20512	14226	20489	55227
SHS-14	167146	157340	139547	464033
SHS-18	61983	71748	37079	170810
Total Volume Pumped In Gallons				2115436

Giant Refining Co. Bloomfield Refinery
Total Volume Summary

First Quarter, 1993

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Total Volume Of Water Recovered	2115436
Net Change In Storage Volume	-5268

Total Water Pumped To The Infiltration Gallery	1934390
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Difference	-186314
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Comments: The approximately 8.8% difference
is due to meter inaccuracy.

SECTION 5

Specific Conductance Tracking

GRW-13

	1/93	2/93	3/93
GENERAL WATER CHEMISTRY			
Lab pH (s.u.)	7.70		
Lab conductivity, umhos/cm	4480.00	3820.00	4100.00
Total dissolved solids (180)	3480.00		
Total dissolved solids (calc)	3390.00		
Total alkalinity as CaCO3	228.00		
Total hardness as CaCO3	1200.00		
Bicarbonate as HCO3	278.00		
Carbonate as CO3	ND		
Hydroxide as OH	ND		
Chloride	489.00		
Sulfate	1650.00		
Calcium	413.00		
Magnesium	41.00		
Potassium	5.50		
Sodium	655.00		