

GW - 40

MONITORING REPORTS

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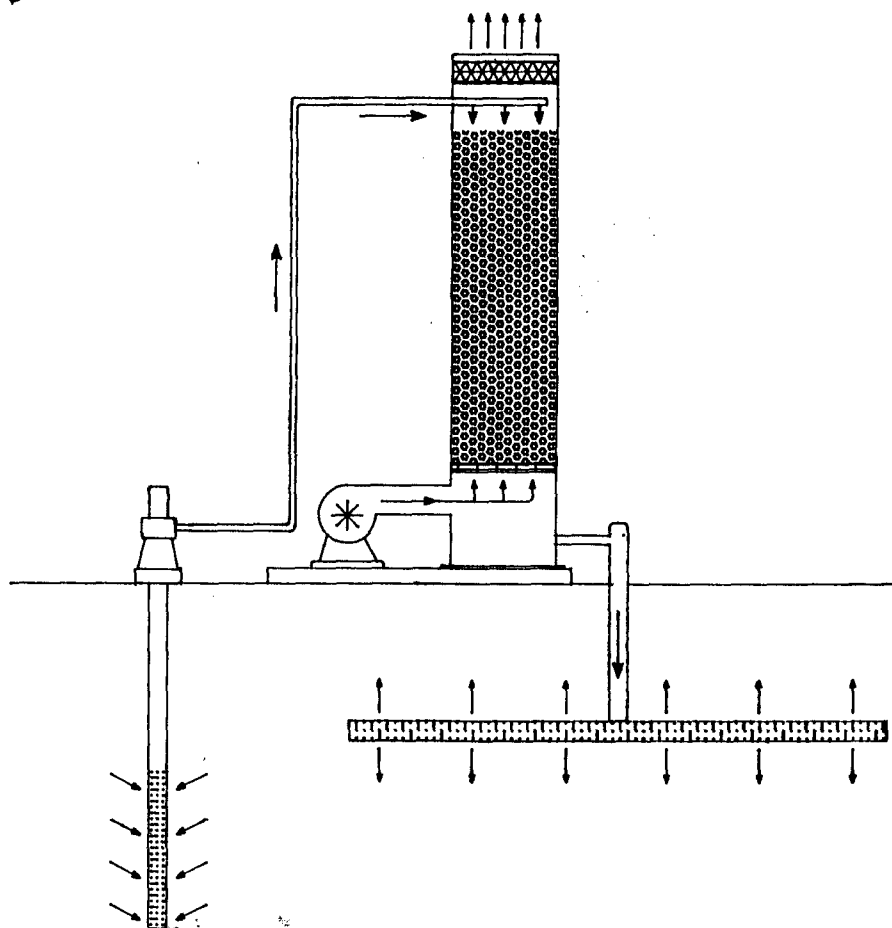
1990

3rd & 4th
Quarters
1990

GIANT

REFINING CO.

BLOOMFIELD REFINERY
REMEDIATION PROJECT



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QUARTERLY DATA REPORT
GIANT BLOOMFIELD REFINERY
THIRD AND FOURTH QUARTERS, 1990

RECEIVED

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OIL CONSERVATION DIV.
SANTA FE

Prepared by:

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Introduction and Summary

Quarterly Report

Third and Fourth Quarter 1990

Introduction

During the third and fourth quarters of 1990, additional changes were made to the remediation system at the refinery. First, booster pumps were installed at tanks 21 and 22 to boost the sytem capacity in anticipation of additional water from south of the refinery. Second, new, insulated, well enclosures were constructed to house meters and filters at all recovery wells insuring more reliability, particularly in cold weather. Third, insulated enclosures were constructed at tanks 21 and 22 to house the new booster pumps. Fourth, the programming of our microprocessor based safety and control system was updated to include the addition of the booster pumps.

Also, during the fourth quarter of 1990, controlled application of water was initiated. A detailed report of the activity is being prepared for submission in January of 1991.

Summary

Section 2

Section 2 contains a summary of the quarterly analytical results. Subsequent reports will contain updates revealing historical trends of the analytes. Raw data, as received from the laboratory, is available on request as a supplement to the quarterly report.

Section 3

Section three contains the results of the semiannual sampling of upgradient wells. Again, the data is tabulated for easy review, but is available in raw format on request.

Section 4

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

Section 5

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

Section 6

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

Section 7

Periodically, samples in addition to those required in the discharge plan are collected. The results are included in this final section of the report.

GIANT REFINING COMPANY
ONSITE REMEDIATION PROJECT
QUARTERLY ANALYTICAL DATA SUMMARY
THIRD AND FOURTH QUARTERS, 1990

STRIPPER INFLUENT

	8/90	9/90	10/90	11/90	12/90
GENERAL WATER CHEMISTRY					
Lab pH (s.u.)	7.47	7.38	6.66	6.66	6.58
Lab conductivity, umhos/cm	5080.00	4830.00	4390.00	4880.00	4870.00
Lab resistivity, ohm-m	1.97	2.07	2.28	2.05	2.05
Total dissolved solids (100)	3328.00	3290.00	3430.00	3430.00	3420.00
Total dissolved solids (calc)	3293.00	3160.00	3250.00	3300.00	3240.00
Total alkalinity as CaCO3	544.35	316.00	94.00	75.20	58.10
Total acidity as CaCO3	0.00	0.00	0.00	0.00	0.00
Total hardness as CaCO3	1114.44	1080.00	1200.00	1180.00	1280.00
Sodium absorption ratio	8.85	8.61	7.42	7.84	7.52
Bicarbonate as HCO3	664.10	386.00	115.00	91.50	70.80
Carbonate as CO3	0.00	0.00	0.00	0.00	0.00
Chloride	582.40	624.00	735.00	736.00	735.00
Sulfate	1259.20	1340.00	1440.00	1440.00	1460.00
Calcium	433.70	241.00	349.00	430.00	205.00
Magnesium	7.90	117.00	81.00	27.40	186.00
Potassium	3.60	3.15	3.15	3.21	2.90
Sodium	679.50	652.00	592.00	620.00	618.00

HALOCARBONS

Bromodichloromethane	1.40		ND	ND	ND
Bromoform	ND		ND	ND	ND
Bromomethane	ND		ND	ND	ND
Carbon tetrachloride	ND		ND	ND	ND
Chloroethane	ND		ND	ND	ND
2-Chloroethylvinylether	ND		ND	ND	ND
Chloroform	ND		ND	ND	ND
Chloromethane	ND		ND	ND	0.42
Dibromochloromethane	ND		ND	ND	ND
1,2-Dichlorobenzene	ND		ND	ND	ND
1,3-Dichlorobenzene	ND		ND	ND	ND
1,4-Dichlorobenzene	ND		ND	ND	ND
1,1-Dichloroethane	0.68		ND	ND	ND
1,2-Dichloroethane	1.10		2.70	ND	ND
1,1-Dichloroethene	ND		ND	ND	ND
cis-1,2-Dichloroethene	0.43		16.00	0.66	ND
trans-1,2-Dichloroethene	ND		ND	ND	ND
1,2-Dichloropropane	ND		ND	ND	ND
cis-1,3-Dichloropropene	ND		ND	ND	ND
trans-1,3-Dichloropropene	ND		ND	ND	ND
Methylene chloride	ND		4.90	ND	ND
1,1,2,2-Tetrachloroethane	ND		ND	ND	ND
Tetrachloroethene	0.32		1.50	0.31	0.15
1,1,1-Trichloroethane	0.20		2.50	ND	ND
1,1,2-Trichloroethane	ND		ND	ND	ND
Trichloroethene	ND		2.30	ND	ND

Trichlorofluoromethane	ND		3.00	ND	ND
Vinyl chloride	ND		ND	ND	ND
AROMATICS					
Benzene	ND	2.80	60.00	5.20	1.20
Chlorobenzene	ND	ND	4.50	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	1.30
1,3-Dichlorobenzene	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	100.00	2.30	ND
Ethylbenzene	ND	ND	ND	0.42	ND
Toluene	ND	ND	3.00	0.25	ND
Xylenes	0.81	0.92	140.00	1.70	1.00

STRIPPER EFFLUENT

	8/90	9/90	10/90	11/90	12/90
GENERAL WATER CHEMISTRY					
Lab pH (s.u.)	7.90	8.16	8.05	7.93	7.91
Lab conductivity, umhos/cm	4892.00	4830.00	4360.00	4920.00	4830.00
Lab resistivity, ohm-m	2.04	2.07	2.30	2.03	2.07
Total dissolved solids (100)	3222.00	3290.00	3430.00	3460.00	3430.00
Total dissolved solids (calc)	3155.00	3180.00	3260.00	3280.00	3250.00
Total alkalinity as CaCO3	401.10	280.00	85.50	54.70	61.60
Total acidity as CaCO3	0.00	0.00	0.00	0.00	0.00
Total hardness as CaCO3	1036.13	1010.00	1220.00	1200.00	1210.00
Sodium absorption ratio	8.90	9.34	7.57	7.79	7.82
Bicarbonate as HCO3	489.30	342.00	104.00	66.50	75.00
Carbonate as CO3	0.00	0.00	0.00	0.00	0.00
Chloride	577.10	619.00	736.00	736.00	725.00
Sulfate	1278.10	1320.00	1440.00	1430.00	1460.00
Calcium	371.10	357.00	297.00	414.00	281.00
Magnesium	26.80	28.80	118.00	42.00	125.00
Potassium	3.00	3.35	3.24	3.15	3.15
Sodium	658.50	682.00	609.00	621.00	627.00

HALOCARBONS

Bromodichloromethane	0.27		13.00	ND	ND
Bromoform	ND		23.00	ND	ND
Bromomethane	ND		ND	ND	ND
Carbon tetrachloride	ND		16.00	ND	ND
Chloroethane	ND		16.00	ND	ND
Chloroethane	ND		ND	ND	ND
2-Chloroethylvinylether	ND		ND	ND	ND
Chloroform	0.18		10.00	ND	ND
Chloromethane	ND		ND	ND	ND
Dibromochloromethane	ND		14.00	ND	ND
1,2-Dichlorobenzene	ND		ND	ND	ND
1,3-Dichlorobenzene	ND		23.00	ND	ND
1,4-Dichlorobenzene	ND		26.00	ND	ND
1,1-Dichloroethane	ND		13.00	ND	ND
1,2-Dichloroethane	ND		13.00	ND	ND
1,1-Dichloroethene	ND		14.00	ND	ND
cis-1,2-Dichloroethene	ND		13.00	ND	ND
trans-1,2-Dichloroethene	ND		ND	ND	ND
1,2-Dichloropropane	ND		6.70	ND	ND
cis-1,3-Dichloropropene	ND		19.00	ND	ND
trans-1,3-Dichloropropene	ND		14.00	ND	ND
Methylene chloride	ND		9.50	ND	ND
1,1,2,2-Tetrachloroethane	ND		ND	ND	ND
Tetrachloroethene	ND		16.00	ND	ND
1,1,1-Trichloroethane	ND		20.00	ND	ND
1,1,2-Trichloroethane	ND		ND	ND	ND
Trichloroethene	0.48		9.90	ND	ND
Trichlorofluoromethane	ND		22.00	0.34	ND
Vinyl chloride	ND		ND	ND	ND

AROMATICS

Benzene	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND

1,2-Dichlorobenzene	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	0.56	ND	ND
Ethylbenzene	0.20	ND	ND	ND	ND
Toluene	0.32	ND	0.45	0.29	ND
Xylenes	0.44	ND	0.91	0.48	ND

GRW-3

8/90

9/90

10/90

11/90

12/90

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.91
Lab conductivity, umhos/cm	3970.00
Lab resistivity, ohm-m	2.52
Total dissolved solids (100)	2950.00
Total dissolved solids (calc)	2940.00
Total alkalinity as CaCO3	829.00
Total acidity as CaCO3	0.00
Total hardness as CaCO3	944.00
Sodium absorption ratio	9.80
Bicarbonate as HCO3	1010.00
Carbonate as CO3	0.00
Chloride	435.00
Sulfate	944.00
Calcium	349.00
Magnesium	17.50
Potassium	2.28
Sodium	692.00

PAH

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	0.15
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(g,h,i)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenzo(a,h)anthracene	ND
Fluoranthene	5.40
Fluorene	6.80
Indeno(1,2,3-cd)pyrene	ND
Naphthalene	57.00
Phenanthrene	45.00
Pyrene	1.40

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	4.30

1,1-Dichloroethene	ND
cis-1,2-Dichloroethene	17.00
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	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

AROMATICS

Benzene	460.00	490.00
Chlorobenzene	ND	5.80
1,2-Dichlorobenzene	ND	ND
1,3-Dichlorobenzene	ND	ND
1,4-Dichlorobenzene	ND	290.00
Ethylbenzene	450.00	420.00
Toluene	5.20	ND
Xylenes	970.00	710.00

GRW-4

8/90

9/90

10/90

11/90

12/90

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.89
Lab conductivity, umhos/cm	4380.00
Lab resistivity, ohm-m	2.29
Total dissolved solids (180)	3410.00
Total dissolved solids (calc)	3230.00
Total alkalinity as CaCO3	804.00
Total acidity as CaCO3	0.00
Total hardness as CaCO3	1350.00
Sodium absorption ratio	7.22
Bicarbonate as HCO3	982.00
Carbonate as CO3	0.00
Chloride	488.00
Sulfate	1170.00
Calcium	369.00
Magnesium	103.00
Potassium	2.31
Sodium	609.00

PAH

Acenaphthene	ND
Acenaphthylene	ND
Anthracene	ND
Benzo(a)anthracene	ND
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	ND
Benzo(g,h,i)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	ND
Dibenzo(a,h)anthracene	ND
Fluoranthene	ND
Fluorene	3.20
Indeno(1,2,3-cd)pyrene	ND
Naphthalene	ND
Phenanthrene	5.50
Pyrene	ND

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	ND
1,2-Dichloroethane	6.10
1,1-Dichloroethene	ND

cis-1,2-Dichloroethene	25.00
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	22.00
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	11.00
Vinyl chloride	ND

AROMATICS

Benzene	450.00	770.00
Chlorobenzene	ND	ND
1,2-Dichlorobenzene	ND	ND
1,3-Dichlorobenzene	ND	ND
1,4-Dichlorobenzene	ND	ND
Ethylbenzene	150.00	160.00
Toluene	ND	ND
Xylenes	40.00	ND

GRW-6

8/90 9/90 10/90 11/90 12/90

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.95
Lab conductivity, umhos/cm	4530.00
Lab resistivity, ohm-m	2.21
Total dissolved solids (180)	3190.00
Total dissolved solids (calc)	2950.00
Total alkalinity as CaCO3	599.00
Total acidity as CaCO3	0.00
Total hardness as CaCO3	1110.00
Sodium absorption ratio	8.45
Bicarbonate as HCO3	732.00
Carbonate as CO3	0.00
Chloride	818.00
Sulfate	702.00
Calcium	382.00
Magnesium	39.50
Potassium	2.16
Sodium	648.00

PAH

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

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	ND
1,2-Dichloroethane	6.10

1,1-Dichloroethene	ND
cis-1,2-Dichloroethene	4.50
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	8.10
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	1.60
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

AROMATICS

Benzene	220.00	300.00
Chlorobenzene	ND	ND
1,2-Dichlorobenzene	ND	ND
1,3-Dichlorobenzene	ND	ND
1,4-Dichlorobenzene	ND	20.00
Ethylbenzene	67.00	47.00
Toluene	ND	ND
Xylenes	46.00	6.80

GRW-13

8/90 9/90 10/90 11/90 12/90

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	8.02
Lab conductivity, umhos/cm	4500.00
Lab resistivity, ohm-m	2.22
Total dissolved solids (180)	3510.00
Total dissolved solids (calc)	3370.00
Total alkalinity as CaCO3	265.00
Total acidity as CaCO3	0.00
Total hardness as CaCO3	1210.00
Sodium absorption ratio	8.04
Bicarbonate as HCO3	323.00
Carbonate as CO3	0.00
Chloride	698.00
Sulfate	1430.00
Calcium	349.00
Magnesium	83.40
Potassium	3.36
Sodium	644.00

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	4.10
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	0.52
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
1,1,1-Trichloroethane	0.62
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	0.20
Vinyl chloride	ND

AROMATICS

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

ND
ND
ND
ND
ND
2.00
ND

GBR-15

8/90 9/90 10/90 11/90 12/90

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	8.17
Lab conductivity, umhos/cm	4510.00
Lab resistivity, ohm-m	2.22
Total dissolved solids (180)	3820.00
Total dissolved solids (calc)	3770.00
Total alkalinity as CaCO3	197.00
Total acidity as CaCO3	0.00
Total hardness as CaCO3	1300.00
Sodium absorption ratio	8.36
Bicarbonate as HCO3	240.00
Carbonate as CO3	0.00
Chloride	431.00
Sulfate	2040.00
Calcium	422.00
Magnesium	59.10
Potassium	6.80
Sodium	692.00

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	52.00
1,1-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

AROMATICS

Benzene	87.00
Chlorobenzene	ND

1,2-Dichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
Ethylbenzene
Toluene
Xylenes

ND
ND
ND
ND
ND
ND

GBR-17

8/90

9/90

10/90

11/90

12/90

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	8.08
Lab conductivity, umhos/cm	2620.00
Lab resistivity, ohm-m	3.82
Total dissolved solids (180)	2260.00
Total dissolved solids (calc)	2150.00
Total alkalinity as CaCO3	239.00
Total acidity as CaCO3	0.00
Total hardness as CaCO3	994.00
Sodium absorption ratio	4.14
Bicarbonate as HCO3	292.00
Carbonate as CO3	0.00
Chloride	76.10
Sulfate	1280.00
Calcium	257.00
Magnesium	85.80
Potassium	0.60
Sodium	300.00

HALOCARBONS

Bromodichloromethane	9.40
Bromoform	21.00
Bromomethane	ND
Carbon tetrachloride	14.00
Chlorobenzene	13.00
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	8.20
Chloromethane	ND
Dibromochloromethane	13.00
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	23.00
1,4-Dichlorobenzene	25.00
1,1-Dichloroethane	11.00
1,2-Dichloroethane	10.00
1,1-Dichloroethene	11.00
cis-1,2-Dichloroethene	11.00
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	5.60
cis-1,3-Dichloropropene	18.00
trans-1,3-Dichloropropene	13.00
Methylene chloride	11.00
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	15.00
1,1,1-Trichloroethane	17.00
1,1,2-Trichloroethane	ND
Trichloroethene	9.50
Trichlorofluoromethane	18.00
Vinyl chloride	ND

AROMATICS

Benzene	4.60
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Chlorobenzene	13.00
1,2-Dichlorobenzene	4.10
1,3-Dichlorobenzene	19.00
1,4-Dichlorobenzene	11.00
Ethylbenzene	7.80
Toluene	7.20
Xylenes	35.00

GBR-24-D

8/90

9/90

10/90

11/90

12/90

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.89
Lab conductivity, umhos/cm	4930.00
Lab resistivity, ohm-m	2.03
Total dissolved solids (180)	3730.00
Total dissolved solids (calc)	3580.00
Total alkalinity as CaCO3	246.00
Total acidity as CaCO3	0.00
Total hardness as CaCO3	1790.00
Sodium absorption ratio	4.75
Bicarbonate as HCO3	300.00
Carbonate as CO3	0.00
Chloride	679.00
Sulfate	1620.00
Calcium	578.00
Magnesium	83.70
Potassium	5.04
Sodium	462.00

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	44.00
1,1-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

AROMATICS

Benzene	25.00
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Chlorobenzene	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	1.70
Ethylbenzene	29.00
Toluene	4.80
Xylenes	16.00

GBR-30

8/90 9/90 10/90 11/90 12/90

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.35
Lab conductivity, umhos/cm	4600.00
Lab resistivity, ohm-m	2.18
Total dissolved solids (180)	3230.00
Total dissolved solids (calc)	3220.00
Total alkalinity as CaCO3	250.00
Total acidity as CaCO3	0.00
Total hardness as CaCO3	1270.00
Sodium absorption ratio	7.70
Bicarbonate as HCO3	304.00
Carbonate as CO3	0.00
Chloride	584.00
Sulfate	1400.00
Calcium	357.00
Magnesium	90.80
Potassium	2.76
Sodium	630.00

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	0.18
1,1-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND

AROMATICS

Benzene	ND
Chlorobenzene	ND
1,2-Dichlorobenzene	0.86

1,3-Dichlorobenzene
1,4-Dichlorobenzene
Ethylbenzene
Toluene
Xylenes

ND
2.60
1.60
1.20
3.50

GBR-31

8/90

9/90

10/90

11/90

12/90

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.58
Lab conductivity, umhos/cm	4670.00
Lab resistivity, ohm-m	2.14
Total dissolved solids (180)	3300.00
Total dissolved solids (calc)	3170.00
Total alkalinity as CaCO3	291.00
Total acidity as CaCO3	0.00
Total hardness as CaCO3	1120.00
Sodium absorption ratio	8.20
Bicarbonate as HCO3	354.00
Carbonate as CO3	0.00
Chloride	584.00
Sulfate	1410.00
Calcium	261.00
Magnesium	115.00
Potassium	2.01
Sodium	632.00

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	ND
1,2-Dichloroethane	ND
1,1-Dichloroethene	ND
cis-1,2-Dichloroethene	13.00
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	2.80
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	0.47
Trichlorofluoromethane	ND
Vinyl chloride	ND

AROMATICS

Benzene	ND
Chlorobenzene	0.34
1,2-Dichlorobenzene	1.20

1,3-Dichlorobenzene	1.80
1,4-Dichlorobenzene	1.50
Ethylbenzene	ND
Toluene	0.98
Xylenes	0.45

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

*ND - Not detected at specified detection limit

GIANT REFINING COMPANY
 ONSITE REMEDIATION PROJECT
 SEMI-ANNUAL UPGRADIENT ANALYTICAL DATA SUMMARY

GBR-32

8/90 9/90 10/90 11/90 12/90

GENERAL WATER CHEMISTRY

Lab pH (s.u.)					7.61
Lab conductivity, umhos/cm					4540.00
Lab resistivity, ohm-m					2.20
Total dissolved solids (180)					3300.00
Total dissolved solids (calc)					3230.00
Total alkalinity as CaCO3					335.00
Total acidity as CaCO3					0.00
Total hardness as CaCO3					1010.00
Sodium absorption ratio					9.19
Bicarbonate as HCO3					409.00
Carbonate as CO3					0.00
Chloride					330.00
Sulfate					1660.00
Calcium					293.00
Magnesium					68.70
Potassium					3.15
Sodium					673.00

METALS

Arsenic
 Barium
 Cadmium
 Chromium
 Lead
 Selenium
 Silver
 Mercury

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	ND
1,2-Dichloroethane	ND
1,1-Dichloroethene	ND
cis-1,2-Dichloroethene	160.00
trans-1,2-Dichloroethene	ND

12/90

1,2-Dichloropropane	ND
cis-1,3-Dichloropropene	ND
trans-1,3-Dichloropropene	ND
Methylene chloride	ND
1,1,2,2-Tetrachloroethane	16.00
Tetrachloroethene	ND
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	6.80
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

GBR-48

8/90

9/90

10/90

11/90

12/90

GENERAL WATER CHEMISTRY

Lab pH (s.u.)					7.18
Lab conductivity, umhos/cm					7080.00
Lab resistivity, ohm-m					1.41
Total dissolved solids (180)					5070.00
Total dissolved solids (calc)					4960.00
Total alkalinity as CaCO3					407.00
Total acidity as CaCO3					1800.00
Total hardness as CaCO3					10.20
Sodium absorption ratio					
Bicarbonate as HCO3					497.00
Carbonate as CO3					0.00
Chloride					1070.00
Sulfate					1980.00
Calcium					594.00
Magnesium					76.40
Potassium					4.90
Sodium					996.00

METALS

Arsenic
 Barium
 Cadmium
 Chromium
 Lead
 Selenium
 Silver
 Mercury

HALOCARBONS

Bromodichloromethane					ND
Bromoform					ND
Bromomethane					ND
Carbon tetrachloride					ND
Chloroethane					ND
2-Chloroethylvinylether					ND
Chloroform					ND
Chloromethane					ND
Dibromochloromethane					ND
1,2-Dichlorobenzene					ND
1,3-Dichlorobenzene					ND
1,4-Dichlorobenzene					ND
1,1-Dichloroethane					ND
1,2-Dichloroethane					ND
1,1-Dichloroethene					ND
cis-1,2-Dichloroethene					140.00
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					15
Dichloromethane	3.2				5.4

12/90

1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	11.0
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

GBR-49

8/90

9/90

10/90

11/90

12/90

GENERAL WATER CHEMISTRY

Lab pH (s.u.)					7.15
Lab conductivity, umhos/cm					4630.00
Lab resistivity, ohm-m					2.16
Total dissolved solids (100)					3350.00
Total dissolved solids (calc)					3310.00
Total alkalinity as CaCO3					257.00
Total acidity as CaCO3					0.00
Total hardness as CaCO3					1020.00
Sodium absorption ratio					9.14
Bicarbonate as HCO3					313.00
Carbonate as CO3					0.00
Chloride					431.00
Sulfate					1650.00
Calcium					386.00
Magnesium					15.10
Potassium					2.97
Sodium					672.00

METALS

Arsenic
 Barium
 Cadmium
 Chromium
 Lead
 Selenium
 Silver
 Mercury

HALOCARBONS

Bromodichloromethane	ND
Bromoform	ND
Bromomethane	ND
Carbon tetrachloride	ND
Chloroethane	ND
2-Chloroethylvinylether	ND
Chloroform	ND
Chloromethane	ND
Dibromochloromethane	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
1,1-Dichloroethane	ND
1,2-Dichloroethane	ND
1,1-Dichloroethene	ND
cis-1,2-Dichloroethene	120.00
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

12/90

Tetrachloroethene	15.00
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	9.10
Trichlorofluoromethane	ND
Vinyl chloride	ND
Dichloromethane	5.80

AROMATICS

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

GBR-50

8/90 9/90 10/90 11/90 12/90

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.68
Lab conductivity, umhos/cm	3480.00
Lab resistivity, ohm-m	2.87
Total dissolved solids (180)	2760.00
Total dissolved solids (calc)	2690.00
Total alkalinity as CaCO3	161.00
Total acidity as CaCO3	0.00
Total hardness as CaCO3	1050.00
Sodium absorption ratio	5.87
Bicarbonate as HCO3	196.00
Carbonate as CO3	0.00
Chloride	76.10
Sulfate	1740.00
Calcium	217.00
Magnesium	123.00
Potassium	2.94
Sodium	436.00

METALS

Arsenic
 Barium
 Cadmium
 Chromium
 Lead
 Selenium
 Silver
 Mercury

HALOCARBONS

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

12/90

1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	ND
Trichlorofluoromethane	ND
Vinyl chloride	ND
cis-1,2-Dichloroethene	ND
AROMATICS	
Benzene	ND
Chlorobenzene	ND
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	ND
Ethylbenzene	ND
Toluene	ND
Xylenes	ND

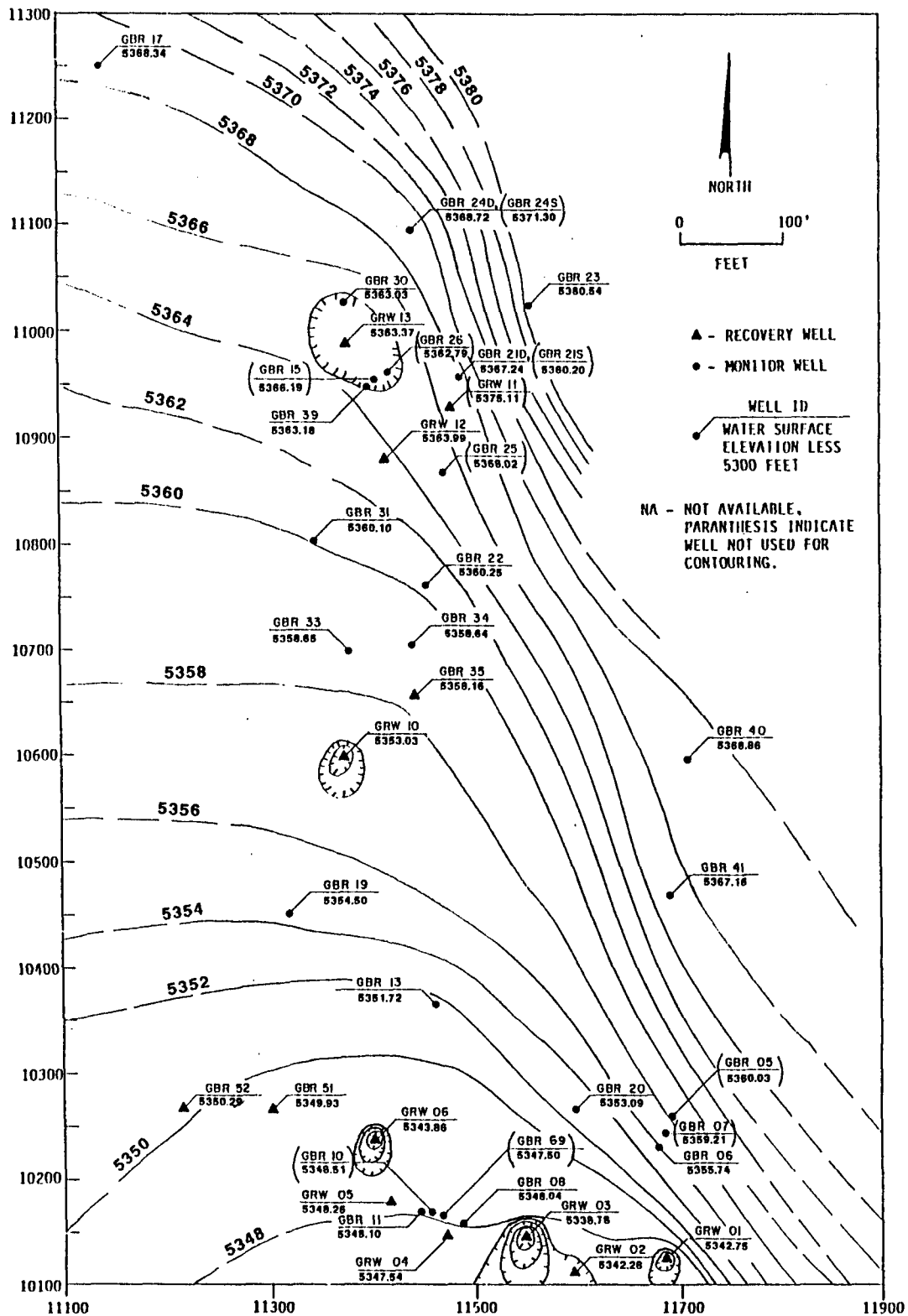
*ND - Not detected at specified detection limit

GIANT REFINING BLOOMFIELD REFINERY
MONTHLY POTENTIOMETRIC SURFACE

MONTH/YEAR: July, 1990

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	51.55		0.00	5342.75
GRW-2	5391.28	49.00		0.00	5342.28
GRW-3	5388.77	49.99		0.00	5338.78
GRW-4	5390.02	42.48		0.00	5347.54
GRW-5	5390.56	42.30		0.00	5348.26
GRW-6	5390.81	40.95		0.00	5343.86
GRW-10	5395.02	44.55	41.35	3.20	5353.03
GRW-11	5397.85	22.74		0.00	5375.11
GRW-12	5397.24	33.25		0.00	5363.99
GRW-13	5396.90	33.53		0.00	5363.37
GBR-5	5395.07	43.13	33.02	10.11	5360.03
GBR-6	5395.70	39.97	39.96	0.01	5355.74
GBR-7	5395.85	44.75	34.61	10.14	5359.21
GBR-8	5390.50	43.00	42.33	0.67	5348.04
GBR-9	5389.92	42.42		0.00	5347.50
GBR-10	5390.57	42.20	42.02	0.18	5348.51
GBR-11	5389.43	43.55	40.78	2.77	5348.10
GBR-13	5393.04	43.34	40.82	2.52	5351.72
GBR-15	5397.99	31.80		0.00	5366.19
GBR-17	5402.69	34.35		0.00	5368.34
GBR-18	5421.68	19.88		0.00	5401.80
GBR-19	5393.83	39.39	39.32	0.07	5354.50
GBR-20	5393.47	41.00	40.22	0.78	5353.09
GBR-21S	5400.65	20.55	20.42	0.13	5380.20
GBR-21D	5400.19	32.95		0.00	5367.24
GBR-22	5395.91	36.34	35.49	0.85	5360.25
GBR-23	5403.72	23.18		0.00	5380.54
GBR-24S	5396.08	24.85	24.76	0.09	5371.30
GBR-24D	5396.77	28.05		0.00	5368.72
GBR-25	5396.72	28.70		0.00	5368.02
GBR-26	5395.59	32.80		0.00	5362.79
GBR-30	5396.58	33.57	33.55	0.02	5363.03
GBR-31	5394.86	34.76		0.00	5360.10
GBR-33	5396.28	37.89	37.56	0.33	5358.65
GBR-34	5394.00	36.72	35.02	1.70	5358.64
GBR-35	5393.66	37.40	35.02	2.38	5358.16
GBR-39	5397.55	34.37		0.00	5363.18
GBR-40	5400.76	31.90		0.00	5368.86
GBR-41	5396.35	29.19		0.00	5367.16
GBR-51	5389.68	39.75		0.00	5349.93
GBR-52	5387.74	37.45		0.00	5350.29

* WSEL -- WATER SURFACE ELEVATION ADJUSTED FOR PRODUCT DEPTH



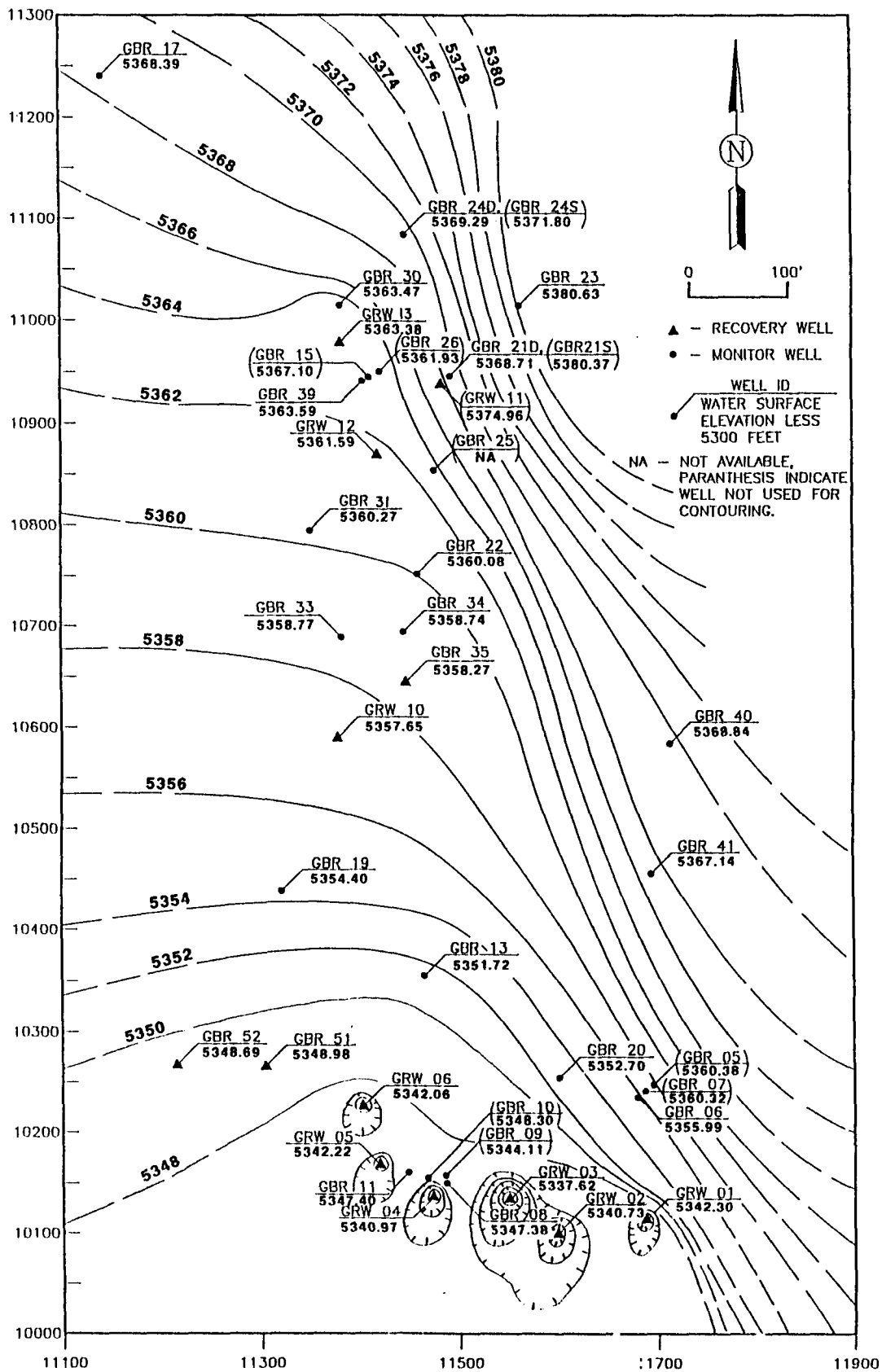
JULY 1990 WATER SURFACE CONTOUR MAP GIANT-BLOOMFIELD REFINERY

GIANT REFINING BLOOMFIELD REFINERY
MONTHLY POTENTIOMETRIC SURFACE

MONTH/YEAR: August, 1990

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	52.00		0.00	5342.30
GRW-2	5391.20	50.55		0.00	5340.73
GRW-3	5388.77	51.15		0.00	5337.62
GRW-4	5390.02	49.05		0.00	5340.97
GRW-5	5390.56	48.34		0.00	5342.22
GRW-6	5390.81	48.75		0.00	5342.06
GRW-10	5395.02	39.25	36.90	2.35	5357.65
GRW-11	5397.85	22.69		0.00	5374.96
GRW-12	5397.24	35.65		0.00	5361.59
GRW-13	5396.90	33.52		0.00	5363.38
GBR-5	5395.07	43.09	32.59	10.50	5360.38
GBR-6	5395.70	39.73	39.71	0.02	5355.99
GBR-7	5395.85	41.23	34.11	7.12	5360.32
GBR-8	5390.50	43.97	42.91	1.06	5347.38
GBR-9	5389.92	45.81		0.00	5344.11
GBR-10	5390.57	42.27		0.00	5348.30
GBR-11	5389.43	44.28	41.47	2.81	5347.40
GBR-13	5393.04	42.06	41.14	0.92	5351.72
GBR-15	5397.99	30.89		0.00	5367.10
GBR-17	5402.69	34.30		0.00	5368.39
GBR-18	5421.68	20.05		0.00	5401.63
GBR-19	5393.83	39.53	39.41	0.12	5354.40
GBR-20	5393.47	42.22	40.41	1.81	5352.70
GBR-21S	5400.65	20.37	20.26	0.11	5380.37
GBR-21D	5400.19	31.48		0.00	5368.71
GBR-22	5395.91	36.93	35.55	1.38	5360.08
GBR-23	5403.72	23.09		0.00	5380.63
GBR-24S	5396.05	24.38	24.25	0.13	5371.80
GBR-24D	5396.77	27.48		0.00	5369.29
GBR-25	5396.72	NA	NA	NA	NA
GBR-26	5395.59	33.66		0.00	5361.93
GBR-30	5396.58	33.11		0.00	5363.47
GBR-31	5394.86	34.59		0.00	5360.27
GBR-33	5396.28	37.95	37.40	0.55	5358.77
GBR-34	5394.00	36.24	35.02	1.22	5358.74
GBR-35	5393.66	37.16	34.95	2.21	5358.27
GBR-39	5397.55	33.96		0.00	5363.59
GBR-40	5400.76	31.92		0.00	5368.84
GBR-41	5396.35	29.21		0.00	5367.14
GBR-51	5389.68	40.70		0.00	5348.98
GBR-52	5387.74	39.05		0.00	5348.69

* WSEL - WATER SURFACE ELEVATION ADJUSTED FOR PRODUCT DEPTH
NA - Data Not Collected



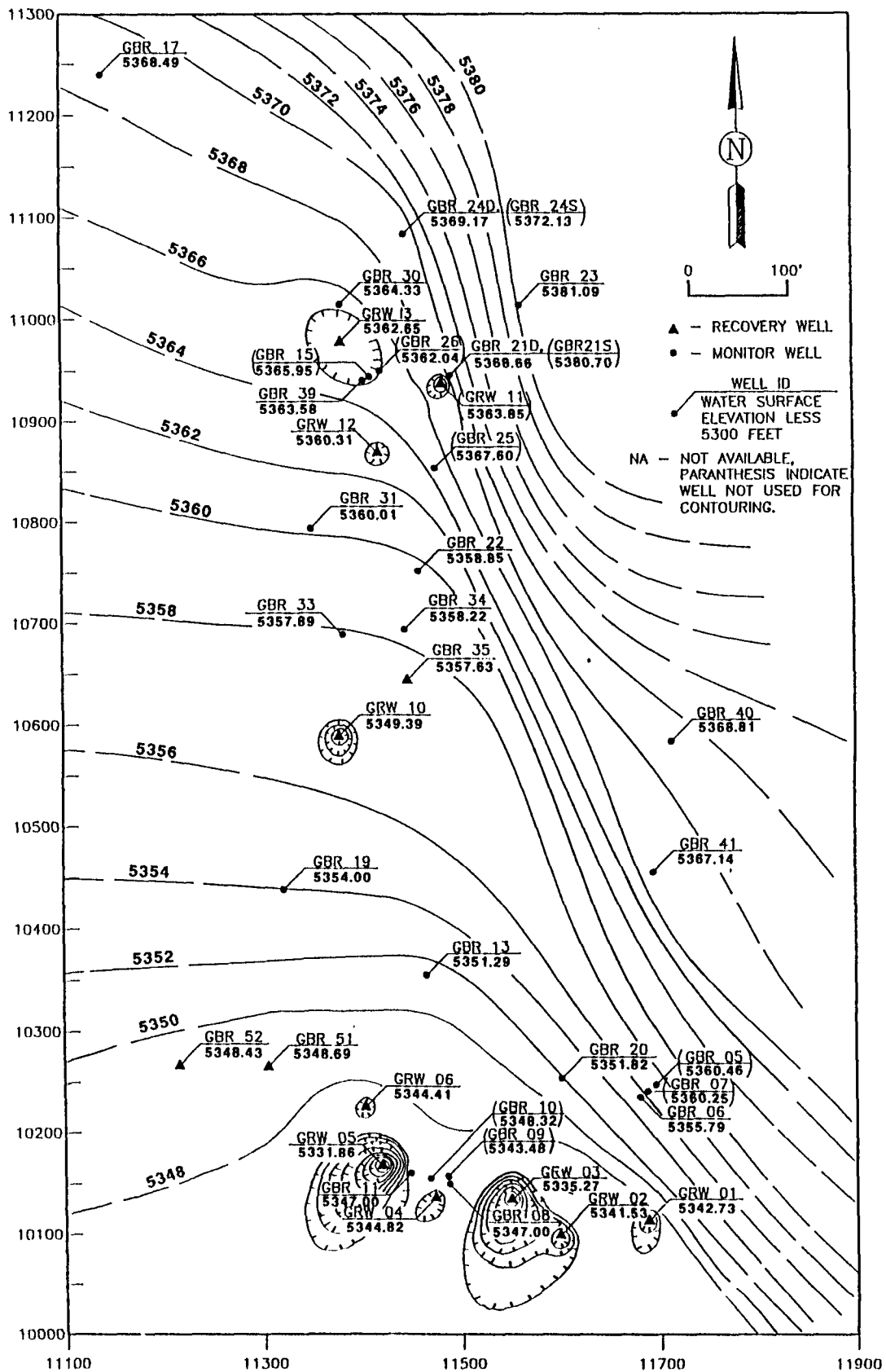
August 1990
Water Surface Contour Map Giant-Bloomfield Refinery

GIANT REFINING BLOOMFIELD REFINERY
MONTHLY POTENTIOMETRIC SURFACE

MONTH/YEAR: Sept., 1990

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	51.57		0.00	5342.73
GRW-2	5391.28	49.75		0.00	5341.53
GRW-3	5388.77	53.50		0.00	5335.27
GRW-4	5390.02	45.20		0.00	5344.82
GRW-5	5390.56	58.70		0.00	5331.86
GRW-6	5390.81	46.40		0.00	5344.41
GRW-10	5395.02	53.65	43.62	10.03	5349.39
GRW-11	5397.85	34.00		0.00	5363.85
GRW-12	5397.24	36.93		0.00	5360.31
GRW-13	5396.90	34.25		0.00	5362.65
GBR-5	5395.07	43.05	32.50	10.55	5360.46
GBR-6	5395.70	39.94	39.90	0.04	5355.79
GBR-7	5395.85	41.75	34.06	7.69	5360.25
GBR-8	5390.50	44.70	43.20	1.50	5347.00
GBR-9	5389.92	46.44		0.00	5343.48
GBR-10	5390.57	42.25		0.00	5348.32
GBR-11	5389.43	44.60	41.89	2.71	5347.00
GBR-13	5393.04	42.95	41.45	1.50	5351.29
GBR-15	5397.99	32.04		0.00	5365.95
GBR-17	5402.69	34.20		0.00	5368.49
GBR-18	5421.68	20.13		0.00	5401.55
GBR-19	5393.83	39.95	39.80	0.15	5354.00
GBR-20	5393.47	42.25	41.50	0.75	5351.82
GBR-21S	5400.65	19.95		0.00	5380.70
GBR-21D	5400.19	31.53		0.00	5368.66
GBR-22	5395.91	42.50	35.70	6.80	5358.85
GBR-23	5403.72	22.63		0.00	5381.09
GBR-24S	5396.08	23.95		0.00	5372.13
GBR-24D	5396.77	27.60		0.00	5369.17
GBR-25	5396.72	29.12		0.00	5367.60
GBR-26	5395.59	33.55		0.00	5362.04
GBR-30	5396.58	32.25		0.00	5364.33
GBR-31	5394.86	34.85		0.00	5360.01
GBR-33	5396.28	39.17	38.20	0.97	5357.89
GBR-34	5394.00	37.23	35.42	1.81	5358.22
GBR-35	5393.66	38.54	35.40	3.14	5357.63
GBR-39	5397.55	33.97		0.00	5363.58
GBR-40	5400.76	31.95		0.00	5368.81
GBR-41	5396.35	29.21		0.00	5367.14
GBR-51	5389.68	40.99		0.00	5348.69
GBR-52	5387.74	39.31		0.00	5348.43

* WSEL - WATER SURFACE ELEVATION ADJUSTED FOR PRODUCT DEPTH



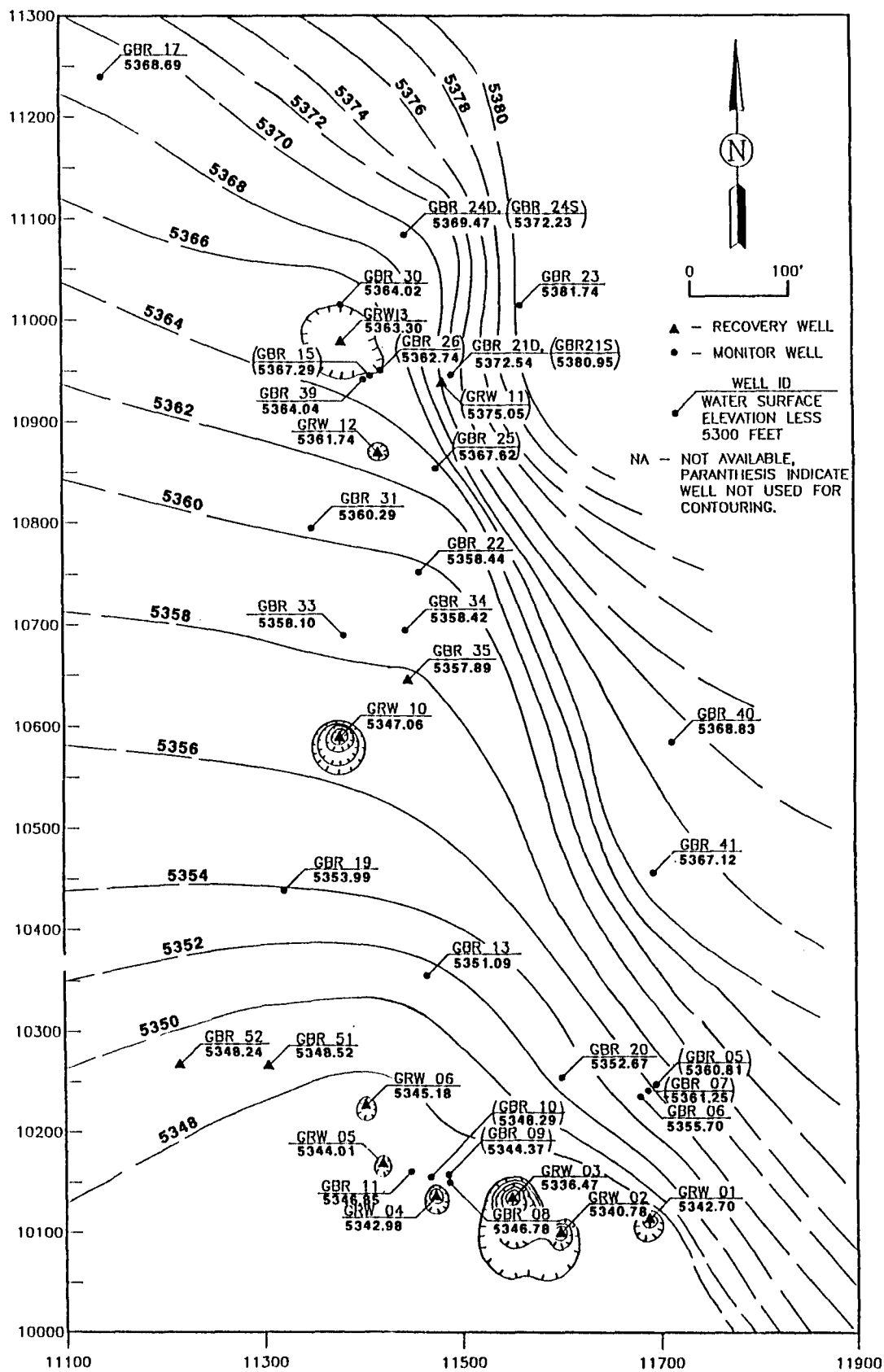
September 1990
Water Surface Contour Map Giant-Bloomfield Refinery

GIANT REFINING BLOOMFIELD REFINERY
MONTHLY POTENTIOMETRIC SURFACE

MONTH/YEAR: Oct. 1990

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	51.60		0.00	5342.70
GRW-2	5391.28	50.50		0.00	5340.78
GRW-3	5388.77	52.30		0.00	5336.47
GRW-4	5390.02	47.04		0.00	5342.98
GRW-5	5390.56	46.57	46.54	0.03	5344.01
GRW-6	5390.81	45.65	45.63	0.02	5345.18
GRW-10	5395.02	48.60	47.80	0.80	5347.06
GRW-11	5397.85	22.80		0.00	5375.05
GRW-12	5397.24	35.50		0.00	5361.74
GRW-13	5396.90	33.60		0.00	5363.30
GBR-5	5395.07	36.90	33.60	3.30	5360.81
GBR-6	5395.70	40.00		0.00	5355.70
GBR-7	5395.85	35.65	34.34	1.31	5361.25
GBR-8	5390.50	45.00	43.40	1.60	5346.78
GBR-9	5389.92	45.55		0.00	5344.37
GBR-10	5390.57	42.28		0.00	5348.29
GBR-11	5389.43	44.20	42.18	2.02	5346.85
GBR-13	5393.04	43.20	41.64	1.56	5351.09
GBR-15	5397.99	30.70		0.00	5367.29
GBR-17	5402.69	34.00		0.00	5368.69
GBR-18	5421.68	19.95		0.00	5401.73
GBR-19	5393.83	39.84		0.00	5353.99
GBR-20	5393.47	41.40	40.65	0.75	5352.67
GBR-21S	5400.65	19.79	19.68	0.11	5380.95
GBR-21D	5400.19	27.65		0.00	5372.54
GBR-22	5395.91	40.35	36.75	3.60	5358.44
GBR-23	5403.72	21.98		0.00	5381.74
GBR-24S	5396.08	23.85		0.00	5372.23
GBR-24D	5396.77	27.30		0.00	5369.47
GBR-25	5396.72	29.10		0.00	5367.62
GBR-26	5395.59	32.85		0.00	5362.74
GBR-30	5396.58	32.56		0.00	5364.02
GBR-31	5394.86	34.57		0.00	5360.29
GBR-33	5396.28	38.97	37.98	0.99	5358.10
GBR-34	5394.00	36.64	35.31	1.33	5358.42
GBR-35	5393.66	37.55	35.32	2.23	5357.89
GBR-39	5397.55	33.51		0.00	5364.04
GBR-40	5400.76	31.93		0.00	5368.83
GBR-41	5396.35	29.23		0.00	5367.12
GBR-51	5389.68	41.16		0.00	5348.52
GBR-52	5387.74	39.50		0.00	5348.24

* WSEL - WATER SURFACE ELEVATION ADJUSTED FOR PRODUCT DEPTH



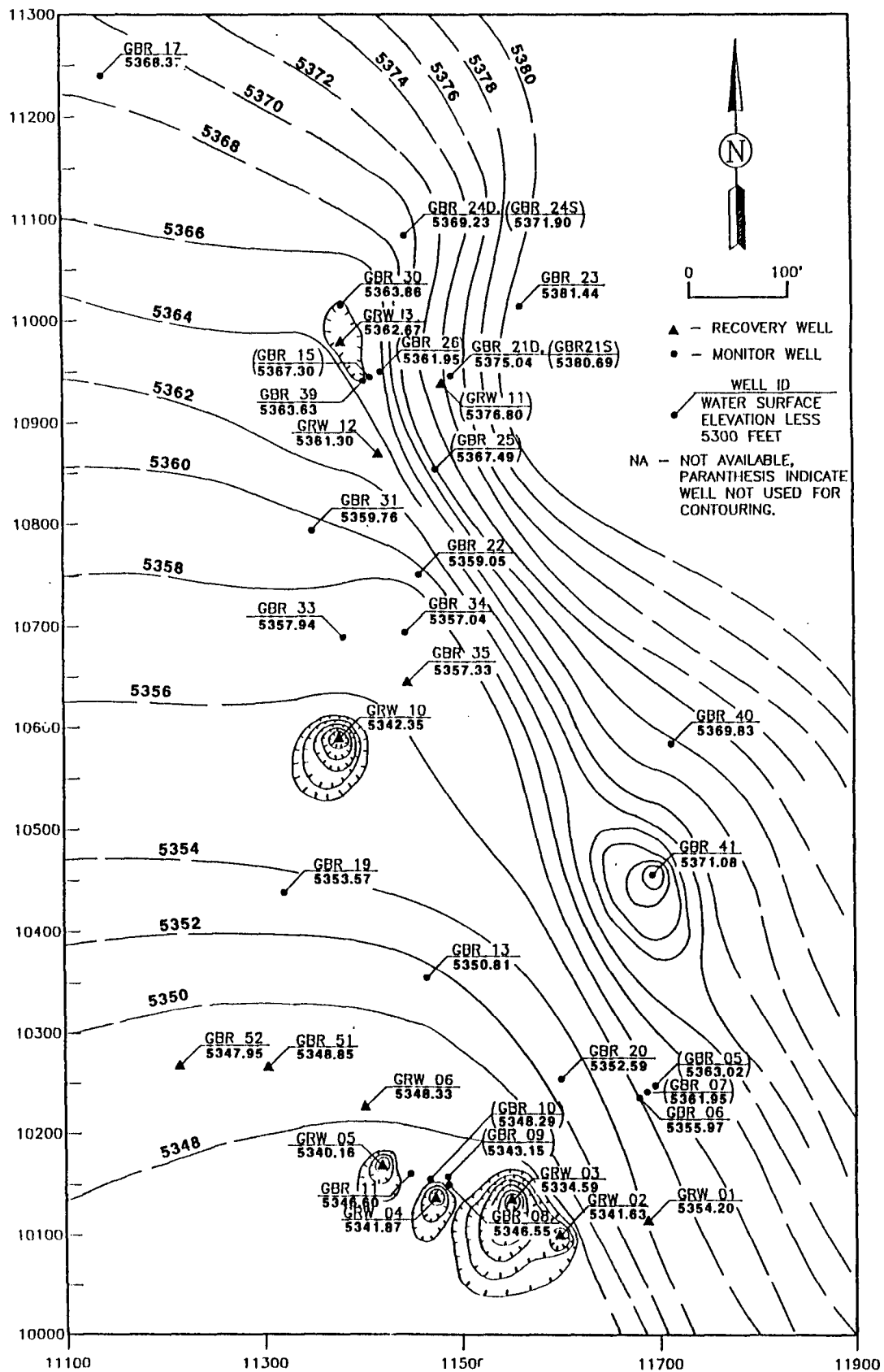
October 1990
Water Surface Contour Map Giant-Bloomfield Refinery

GIANT REFINING BLOOMFIELD REFINERY
MONTHLY POTENTIOMETRIC SURFACE

MONTH/YEAR: Nov., 1990

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	40.10		0.00	5354.20
GRW-2	5391.20	49.65		0.00	5341.63
GRW-3	5388.77	54.18		0.00	5334.59
GRW-4	5390.02	48.15		0.00	5341.87
GRW-5	5390.56	50.40		0.00	5340.16
GRW-6	5390.81	42.48		0.00	5348.33
GRW-10	5395.02	53.53	52.45	1.08	5342.35
GRW-11	5397.85	21.05		0.00	5376.80
GRW-12	5397.24	35.94		0.00	5361.30
GRW-13	5396.90	34.23		0.00	5362.67
GBR-5	5395.07	33.95	31.58	2.37	5363.02
GBR-6	5395.70	39.73		0.00	5355.97
GBR-7	5395.85	34.77	33.68	1.09	5361.95
GBR-8	5390.50	45.53	43.55	1.98	5346.55
GBR-9	5389.92	46.77		0.00	5343.15
GBR-10	5390.57	42.28		0.00	5348.29
GBR-11	5389.43	44.47	42.42	2.05	5346.60
GBR-13	5393.04	43.53	41.90	1.63	5350.81
GBR-15	5397.99	30.69		0.00	5367.30
GBR-17	5402.69	34.32		0.00	5368.37
GBR-18	5421.68	19.88		0.00	5401.80
GBR-19	5393.83	40.43	40.22	0.21	5353.57
GBR-20	5393.47	40.88		0.00	5352.59
GBR-21S	5400.65	20.04	19.94	0.10	5380.69
GBR-21D	5400.19	25.15		0.00	5375.04
GBR-22	5395.91	40.27	36.01	4.26	5359.05
GBR-23	5403.72	22.28		0.00	5381.44
GBR-24S	5396.08	24.32	24.15	0.17	5371.90
GBR-24D	5396.77	27.54		0.00	5369.23
GBR-25	5396.72	29.23		0.00	5367.49
GBR-26	5395.59	33.64		0.00	5361.95
GBR-30	5396.58	32.72		0.00	5363.86
GBR-31	5394.86	35.10		0.00	5359.76
GBR-33	5396.28	38.80	38.23	0.57	5357.94
GBR-34	5394.00	37.50	36.83	0.67	5357.04
GBR-35	5393.66	38.35	35.83	2.52	5357.33
GBR-39	5397.55	33.92		0.00	5363.63
GBR-40	5400.76	30.93		0.00	5369.83
GBR-41	5396.35	25.27		0.00	5371.08
GBR-51	5389.68	40.83		0.00	5348.85
GBR-52	5387.74	39.79		0.00	5347.95

* WSEL - WATER SURFACE ELEVATION ADJUSTED FOR PRODUCT DEPTH



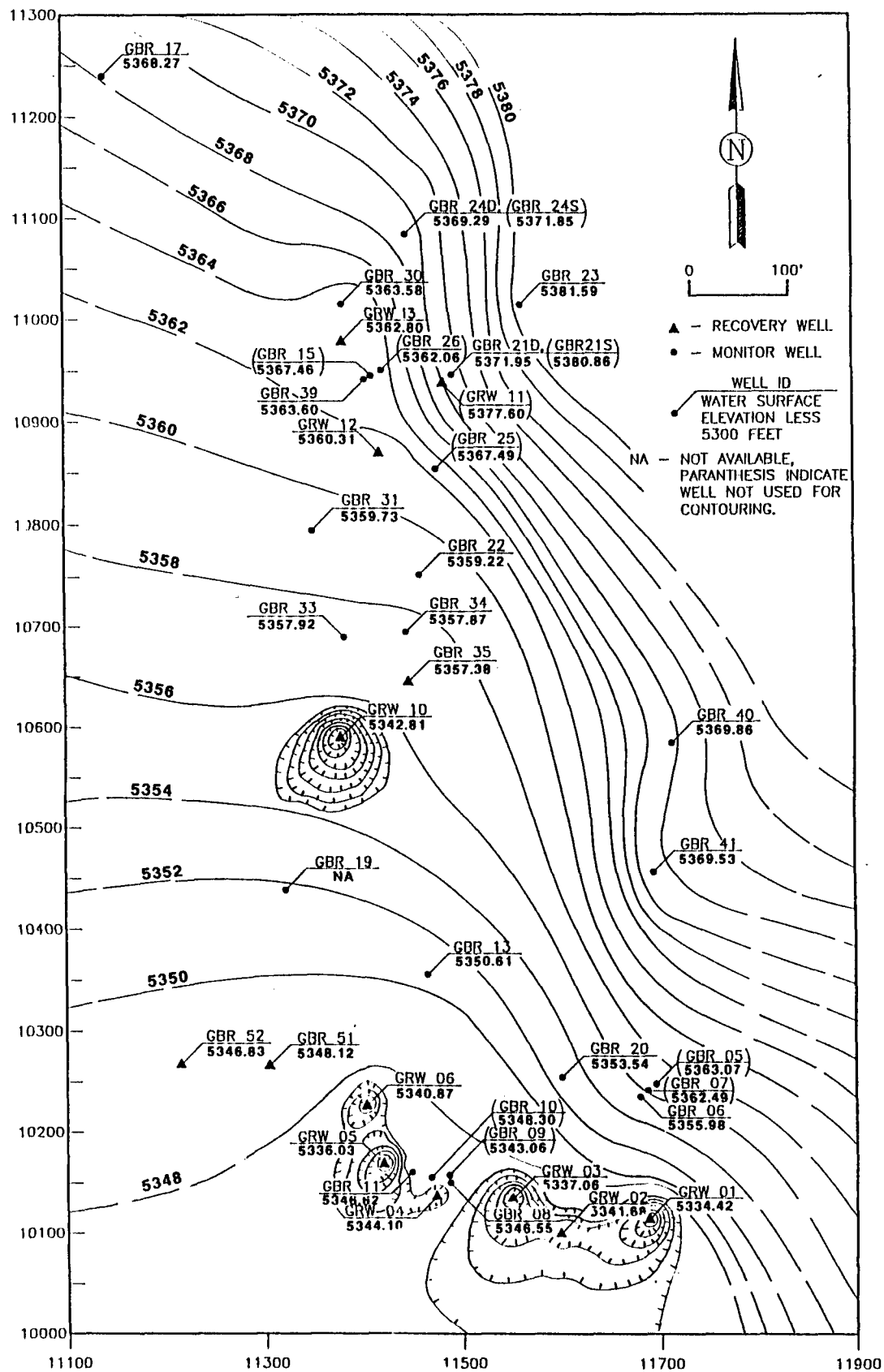
November 1990
Water Surface Contour Map Giant-Bloomfield Refinery

GIANT REFINING BLOOMFIELD REFINERY
MONTHLY POTENTIOMETRIC SURFACE

MONTH/YEAR: Dec., 1990

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	59.88		0.00	5334.42
GRW-2	5391.28	49.60		0.00	5341.68
GRW-3	5388.77	51.71		0.00	5337.06
GRW-4	5390.02	45.92		0.00	5344.10
GRW-5	5390.56	54.53		0.00	5336.03
GRW-6	5390.01	49.94		0.00	5340.07
GRW-10	5395.02	53.12	51.98	1.14	5342.81
GRW-11	5397.85	20.25		0.00	5377.60
GRW-12	5397.24	36.93		0.00	5360.31
GRW-13	5396.90	34.10		0.00	5362.80
GBR-5	5395.07	33.02	31.75	1.27	5363.07
GBR-6	5395.70	39.72		0.00	5355.98
GBR-7	5395.85	34.22	33.14	1.08	5362.49
GBR-8	5390.50	45.54	43.55	1.99	5346.55
GBR-9	5389.92	46.86		0.00	5343.06
GBR-10	5390.57	42.27		0.00	5348.30
GBR-11	5389.43	44.35	42.42	1.93	5346.62
GBR-13	5393.04	44.33	41.95	2.38	5350.61
GBR-15	5397.99	30.53		0.00	5367.46
GBR-17	5402.69	34.42		0.00	5368.27
GBR-18	5421.68	20.23		0.00	5401.45
GBR-19	5393.83	NA	NA	NA	NA
GBR-20	5393.47	39.93		0.00	5353.54
GBR-21S	5400.65	19.79		0.00	5380.86
GBR-21D	5400.19	28.24		0.00	5371.95
GBR-22	5395.91	39.92	35.88	4.04	5359.22
GBR-23	5403.72	22.13		0.00	5381.59
GBR-24S	5396.08	24.23		0.00	5371.85
GBR-24D	5396.77	27.48		0.00	5369.29
GBR-25	5396.72	29.23		0.00	5367.49
GBR-26	5395.59	33.53		0.00	5362.06
GBR-30	5396.58	33.00		0.00	5363.58
GBR-31	5394.86	35.13		0.00	5359.73
GBR-33	5396.28	38.84	38.24	0.60	5357.92
GBR-34	5394.00	37.35	35.83	1.52	5357.87
GBR-35	5393.66	38.04	35.84	2.20	5357.38
GBR-39	5397.55	33.95		0.00	5363.60
GBR-40	5400.76	30.90		0.00	5369.86
GBR-41	5396.35	26.82		0.00	5369.53
GBR-51	5389.68	41.56		0.00	5348.12
GBR-52	5387.74	40.91		0.00	5346.83

* WSEL -- WATER SURFACE ELEVATION ADJUSTED FOR PRODUCT DEPTH
NA - Data Not Collected



December 1990
Water Surface Contour Map Giant-Bloomfield Refinery

Giant Refining Co. Bloomfield Refinery
Quarterly Recovery Well
Volume Tabulation

Third Quarter of 1990

	Well	Month #1	Month #2	Month #3	Total
GRW-1	6850	6440	6820	20110	
GRW-2	12560	11530	10730	34820	
GRW-3	50360	34960	35120	120440	
GRW-4	21610	22570	22030	66210	
GRW-5	50780	57220	51790	159790	
GRW-6	30750	22600	22160	75510	
GRW-10	135610	140030	275690	551330	
GRW-11	1661	0	5492	7153	
GRW-12	10482	6934	6711	24127	
GRW-13	15808	10038	10070	35916	
Total Volume Pumped In Gallons				1095406	

Giant Refining Co. Bloomfield Refinery
Quarterly Net Tank
Volume Change

Third Quarter, 1990

Tank Number	Beginning Volume	Ending Volume	Net Change
102	8217	16904	8687
106	8010	8010	0
21	357568	354524	-3044
22	56978	205488	148510
27	185631	185631	0
32	159291	159291	0
34	200948	200948	0
35	0	0	0
37	352232	250231	-102001
Total Net Volume Change			52152

Giant Refining Co. Bloomfield Refinery
Total Volume Summary

Third Quarter, 1990

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Total Volume Of Water Recovered	1095406
Net Change In Storage Volume	52152

Total Water Pumped To The Infiltration Gallery	1223474
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Difference	180220
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Comments: The approximately 16% difference
can be accounted for in meter
inaccuracy, and the estimated
volumes of the air lift pump
discharges.

Giant Refining Co. Bloomfield Refinery
Quarterly Recovery Well
Volume Tabulation

Fourth Quarter of 1990

	Well	Month #1	Month #2	Month #3	Total
GRW-1	8680	6130	8000	22810	
GRW-2	12570	8660	12140	33370	
GRW-3	45950	34870	37650	118470	
GRW-4	24470	16990	20180	61640	
GRW-5	76250	46590	48030	170870	
GRW-6	26320	16400	19600	62320	
GRW-10	242950	169320	150340	562610	
GRW-11	2697	0	0	2697	
GRW-12	4205	3359	3706	11270	
GRW-13	6293	5031	5551	16875	
Total Volume Pumped In Gallons					1062932

Giant Refining Co. Bloomfield Refinery
Quarterly Net Tank
Volume Change

Fourth Quarter, 1990

Tank Number	Beginning Volume	Ending Volume	Net Change
102	16904	19722	2818
106	8010	8010	0
21	354524	418451	63927
22	205488	317423	111935
27	185631	185631	0
32	159291	159291	0
34	200948	200948	0
35	0	0	0
37	250231	250231	0
Total Net Volume Change			178680

Giant Refining Co. Bloomfield Refinery
Total Volume Summary

Fourth Quarter, 1990

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Total Volume Of Water Recovered	1062932
Net Change In Storage Volume	178680
Total Water Pumped To The Infiltration Gallery	1174650

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Difference	290398
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Comments: The approximately 27% difference
can be accounted for in meter
inaccuracy, and the estimated
volumes of the air lift pump
discharges.

SPECIFIC CONDUCTANCE VALUES
FOR GRW-13 IN umhos/cm
THIRD AND FOURTH QUARTERS, 1990

<u>7/90</u>	<u>8/90</u>	<u>9/90</u>
5090	4820	N/C

<u>10/90</u>	<u>11/90</u>	<u>12/90</u>
5410	N/C	N/C

*N/C - No data collected

GRW-1

8/90 9/90 10/90 11/90 12/90

AROMATICS

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

GRW-2

8/90 9/90 10/90 11/90 12/90

AROMATICS

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

BRW-5

	8/90	9/90	10/90	11/90	12/90
AROMATICS					
Benzene		140.00			
Chlorobenzene		ND			
1,2-Dichlorobenzene		ND			
1,3-Dichlorobenzene		ND			
1,4-Dichlorobenzene		ND			
Ethylbenzene		120.00			
Toluene		ND			
Xylenes		14.00			

GBR-6

8/90

9/90

10/90

11/90

12/90

GENERAL WATER CHEMISTRY

Bicarbonate as HCO_3

1170.00

Carbonate as CO_3

0.00

Chloride

387.00

Sulfate

728.00

Calcium

373.00

Magnesium

61.50

Potassium

3.21

Sodium

509.00

GRW-10

	8/90	9/90	10/90	11/90	12/90
AROMATICS					
Benzene		2.20			
Chlorobenzene		ND			
1,2-Dichlorobenzene		ND			
1,3-Dichlorobenzene		ND			
1,4-Dichlorobenzene		ND			
Ethylbenzene		5.30			
Toluene		0.33			
Xylenes		19.00			

GRW-12

	8/90	9/90	10/90	11/90	12/90
AROMATICS					
Benzene		1400.00			
Chlorobenzene		ND			
1,2-Dichlorobenzene		ND			
1,3-Dichlorobenzene		ND			
1,4-Dichlorobenzene		ND			
Ethylbenzene		52.00			
Toluene		2.20			
Xylenes		66.00			

GBR-20

8/90 9/90 10/90 11/90 12/90

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	8.43
Lab conductivity, umhos/cm	3120.00
Lab resistivity, ohm-m	3.21
Total dissolved solids (180)	1820.00
Total dissolved solids (calc)	1760.00
Total alkalinity as CaCO3	1000.00
Total acidity as CaCO3	0.00
Total hardness as CaCO3	106.00
Sodium absorption ratio	29.40
Bicarbonate as HCO3	1070.00
Carbonate as CO3	71.70
Chloride	352.00
Sulfate	67.50
Calcium	36.10
Magnesium	3.95
Potassium	2.80
Sodium	698.00

GBR-41

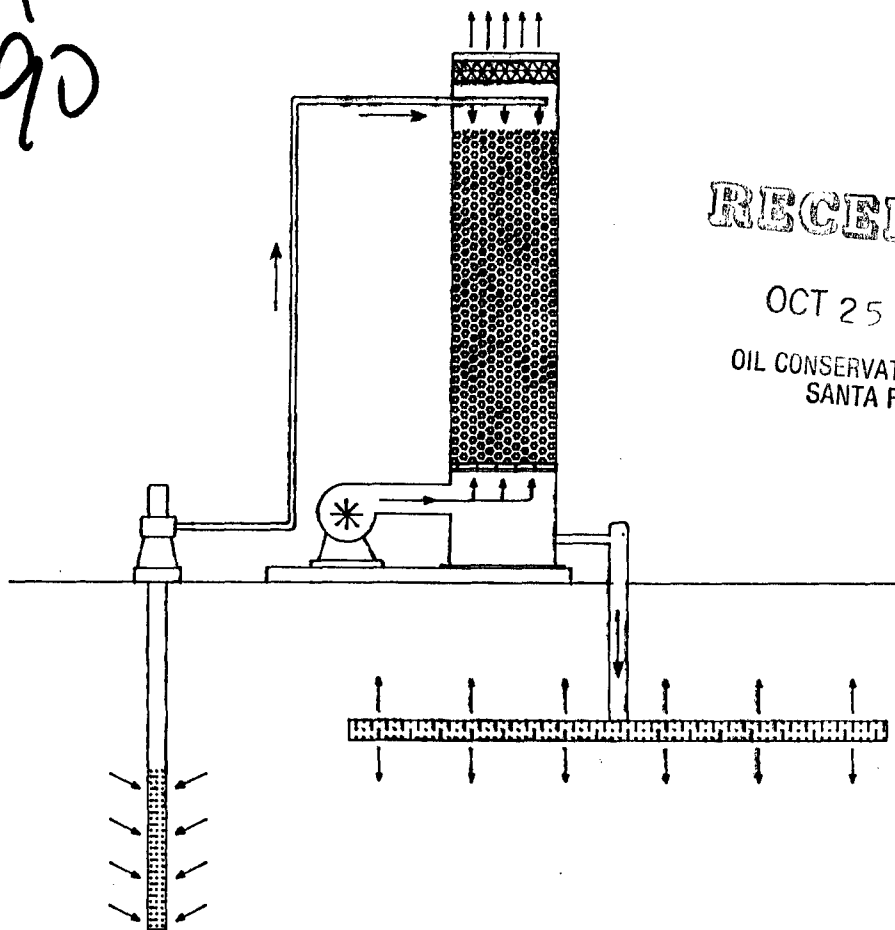
	8/90	9/90	10/90	11/90	12/90
GENERAL WATER CHEMISTRY					
Lab pH (s.u.)			7.80	6.97	
Lab conductivity, umhos/cm			4620.00	6840.00	
Lab resistivity, ohm-m			2.16	1.46	
Total dissolved solids (180)			3240.00	5050.00	
Total dissolved solids (calc)			3130.00	4830.00	
Total alkalinity as CaCO3			770.00	428.00	
Total acidity as CaCO3			0.00	0.00	
Total hardness as CaCO3			1200.00	1730.00	
Sodium absorption ratio			8.40	10.10	
Bicarbonate as HCO3			939.00	522.00	
Carbonate as CO3			0.00	0.00	
Chloride			467.00	812.00	
Sulfate			1090.00	2180.00	
Calcium			365.00	482.00	
Magnesium			71.30	128.00	
Potassium			4.56	2.30	
Sodium			670.00	966.00	

GIANT

REFINING CO.

BLOOMFIELD REFINERY
REMEDATION PROJECT

2nd
Quarter
1990



RECEIVED

OCT 25 1990

OIL CONSERVATION DIV.
SANTA FE

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QUARTERLY DATA REPORT
GIANT BLOOMFIELD REFINERY
SECOND QUARTER, 1990

Prepared by:

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SECTION 1

INTRODUCTION AND SUMMARY

Introduction and Summary
Quarterly Report
Second Quarter 1990

Introduction

During the second quarter of 1990, several changes were made to the remediation system at the refinery. First, the replacement of all remaining steel piping in the system was completed. The PVC pipe which was installed greatly enhances the longevity of our system. Second, during the replacement of the piping, pressure testing of the system was conducted, assuring us that there were no leaks in the piping. Third, the batch system installation was completed. Installation of the batch system greatly enhances our water processing scheme. All water is currently being processed twice prior to discharge. Fourth, the programming of our microprocessor based safety and control system was enhanced, giving us greater confidence and control over the automatic functions of the system.

In addition, to facilitate the BLM's landfill investigation, on several occasions Giant allowed the BLM to access upgradient wells for sample collection.

Summary

Section 2

Section 2 contains a summary of the quarterly analytical results. This is a change from previous reports where data was reported in the raw format in which we receive it from the laboratory. The new format should be easier to review. Subsequent reports will contain updates revealing historical trends of the analytes. Raw data is available on request as a supplement to the quarterly report.

Section 3

Semiannually, samples from upgradient wells are collected and analyzed to determine background migration from upgradient sources. Again, the data is tabulated for easy review, but is available in raw format on request.

Section 4

Potentiometric surface maps, as well as actual water surface elevations and product thicknesses are included in section four.

Section 5

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

Section 6

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

Section 7

Subsequent to the issuing of the first quarterly report of 1990, the analytical laboratory informed us that they were revising several of the reports included in our first quarterly report. Their explanation and revised reports are included in this section.

Section 8

Samples in addition to those required in the discharge plan were collected. The results are included in this final section of the report.

SECTION 2

QUARTERLY ANALYTICAL
DATA SUMMARY

GIANT REFINING COMPANY
ONSITE REMEDIATION PROJECT
QUARTERLY ANALYTICAL DATA SUMMARY
SECOND QUARTER, 1990

STRIPPER INFLUENT	5/90	5/90	6/90	6/90	7/90	7/90
GENERAL WATER CHEMISTRY						
Lab pH (s.u.)		7.51		7.91		8.30
Lab conductivity, umhos/cm		4886.00		4635.00		4802.00
Lab resistivity, ohm-m		2.0467		2.1575		2.0625
Total dissolved solids (182), mg/l		3580.00		3124.00		3450.00
Total dissolved solids, (calc), mg/l		3509.00		3112.00		3451.00
Total alkalinity as CaCO ₃ , mg/l		508.06		597.83		553.90
Total acidity as CaCO ₃ , mg/l		0.00		0.00		0.00
Total hardness as CaCO ₃ , mg/l		1355.40		1084.32		1234.92
Sodium absorption ratio		8.00		8.87		8.48
	mg/l	meq/l	mg/l	meq/l	mg/l	meq/l
Bicarbonate as HCO ₃	619.80	10.16	729.40	11.96	675.80	11.08
Carbonate as CO ₃	0.00	0.00	0.00	0.00	0.00	0.00
Chloride	583.50	16.46	613.90	17.32	577.10	16.28
Sulfate	1418.00	29.54	1068.70	22.26	1390.90	28.98
Calcium	485.90	24.25	333.30	16.63	409.60	20.44
Magnesium	34.80	2.86	61.40	5.05	51.80	4.26
Potassium	5.30	0.14	4.60	0.12	3.80	0.10
Sodium	677.00	29.45	671.50	29.21	685.50	29.82
Major cations		56.69		51.01		54.61
Major anions		56.16		51.54		56.33
Cation/anion difference (%)		0.47		0.51		1.55
HALOCARBONS						
	ug/l	ug/l	ug/l	ug/l	ug/l	ug/l
Bromodichloromethane	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	1.20	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND
2-Chloroethylvinylether	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	2.20	2.20	ND	ND	ND	16.00
1,1-Dichloroethene	ND	ND	1.30	ND	ND	ND
cis-1,2-Dichloroethene	5.90	ND	ND	ND	ND	16.00
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND
Methylene chloride	ND	ND	ND	ND	ND	6.20
1,1,2,2-Tetrachloroethane	ND	ND	0.99	ND	ND	ND

Tetrachloroethene	2.70	ND	4.20
1,1,1-Trichloroethane	0.53	ND	16.00
1,1,2-Trichloroethane	ND	ND	ND
Trichloroethene	2.60	ND	36.00
Trichlorofluoromethane	ND	ND	ND
Vinyl chloride	ND	ND	ND
AROMATICS			
Benzene	22.00	ND	52.00
Chlorobenzene	ND	4.50	ND
1,2-Dichlorobenzene	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND
Ethylbenzene	3.50	7.10	6.70
Toluene	ND	1.20	2.20
Xylenes	3.80	16.00	36.00

STRIPPER EFFLUENT

GENERAL WATER CHEMISTRY

Lab pH (s.u.)	7.69	6/90	7/90	8.01	8.16
Lab conductivity, umhos/cm	4806.00			4646.00	4690.00
Lab resistivity, ohm-m	2.0807			2.1524	2.1322
Total dissolved solids (180), mg/l	3498.00			3152.00	3346.00
Total dissolved solids, (calc), mg/l	3436.00			3227.00	3242.00
Total alkalinity as CaCO ₃ , mg/l	450.76			485.14	391.55
Total acidity as CaCO ₃ , mg/l	0.00			0.00	0.00
Total hardness as CaCO ₃ , mg/l	1295.16			1114.44	1094.36
Sodium absorption ratio	8.17			9.19	8.78
	mg/l	meq/l	mg/l	meq/l	mg/l
Bicarbonate as HCO ₃	549.90	9.02	591.90	9.70	477.70
Carbonate as CO ₃	0.00	0.00	0.00	0.00	0.00
Chloride	572.80	16.16	650.60	18.35	571.90
Sulfate	1419.70	29.58	1160.80	24.18	1383.90
Calcium	449.80	22.44	369.50	18.44	289.20
Magnesium	42.10	3.46	46.80	3.85	90.70
Potassium	5.60	0.14	2.90	0.07	3.70
Sodium	676.00	29.40	705.00	30.67	668.00
Major cations		55.45		53.03	29.06
Major anions		54.75		52.24	51.04
Cation/anion difference (%)		0.64		0.75	52.79
					1.69

HALOCARBONS

Bromodichloromethane	ug/l	ug/l
Bromoform	ND	ND
Bromomethane	ND	ND
Carbon tetrachloride	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
1,1-Dichloroethene	0.17	ND
cis-1,2-Dichloroethene	ND	ND
trans-1,2-Dichloroethene	ND	ND
1,2-Dichloropropane	5.20	ND
cis-1,3-Dichloropropene	ND	ND
trans-1,3-Dichloropropene	ND	ND
Methylene chloride	ND	ND
1,1,2,2-Tetrachloroethane	ND	0.69
Tetrachloroethene	ND	ND
1,1,1-Trichloroethane	ND	0.14
1,1,2-Trichloroethane	ND	0.94
Trichloroethene	ND	ND
Trichlorofluoromethane	ND	6.80
Vinyl chloride	ND	0.24
		ND

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

ND
 ND
 ND
 ND
 ND
 ND
 ND
 ND

ND
 ND
 ND
 ND
 ND
 ND
 ND
 ND

ND
 ND
 ND
 ND
 ND
 ND
 ND
 ND

GRW-3

GENERAL WATER CHEMISTRY

Lab pH (s.u.)
 Lab conductivity, umhos/cm
 Lab resistivity, ohm-m
 Total dissolved solids (180), mg/l
 Total dissolved solids, (calc), mg/l
 Total alkalinity as CaCO₃, mg/l
 Total acidity as CaCO₃, mg/l
 Total hardness as CaCO₃, mg/l
 Sodium absorption ratio

Bicarbonate as HCO₃Carbonate as CO₃

Chloride

Sulfate

Calcium

Magnesium

Potassium

Sodium

Major cations

Major anions

Cation/anion difference (%)

2.5

PAH

Acenaphthene

Acenaphthylene

Anthracene

Benzo(a)anthracene

Benzo(a)pyrene

Benzo(b)fluoranthene

Benzo(g,h,i)perylene

Benzo(k)fluoranthene

Chrysene

Dibenzo(a,h)anthracene

Fluoranthene

Fluorene

Indeno(1,2,3-cd)pyrene

Naphthalene

Phenanthrene

Pyrene

HALOCARBONS

Bromodichloromethane

Bromoform

Bromomethane

Carbon tetrachloride

Chloroethane

2-Chloroethylvinylether

Chloroform

Chloromethane

Dibromochloromethane

1,2-Dichlorobenzene

1,3-Dichlorobenzene

5/90 5/90 6/90 6/90 7/90 7/90

7.94

4465.00

2.2396

3042.00

3014.00

821.30

0.00

953.80

9.63

mg/l

1002.00

0.00

461.70

1010.60

333.30

29.70

2.60

683.50

29.73

48.87

50.51

1.64

ug/l

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

1,4-Dichlorobenzene
 1,1-Dichloroethane
 1,2-Dichloroethane
 1,1-Dichloroethene
 cis-1,2-Dichloroethene
 trans-1,2-Dichloroethene
 1,2-Dichloropropane
 cis-1,3-Dichloropropene
 trans-1,3-Dichloropropene
 Methylene chloride
 1,1,2,2-Tetrachloroethane
 Tetrachloroethene
 1,1,1-Trichloroethane
 1,1,2-Trichloroethane
 Trichloroethene
 Trichlorofluoromethane
 Vinyl chloride

ND
 ND
 ND
 ND
 22.00
 ND
 ND
 ND
 ND
 ND
 ND
 ND
 ND
 ND
 ND
 ND
 ND

AROMATICS

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

380.00
 ND
 ND
 ND
 ND
 160.00
 ND
 57.00

GRW-4

GENERAL WATER CHEMISTRY

Lab pH (s.u.)
 Lab conductivity, umhos/cm
 Lab resistivity, ohm-m
 Total dissolved solids (180), mg/l
 Total dissolved solids, (calc), mg/l
 Total alkalinity as CaCO₃, mg/l
 Total acidity as CaCO₃, mg/l
 Total hardness as CaCO₃, mg/l
 Sodium absorption ratio

Bicarbonate as HCO₃Carbonate as CO₃

Chloride

Sulfate

Calcium

Magnesium

Potassium

Sodium

Major cations

Major anions

Cation/anion difference (%)

2.7

PAH

Acenaphthene

Acenaphthylene

Anthracene

Benzo(a)anthracene

Benzo(a)pyrene

Benzo(b)fluoranthene

Benzo(g,h,i)perylene

Benzo(k)fluoranthene

Chrysene

Dibenzo(a,h)anthracene

Fluoranthene

Fluorene

Indeno(1,2,3-cd)pyrene

Naphthalene

Phenanthrene

Pyrene

HALOCARBONS

Bromodichloromethane

Bromoform

Bromomethane

Carbon tetrachloride

Chloroethane

2-Chloroethylvinylether

Chloroform

Chloromethane

Dibromochloromethane

1,2-Dichlorobenzene

1,3-Dichlorobenzene

5/90 6/90 7/90

7.91

4884.00

2.0475

3334.00

3374.00

974.10

0.00

1255.00

8.88

mg/l

1188.40

0.00

519.40

1076.50

413.60

54.20

2.70

723.00

31.45

56.62

56.56

0.05

ug/l

ND

24.00

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

3.90

ND

11.00

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

1,4-Dichlorobenzene
 1,1-Dichloroethane
 1,2-Dichloroethane
 1,1-Dichloroethene
 cis-1,2-Dichloroethene
 trans-1,2-Dichloroethene
 1,2-Dichloropropane
 cis-1,3-Dichloropropene
 trans-1,3-Dichloropropene
 Methylene chloride
 1,1,2,2-Tetrachloroethane
 Tetrachloroethene
 1,1,1-Trichloroethane
 1,1,2-Trichloroethane
 Trichloroethene
 Trichlorofluoromethane
 Vinyl chloride

ND
 13.00
 5.20
 ND
 46.00
 ND
 ND
 ND
 ND
 ND
 ND
 ND
 ND
 ND
 ND
 ND
 ND

AROMATICS

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

290.00
 ND
 ND
 ND
 ND
 56.00
 ND
 9.30

GRW-6

5/90

5/90

6/90

6/90

7/90

7/90

GENERAL WATER CHEMISTRY

Lab pH (s.u.)

Lab conductivity, umhos/cm

Lab resistivity, ohm-m

Total dissolved solids (180), mg/l

Total dissolved solids, (calc), mg/l

Total alkalinity as CaCO₃, mg/lTotal acidity as CaCO₃, mg/lTotal hardness as CaCO₃, mg/l

Sodium absorption ratio

Bicarbonate as HCO₃Carbonate as CO₃

Chloride

Sulfate

Calcium

Magnesium

Potassium

Sodium

Major cations

Major anions

Cation/anion difference (%)

PAH

Acenaphthene

Acenaphthylene

Anthracene

Benzo (a) anthracene

Benzo (a) pyrene

Benzo (b) fluoranthene

Benzo (g, h, i) perylene

Benzo (k) fluoranthene

Chrysene

Dibenzo (a, h) anthracene

Fluoranthene

Fluorene

Indeno (1, 2, 3-cd) pyrene

Naphthalene

Phenanthrene

Pyrene

HALOCARBONS

Bromodichloromethane

Bromoform

Bromomethane

Carbon tetrachloride

Chloroethane

2-Chloroethylvinylether

Chloroform

Chloromethane

Dibromochloromethane

1, 2-Dichlorobenzene

1, 3-Dichlorobenzene

7.74

5068.00

1.9732

3306.00

3179.00

668.50

0.00

1164.64

8.97

meq/l

13.37

0.00

23.24

17.42

16.43

6.86

0.06

30.60

53.95

54.03

0.07

ug/l

ND

26.00

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

1.60

ND

ND

ND

ND

ND

ND

ND

ND

ND

8.50

ND

ND

ND

ND

ND

1,4-Dichlorobenzene
 1,1-Dichloroethane
 1,2-Dichloroethane
 1,1-Dichloroethene
 cis-1,2-Dichloroethene
 trans-1,2-Dichloroethene
 1,2-Dichloropropane
 cis-1,3-Dichloropropene
 trans-1,3-Dichloropropene
 Methylene chloride
 1,1,2,2-Tetrachloroethane
 Tetrachloroethene
 1,1,1-Trichloroethane
 1,1,2-Trichloroethane
 Trichloroethene
 Trichlorofluoromethane
 Vinyl chloride

ND
 ND
 1.90
 5.10
 ND
 7.80
 ND
 ND
 ND
 ND
 ND
 ND
 1.70
 0.41
 ND
 1.50
 0.34
 ND

AROMATICS

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

120.00
 ND
 ND
 ND
 ND
 24.00
 ND
 8.50

GRW-13

GENERAL WATER CHEMISTRY

Lab pH (s.u.)
 Lab conductivity, umhos/cm
 Lab resistivity, ohm-m
 Total dissolved solids (180), mg/l
 Total alkalinity as CaCO₃, (calc), mg/l
 Total alkalinity as CaCO₃, mg/l
 Total acidity as CaCO₃, mg/l
 Total hardness as CaCO₃, mg/l
 Sodium absorption ratio

Bicarbonate as HCO₃Carbonate as CO₃

Chloride

Sulfate

Calcium

Magnesium

Potassium

Sodium

Major cations

Major anions

Cation/anion difference (%)

HALOCARBONS

Bromodichloromethane

Bromoform

Bromomethane

Carbon tetrachloride

Chloroethane

2-Chloroethylvinylether

Chloroform

Chloromethane

Dibromochloromethane

1,2-Dichlorobenzene

1,3-Dichlorobenzene

1,4-Dichlorobenzene

1,1-Dichloroethane

1,2-Dichloroethane

1,1-Dichloroethene

cis-1,2-Dichloroethene

trans-1,2-Dichloroethene

1,2-Dichloropropane

cis-1,3-Dichloropropene

trans-1,3-Dichloropropene

Methylene chloride

1,1,2,2-Tetrachloroethane

Tetrachloroethene

1,1,1-Trichloroethane

1,1,2-Trichloroethane

Trichloroethene

Trichlorofluoromethane

Vinyl chloride

AROMATICS

5/90 6/90 7/90

8.05

5139.00

1.9459

3800.00

3600.00

305.60

0.00

1355.40

8.18

mg/l

372.80

0.00

682.10

1602.00

289.20

154.20

4.40

692.50

meq/l

6.11

0.00

19.24

33.37

14.43

12.68

0.11

30.12

57.34

58.73

1.19

ug/l

ND

ND

ND

ND

ND

3.00

0.25

ND

111.00

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

3.00

0.25

ND

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

ND
ND
ND
ND
ND
ND

GBR-15 5/90 6/90 7/90

GENERAL WATER CHEMISTRY

Lab pH (s.u.) 7.75
 Lab conductivity, umhos/cm 4776.00
 Lab resistivity, ohm-m 2.0938
 Total dissolved solids (180), mg/l 3886.00
 Total dissolved solids, (calc), mg/l 3685.00
 Total alkalinity as CaCO₃, mg/l 152.80
 Total acidity as CaCO₃, mg/l 0.00
 Total hardness as CaCO₃, mg/l 1295.16
 Sodium absorption ratio 8.47

mg/l meq/l
 Bicarbonate as HCO₃ 186.40 3.06
 Carbonate as CO₃ 0.00 0.00
 Chloride 440.70 12.43
 Sulfate 2027.90 42.25
 Calcium 257.00 12.83
 Magnesium 159.00 13.08
 Potassium 7.80 0.20
 Sodium 701.00 30.49
 Major cations 56.59
 Major anions 57.74
 Cation/anion difference (%) 1.00

HALOCARBONS ug/l

Bromodichloromethane ND
 Bromoform ND
 Bromomethane ND
 Carbon tetrachloride ND
 Chloroethane ND
 2-Chloroethylvinylether ND
 Chloroform ND
 Chloromethane ND
 Dibromochloromethane ND
 1,2-Dichlorobenzene ND
 1,3-Dichlorobenzene ND
 1,4-Dichlorobenzene ND
 1,1-Dichloroethane ND
 1,2-Dichloroethane ND
 1,1-Dichloroethene ND
 cis-1,2-Dichloroethene ND
 trans-1,2-Dichloroethene 0.45
 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

5/90

5/90

6/90

6/90

7/90

7/90

GENERAL WATER CHEMISTRY

Lab pH (s.u.)

Lab conductivity, umhos/cm

Lab resistivity, ohm-m

Total dissolved solids (100), mg/l

Total dissolved solids, (calc), mg/l

Total alkalinity as CaCO₃, mg/lTotal acidity as CaCO₃, mg/lTotal hardness as CaCO₃, mg/l

Sodium absorption ratio

Bicarbonate as HCO₃Carbonate as CO₃

Chloride

Sulfate

Calcium

Magnesium

Potassium

Sodium

Major cations

Major anions

Cation/anion difference (%)

HALOCARBONS

Bromodichloromethane

Bromoform

Bromomethane

Carbon tetrachloride

Chloroethane

2-Chloroethylvinylether

Chloroform

Chloromethane

Dibromochloromethane

1,2-Dichlorobenzene

1,3-Dichlorobenzene

1,4-Dichlorobenzene

1,1-Dichloroethane

1,2-Dichloroethane

1,1-Dichloroethene

cis-1,2-Dichloroethene

trans-1,2-Dichloroethene

1,2-Dichloropropane

cis-1,3-Dichloropropene

trans-1,3-Dichloropropene

Methylene chloride

1,1,2,2-Tetrachloroethane

Tetrachloroethene

1,1,1-Trichloroethane

1,1,2-Trichloroethane

Trichloroethene

Trichlorofluoromethane

Vinyl chloride

8.20

2851.00

3.5075

2346.00

2214.00

219.65

0.00

1084.32

3.61

mg/l

268.00

0.00

110.20

1290.90

365.50

42.00

0.50

273.60

11.90

33.60

34.39

1.17

ug/l

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

0.19

0.30

ND

1.50

ND

ND

AROMATICS

Benzene

Chlorobenzene

1,2-Dichlorobenzene

1,3-Dichlorobenzene

1,4-Dichlorobenzene

Ethylbenzene

Toluene

Xylenes

ND
ND
ND
ND
ND
ND
ND
ND
ND

GBR-24-D

5/90

5/90

6/90

6/90

7/90

7/90

GENERAL WATER CHEMISTRY

Lab pH (s.u.) 8.07
 Lab conductivity, umhos/cm 4659.00
 Lab resistivity, ohm-m 2.1464
 Total dissolved solids (180), mg/l 3704.00
 Total dissolved solids, (calc), mg/l 3539.00
 Total alkalinity as CaCO₃, mg/l 210.10
 Total acidity as CaCO₃, mg/l 0.00
 Total hardness as CaCO₃, mg/l 1746.96
 Sodium absorption ratio 4.92

Bicarbonate as HCO₃ mg/l meq/l
 Carbonate as CO₃ 256.30 4.20
 Chloride 0.00 0.00
 Sulfate 187.80 12.68
 Calcium 1603.80 33.41
 Magnesium 526.10 26.25
 Potassium 105.60 8.69
 Sodium 6.50 0.16
 Major cations 473.00 20.57
 Major anions 55.68
 Cation/anion difference (%) 57.29
 1.43

HALOCARBONS

Bromodichloromethane ug/l
 Bromoform ND
 Bromomethane ND
 Carbon tetrachloride ND
 Chloroethane ND
 2-Chloroethylvinylether ND
 Chloroform ND
 Chloromethane ND
 Dibromochloromethane ND
 1,2-Dichlorobenzene ND
 1,3-Dichlorobenzene ND
 1,4-Dichlorobenzene ND
 1,1-Dichloroethane ND
 1,2-Dichloroethane ND
 1,1-Dichloroethene ND
 cis-1,2-Dichloroethene ND
 trans-1,2-Dichloroethene ND
 1,2-Dichloropropane ND
 cis-1,3-Dichloropropene ND
 trans-1,3-Dichloropropene ND
 Methylene chloride ND
 1,1,2,2-Tetrachloroethane ND
 Tetrachloroethene ND
 1,1,1-Trichloroethane 4.00
 1,1,2-Trichloroethane 6.80
 Trichloroethene ND
 Trichlorofluoromethane 56.00
 Vinyl chloride ND

AROMATICS

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

39.00
 16.00
 ND
 ND
 ND
 28.00
 4.80
 8.80

GBR-30

5/90

5/90

6/90

6/90

7/90

7/90

GENERAL WATER CHEMISTRY

Lab pH (s.u.) 7.93
 Lab conductivity, umhos/cm 4710.00
 Lab resistivity, ohm-m 2.1231
 Total dissolved solids (180), mg/l 3608.00
 Total dissolved solids, (calc), mg/l 3465.00
 Total alkalinity as CaCO₃, mg/l 315.15
 Total acidity as CaCO₃, mg/l 0.00
 Total hardness as CaCO₃, mg/l 1275.08
 Sodium absorption ratio 7.81

Bicarbonate as HCO₃ mg/l meq/l
 Carbonate as CO₃ 384.50 6.30
 Chloride 0.00 0.00
 Sulfate 519.40 14.65
 Calcium 1628.30 33.92
 Magnesium 437.70 21.84
 Potassium 44.50 3.66
 Sodium 4.80 0.12
 Major cations 641.00 27.88
 Major anions 53.51 1.27
 Cation/anion difference (%) 54.88

HALOCARBONS

Bromodichloromethane ug/l
 Bromoform ND
 Bromomethane ND
 Carbon tetrachloride ND
 Chloroethane ND
 2-Chloroethylvinylether ND
 Chloroform ND
 Chloromethane 1.79
 Dibromochloromethane ND
 1,2-Dichlorobenzene ND
 1,3-Dichlorobenzene ND
 1,4-Dichlorobenzene ND
 1,1-Dichloroethane 0.67
 1,2-Dichloroethane 0.75
 1,1-Dichloroethene ND
 cis-1,2-Dichloroethene 5.60
 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 0.44
 1,1,1-Trichloroethane ND
 1,1,2-Trichloroethane ND
 Trichloroethene 0.44
 Trichlorofluoromethane ND
 Vinyl chloride ND

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

2.20

ND
1.80
ND
ND
ND
0.55
ND
2.40

GBR-31

GENERAL WATER CHEMISTRY

Lab pH (s.u.)					7/90	7.83
Lab conductivity, umhos/cm						4746.00
Lab resistivity, ohm-m						2.1070
Total dissolved solids (180), mg/l						3874.00
Total dissolved solids, (calc), mg/l						3795.00
Total alkalinity as CaCO ₃ , mg/l						362.90
Total acidity as CaCO ₃ , mg/l						0.00
Total hardness as CaCO ₃ , mg/l						1445.76
Sodium absorption ratio						7.50
		mg/l				meq/l
Bicarbonate as HCO ₃		442.70				7.26
Carbonate as CO ₃		0.00				0.00
Chloride		440.70				12.43
Sulfate		1918.00				39.96
Calcium		526.10				26.25
Magnesium		32.40				2.66
Potassium		4.00				0.10
Sodium		656.00				28.53
Major cations						57.55
Major anions						59.65
Cation/anion difference (%)						1.79

HALOCARBONS

Bromodichloromethane	ug/l	
Bromoform	ND	
Bromomethane	ND	
Carbon tetrachloride	ND	
Chloroethane	ND	
2-Chloroethylvinylether	ND	
Chloroform	ND	
Chloromethane	ND	
Dibromochloromethane	ND	
1,2-Dichlorobenzene	ND	
1,3-Dichlorobenzene	ND	
1,4-Dichlorobenzene	ND	
1,1-Dichloroethane	ND	
1,2-Dichloroethane	ND	
1,1-Dichloroethene	5.50	
cis-1,2-Dichloroethene	ND	
trans-1,2-Dichloroethene	ND	
1,2-Dichloropropane	81.00	
cis-1,3-Dichloropropene	ND	
trans-1,3-Dichloropropene	ND	
Methylene chloride	ND	
1,1,2,2-Tetrachloroethane	ND	
Tetrachloroethene	12.00	
1,1,1-Trichloroethane	15.00	
1,1,2-Trichloroethane	ND	
Trichloroethene	34.00	
Trichlorofluoromethane	ND	
Vinyl chloride	ND	

AROMATICS

Benzene	ND
Chlorobenzene	2.50
1,2-Dichlorobenzene	ND
1,3-Dichlorobenzene	ND
1,4-Dichlorobenzene	12.00
Ethylbenzene	3.70
Toluene	0.35
Xylenes	6.60

PAH

Acenaphthene	ND
Acenaphthylene	103.00
Anthracene	67.00
Benzo(a)anthracene	12.00
Benzo(a)pyrene	ND
Benzo(b)fluoranthene	1.90
Benzo(g,h,i)perylene	ND
Benzo(k)fluoranthene	ND
Chrysene	63.00
Dibenzo(a,h)anthracene	ND
Fluoranthene	140.00
Fluorene	87.00
Indeno(1,2,3-cd)pyrene	ND
Naphthalene	55.00
Phenanthrene	320.00
Pyrene	110.00

GBR-33

GENERAL WATER CHEMISTRY

Lab pH (s.u.)					7.73
Lab conductivity, umhos/cm					4287.00
Lab resistivity, ohm-m					2.3326
Total dissolved solids (180), mg/l					3268.00
Total dissolved solids, (calc), mg/l					3165.00
Total alkalinity as CaCO ₃ , mg/l					362.90
Total acidity as CaCO ₃ , mg/l					0.00
Total hardness as CaCO ₃ , mg/l					1194.76
Sodium absorption ratio					7.42
	mg/l			meq/l	
Bicarbonate as HCO ₃	442.70			7.26	
Carbonate as CO ₃	0.00			0.00	
Chloride	545.60			15.39	
Sulfate	1369.10			28.52	
Calcium	377.50			18.84	
Magnesium	61.50			5.06	
Potassium	3.40			0.09	
Sodium	590.00			25.66	
Major cations				49.65	
Major anions				51.17	
Cation/anion difference (%)				1.51	

HALOCARBONS

Bromodichloromethane	ug/l	
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	0.28	
1,1-Dichloroethene	ND	
cis-1,2-Dichloroethene	4.90	
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	0.60	
1,1,1-Trichloroethane	ND	
1,1,2-Trichloroethane	ND	
Trichloroethene	3.20	
Trichlorofluoromethane	0.28	
Vinyl chloride	ND	

AROMATICS

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

三

Acenaphthene

Acenaphthylene

Anthracene

Benzo(a)anthracene

Benzo(a)pyrene

Benzo(b)fluoranthene

Benzo(g,h,i) perylene

Benzo(k)fluoranthene

Chrysene

Dibenzo(a,h)anthracene

Fluoranthene

аудиофиль

indeno(1,2,3-cd)pyrene

Naphthalene

Phenanthrene

2.2. Pyrene

ND ND ND ND ND ND ND ND

Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z

SECTION 3

SEMI-ANNUAL UPGRADIENT
ANALYTICAL DATA SUMMARY

7/90

017698

meq/l
5.35
0.00
13.60
35.39
17.64
2.44
0.12
32.62
52.82
54.34
1.42

11/10/68

ND 0.03
ND 0.27
ND
ND
ND

trans-1,3-Dichloroethane

ug/l

cis-1,3-Dichloropropene
 trans-1,3-Dichloropropene
 Methylene chloride
 1,1,2,2-Tetrachloroethane
 Tetrachloroethene
 1,1,1-Trichloroethane
 1,1,2-Trichloroethane
 Trichloroethene
 Trichlorofluoromethane
 Vinyl chloride

ND
 ND
 10.00
 ND
 23.00
 ND
 ND
 17.00
 ND
 ND

AROMATICS

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

ND
 ND
 ND
 ND
 ND
 ND
 ND
 ND

GBR-48

5/90

5/90

6/90

6/90

7/90

7/90

GENERAL WATER CHEMISTRY

Lab pH (s.u.)
 Lab conductivity, umhos/cm
 Lab resistivity, ohm-m
 Total dissolved solids (180), mg/l
 Total dissolved solids, (calc), mg/l
 Total alkalinity as CaCO₃, mg/l
 Total acidity as CaCO₃, mg/l
 Total hardness as CaCO₃, mg/l
 Sodium absorption ratio

7.70
 7378.00
 1.3554
 5332.00
 4891.00
 439.30
 0.00
 1686.72
 11.07

meq/l

Bicarbonate as HCO₃Carbonate as CO₃

Chloride

Sulfate

Calcium

Magnesium

Potassium

Sodium

Major cations

Major anions

Cation/anion difference (%)

mg/l
 535.90
 0.00
 888.40
 2055.90
 562.20
 69.10
 7.00
 1045.20

1.73

METALS

Arsenic

Barium

Cadmium

Chromium

Lead

Selenium

Silver

Mercury

ND
 0.24
 ND
 0.04
 ND
 ND
 ND

0.0004

HALOCARBONS

Bromodichloromethane

Bromoform

Bromomethane

Carbon tetrachloride

Chloroethane

2-Chloroethylvinylether

Chloroform

Chloromethane

Dibromochloromethane

1,2-Dichlorobenzene

1,3-Dichlorobenzene

1,4-Dichlorobenzene

1,1-Dichloroethane

1,2-Dichloroethane

1,1-Dichloroethene

cis-1,2-Dichloroethene

trans-1,2-Dichloroethene

ug/l
 ND
 ND
 ND
 ND
 3.30
 ND
 ND
 ND
 ND
 ND
 ND
 ND
 ND
 ND
 14.00
 ND
 14.00

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

220.00
 ND
 ND
 ND
 ND
 32.00
 6.20
 ND
 30.00
 ND
 NC

AROMATICS

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

5.70
 ND
 ND
 ND
 ND
 ND

GBR-49

5/90

5/90

6/90

6/90

7/90

7/90

GENERAL WATER CHEMISTRY

Lab pH (s.u.)
 Lab conductivity, umhos/cm
 Lab resistivity, ohm-m
 Total dissolved solids (180), mg/l
 Total dissolved solids, (calc), mg/l
 Total alkalinity as CaCO₃, mg/l
 Total acidity as CaCO₃, mg/l
 Total hardness as CaCO₃, mg/l
 Sodium absorption ratio

7.95
 4040.00
 2.4752
 2896.00
 2860.00
 296.05
 0.00
 843.36
 9.48

mg/l

meq/l

Bicarbonate as HCO₃

361.20

5.92

Carbonate as CO₃

0.00

0.00

Chloride

482.30

13.60

Sulfate

1246.80

25.98

Calcium

285.10

14.23

Magnesium

32.10

2.64

Potassium

3.00

0.08

Sodium

633.00

27.53

Major cations

44.48

45.50

Major anions

1.14

1.14

Cation/anion difference (%)

3.5

METALS

Arsenic ND
 Barium 0.03
 Cadmium ND
 Chromium 0.06
 Lead ND
 Selenium ND
 Silver ND
 Mercury ND

HALOCARBONS

Bromodichloromethane ug/l
 Bromoform ND
 Bromomethane ND
 Carbon tetrachloride 3.50
 Chloroethane ND
 2-Chloroethylvinylether ND
 Chloroform ND
 Chloromethane 2.50
 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	120.00
trans-1,3-Dichloropropene	ND
Methylene chloride	21.00
1,1,2,2-Tetrachloroethane	ND
Tetrachloroethene	22.00
1,1,1-Trichloroethane	ND
1,1,2-Trichloroethane	ND
Trichloroethene	14.00
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

GBR-50

GENERAL WATER CHEMISTRY

Lab pH (s.u.)
 Lab conductivity, umhos/cm
 Lab resistivity, ohm-m
 Total dissolved solids (180), mg/l
 Total dissolved solids, (calc), mg/l
 Total alkalinity as CaCO₃, mg/l
 Total acidity as CaCO₃, mg/l
 Total hardness as CaCO₃, mg/l
 Sodium absorption ratio

Bicarbonate as HCO₃Carbonate as CO₃

Chloride

Sulfate

Calcium

Magnesium

Potassium

Sodium

Major cations

Major anions

Cation/anion difference (%)

3.7 METALS

Arsenic

Barium

Cadmium

Chromium

Lead

Selenium

Silver

Mercury

HALOCARBONS

Bromodichloromethane

Bromoform

Bromomethane

Carbon tetrachloride

Chloroethane

2-Chloroethylvinylether

Chloroform

Chloromethane

Dibromochloromethane

1,2-Dichlorobenzene

1,3-Dichlorobenzene

1,4-Dichlorobenzene

1,1-Dichloroethane

1,2-Dichloroethane

1,1-Dichloroethene

cis-1,2-Dichloroethene

trans-1,2-Dichloroethene

1,2-Dichloropropane

cis-1,3-Dichloropropene

7/90

7/90

6/90

6/90

5/90

5/90

7.99

3327.00

3.0057

2602.00

2625.00

210.10

0.00

1074.28

5.45

mg/l

4.20

0.00

3.58

32.42

17.84

3.65

0.09

17.85

39.43

40.20

0.97

mg/l

256.30

0.00

126.90

1556.30

357.40

44.40

3.70

410.40

ND

0.56

ND

0.04

0.10

ND

ND

0.0002

ug/l

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

ND

0.37

ND

ND

ND

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

ND
0.43
0.16
0.57
ND
ND
0.31
ND
ND

AROMATICS

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

ND
ND
ND
ND
ND
ND
ND
ND
ND

*ND - Not detected at specified detection limit
NC - Not calculated

SECTION 4

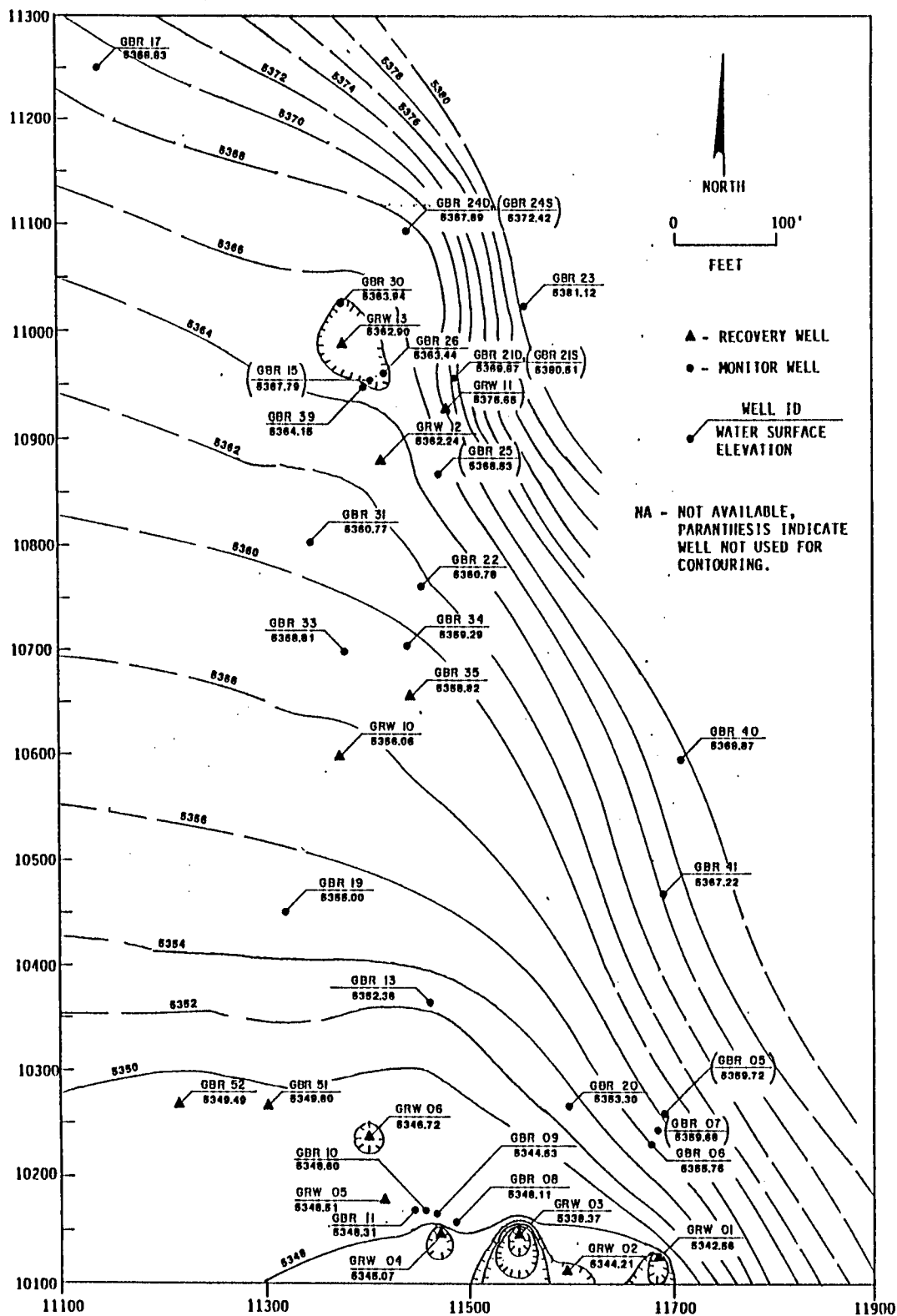
POTENTIOMETRIC MAPS

GIANT REFINING BLOOMFIELD REFINERY
MONTHLY POTENTIOMETRIC SURFACE

MONTH/YEAR: May, 1990

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	51.74	51.74	0.00	5342.56
GRW-2	5391.28	47.07	47.07	0.00	5344.21
GRW-3	5388.77	50.40	50.40	0.00	5338.37
GRW-4	5390.02	44.95	44.95	0.00	5345.07
GRW-5	5390.56	42.05	42.05	0.00	5348.51
GRW-6	5390.81	44.09	44.09	0.00	5346.72
GRW-10	5395.02	46.50	37.08	9.42	5356.06
GRW-11	5397.85	22.20	22.20	0.00	5375.65
GRW-12	5397.24	35.00	35.00	0.00	5362.24
GRW-13	5396.90	34.00	34.00	0.00	5362.90
GBR-5	5395.07	42.95	33.45	9.50	5359.72
GBR-6	5395.70	39.94	39.94	0.00	5355.76
GBR-7	5395.85	41.50	34.84	6.66	5359.68
GBR-8	5390.50	42.86	42.27	0.59	5348.11
GBR-9	5389.92	45.39	45.39	0.00	5344.53
GBR-10	5390.57	42.25	41.90	0.35	5348.60
GBR-11	5389.43	43.20	40.60	2.60	5348.31
GBR-13	5393.04	41.70	40.40	1.30	5352.38
GBR-15	5397.99	30.20	30.20	0.00	5367.79
GBR-17	5402.69	33.86	33.86	0.00	5368.83
GBR-18	5421.68	21.85	21.85	0.00	5399.83
GBR-19	5393.83	38.83	38.83	0.00	5355.00
GBR-20	5393.47	40.85	40.00	0.85	5353.30
GBR-21S	5400.65	20.25	20.11	0.14	5380.51
GBR-21D	5400.19	30.32	30.32	0.00	5369.87
GBR-22	5395.91	35.61	35.01	0.60	5360.78
GBR-23	5403.72	22.60	22.60	0.00	5381.12
GBR-24S	5396.08	23.73	23.64	0.09	5372.42
GBR-24D	5396.77	28.88	28.88	0.00	5367.89
GBR-25	5396.72	28.19	28.19	0.00	5368.53
GBR-26	5395.59	32.15	32.15	0.00	5363.44
GBR-30	5396.58	32.66	32.63	0.03	5363.94
GBR-31	5394.86	34.09	34.09	0.00	5360.77
GBR-33	5396.28	37.47	37.47	0.00	5358.81
GBR-34	5394.00	35.55	34.50	1.05	5359.29
GBR-35	5393.66	36.00	34.55	1.45	5358.82
GBR-39	5397.55	33.40	33.40	0.00	5364.15
GBR-40	5400.76	31.89	31.89	0.00	5368.87
GBR-41	5396.35	29.13	29.13	0.00	5367.22
GBR-51	5389.68	39.88	39.88	0.00	5349.80
GBR-52	5387.74	38.25	38.25	0.00	5349.49

* WSEL - WATER SURFACE ELEVATION ADJUSTED FOR PRODUCT DEPTH



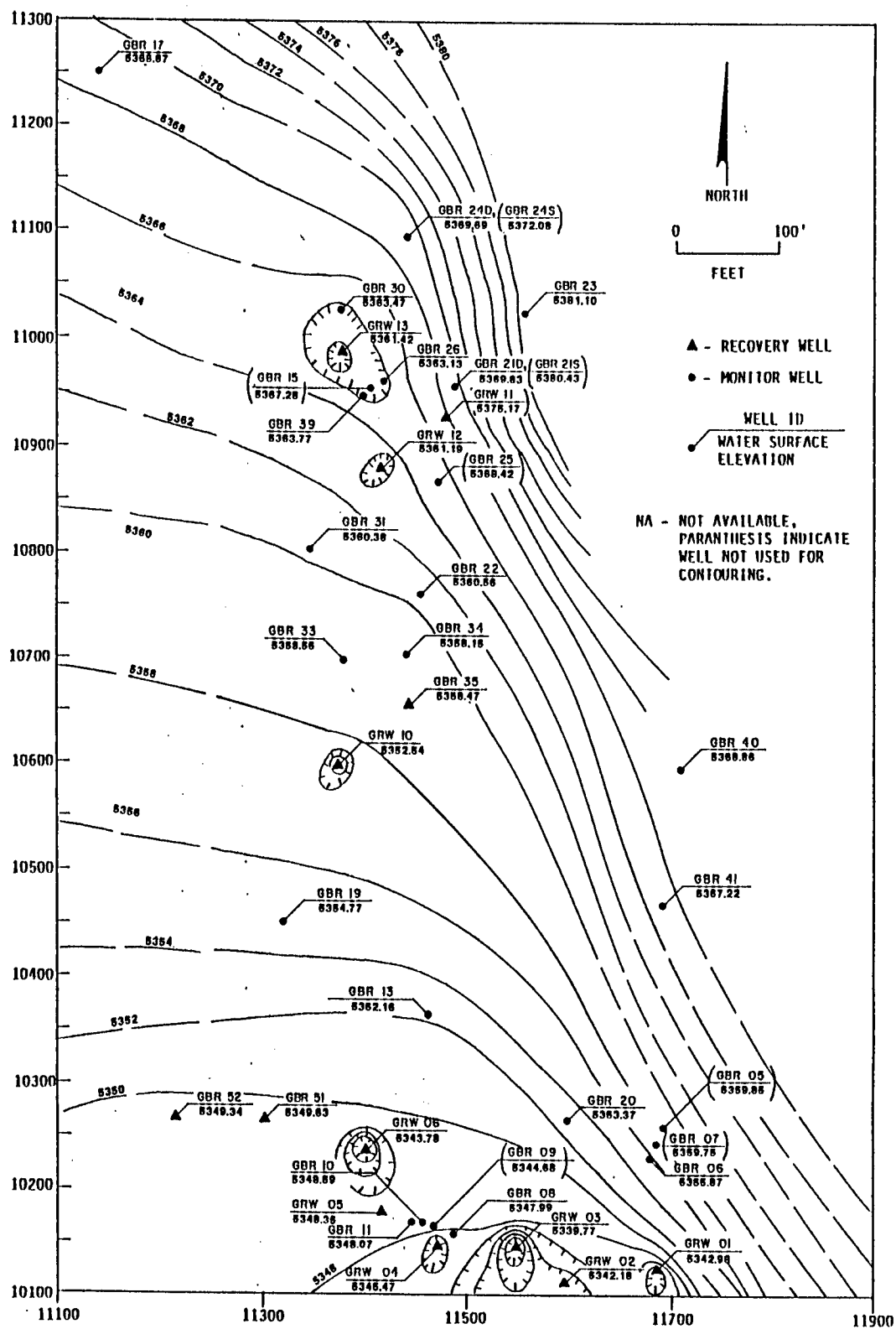
MAY 1999 WATER SURFACE CONTOUR MAP GIANT-BLOOMFIELD REFINERY

GIANT REFINING BLOOMFIELD REFINERY
MONTHLY POTENTIOMETRIC SURFACE

MONTH/YEAR: June, 1990

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	51.32	51.32	0.00	5342.98
GRW-2	5391.28	49.10	49.10	0.00	5342.18
GRW-3	5388.77	49.00	49.00	0.00	5339.77
GRW-4	5390.02	44.55	44.55	0.00	5345.47
GRW-5	5390.56	42.20	42.20	0.00	5348.36
GRW-6	5390.81	47.03	47.03	0.00	5343.78
GRW-10	5395.02	46.62	41.45	5.17	5352.54
GRW-11	5397.85	22.68	22.68	0.00	5375.17
GRW-12	5397.24	36.05	36.05	0.00	5361.19
GRW-13	5396.90	35.48	35.48	0.00	5361.42
GBR-5	5395.07	42.75	33.34	9.41	5359.85
GBR-6	5395.70	39.83	39.83	0.00	5355.87
GBR-7	5395.85	41.55	34.74	6.81	5359.75
GBR-8	5390.50	43.14	42.35	0.79	5347.99
GBR-9	5389.92	45.24	45.24	0.00	5344.68
GBR-10	5390.57	42.20	41.93	0.27	5348.59
GBR-11	5389.43	43.49	40.83	2.66	5348.07
GBR-13	5393.04	42.12	40.57	1.55	5352.16
GBR-15	5397.99	30.71	30.71	0.00	5367.28
GBR-17	5402.69	34.02	34.02	0.00	5368.67
GBR-18	5421.68	19.86	19.86	0.00	5401.82
GBR-19	5393.83	39.06	39.06	0.00	5354.77
GBR-20	5393.47	40.73	39.94	0.79	5353.37
GBR-21S	5400.65	20.32	20.20	0.12	5380.43
GBR-21D	5400.19	30.36	30.36	0.00	5369.83
GBR-22	5395.91	35.94	35.20	0.74	5360.56
GBR-23	5403.72	22.62	22.62	0.00	5381.10
GBR-24S	5396.08	24.05	23.99	0.06	5372.08
GBR-24D	5396.77	27.08	27.08	0.00	5369.69
GBR-25	5396.72	28.30	28.30	0.00	5368.42
GBR-26	5395.59	32.46	32.46	0.00	5363.13
GBR-30	5396.58	33.13	33.10	0.03	5363.47
GBR-31	5394.86	34.48	34.48	0.00	5360.38
GBR-33	5396.28	37.92	37.68	0.24	5358.55
GBR-34	5394.00	36.25	35.75	0.50	5358.15
GBR-35	5393.66	36.55	34.85	1.70	5358.47
GBR-39	5397.55	33.78	33.78	0.00	5363.77
GBR-40	5400.76	31.90	31.90	0.00	5368.86
GBR-41	5396.35	29.13	29.13	0.00	5367.22
GBR-51	5389.68	40.05	40.05	0.00	5349.63
GBR-52	5387.74	38.40	38.40	0.00	5349.34

* WSEL - WATER SURFACE ELEVATION ADJUSTED FOR PRODUCT DEPTH



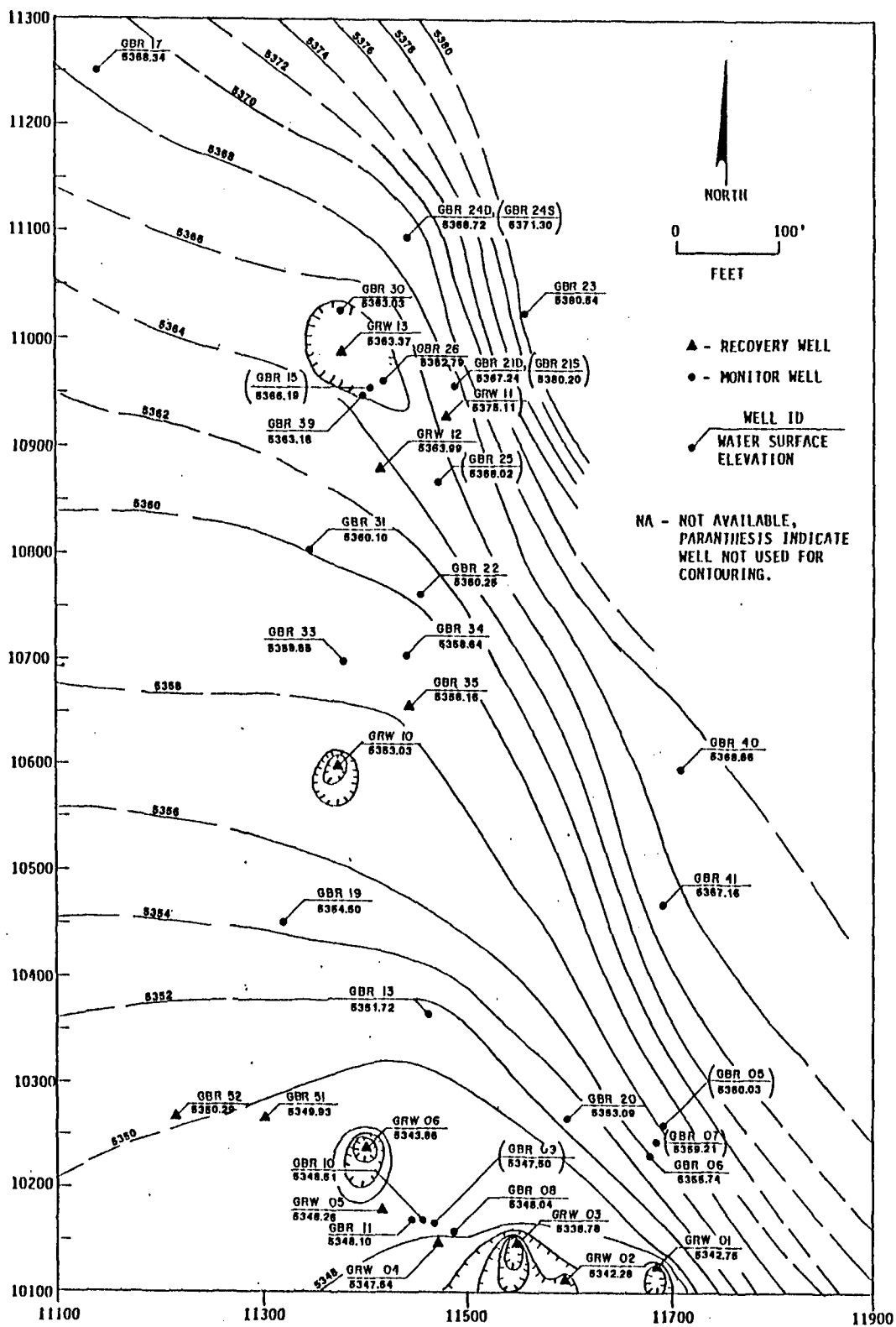
JUNE 1990 WATER SURFACE CONTOUR MAP GIANT-BLOOMFIELD REFINERY

GIANT REFINING BLOOMFIELD REFINERY
MONTHLY POTENTIOMETRIC SURFACE

MONTH/YEAR: July, 1990

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	51.55	51.55	0.00	5342.75
GRW-2	5391.28	49.00	49.00	0.00	5342.28
GRW-3	5388.77	49.99	49.99	0.00	5338.78
GRW-4	5390.02	42.48	42.48	0.00	5347.54
GRW-5	5390.56	42.30	42.30	0.00	5348.26
GRW-6	5390.81	46.95	46.95	0.00	5343.86
GRW-10	5395.02	44.55	41.35	3.20	5353.03
GRW-11	5397.85	22.74	22.74	0.00	5375.11
GRW-12	5397.24	33.25	33.25	0.00	5363.99
GRW-13	5396.90	33.53	33.53	0.00	5363.37
GBR-5	5395.07	43.13	33.02	10.11	5360.03
GBR-6	5395.70	39.97	39.96	0.01	5355.74
GBR-7	5395.85	44.75	34.61	10.14	5359.21
GBR-8	5390.50	43.00	42.33	0.67	5348.04
GBR-9	5389.92	42.42	42.42	0.00	5347.50
GBR-10	5390.57	42.20	42.02	0.18	5348.51
GBR-11	5389.43	43.55	40.78	2.77	5348.10
GBR-13	5393.04	43.34	40.82	2.52	5351.72
GBR-15	5397.99	31.80	31.80	0.00	5366.19
GBR-17	5402.69	34.35	34.35	0.00	5368.34
GBR-18	5421.68	19.88	19.88	0.00	5401.80
GBR-19	5393.83	39.39	39.32	0.07	5354.50
GBR-20	5393.47	41.00	40.22	0.78	5353.09
GBR-21S	5400.65	20.55	20.42	0.13	5380.20
GBR-21D	5400.19	32.95	32.95	0.00	5367.24
GBR-22	5395.91	36.34	35.49	0.85	5360.25
GBR-23	5403.72	23.18	23.18	0.00	5380.54
GBR-24S	5396.08	24.85	24.76	0.09	5371.30
GBR-24D	5396.77	28.05	28.05	0.00	5368.72
GBR-25	5396.72	28.70	28.70	0.00	5368.02
GBR-26	5395.59	32.80	32.80	0.00	5362.79
GBR-30	5396.58	33.57	33.55	0.02	5363.03
GBR-31	5394.86	34.76	34.76	0.00	5360.10
GBR-33	5396.28	37.89	37.56	0.33	5358.65
GBR-34	5394.00	36.72	35.02	1.70	5358.64
GBR-35	5393.66	37.40	35.02	2.38	5358.16
GBR-39	5397.55	34.37	34.37	0.00	5363.18
GBR-40	5400.76	31.90	31.90	0.00	5368.86
GBR-41	5396.35	29.19	29.19	0.00	5367.16
GBR-51	5389.68	39.75	39.75	0.00	5349.93
GBR-52	5387.74	37.45	37.45	0.00	5350.29

* WSEL - WATER SURFACE ELEVATION ADJUSTED FOR PRODUCT DEPTH



JULY 1990 WATER SURFACE CONTOUR MAP GIANT-BLOOMFIELD REFINERY

SECTION 5

VOLUME TABULATIONS

Giant Refining Co. Bloomfield Refinery
Total Volume Summary

Second Quarter of 1990

```
=====
Total Volume Of Water Recovered      773100
Net Change In Storage Volume          393623
=====
Total Water Pumped To The              379477
Air Stripper

Air Stripped Water Volume              315900
As Indicated On The Air
Stripper Influent Meter
=====
Difference                             63577
```

Comments: The approximately 8% difference can
accounted for in meter innaccuracy,
and the estimated volumes of the
air lift pump discharges.

Giant Refining Co. Bloomfield Refinery
Quarterly Net Tank
Volume Change

Second Quarter of 1990

Tank Number	Beginning Volume	Ending Volume	Net Change
102	8922	8217	-705
106	8010	8010	0
21	0	357568	357568
22	20218	56978	36760
27	185631	185631	0
32	159291	159291	0
34	200948	200948	0
35	0	0	0
37	352232	352232	0
Total Net Volume Change			393623

Giant Refining Co. Bloomfield Refinery
Quarterly Recovery Well
Volume Tabulation

Second Quarter of 1990

	Well	Month #1	Month #2	Month #3	Total
GRW-1	6230	4560	5470	16260	
GRW-2	12780	9190	9530	31500	
GRW-3	27820	37340	44190	109350	
GRW-4	30910	29150	21220	81280	
GRW-5	0	0	10	10	
GRW-6	30630	23830	28080	82540	
GRW-10	138850	118080	166150	423080	
GRW-11	5007	2118	1722	8847	
GRW-12	2691	1306	2399	6396	
GRW-13	6431	3747	3659	13837	
Total Volume Pumped In Gallons					773100

SECTION 6

SPECIFIC CONDUCTANCE VALUES

SPECIFIC CONDUCTANCE VALUES
FOR GRW-13 IN umhos/cm
SECOND QUARTER 1990

4/90

6000

5/90

6760

6/90

5830

SECTION 7

CORRECTED FIRST QUARTER
ANALYTICAL DATA

RADIAN

CORPORATION

July 26, 1990

Dear Client:

The attached report contains the revision of selected results for previously reported EPA 601 or SW8010 analyses. The revision is required by the discovery of a high bias in the data generated from one of our three gas chromatographs which is designated instrument B on our reports. This high bias resulted from a five point calibration curve for which the highest calibration point was outside limits. To revise the data this 30 ppb calibration point was removed and a new, acceptable four point calibration curve was generated with an upper working range of 15 ppb. These changes impact the data in three ways:

- o Revised response factors result in decreases in the results,
- o The calibration range was reduced to 15 ppb, and
- o The number of points in the calibration curve was decreased from 5 to 4.

Revised response factors were used to correct the results denoted in this report with an I flag. The new response factors result in decreases in the previously reported values for all analytes with the exception of bromomethane which is increased by +6.8%. The decreases range from 11 to 25% for 24 of the analytes and from 26 to 39% for 4 of the analytes.

The reduction of the working calibration range from 30 ppb to 15 ppb resulted in selected data points falling outside the new calibration range. While our experience indicates that the typical calibration curve is linear beyond its upper limit, these data are flagged as estimated values.

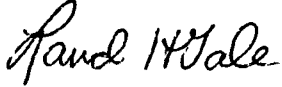
The EPA 601 method requires a three point calibration, and thus the revised data for the EPA 601 analyses which fall within the working range of our new four point calibration curve are in conformance with this method.

The SW8010 method requires a five point calibration, and thus the use of a four point calibration curve is not in strict conformance with this method. However, we routinely confirm all positive results by analysis on a second GC instrument containing a GC column with a dissimilar phase. The instrument is calibrated using a five point curve. This goes beyond both the EPA 601 and SW8010 method which recommend second column confirmations but do not require multipoint calibration of the second column. The results of our second column confirmation analysis can be used to confirm the quantitation of any estimated

values from the primary analysis. Where strict adherence to the Method SW8010 calibration requirements (ie. a five point calibration) is necessary, the results of the second column analysis can be used in place of the estimated result.

We apologize for any inconvenience resulting from these revised data. I can assure you we are implementing corrective actions to prevent recurrence of this problem.

Sincerely,



Laird H. Gale, Ph.D.
Technical Director

Analytical Report
08/03/90

Giant Refining Company

Giant Refining Company
606 E. Highway 64
Farmington, NM 87401

Tim Kinney

Customer Work Identification REFINERY
Purchase Order Number RFE-9003-39

Contents:

- 1 Analytical Data Summary
- 2 Sample History
- 3 Comments Summary
- 4 Notes and Definitions

Radian Analytical Services
10395 Old Placerville Road
Sacramento, CA 95827

916-362-5332

Client Services Coordinator: WLBROWN

Certified by:

David H. Hale

Previously Reported on 05/10/90.
First Reported on 04/19/90.

Giant Refining Company
 Radian Work Order: S0-05-045

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	9004041025	9004041120	TRIP BLANK	REAGENT BLANK
	/GBR-33	/GBR-31		
Factor:	1	1	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
	01A	02A	06A	07A
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Bromodichloromethane	ND	0.10	ND	0.10	ND	0.10	ND	0.10
Bromoform	ND	0.50	ND	0.50	ND	0.50	ND	0.50
Bromomethane	ND	1.2	ND	1.2	ND	1.2	ND	1.2
Carbon tetrachloride	ND	0.12	ND	0.12	ND	0.12	ND	0.12
Chlorobenzene	ND	0.25	ND	0.25	ND	0.25	ND	0.25
Chloroethane	ND	0.52	ND	0.52	ND	0.52	ND	0.52
2-Chloroethylvinylether	ND	0.50	ND	0.50	ND	0.50	ND	0.50
Chloroform	ND	0.10	ND	0.10	ND	0.10	ND	0.10
Chloromethane	ND	0.30	ND	0.30	ND	0.30	ND	0.30
Dibromochloromethane	ND	0.20	ND	0.20	ND	0.20	ND	0.20
1,2-Dichlorobenzene	ND	0.50	ND	0.50	ND	0.50	ND	0.50
1,3-Dichlorobenzene	ND	0.32	ND	0.32	ND	0.32	ND	0.32
1,4-Dichlorobenzene	ND	0.24	ND	0.24	ND	0.24	ND	0.24
1,1-Dichloroethane	<u>1.1 C1a</u>	0.50	ND	0.50	ND	0.50	ND	0.50
1,2-Dichloroethane	<u>0.17 C1a</u>	0.10	<u>0.84 C1</u>	0.10	ND	0.10	ND	0.10
1,1-Dichloroethene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
cis-1,2-Dichloroethene	<u>8.7 C1</u>	0.20	<u>4.7 C1</u>	0.20	ND	0.20	ND	0.20
trans-1,2-Dichloroethene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
1,2-Dichloropropane	ND	0.10	ND	0.10	ND	0.10	ND	0.10
cis-1,3-Dichloropropene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
trans-1,3-Dichloropropene	ND	0.34	ND	0.34	ND	0.34	ND	0.34
Methylene chloride	ND	0.40	ND	0.40	ND	0.40	ND	0.40
1,1,2,2-Tetrachloroethane	ND	0.15	ND	0.15	ND	0.15	ND	0.15
Tetrachloroethene	<u>1.7 C1</u>	0.10	<u>0.44 C1a</u>	0.10	ND	0.10	ND	0.10
1,1,1-Trichloroethane	ND I	0.20	ND	0.20	ND	0.20	ND	0.20
1,1,2-Trichloroethane	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Trichloroethene	<u>0.89 C1a</u>	0.20	<u>0.71 C1a</u>	0.20	ND	0.20	ND	0.20
Trichlorofluoromethane	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Vinyl chloride	ND	0.20	ND	0.20	ND	0.20	ND	0.20

ND Not detected at specified detection limit

I Result differs from last report - see report narrative

C Confirmed on second column or by GC/MS

a Est. result less than 5 times detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-05-045

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	9004041025 /GBR-33	9004041120 /GBR-31	TRIP BLANK	REAGENT BLANK
Factor:	1	1	1	1
Results in:	ug/L 01A	ug/L 02A	ug/L 06A	ug/L 07A
Matrix:	water	water	water	water

	Result Det. Limit	Result Det. Limit	Result Det. Limit	Result Det. Limit
<u>Surrogate Recovery(%)</u>				
1-Bromo-4-fluorobenzene	128	117	125	132
Control Limits: 40 to 140				

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-05-045

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:

REAGENT BLANK

Factor:

1

Results in:

ug/L

07B

Matrix:

water

	Result	Det. Limit
Bromodichloromethane	ND	0.10
Bromoform	ND	0.50
Bromomethane	ND	1.2
Carbon tetrachloride	ND	0.12
Chlorobenzene	ND	0.25
Chloroethane	ND	0.52
2-Chloroethylvinylether	ND	0.50
Chloroform	ND	0.10
Chloromethane	ND	0.30
Dibromochloromethane	ND	0.20
1,2-Dichlorobenzene	ND	0.50
1,3-Dichlorobenzene	ND	0.32
1,4-Dichlorobenzene	ND	0.24
1,1-Dichloroethane	ND	0.50
1,2-Dichloroethane	ND	0.10
1,1-Dichloroethene	ND	0.20
cis-1,2-Dichloroethene	ND	0.20
trans-1,2-Dichloroethene	ND	0.20
1,2-Dichloropropane	ND	0.10
cis-1,3-Dichloropropene	ND	0.20
trans-1,3-Dichloropropene	ND	0.34
Methylene chloride	ND	0.40
1,1,2,2-Tetrachloroethane	ND	0.15
Tetrachloroethene	ND	0.10
1,1,1-Trichloroethane	ND	0.20
1,1,2-Trichloroethane	ND	0.20
Trichloroethene	ND	0.20
Trichlorofluoromethane	ND	0.20
Vinyl chloride	ND	0.20

ND Not detected at specified detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
Radian Work Order: S0-05-045

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:

REAGENT BLANK

Factor:

1

Results in:

ug/L

07B

Matrix:

water

Result Det. Limit

Surrogate Recovery(%)

1-Bromo-4-fluorobenzene

119

Control Limits: 40 to 140

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-05-045

Method: Aromatics by SW8020 (1) List: Complete analyte list				
Sample ID:	9004041025	9004041120	TRIP BLANK	REAGENT BLANK
	/GBR-33	/GBR-31		
Factor:	1	1	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
	01C	02C	06A	08A
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Benzene	ND	0.20	0.98 C ^a	0.20	ND	0.20	ND	0.20
Chlorobenzene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
1,2-Dichlorobenzene	ND	0.40	ND	0.40	ND	0.40	ND	0.40
1,3-Dichlorobenzene	ND	0.40	ND	0.40	ND	0.40	ND	0.40
1,4-Dichlorobenzene	ND	0.30	ND	0.30	ND	0.30	ND	0.30
Ethylbenzene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Toluene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Xylenes (total)	ND	0.20	6.0 C	0.20	ND	0.20	ND	0.20

Surrogate Recovery(%)				
1-Bromo-4-fluorobenzene	98	29 Q	100	101
Control Limits: 40 to 140				

ND Not detected at specified detection limit	C Confirmed on second column or by GC/MS
^a Est. result less than 5 times detection limit	Q Outside control limits

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-05-045

Method: Aromatics by SW8020 (1)

List: Complete analyte list

Sample ID: REAGENT BLANK

Factor: 1

Results in: ug/L

088

Matrix: water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Benzene	ND	0.20						
Chlorobenzene	ND	0.20						
1,2-Dichlorobenzene	ND	0.40						
1,3-Dichlorobenzene	ND	0.40						
1,4-Dichlorobenzene	ND	0.30						
Ethylbenzene	ND	0.20						
Toluene	ND	0.20						
Xylenes (total)	ND	0.20						
Surrogate Recovery(%)								
1-Bromo-4-fluorobenzene	98							
Control Limits: 40 to 140								

ND Not detected at specified detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Indian Work Order: S0-05-045

Sample Identifications and Dates

Sample ID	9004041025 /GBR-33	9004041120 /GBR-31	TRIP BLANK	REAGENT BLANK	REAGENT BLANK
Date Sampled	04/04/90	04/04/90			
Date Received	04/05/90	04/05/90	04/05/90	04/05/90	04/05/90
Matrix	water 01	water 02	water 06	water 07	water 08

Halocarbons by SW8010

Prepared				
Analyzed	04/07/90	04/10/90	04/07/90	04/07/90
Analyst	MG	MG	MG	MG
File ID	DB040710	DB04105	DB04079	QB04071
Blank ID	QB04071	QB04101	QB04071	
Instrument	B	B	B	B
Report as	received	received	received	received

Halocarbons by SW8010

Prepared	
Analyzed	04/10/90
Analyst	MG
File ID	QB04101
Blank ID	
Instrument	B
Report as	received

Aromatics by SW8020

Prepared				
Analyzed	04/07/90	04/10/90	04/07/90	04/07/90
Analyst	MG	MG	MG	MG
File ID	EB040710	EB04105	EB04079	RB04071
Blank ID	RB04071	RB04101	RB04071	
Instrument	B	B	B	B
Report as	received	received	received	received

Aromatics by SW8020

Prepared	
Analyzed	04/10/90
Analyst	MG
File ID	RB04101
Blank ID	
Instrument	B
Report as	received

Appendix A

Comments, Notes and Definitions

Giant Refining Company
Radian Work Order: S0-05-045

General Comments

SAMPLE 9004041120 HAD LOW SURROGATE RECOVERY DUE TO MATRIX
INTERFERENCE WITH THE INTERNAL STANDARD.

I=RESULT CORRECTED. RESULTS WITH THE I FLAG HAVE BEEN REVISED
BASED ON CORRECTED RESPONSE FACTORS FOR GC INSTRUMENT B. SEE
ATTACHED LETTER FOR EXPLANATION.

Giant Refining Company
Radian Work Order: S0-05-045

Q ALL METHODS EXCEPT CLP

The results which are less than five times the method specified detection limit.

EXPLANATION

Uncertainty of the analysis will increase as the method detection limit is approached. These results should be considered approximate.

C ORGANIC CLP

pesticides require that single component results > 10ng/uL in the final extract be confirmed by GC/MS.

OTHER ORGANIC METHODS

This analysis has been confirmed on a second column or by GC/MS.

EXPLANATION

Most methods of analysis by gas chromatography recommend reanalysis on a second column of dissimilar phase to resolve compounds of interest from interferences that may occur and for analyte confirmation.

I ALL METHODS EXCEPT CLP

This result has been modified since the last issue of this report.

EXPLANATION

The explanations are included in the report narrative.

ND ALL METHODS EXCEPT CLP

This flag is used to denote analytes which are not detected at or above the specified detection limit.

EXPLANATION

The value to the right of the < symbol is the method specified detection limit for the analyte.

Q ALL METHODS EXCEPT CLP

This quality control standard is outside method or laboratory specified control limits.

EXPLANATION

This flag is applied to matrix spike, analytical QC spike, and surrogate recoveries; and to RPD(relative percent difference) values for duplicate analyses and matrix spike/matrix spike duplicate result.

Giant Refining Company
Radian Work Order: S0-05-045

TERMS USED IN THIS REPORT:

Analyte - A chemical for which a sample is to be analyzed. The analysis will meet EPA method and QC specifications.

Compound - See Analyte.

Detection Limit - The method specified detection limit, which is the lower limit of quantitation specified by EPA for a method. Radian staff regularly assess their laboratories' method detection limits to verify that they meet or are lower than those specified by EPA. Detection limits which are higher than method limits are based on experimental values at the 99% confidence level. The detection limits for EPA CLP (Contract Laboratory Program) methods are CRQLs (contract required quantitation limits) for organics and CRDLs (contract required detection limits) for inorganics. Note, the detection limit may vary from that specified by EPA based on sample size, dilution or cleanup. (Refer to Factor, below)

EPA Method - The EPA specified method used to perform an analysis. EPA has specified standard methods for analysis of environmental samples. Radian will perform its analyses and accompanying QC tests in conformance with EPA methods unless otherwise specified.

Factor - Default method detection limits are based on analysis of clean water samples. A factor is required to calculate sample specific detection limits based on alternate matrices (soil or water), reporting units, use of cleanup procedures, or dilution of extracts/digestates. For example, extraction or digestion of 10 grams of soil in contrast to 1 liter of water will result in a factor of 100.

Matrix - The sample material. Generally, it will be soil, water, air, oil, or solid waste.

Radian Work Order - The unique Radian identification code assigned to the samples reported in the analytical summary.

Units - ug/L	micrograms per liter (parts per billion); liquids/water
ug/kg	micrograms per kilogram (parts per billion); soils/solids
ug/M3	micrograms per cubic meter; air samples
mg/L	milligrams per liter (parts per million); liquids/water
mg/kg	milligrams per kilogram (parts per million); soils/solids
%	percent; usually used for percent recovery of QC standards
uS/cm	conductance unit; microSiemens/centimeter
mL/hr	milliliters per hour; rate of settlement of matter in water
NTU	turbidity unit; nephelometric turbidity unit
CU	color unit; equal to 1 mg/L of chloroplatinate salt

Analytical Report
08/03/90

Giant Refining Company

Giant Refining Company
606 E. Highway 64
Farmington, NM 87401

Tim Kinney

Customer Work Identification Refinery Remediation RFE-9834
Purchase Order Number RFE-9834

Contents:

- 1 Analytical Data Summary
- 2 Sample History
- 3 Comments Summary
- 4 Notes and Definitions

Radian Analytical Services
10395 Old Placerville Road
Sacramento, CA 95827

916-362-5332

Client Services Coordinator: WLBROWN

Certified by:

Paul Wole

Previously Reported on 04/19/90.

Giant Refining Company
 Radian Work Order: 50-04-013

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	9004021055	9004021130	9004021145	9004021245
	/GRW-3	/GRW-4	/GRW-6	/STRIPPER INFL
Factor:	10	20	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
	01A	02A	03A	04A
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Bromodichloromethane	ND	1.0	ND	2.0	ND	0.10	ND	0.10
Bromoform	ND	5.0	ND	10	ND	0.50	ND	0.50
Bromomethane	ND	12	ND	24	ND	1.2	ND	1.2
Carbon tetrachloride	ND	1.2	ND	2.4	ND	0.12	ND	0.12
Chlorobenzene	ND	2.5	ND	5.0	ND	0.25	ND	0.25
Chloroethane	ND	5.2	ND	10	ND	0.52	ND	0.52
2-Chloroethylvinylether	ND	5.0	ND	10	ND	0.50	ND	0.50
Chloroform	ND	1.0	ND	2.0	ND	0.10	ND	0.10
Chloromethane	ND	3.0	ND	6.0	ND	0.30	ND	0.30
Dibromochloromethane	ND	2.0	ND	4.0	ND	0.20	ND	0.20
1,2-Dichlorobenzene	ND	5.0	ND	10	ND	0.50	ND	0.50
1,3-Dichlorobenzene	ND	3.2	ND	6.4	ND	0.32	ND	0.32
1,4-Dichlorobenzene	ND	2.4	ND	4.8	ND	0.24	ND	0.24
1,1-Dichloroethane	ND	5.0	ND	10	1.8 CI@	0.50	2.6 CI	0.50
1,2-Dichloroethane	ND	1.0	ND	2.0	6.5 CI	0.10	3.7 CI	0.10
1,1-Dichloroethene	ND	2.0	ND	4.0	ND	0.20	ND	0.20
cis-1,2-Dichloroethene	10 CI	2.0	16 CI@	4.0	ND	0.20	19 CI	0.20
trans-1,2-Dichloroethene	ND	2.0	ND	4.0	ND	0.20	ND	0.20
1,2-Dichloropropane	ND	1.0	ND	2.0	ND	0.10	ND	0.10
cis-1,3-Dichloropropene	ND	2.0	ND	4.0	ND	0.20	ND	0.20
trans-1,3-Dichloropropene	ND	3.4	ND	6.8	ND	0.34	ND	0.34
Methylene chloride	ND	4.0	ND	8.0	0.86 CI@	0.40	0.51 CI@	0.40
1,1,2,2-Tetrachloroethane	ND	1.5	ND	3.0	ND	0.15	ND	0.15
Tetrachloroethene	ND	1.0	ND	2.0	1.9 CI	0.10	2.0 CI	0.10
1,1,1-Trichloroethane	ND	2.0	ND	4.0	1.1 CI	0.20	0.70 CI@	0.20
1,1,2-Trichloroethane	ND	2.0	ND	4.0	ND	0.20	ND	0.20
Trichloroethene	ND	2.0	7.2 CI@	4.0	2.0 CI	0.20	2.0 CI	0.20
Trichlorofluoromethane	ND	2.0	ND	4.0	ND	0.20	ND	0.20
Vinyl chloride	ND	2.0	ND	4.0	ND	0.20	ND	0.20

ND Not detected at specified detection limit

C Confirmed on second column or by GC/MS

I Result differs from last report - see report narrative

@ Est. result less than 5 times detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-04-013

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	9004021055	9004021130	9004021145	9004021245
	/GRW-3	/GRW-4	/GRW-6	/STRIPPER INFL
Factor:	10	20	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
	01A	02A	03A	04A
Matrix:	water	water	water	water

	Result Det. Limit	Result Det. Limit	Result Det. Limit	Result Det. Limit
<u>Surrogate Recovery(%)</u>				
1-Bromo-4-fluorobenzene	135	147 Q	93	106
Control Limits: 40 to 140				

Q Outside control limits

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-04-013

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	9004021255	9004021430	TRIP BLANK #2	REAGENT BLANK
	/STRIPPER EFFL	/GRW-13		
Factor:	1	1	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
	05A	06A	07A	08A
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Bromodichloromethane	ND	0.10	ND	0.10	ND	0.10	ND	0.10
Bromoform	ND	0.50	ND	0.50	ND	0.50	ND	0.50
Bromomethane	ND	1.2	ND	1.2	ND	1.2	ND	1.2
Carbon tetrachloride	ND	0.12	ND	0.12	ND	0.12	ND	0.12
Chlorobenzene	ND	0.25	ND	0.25	ND	0.25	ND	0.25
Chloroethane	ND	0.52	ND	0.52	ND	0.52	ND	0.52
2-Chloroethylvinylether	ND	0.50	ND	0.50	ND	0.50	ND	0.50
Chloroform	ND	0.10	ND	0.10	ND	0.10	ND	0.10
Chloromethane	ND	0.30	ND	0.30	ND	0.30	ND	0.30
Dibromochloromethane	ND	0.20	ND	0.20	ND	0.20	ND	0.20
1,2-Dichlorobenzene	ND	0.50	ND	0.50	ND	0.50	ND	0.50
1,3-Dichlorobenzene	ND	0.32	ND	0.32	ND	0.32	ND	0.32
1,4-Dichlorobenzene	ND	0.24	ND	0.24	ND	0.24	ND	0.24
1,1-Dichloroethane	ND	0.50	ND	0.50	ND	0.50	ND	0.50
1,2-Dichloroethane	ND	0.10	3.7 CI	0.10	ND	0.10	ND	0.10
1,1-Dichloroethene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
cis-1,2-Dichloroethene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
trans-1,2-Dichloroethene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
1,2-Dichloropropane	ND	0.10	ND	0.10	ND	0.10	ND	0.10
cis-1,3-Dichloropropene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
trans-1,3-Dichloropropene	ND	0.34	ND	0.34	ND	0.34	ND	0.34
Methylene chloride	ND	0.40	ND	0.40	ND	0.40	ND	0.40
1,1,2,2-Tetrachloroethane	ND	0.15	ND	0.15	ND	0.15	ND	0.15
Tetrachloroethene	ND	0.10	ND	0.10	ND	0.10	ND	0.10
1,1,1-Trichloroethane	ND	0.20	ND	0.20	ND	0.20	ND	0.20
1,1,2-Trichloroethane	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Trichloroethene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Trichlorofluoromethane	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Vinyl chloride	ND	0.20	ND	0.20	ND	0.20	ND	0.20

ND Not detected at specified detection limit

C Confirmed on second column or by GC/MS

I Result differs from last report - see report narrative

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: SO-04-013

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	9004021255 /STRIPPER EFFL	9004021430 /GRW-13	TRIP BLANK #2	REAGENT BLANK
Factor:	1	1	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
	05A	06A	07A	08A
Matrix:	water	water	water	water

Surrogate Recovery(%)

1-Bromo-4-fluorobenzene

Control Limits: 40 to 140

Result Det. Limit

101

Result Det. Limit

104

Result Det. Limit

105

Result Det. Limit

123

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: SO-04-013

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	REAGENT BLANK	REAGENT BLANK
Factor:	1	1
Results in:	ug/L	ug/L
	08B	08C
Matrix:	water	water

	Result	Det. Limit	Result	Det. Limit
Bromodichloromethane	ND	0.10	ND	0.10
Bromoform	ND	0.50	ND	0.50
Bromomethane	ND	1.2	ND	1.2
Carbon tetrachloride	ND	0.12	ND	0.12
Chlorobenzene	ND	0.25	ND	0.25
Chloroethane	ND	0.52	ND	0.52
2-Chloroethylvinylether	ND	0.50	ND	0.50
Chloroform	ND	0.10	ND	0.10
Chloromethane	ND	0.30	ND	0.30
Dibromochloromethane	ND	0.20	ND	0.20
1,2-Dichlorobenzene	ND	0.50	ND	0.50
1,3-Dichlorobenzene	ND	0.32	ND	0.32
1,4-Dichlorobenzene	ND	0.24	ND	0.24
1,1-Dichloroethane	ND	0.50	ND	0.50
1,2-Dichloroethane	ND	0.10	ND	0.10
1,1-Dichloroethene	ND	0.20	ND	0.20
cis-1,2-Dichloroethene	ND	0.20	ND	0.20
trans-1,2-Dichloroethene	ND	0.20	ND	0.20
1,2-Dichloropropane	ND	0.10	ND	0.10
cis-1,3-Dichloropropene	ND	0.20	ND	0.20
trans-1,3-Dichloropropene	ND	0.34	ND	0.34
Methylene chloride	ND	0.40	ND	0.40
1,1,2,2-Tetrachloroethane	ND	0.15	ND	0.15
Tetrachloroethene	ND	0.10	ND	0.10
1,1,1-Trichloroethane	ND	0.20	ND	0.20
1,1,2-Trichloroethane	ND	0.20	ND	0.20
Trichloroethene	ND	0.20	ND	0.20
Trichlorofluoromethane	ND	0.20	ND	0.20
Vinyl chloride	ND	0.20	ND	0.20

ND Not detected at specified detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-04-013

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	REAGENT BLANK	REAGENT BLANK
Factor:	1	1
Results in:	ug/L	ug/L
	08B	08C
Matrix:	water	water

Surrogate Recovery(%)

1-Bromo-4-fluorobenzene

Control Limits: 40 to 140

Result Det. Limit

134

Result Det. Limit

106

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-04-013

Method: Aromatics by SW8020 (1)

List: Complete analyte list

Sample ID:	9004021055	9004021130	9004021145	9004021245
	/GRW-3	/GRW-4	/GRW-6	/STRIPPER INFL
Factor:	10	20	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
	01B	02B	03C	04C
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Benzene	280 C	2.0	440 C	4.0	16 C	0.20	23 C	0.20
Chlorobenzene	ND	2.0	ND	4.0	ND	0.20	ND	0.20
1,2-Dichlorobenzene	ND	4.0	ND	8.0	ND	0.40	ND	0.40
1,3-Dichlorobenzene	ND	4.0	ND	8.0	ND	0.40	ND	0.40
1,4-Dichlorobenzene	ND	3.0	ND	6.0	ND	0.30	ND	0.30
Ethylbenzene	98 C	2.0	65 C	4.0	ND	0.20	0.90 C	0.20
Toluene	ND	2.0	ND	4.0	0.65 C	0.20	ND	0.20
Xylenes (total)	33 C	2.0	ND	4.0	3.4 C	0.20	7.1 C	0.20
Surrogate Recovery(%)								
1-Bromo-4-fluorobenzene	91		104		69		84	
Control Limits: 40 to 140								

C Confirmed on second column or by GC/MS

ND Not detected at specified detection limit

a Est. result less than 5 times detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-04-013

Method: Aromatics by SW8020 (1)

List: Complete analyte list

Sample ID:	9004021255	9004021430	TRIP BLANK #2	REAGENT BLANK
	/STRIPPER EFFL	/GRW-13		
Factor:	1	1	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
	05C	06C	07A	09A
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Benzene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Chlorobenzene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
1,2-Dichlorobenzene	ND	0.40	ND	0.40	ND	0.40	ND	0.40
1,3-Dichlorobenzene	ND	0.40	ND	0.40	ND	0.40	ND	0.40
1,4-Dichlorobenzene	ND	0.30	ND	0.30	ND	0.30	ND	0.30
Ethylbenzene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Toluene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Xylenes (total)	ND	0.20	ND	0.20	ND	0.20	ND	0.20
<u>Surrogate Recovery(%)</u>								
1-Bromo-4-fluorobenzene	92		89		89		101	
Control Limits: 40 to 140								

ND Not detected at specified detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-04-013

Method: Aromatics by SW8020 (1)

List: Complete analyte list

Sample ID:	REAGENT BLANK	REAGENT BLANK
Factor:	1	1
Results in:	ug/L	ug/L
	09B	09C
Matrix:	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Benzene	ND	0.20	ND	0.20				
Chlorobenzene	ND	0.20	ND	0.20				
1,2-Dichlorobenzene	ND	0.40	ND	0.40				
1,3-Dichlorobenzene	ND	0.40	ND	0.40				
1,4-Dichlorobenzene	ND	0.30	ND	0.30				
Ethylbenzene	ND	0.20	ND	0.20				
Toluene	ND	0.20	ND	0.20				
Xylenes (total)	ND	0.20	ND	0.20				
<u>Surrogate Recovery(%)</u>								
1-Bromo-4-fluorobenzene	100		102					
Control Limits: 40 to 140								

ND Not detected at specified detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company

Radian Work Order: S0-04-013

Sample Identifications and Dates

Sample ID	9004021055	9004021130	9004021145	9004021245	9004021255	9004021430
	/GRW-3	/GRW-4	/GRW-6	/STRIPPER INFL	/STRIPPER EFFL	/GRW-13
Date Sampled	04/02/90	04/02/90	04/02/90	04/02/90	04/02/90	04/02/90
Date Received	04/03/90	04/03/90	04/03/90	04/03/90	04/03/90	04/03/90
Matrix	water	water	water	water	water	water
	01	02	03	04	05	06

Halocarbons by SW8010

Prepared						
Analyzed	04/06/90	04/08/90	04/05/90	04/05/90	04/05/90	04/05/90
Analyst	MG	MG	MG	MG	MG	MG
File ID	DB04065	DB04084	DB040512	DB040513	DB040514	DB040515
Blank ID	QB04061	QB04081	QB04051	QB04051	QB04051	QB04051
Instrument	B	B	B	B	B	B
Report as	received	received	received	received	received	received

Aromatics by SW8020

Prepared						
Analyzed	04/06/90	04/08/90	04/05/90	04/05/90	04/05/90	04/05/90
Analyst	MG	MG	MG	MG	MG	MG
File ID	EB04065	EB04084	EB040512	EB040513	EB040514	EB040515
Blank ID	RB04061	RB04081	RB04051	RB04051	RB04051	RB04051
Instrument	B	B	B	B	B	B
Report as	received	received	received	received	received	received

Giant Refining Company
 Radian Work Order: S0-04-013

Sample Identifications and Dates

Sample ID	TRIP BLANK #2	REAGENT BLANK	REAGENT BLANK
Date Sampled	04/02/90		
Date Received	04/03/90	04/03/90	04/03/90
Matrix	water	water	water
	07	08	09

Halocarbons by SW8010

Prepared		
Analyzed	04/05/90	04/05/90
Analyst	MG	MG
File ID	DB040516	QB04051
Blank ID	QB04051	
Instrument	B	B
Report as	received	received

Halocarbons by SW8010

Prepared		
Analyzed		04/08/90
Analyst		MG
File ID		QB04081
Blank ID		
Instrument		B
Report as		received

Halocarbons by SW8010

Prepared		
Analyzed		04/06/90
Analyst		MG
File ID		QB04061
Blank ID		
Instrument		B
Report as		received

Aromatics by SW8020

Prepared		
Analyzed	04/05/90	04/05/90
Analyst	MG	MG
File ID	EB040516	RB04051
Blank ID	RB04051	
Instrument	B	B
Report as	received	received

Aromatics by SW8020

Prepared		
Analyzed		04/06/90
Analyst		MG
File ID		RB04061
Blank ID		
Instrument		B
Report as		received

Giant Refining Company
 Radian Work Order: S0-04-013

Sample Identifications and Dates

Sample ID	TRIP BLANK #2	REAGENT BLANK	REAGENT BLANK
Date Sampled	04/02/90		
Date Received	04/03/90	04/03/90	04/03/90
Matrix			water
	07	08	09

Aromatics by SW8020

Prepared

Analyzed

Analyst

File ID

Blank ID

Instrument

Report as

04/08/90

MG

RB04081

B

received

Appendix A

Comments, Notes and Definitions

Giant Refining Company
Radian Work Order: S0-04-013

General Comments

SAMPLE 9004021130 SURROGATE RECOVERY OUT OF QC LIMITS DUE TO
MATRIX INTERFERENCES.

I=RESULT CORRECTED. RESULTS WITH THE I FLAG HAVE BEEN REVISED
BASED ON CORRECTED RESPONSE FACTORS FOR GC INSTRUMENT B. SEE
ATTACHED LETTER FOR EXPLANATION.

Plant Refining Company
Radian Work Order: S0-04-013

A ALL METHODS EXCEPT CLP

The results which are less than five times the method specified detection limit.

EXPLANATION

Uncertainty of the analysis will increase as the method detection limit is approached. These results should be considered approximate.

C ORGANIC CLP

pesticides require that single component results > 10ng/uL in the final extract be confirmed by GC/MS.

OTHER ORGANIC METHODS

This analysis has been confirmed on a second column or by GC/MS.

EXPLANATION

Most methods of analysis by gas chromatography recommend reanalysis on a second column of dissimilar phase to resolve compounds of interest from interferences that may occur and for analyte confirmation.

I ALL METHODS EXCEPT CLP

This result has been modified since the last issue of this report.

EXPLANATION

The explanations are included in the report narrative.

ND ALL METHODS EXCEPT CLP

This flag is used to denote analytes which are not detected at or above the specified detection limit.

EXPLANATION

The value to the right of the < symbol is the method specified detection limit for the analyte.

Q ALL METHODS EXCEPT CLP

This quality control standard is outside method or laboratory specified control limits.

EXPLANATION

This flag is applied to matrix spike, analytical QC spike, and surrogate recoveries; and to RPD(relative percent difference) values for duplicate analyses and matrix spike/matrix spike duplicate result.

Giant Refining Company
Radian Work Order: SO-04-013

TERMS USED IN THIS REPORT:

Analyte - A chemical for which a sample is to be analyzed. The analysis will meet EPA method and QC specifications.

Compound - See Analyte.

Detection Limit - The method specified detection limit, which is the lower limit of quantitation specified by EPA for a method. Radian staff regularly assess their laboratories' method detection limits to verify that they meet or are lower than those specified by EPA. Detection limits which are higher than method limits are based on experimental values at the 99% confidence level. The detection limits for EPA CLP (Contract Laboratory Program) methods are CRQLs (contract required quantitation limits) for organics and CRDLs (contract required detection limits) for inorganics. Note, the detection limit may vary from that specified by EPA based on sample size, dilution or cleanup. (Refer to Factor, below)

EPA Method - The EPA specified method used to perform an analysis. EPA has specified standard methods for analysis of environmental samples. Radian will perform its analyses and accompanying QC tests in conformance with EPA methods unless otherwise specified.

Factor - Default method detection limits are based on analysis of clean water samples. A factor is required to calculate sample specific detection limits based on alternate matrices (soil or water), reporting units, use of cleanup procedures, or dilution of extracts/digestates. For example, extraction or digestion of 10 grams of soil in contrast to 1 liter of water will result in a factor of 100.

Matrix - The sample material. Generally, it will be soil, water, air, oil, or solid waste.

Radian Work Order - The unique Radian identification code assigned to the samples reported in the analytical summary.

Units - ug/L	micrograms per liter (parts per billion); liquids/water
ug/kg	micrograms per kilogram (parts per billion); soils/solids
ug/M3	micrograms per cubic meter; air samples
mg/L	milligrams per liter (parts per million); liquids/water
mg/kg	milligrams per kilogram (parts per million); soils/solids
%	percent; usually used for percent recovery of QC standards
uS/cm	conductance unit; microSiemens/centimeter
mL/hr	milliliters per hour; rate of settlement of matter in water
NTU	turbidity unit; nephelometric turbidity unit
CU	color unit; equal to 1 mg/L of chloroplatinate salt

Analytical Report
08/03/90

Giant Refining Company

Giant Refining Company
606 E. Highway 64
Farmington, NM 87401

Tim Kinney

Customer Work Identification Refinery Remediation RFE-9834
Purchase Order Number RFE-9834

Contents:

- 1 Analytical Data Summary
- 2 Sample History
- 3 Comments Summary
- 4 Notes and Definitions

Radian Analytical Services
10395 Old Placerville Road
Sacramento, CA 95827

916-362-5332

Client Services Coordinator: WLBROWN

Certified by:

D. L. Casagrande

Previously Reported on 04/20/90.

Giant Refining Company

Radian Work Order: 50-04-020

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	9004031005	9004031109	9004031150	9004031359
	/GBR-17	/GBR-30	/GBR-24D	/GBR-15
Factor:	1	1	1	20
Results in:	ug/L	ug/L	ug/L	ug/L
	01A	02A	03A	04A
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Bromodichloromethane	ND	0.10	ND	0.10	ND	0.10	ND	2.0
Bromoform	ND	0.50	ND	0.50	ND	0.50	ND	10
Bromomethane	ND	1.2	ND	1.2	ND	1.2	ND	24
Carbon tetrachloride	ND	0.12	ND	0.12	ND	0.12	ND	2.4
Chlorobenzene	ND	0.25	ND	0.25	ND	0.25	ND	5.0
Chloroethane	ND	0.52	ND	0.52	ND	0.52	ND	10
2-Chloroethylvinylether	ND	0.50	ND	0.50	ND	0.50	ND	10
Chloroform	ND	0.10	ND	0.10	ND	0.10	ND	2.0
Chloromethane	ND	0.30	ND	0.30	ND	0.30	ND	6.0
Dibromochloromethane	ND	0.20	ND	0.20	ND	0.20	ND	4.0
1,2-Dichlorobenzene	ND	0.50	ND	0.50	ND	0.50	ND	10
1,3-Dichlorobenzene	ND	0.32	ND	0.32	ND	0.32	ND	6.4
1,4-Dichlorobenzene	ND	0.24	ND	0.24	ND	0.24	ND	4.8
1,1-Dichloroethane	ND	0.50	ND	0.50	ND	0.50	69 CI	10
1,2-Dichloroethane	ND	0.10	ND	0.10	13 CI	0.10	ND	2.0
1,1-Dichloroethene	ND	0.20	ND	0.20	ND	0.20	ND	4.0
cis-1,2-Dichloroethene	ND	0.20	ND	0.20	ND	0.20	ND	4.0
trans-1,2-Dichloroethene	ND	0.20	ND	0.20	ND	0.20	ND	4.0
1,2-Dichloropropane	ND	0.10	ND	0.10	ND	0.10	ND	2.0
cis-1,3-Dichloropropene	ND	0.20	ND	0.20	ND	0.20	ND	4.0
trans-1,3-Dichloropropene	ND	0.34	ND	0.34	ND	0.34	ND	6.8
Methylene chloride	ND	0.40	ND	0.40	ND	0.40	ND	8.0
1,1,2,2-Tetrachloroethane	ND	0.15	ND	0.15	ND	0.15	ND	3.0
Tetrachloroethene	0.25 C1a	0.10	ND	0.10	0.14 C1a	0.10	ND	2.0
1,1,1-Trichloroethane	1.2 CI	0.20	ND	0.20	ND	0.20	ND	4.0
1,1,2-Trichloroethane	ND	0.20	ND	0.20	ND	0.20	ND	4.0
Trichloroethene	ND	0.20	ND	0.20	ND	0.20	ND	4.0
Trichlorofluoromethane	ND	0.20	ND	0.20	ND	0.20	ND	4.0
Vinyl chloride	ND	0.20	ND	0.20	ND	0.20	ND	4.0

ND Not detected at specified detection limit

C Confirmed on second column or by GC/MS

I Result differs from last report - see report narrative

a Est. result less than 5 times detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-04-020

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	9004031005	9004031109	9004031150	9004031359
	/GBR-17	/GBR-30	/GBR-24D	/GBR-15
Factor:	1	1	1	20
Results in:	ug/L	ug/L	ug/L	ug/L
	01A	02A	03A	04A
Matrix:	water	water	water	water

Surrogate Recovery(%)

1-Bromo-4-fluorobenzene

Control Limits: 40 to 140

Result Det. Limit

137

Result Det. Limit

119

Result Det. Limit

128

Result Det. Limit

103

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-04-020

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	TRIP BLANK #5	REAGENT BLANK	REAGENT BLANK	REAGENT BLANK
Factor:	1	1	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
	05A	06A	06B	06C
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Bromodichloromethane	ND	0.10	ND	0.10	ND	0.10	ND	0.10
Bromoform	ND	0.50	ND	0.50	ND	0.50	ND	0.50
Bromomethane	ND	1.2	ND	1.2	ND	1.2	ND	1.2
Carbon tetrachloride	ND	0.12	ND	0.12	ND	0.12	ND	0.12
Chlorobenzene	ND	0.25	ND	0.25	ND	0.25	ND	0.25
Chloroethane	ND	0.52	ND	0.52	ND	0.52	ND	0.52
2-Chloroethylvinylether	ND	0.50	ND	0.50	ND	0.50	ND	0.50
Chloroform	ND	0.10	ND	0.10	ND	0.10	ND	0.10
Chloromethane	ND	0.30	ND	0.30	ND	0.30	ND	0.30
Dibromochloromethane	ND	0.20	ND	0.20	ND	0.20	ND	0.20
1,2-Dichlorobenzene	ND	0.50	ND	0.50	ND	0.50	ND	0.50
1,3-Dichlorobenzene	ND	0.32	ND	0.32	ND	0.32	ND	0.32
1,4-Dichlorobenzene	ND	0.24	ND	0.24	ND	0.24	ND	0.24
1,1-Dichloroethane	ND	0.50	ND	0.50	ND	0.50	ND	0.50
1,2-Dichloroethane	ND	0.10	ND	0.10	ND	0.10	ND	0.10
1,1-Dichloroethene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
cis-1,2-Dichloroethene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
trans-1,2-Dichloroethene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
1,2-Dichloropropane	ND	0.10	ND	0.10	ND	0.10	ND	0.10
cis-1,3-Dichloropropene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
trans-1,3-Dichloropropene	ND	0.34	ND	0.34	ND	0.34	ND	0.34
Methylene chloride	ND	0.40	ND	0.40	ND	0.40	ND	0.40
1,1,2,2-Tetrachloroethane	ND	0.15	ND	0.15	ND	0.15	ND	0.15
Tetrachloroethene	ND	0.10	ND	0.10	ND	0.10	ND	0.10
1,1,1-Trichloroethane	ND	0.20	ND	0.20	ND	0.20	ND	0.20
1,1,2-Trichloroethane	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Trichloroethene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Trichlorofluoromethane	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Vinyl chloride	ND	0.20	ND	0.20	ND	0.20	ND	0.20

ND Not detected at specified detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: 50-04-020

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	TRIP BLANK #5	REAGENT BLANK	REAGENT BLANK	REAGENT BLANK
Factor:	1	1	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
	05A	06A	06B	06C
Matrix:	water	water	water	water

	Result Det. Limit	Result Det. Limit	Result Det. Limit	Result Det. Limit
<u>Surrogate Recovery(%)</u>				
1-Bromo-4-fluorobenzene	139	132	137	131
Control Limits: 40 to 140				

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company

Radian Work Order: S0-04-020

Method: Aromatics by SW8020 (1)

List: Complete analyte list

Sample ID:	9004031005	9004031109	9004031150	9004031359
	/GBR-17	/GBR-30	/GBR-24D	/GBR-15
Factor:	1	1	1	20
Results in:	ug/L	ug/L	ug/L	ug/L
	01C	02C	03C	04C
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Benzene	ND	0.20	ND	0.20	31 C	0.20	110 C	4.0
Chlorobenzene	ND	0.20	ND	0.20	ND	0.20	ND	4.0
1,2-Dichlorobenzene	ND	0.40	ND	0.40	ND	0.40	ND	8.0
1,3-Dichlorobenzene	ND	0.40	ND	0.40	ND	0.40	ND	8.0
1,4-Dichlorobenzene	ND	0.30	ND	0.30	ND	0.30	ND	6.0
Ethylbenzene	ND	0.20	2.0 C	0.20	13 C	0.20	ND	4.0
Toluene	ND	0.20	3.1 CG	0.20	2.3 C	0.20	ND	4.0
Xylenes (total)	ND	0.20	ND	0.20	6.7 C	0.20	ND	4.0
Surrogate Recovery(%)								
1-Bromo-4-fluorobenzene	99		111		90		86	
Control Limits: 40 to 140								

ND Not detected at specified detection limit

C Confirmed on second column or by GC/MS

G Indicates an estimated GC value due to interferences.

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company

Radian Work Order: S0-04-020

Method: Aromatics by SW8020 (1)

List: Complete analyte list

Sample ID:	TRIP BLANK #5	REAGENT BLANK	REAGENT BLANK	REAGENT BLANK
Factor:	1	1	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
	05A	07A	07B	07C
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Benzene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Chlorobenzene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
1,2-Dichlorobenzene	ND	0.40	ND	0.40	ND	0.40	ND	0.40
1,3-Dichlorobenzene	ND	0.40	ND	0.40	ND	0.40	ND	0.40
1,4-Dichlorobenzene	ND	0.30	ND	0.30	ND	0.30	ND	0.30
Ethylbenzene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Toluene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Xylenes (total)	ND	0.20	ND	0.20	ND	0.20	ND	0.20

Surrogate Recovery(%)

1-Bromo-4-fluorobenzene

Control Limits: 40 to 140

99

101

100

98

ND Not detected at specified detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-04-020

Sample Identifications and Dates

Sample ID	9004031005	9004031109	9004031150	9004031359	TRIP BLANK #5	REAGENT BLANK
	/GBR-17	/GBR-30	/GBR-24D	/GBR-15		
Date Sampled	04/03/90	04/03/90	04/03/90	04/03/90	04/03/90	
Date Received	04/04/90	04/04/90	04/04/90	04/04/90	04/04/90	04/04/90
Matrix	water	water	water	water	water	water
	01	02	03	04	05	06
Halocarbons by SW8010						
Prepared						
Analyzed	04/07/90	04/10/90	04/07/90	04/09/90	04/07/90	04/07/90
Analyst	MG	MG	MG	MG	MG	MG
File ID	DB04075	DB04104	DB04077	DB040912	QB04074	QB04071
Blank ID	QB04071	QB04101	QB04071	QB04091	QB04071	
Instrument	B	B	B	B	B	B
Report as	received	received	received	received	received	received
Halocarbons by SW8010						
Prepared						
Analyzed						04/09/90
Analyst						MG
File ID						QB04091
Blank ID						
Instrument						B
Report as						received
Halocarbons by SW8010						
Prepared						
Analyzed						04/10/90
Analyst						MG
File ID						QB04101
Blank ID						
Instrument						B
Report as						received
Aromatics by SW8020						
Prepared						
Analyzed	04/07/90	04/10/90	04/07/90	04/09/90	04/07/90	
Analyst	MG	MG	MG	MG	MG	
File ID	EB04075	EB04104	EB04077	EB040912	EB04074	
Blank ID	RB04071	RB04101	RB04071	RB04091	RB04071	
Instrument	B	B	B	B	B	
Report as	received	received	received	received	received	

Giant Refining Company

Radian Work Order: S0-04-020

Sample Identifications and Dates

Sample ID

REAGENT BLANK

Date Sampled

Date Received

Matrix

04/04/90

water

07

Aromatics by SW8020

Prepared

Analyzed

Analyst

File ID

Blank ID

Instrument

Report as

04/07/90

MG

RB04071

B

received

Aromatics by SW8020

Prepared

Analyzed

Analyst

File ID

Blank ID

Instrument

Report as

04/09/90

MG

RB04091

B

received

Giant Refining Company

Radian Work Order: S0-04-020

Sample Identifications and Dates

Sample ID

REAGENT BLANK

Date Sampled

Date Received

04/04/90

Matrix

water

07

Aromatics by SW8020

Prepared

Analyzed

Analyst

File ID

Blank ID

Instrument

Report as

04/10/90

MG

RB04101

B

received

Appendix A

Comments, Notes and Definitions

Giant Refining Company
Radian Work Order: S0-04-020

General Comments

SOME ANALYTES REPORTED AS ESTIMATED VALUE DUE TO MATRIX INTERFERENCES. I=RESULT CORRECTED. RESULTS WITH THE I FLAG HAVE BEEN REVISED BASED ON CORRECTED RESPONSE FACTORS FOR GC INSTRUMENT B. SEE ATTACHED LETTER FOR EXPLANATION.

Giant Refining Company
Radian Work Order: S0-04-020

a ALL METHODS EXCEPT CLP

The results which are less than five times the method specified detection limit.

EXPLANATION

Uncertainty of the analysis will increase as the method detection limit is approached. These results should be considered approximate.

C ORGANIC CLP

pesticides require that single component results > 10ng/uL in the final extract be confirmed by GC/MS.

OTHER ORGANIC METHODS

This analysis has been confirmed on a second column or by GC/MS.

EXPLANATION

Most methods of analysis by gas chromatography recommend reanalysis on a second column of dissimilar phase to resolve compounds of interest from interferences that may occur and for analyte confirmation.

G ALL ORGANIC GC METHODS EXCEPT CLP

Indicates an estimated GC value due to interferences.

I ALL METHODS EXCEPT CLP

This result has been modified since the last issue of this report.

EXPLANATION

The explanations are included in the report narrative.

ND ALL METHODS EXCEPT CLP

This flag is used to denote analytes which are not detected at or above the specified detection limit.

EXPLANATION

The value to the right of the < symbol is the method specified detection limit for the analyte.

Giant Refining Company
Radian Work Order: S0-04-020

TERMS USED IN THIS REPORT:

Analyte - A chemical for which a sample is to be analyzed. The analysis will meet EPA method and QC specifications.

Compound - See Analyte.

Detection Limit - The method specified detection limit, which is the lower limit of quantitation specified by EPA for a method. Radian staff regularly assess their laboratories' method detection limits to verify that they meet or are lower than those specified by EPA. Detection limits which are higher than method limits are based on experimental values at the 99% confidence level. The detection limits for EPA CLP (Contract Laboratory Program) methods are CRQLs (contract required quantitation limits) for organics and CRDLs (contract required detection limits) for inorganics. Note, the detection limit may vary from that specified by EPA based on sample size, dilution or cleanup. (Refer to Factor, below)

EPA Method - The EPA specified method used to perform an analysis. EPA has specified standard methods for analysis of environmental samples. Radian will perform its analyses and accompanying QC tests in conformance with EPA methods unless otherwise specified.

Factor - Default method detection limits are based on analysis of clean water samples. A factor is required to calculate sample specific detection limits based on alternate matrices (soil or water), reporting units, use of cleanup procedures, or dilution of extracts/digestates. For example, extraction or digestion of 10 grams of soil in contrast to 1 liter of water will result in a factor of 100.

Matrix - The sample material. Generally, it will be soil, water, air, oil, or solid waste.

Radian Work Order - The unique Radian identification code assigned to the samples reported in the analytical summary.

Units - ug/L	micrograms per liter (parts per billion); liquids/water
ug/kg	micrograms per kilogram (parts per billion); soils/solids
ug/M3	micrograms per cubic meter; air samples
mg/L	milligrams per liter (parts per million); liquids/water
mg/kg	milligrams per kilogram (parts per million); soils/solids
%	percent; usually used for percent recovery of QC standards
uS/cm	conductance unit; microSiemens/centimeter
mL/hr	milliliters per hour; rate of settlement of matter in water
NTU	turbidity unit; nephelometric turbidity unit
CU	color unit; equal to 1 mg/L of chloroplatinate salt

Analytical Report
09/26/90

Giant Refining Co.

Giant Refining Co.
606 E. Highway 64
Farmington, NM 87401

Tim Kinney

Customer Work Identification 90-04-097
Purchase Order Number RFE-9834

Contents:

- 1 Analytical Data Summary
- 2 Sample History
- 3 Comments Summary
- 4 Notes and Definitions

Radian Analytical Services
8501 Mo-Pac Boulevard
P. O. Box 201088
Austin, TX 78720-1088

512/454-4797

Client Services Coordinator: RRMAY

Certified by:

Clifford Mayen

Giant Refining Co.
 Radian Work Order: 90-09-340

Method: SW8310 PAHs by HPLC (1)

List: 8310 Method analytes

Sample ID:	9004041025	9004041120	REAGENT BLANK
	GBR-33	GBR-31	
Factor:	0.94	47	1
Results in:	ug/L	ug/L	ug/L
	01A	02A	03A
Matrix:	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Acenaphthene	ND	1.7	ND	85	ND	1.8
Acenaphthylene	ND	2.2	270 a	110	ND	2.3
Anthracene	ND	0.62	ND	31	ND	0.66
Benzo(a)anthracene	ND	0.012	ND	0.61	ND	0.013
Benzo(a)pyrene	ND	0.022	ND	1.1	ND	0.023
Benzo(b)fluoranthene	ND	0.017	ND	0.85	ND	0.018
Benzo(g,h,i)perylene	ND	0.071	ND	3.6	ND	0.076
Benzo(k)fluoranthene	ND	0.016	ND	0.80	ND	0.017
Chrysene	ND	0.14	ND	7.0	ND	0.15
Dibenzo(a,h)anthracene	ND	0.028	ND	1.4	ND	0.030
Fluoranthene	ND	0.20	ND	9.9	ND	0.21
Fluorene	ND	0.20	ND	9.9	ND	0.21
Indeno(1,2,3-cd)pyrene	ND	0.040	ND	2.0	ND	0.043
Naphthalene	ND	1.7	ND	85	ND	1.8
Phenanthrene	ND	0.60	90 a	30	ND	0.64
Pyrene	ND	0.25	24 a	13	ND	0.27
<u>Surrogate Recovery(%)</u>						
Terphenyl-d14	39		107		42	
Control Limits: 24 to 146						

ND Not detected at specified detection limit

a Est. result less than 5 times detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Co.
 Radian Work Order: 90-09-340

Method: SW8310 PAHs by HPLC (1)

List: Matrix Spike Analyte List

Sample ID:	RECOVERY CHECK	RECOVERY CHECK K DUP
Factor:	1	1
Results in:	%recvry	%recvry
	04A	05A
Matrix:	water	water

	Result	Det. Limit	Result	Det. Limit
Acenaphthene	81		74	
Acenaphthylene	82		82	
Anthracene	88		89	
Benzo(k)fluoranthene	91		93	
Dibenzo(a,h)anthracene	94		98	
Fluorene	87		87	
Naphthalene	85		83	
Phenanthrene	80		90	

Surrogate Recovery(%)

Terphenyl-d14

87

87

Control Limits: 24 to 146

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Co.

Radian Work Order: 90-09-340

Sample Identifications and Dates

Sample ID	9004041025 GBR-33	9004041120 GBR-31	REAGENT BLANK	RECOVERY CHECK	RECOVERY CHECK- K DUP
Date Sampled	04/04/90	04/04/90			
Date Received	04/10/90	04/10/90	04/10/90	04/10/90	04/10/90
Matrix	water 01	water 02	water 03	water 04	water 05
SW8310 PAHs by HPLC					
Prepared	04/11/90	04/11/90	04/11/90		
Analyzed	05/04/90	05/07/90	05/06/90		
Analyst	TLS	TLS	TLS		
File ID	734 & 64	769 & 99	760 & 90		
Blank ID	760 & 90	760 & 90	760 & 90		
Instrument	HPLC 2	HPLC 2	HPLC 2		
Report as	received	received	received		
SW8310 PAHs by HPLC					
Prepared				04/11/90	04/11/90
Analyzed				05/04/90	05/04/90
Analyst				TLS	TLS
File ID				732 & 92	733 & 93
Blank ID				760 & 90	760 & 90
Instrument				HPLC 2	HPLC 2
Report as				received	received

Appendix A

Comments, Notes and Definitions

Giant Refining Co.
Radian Work Order: 90-09-340

@ ALL METHODS EXCEPT CLP

The results which are less than five times the method specified detection limit.

EXPLANATION

Uncertainty of the analysis will increase as the method detection limit is approached. These results should be considered approximate.

ND ALL METHODS EXCEPT CLP

This flag is used to denote analytes which are not detected at or above the specified detection limit.

EXPLANATION

The value to the right of the < symbol is the method specified detection limit for the analyte.

Giant Refining Co.
Radian Work Order: 90-09-340

TERMS USED IN THIS REPORT:

Analyte - A chemical for which a sample is to be analyzed. The analysis will meet EPA method and QC specifications.

Compound - See Analyte.

Detection Limit - The method specified detection limit, which is the lower limit of quantitation specified by EPA for a method. Radian staff regularly assess their laboratories' method detection limits to verify that they meet or are lower than those specified by EPA. Detection limits which are higher than method limits are based on experimental values at the 99% confidence level. The detection limits for EPA CLP (Contract Laboratory Program) methods are CRQLs (contract required quantitation limits) for organics and CRDLs (contract required detection limits) for inorganics. Note, the detection limit may vary from that specified by EPA based on sample size, dilution or cleanup. (Refer to Factor, below)

EPA Method - The EPA specified method used to perform an analysis. EPA has specified standard methods for analysis of environmental samples. Radian will perform its analyses and accompanying QC tests in conformance with EPA methods unless otherwise specified.

Factor - Default method detection limits are based on analysis of clean water samples. A factor is required to calculate sample specific detection limits based on alternate matrices (soil or water), reporting units, use of cleanup procedures, or dilution of extracts/digestates. For example, extraction or digestion of 10 grams of soil in contrast to 1 liter of water will result in a factor of 100.

Matrix - The sample material. Generally, it will be soil, water, air, oil, or solid waste.

Radian Work Order - The unique Radian identification code assigned to the samples reported in the analytical summary.

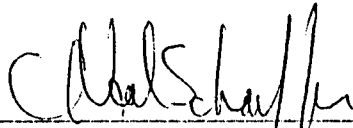
Units - ug/L	micrograms per liter (parts per billion); liquids/water
ug/kg	micrograms per kilogram (parts per billion); soils/solids
ug/M3	micrograms per cubic meter; air samples
mg/L	milligrams per liter (parts per million); liquids/water
mg/kg	milligrams per kilogram (parts per million); soils/solids
%	percent; usually used for percent recovery of QC standards
uS/cm	conductance unit; microSiemens/centimeter
mL/hr	milliliters per hour; rate of settlement of matter in water
NTU	turbidity unit; nephelometric turbidity unit
CU	color unit; equal to 1 mg/L of chloroplatinate salt

CLIENT: GBR
ID: 9007100955
SITE: GRW-3
LAB NO: F4585

DATE REPORTED: 07/16/90
DATE RECEIVED: 07/10/90
DATE COLLECTED: 07/10/90

Lab pH (s.u.).....	7.94
Lab conductivity, umhos/cm.....	4465
Lab resistivity, ohm-m.....	2.2396
Total dissolved solids (180), mg/l..	3042
Total dissolved solids (calc), mg/l.	3014
Total alkalinity as CaCO ₃ , mg/l.....	821.30
Total acidity as CaCO ₃ , mg/l.....	0.00
Total hardness as CaCO ₃ , mg/l.....	953.80
Sodium absorption ratio.....	9.63

	mg/l	meq/l
Bicarbonate as HCO ₃	1002.0	16.43
Carbonate as CO ₃	0.0	0.00
Chloride.....	461.7	13.02
Sulfate.....	1010.6	21.06
Calcium.....	333.3	16.63
Magnesium.....	29.7	2.44
Potassium.....	2.6	0.07
Sodium.....	683.5	29.73
Major cations.....		48.87
Major anions.....		50.51
Cation/anion difference.....		1.64 %


C. Neal Schaeffer
Lab Director



Inter-Mountain
Laboratories, Inc.

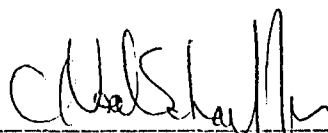
2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: GBR
ID: 9007101030
SITE: GRW-4
LAB NO: F4586

DATE REPORTED: 07/16/90
DATE RECEIVED: 07/10/90
DATE COLLECTED: 07/10/90

Lab pH (s.u.).....	7.91
Lab conductivity, umhos/cm.....	4884
Lab resistivity, ohm-m.....	2.0475
Total dissolved solids (180), mg/l..	3334
Total dissolved solids (calc), mg/l.	3374
Total alkalinity as CaCO ₃ , mg/l.....	974.10
Total acidity as CaCO ₃ , mg/l.....	0.00
Total hardness as CaCO ₃ , mg/l.....	1255.00
Sodium absorption ratio.....	8.88

	mg/l	meq/l
Bicarbonate as HCO ₃	1188.4	19.48
Carbonate as CO ₃	0.0	0.00
Chloride.....	519.4	14.65
Sulfate.....	1076.5	22.43
Calcium.....	413.6	20.64
Magnesium.....	54.2	4.46
Potassium.....	2.7	0.07
Sodium.....	723.0	31.45
Major cations.....		56.62
Major anions.....		56.56
Cation/anion difference.....		0.05 %

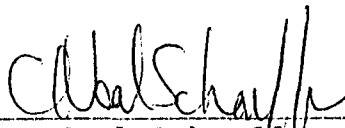

C. Neal Schaeffer
Lab Director

CLIENT: GBR
ID: 9007101050
SITE: GRW-6
LAB NO: F4587

DATE REPORTED: 07/16/90
DATE RECEIVED: 07/10/90
DATE COLLECTED: 07/10/90

Lab pH (s.u.).....	7.74
Lab conductivity, umhos/cm.....	5068
Lab resistivity, ohm-m.....	1.9732
Total dissolved solids (180), mg/l..	3306
Total dissolved solids (calc), mg/l.	3179
Total alkalinity as CaCO ₃ , mg/l.....	668.50
Total acidity as CaCO ₃ , mg/l.....	0.00
Total hardness as CaCO ₃ , mg/l.....	1164.64
Sodium absorption ratio.....	8.97

	mg/l	meq/l
Bicarbonate as HCO ₃	815.6	13.37
Carbonate as CO ₃	0.0	0.00
Chloride.....	823.7	23.24
Sulfate.....	836.2	17.42
Calcium.....	329.3	16.43
Magnesium.....	83.4	6.86
Potassium.....	2.2	0.06
Sodium.....	703.5	30.60
Major cations.....		53.95
Major anions.....		54.03
Cation/anion difference.....		0.07 %


C. Neal Schaeffer
Lab Director



Inter-Mountain
Laboratories, Inc.

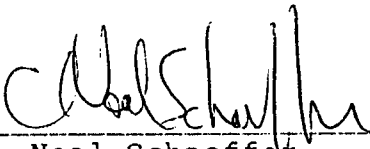
2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: GBR
ID: Lab split
SITE: GBR-6 LS
LAB NO: F4591

DATE REPORTED: 07/16/90
DATE RECEIVED: 07/10/90
DATE COLLECTED: 07/10/90

Lab pH (s.u.).....	7.64
Lab conductivity, umhos/cm.....	5047
Lab resistivity, ohm-m.....	1.9814
Total dissolved solids (180), mg/l..	3250
Total dissolved solids (calc), mg/l.	3232
Total alkalinity as CaCO ₃ , mg/l.....	668.50
Total acidity as CaCO ₃ , mg/l.....	0.00
Total hardness as CaCO ₃ , mg/l.....	1174.68
Sodium absorption ratio.....	8.97

	mg/l	meq/l
Bicarbonate as HCO ₃	815.6	13.37
Carbonate as CO ₃	0.0	0.00
Chloride.....	839.5	23.68
Sulfate.....	846.9	17.64
Calcium.....	381.5	19.04
Magnesium.....	54.2	4.46
Potassium.....	2.6	0.07
Sodium.....	706.5	30.73
Major cations.....		54.29
Major anions.....		54.69
Cation/anion difference.....		0.37 %

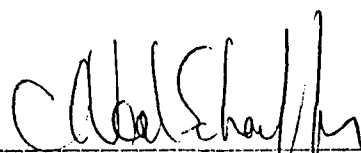

C. Neal Schaeffer
Lab Director

CLIENT: GBR
ID: 9007101115
SITE: GRW-13
LAB NO: F4588

DATE REPORTED: 07/16/90
DATE RECEIVED: 07/10/90
DATE COLLECTED: 07/10/90

Lab pH (s.u.).....	8.05
Lab conductivity, umhos/cm.....	5139
Lab resistivity, ohm-m.....	1.9459
Total dissolved solids (180), mg/l..	3800
Total dissolved solids (calc), mg/l.	3608
Total alkalinity as CaCO ₃ , mg/l.....	305.60
Total acidity as CaCO ₃ , mg/l.....	0.00
Total hardness as CaCO ₃ , mg/l.....	1355.40
Sodium absorption ratio.....	8.18

	mg/l	meq/l
Bicarbonate as HCO ₃	372.8	6.11
Carbonate as CO ₃	0.0	0.00
Chloride.....	682.1	19.24
Sulfate.....	1602.0	33.37
Calcium.....	289.2	14.43
Magnesium.....	154.2	12.68
Potassium.....	4.4	0.11
Sodium.....	692.5	30.12
Major cations.....		57.34
Major anions.....		58.73
Cation/anion difference.....		1.19 %

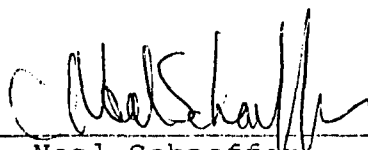

C. Neal Schaeffer
Lab Director

CLIENT: GBR
ID: 9007111005
SITE: GBR 15
LAB NO: F4593

DATE REPORTED: 07/16/90
DATE RECEIVED: 07/11/90
DATE COLLECTED: 07/11/90

Lab pH (s.u.).....	7.75
Lab conductivity, umhos/cm.....	4776
Lab resistivity, ohm-m.....	2.0938
Total dissolved solids (180), mg/l..	3886
Total dissolved solids (calc), mg/l.	3685
Total alkalinity as CaCO ₃ , mg/l.....	152.80
Total acidity as CaCO ₃ , mg/l.....	0.00
Total hardness as CaCO ₃ , mg/l.....	1295.16
Sodium absorption ratio.....	8.47

	mg/l	meq/l
Bicarbonate as HCO ₃	186.4	3.06
Carbonate as CO ₃	0.0	0.00
Chloride.....	440.7	12.43
Sulfate.....	2027.9	42.25
Calcium.....	257.0	12.83
Magnesium.....	159.0	13.08
Potassium.....	7.8	0.20
Sodium.....	701.0	30.49
Major cations.....		56.59
Major anions.....		57.74
Cation/anion difference.....		1.00 %


C. Neal Schaeffer
Lab Director



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Laboratories, Inc.

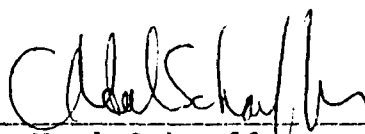
2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: GBR
ID: 9007101326
SITE: GBR-17
LAB NO: F4589

DATE REPORTED: 07/16/90
DATE RECEIVED: 07/10/90
DATE COLLECTED: 07/10/90

Lab pH (s.u.).....	8.20
Lab conductivity, umhos/cm.....	2851
Lab resistivity, ohm-m.....	3.5075
Total dissolved solids (180), mg/l..	2346
Total dissolved solids (calc), mg/l.	2214
Total alkalinity as CaCO ₃ , mg/l.....	219.65
Total acidity as CaCO ₃ , mg/l.....	0.00
Total hardness as CaCO ₃ , mg/l.....	1084.32
Sodium absorption ratio.....	3.61

	mg/l	meq/l
Bicarbonate as HCO ₃	268.0	4.39
Carbonate as CO ₃	0.0	0.00
Chloride.....	110.2	3.11
Sulfate.....	1290.9	26.89
Calcium.....	365.5	18.24
Magnesium.....	42.0	3.45
Potassium.....	0.5	0.01
Sodium.....	273.6	11.90
Major cations.....		33.60
Major anions.....		34.39
Cation/anion difference.....		1.17 %


C. Neal Schaeffer
Lab Director



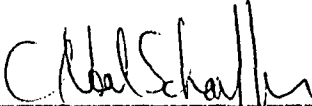
2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: GBR
ID: 9007111105
SITE: GBR 24-D
LAB NO: F4594

DATE REPORTED: 07/16/90
DATE RECEIVED: 07/11/90
DATE COLLECTED: 07/11/90

Lab pH (s.u.).....	8.07
Lab conductivity, umhos/cm.....	4659
Lab resistivity, ohm-m.....	2.1464
Total dissolved solids (180), mg/l..	3704
Total dissolved solids (calc), mg/l.	3539
Total alkalinity as CaCO ₃ , mg/l.....	210.10
Total acidity as CaCO ₃ , mg/l.....	0.00
Total hardness as CaCO ₃ , mg/l.....	1746.96
Sodium absorption ratio.....	4.92

	mg/l	meq/l
Bicarbonate as HCO ₃	256.3	4.20
Carbonate as CO ₃	0.0	0.00
Chloride.....	697.8	19.68
Sulfate.....	1603.6	33.41
Calcium.....	526.1	26.25
Magnesium.....	105.6	8.69
Potassium.....	6.5	0.16
Sodium.....	473.0	20.57
Major cations.....		55.68
Major anions.....		57.29
Cation/anion difference.....		1.43 %

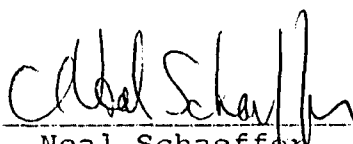

C. Neal Schaeffer
Lab Director

CLIENT: GBR
ID: 9007101420
SITE: GBR-30
LAB NO: F4590

DATE REPORTED: 07/16/90
DATE RECEIVED: 07/10/90
DATE COLLECTED: 07/10/90

Lab pH (s.u.).....	7.93
Lab conductivity, umhos/cm.....	4710
Lab resistivity, ohm-m.....	2.1231
Total dissolved solids (180), mg/l..	3608
Total dissolved solids (calc), mg/l.	3465
Total alkalinity as CaCO ₃ , mg/l.....	315.15
Total acidity as CaCO ₃ , mg/l.....	0.00
Total hardness as CaCO ₃ , mg/l.....	1275.08
Sodium absorption ratio.....	7.81

	mg/l	meq/l
Bicarbonate as HCO ₃	384.5	6.30
Carbonate as CO ₃	0.0	0.00
Chloride.....	519.4	14.65
Sulfate.....	1628.3	33.92
Calcium.....	437.7	21.84
Magnesium.....	44.5	3.66
Potassium.....	4.8	0.12
Sodium.....	641.0	27.88
Major cations.....		53.51
Major anions.....		54.88
Cation/anion difference.....		1.27 %

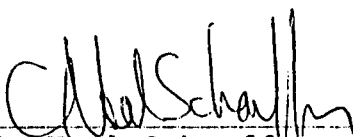

C. Neal Schaeffer
Lab Director

CLIENT: GBR
ID: 9007111205
SITE: GBR 31
LAB NO: F4595

DATE REPORTED: 07/16/90
DATE RECEIVED: 07/11/90
DATE COLLECTED: 07/11/90

Lab pH (s.u.).....	7.83
Lab conductivity, umhos/cm.....	4746
Lab resistivity, ohm-m.....	2.1070
Total dissolved solids (180), mg/l..	3874
Total dissolved solids (calc), mg/l.	3795
Total alkalinity as CaCO ₃ , mg/l.....	362.90
Total acidity as CaCO ₃ , mg/l.....	0.00
Total hardness as CaCO ₃ , mg/l.....	1445.76
Sodium absorption ratio.....	7.50

	mg/l	meq/l
Bicarbonate as HCO ₃	442.7	7.26
Carbonate as CO ₃	0.0	0.00
Chloride.....	440.7	12.43
Sulfate.....	1918.0	39.96
Calcium.....	526.1	26.25
Magnesium.....	32.4	2.66
Potassium.....	4.0	0.10
Sodium.....	656.0	28.53
Major cations.....		57.55
Major anions.....		59.65
Cation/anion difference.....		1.79 %


C. Neal Schaeffer
Lab Director



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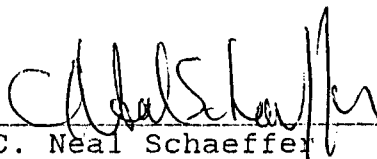
2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: GBR
ID: 9007111300
SITE: GBR 33
LAB NO: F4596

DATE REPORTED: 07/16/90
DATE RECEIVED: 07/11/90
DATE COLLECTED: 07/11/90

Lab pH (s.u.).....	7.73
Lab conductivity, umhos/cm.....	4287
Lab resistivity, ohm-m.....	2.3326
Total dissolved solids (180), mg/l..	3268
Total dissolved solids (calc), mg/l.	3165
Total alkalinity as CaCO ₃ , mg/l.....	362.90
Total acidity as CaCO ₃ , mg/l.....	0.00
Total hardness as CaCO ₃ , mg/l.....	1194.76
Sodium absorption ratio.....	7.42

	mg/l	meq/l
Bicarbonate as HCO ₃	442.7	7.26
Carbonate as CO ₃	0.0	0.00
Chloride.....	545.6	15.39
Sulfate.....	1369.1	28.52
Calcium.....	377.5	18.84
Magnesium.....	61.5	5.06
Potassium.....	3.4	0.09
Sodium.....	590.0	25.66
Major cations.....		49.65
Major anions.....		51.17
Cation/anion difference.....		1.51 %


C. Neal Schaeffer
Lab Director



Inter-Mountain
Laboratories, Inc.

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

CLIENT: GBR
ID: 9007100915
SITE: Stripper influent
LAB NO: F4584

DATE REPORTED: 07/16/90
DATE RECEIVED: 07/10/90
DATE COLLECTED: 07/10/90

Lab pH (s.u.).....	8.30
Lab conductivity, umhos/cm.....	4802
Lab resistivity, ohm-m.....	2.0825
Total dissolved solids (180), mg/l..	3450
Total dissolved solids (calc), mg/l.	3451
Total alkalinity as CaCO ₃ , mg/l.....	553.90
Total acidity as CaCO ₃ , mg/l.....	0.00
Total hardness as CaCO ₃ , mg/l.....	1234.92
Sodium absorption ratio.....	8.48

	mg/l	meq/l
Bicarbonate as HCO ₃	675.8	11.08
Carbonate as CO ₃	0.0	0.00
Chloride.....	577.1	16.28
Sulfate.....	1390.9	28.98
Calcium.....	409.6	20.44
Magnesium.....	51.8	4.26
Potassium.....	3.8	0.10
Sodium.....	685.5	29.82
Major cations.....	54.61	
Major anions.....	56.33	
Cation/anion difference.....	1.55	%

C. Neal Schaeffer
Lab Director



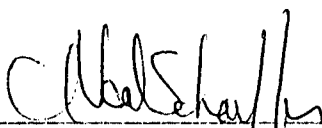
2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: GBR
ID: 9007100925
SITE: Stripper effluent
LAB NO: F4583

DATE REPORTED: 07/16/90
DATE RECEIVED: 07/10/90
DATE COLLECTED: 07/10/90

Lab pH (s.u.).....	8.16
Lab conductivity, umhos/cm.....	4690
Lab resistivity, ohm-m.....	2.1322
Total dissolved solids (180), mg/l..	3346
Total dissolved solids (calc), mg/l.	3242
Total alkalinity as CaCO ₃ , mg/l.....	391.55
Total acidity as CaCO ₃ , mg/l.....	0.00
Total hardness as CaCO ₃ , mg/l.....	1094.36
Sodium absorption ratio.....	8.78

	mg/l	meq/l
Bicarbonate as HCO ₃	477.7	7.83
Carbonate as CO ₃	0.0	0.00
Chloride.....	571.9	16.13
Sulfate.....	1383.9	28.83
Calcium.....	289.2	14.43
Magnesium.....	90.7	7.46
Potassium.....	3.7	0.10
Sodium.....	668.0	29.06
Major cations.....		51.04
Major anions.....		52.79
Cation/anion difference.....		1.69 %


C. Neal Schaeffer
Lab Director

Analytical Report
09/26/90

Giant Refining Co.

Giant Refining Co.
606 E. Highway 64
Farmington, NM 87401

Tim Kinney

Customer Work Identification 8310
Purchase Order Number

Contents:

- 1 Analytical Data Summary
- 2 Sample History
- 3 Comments Summary
- 4 Notes and Definitions

Radian Analytical Services
8501 Mo-Pac Boulevard
P. O. Box 201088
Austin, TX 78720-1088

512/454-4797

Client Services Coordinator: RRMAY

Certified by:

Clifford Meyer

Giant Refining Co.
 Radian Work Order: 90-07-185

Method: SW8310 PAHs by HPLC (1)

List: 8310 Method analytes

Sample ID:	900717930	9007171004	900717945	REAGENT BLANK
	RW-3	RW-6	RW-4	
Factor:	9.5	4.8	4.8	1
Results in:	ug/L	ug/L	ug/L	ug/L
	01A	02A	03A	04A
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Acenaphthene	ND	17	ND	8.6	ND	8.6	ND	1.8
Acenaphthylene	ND	22	26 *	11	24 *	11	ND	2.3
Anthracene	ND	6.3	ND	3.2	ND	3.2	ND	0.66
Benzo(a)anthracene	ND	0.12	ND	0.062	ND	0.062	ND	0.013
Benzo(a)pyrene	ND	0.22	ND	0.11	ND	0.11	ND	0.023
Benzo(b)fluoranthene	ND	0.17	ND	0.086	ND	0.086	ND	0.018
Benzo(g,h,i)perylene	ND	0.72	ND	0.36	ND	0.36	ND	0.076
Benzo(k)fluoranthene	ND	0.16	ND	0.082	ND	0.082	ND	0.017
Chrysene	ND	1.4	ND	0.72	ND	0.72	ND	0.15
Dibenzo(a,h)anthracene	ND	0.28	ND	0.14	ND	0.14	ND	0.030
Fluoranthene	ND	2.0	ND	1.0	ND	1.0	ND	0.21
Fluorene	5.7 *	2.0	1.6 *	1.0	3.9 *	1.0	ND	0.21
Indeno(1,2,3-cd)pyrene	ND	0.41	ND	0.21	ND	0.21	ND	0.043
Naphthalene	ND	17	ND	8.6	11 *	8.6	ND	1.8
Phenanthrene	15 *	6.1	ND	3.1	ND	3.1	ND	0.64
Pyrene	ND	2.6	ND	1.3	ND	1.3	ND	0.27
Surrogate Recovery(%)								
Terphenyl-d14	100		102		99		97	
Control Limits: 24 to 146								

ND Not detected at specified detection limit

* Est. result less than 5 times detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Co.
 Radian Work Order: 90-07-185

Method: SW8310 PAHs by HPLC (1)

List: Matrix Spike Analyte List

Sample ID:	RECOVERY CHECK	RECOVERY CHECK-
		K DUP
Factor:	1	1
Results in:	% recvry	% recvry
	05A	06A
Matrix:	water	water

	Result	Det. Limit	Result	Det. Limit
Acenaphthene	108		110	
Acenaphthylene	65		64	
Anthracene	86		86	
Benzo(k)fluoranthene	103		102	
Dibenzo(a,h)anthracene	96		90	
Fluorene	78		77	
Naphthalene	59		54	
Phenanthrene	91		87	

Surrogate Recovery(%)

Terphenyl-d14 93 96

Control Limits: 24 to 146

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Co.
 Radian Work Order: 90-07-185

Sample Identifications and Dates

Sample ID	900717930	9007171004	900717945	REAGENT BLANK	RECOVERY CHECK	RECOVERY CHECK-DUP
	RW-3	RW-6	RW-4			
Date Sampled	07/17/90	07/17/90	07/17/90			
Date Received	07/19/90	07/19/90	07/19/90	07/19/90	07/19/90	07/19/90
Matrix	water	water	water	water	water	water
	01	02	03	04	05	06

SW8310 PAHs by HPLC						
Prepared	07/24/90	07/24/90	07/24/90	07/24/90		
Analyzed	08/16/90	08/16/90	08/16/90	07/29/90		
Analyst	TLS	TLS	TLS	TLS		
File ID	59 & 129	60 & 130	61 & 131	117 & 118		
Blank ID	117 & 118	117 & 118	117 & 118	117 & 118		
Instrument	HPLC 2	HPLC 2	HPLC 2	HPLC 2		
Report as	received	received	received	received		
SW8310 PAHs by HPLC						
Prepared					07/24/90	07/24/90
Analyzed					07/29/90	07/29/90
Analyst					TLS	TLS
File ID					126 & 127	127 & 128
Blank ID					117 & 118	117 & 118
Instrument					HPLC 2	HPLC 2
Report as					received	received

Appendix A

Comments, Notes and Definitions

Giant Refining Co.
Radian Work Order: 90-07-185

- ND This flag (or <) is used to denote analytes which are not detected at or above the specified detection limit. The value to the right of the < symbol is the method specified detection limit for the sample.
- * The asterisk(*) is used to flag results which are less than five times the method specified detection limit. Studies have shown that the uncertainty of the analysis will increase exponentially as the method detection limit is approached. These results should be considered approximate.

Giant Refining Co.
Radian Work Order: 90-07-185

TERMS USED IN THIS REPORT:

Analyte - A chemical for which a sample is to be analyzed. The analysis will meet EPA method and QC specifications.

Compound - See Analyte.

Detection Limit - The method specified detection limit, which is the lower limit of quantitation specified by EPA for a method. Radian staff regularly assess their laboratories' method detection limits to verify that they meet or are lower than those specified by EPA. Detection limits which are higher than method limits are based on experimental values at the 99% confidence level. The detection limits for EPA CLP (Contract Laboratory Program) methods are CRQLs (contract required quantitation limits) for organics and CRDLs (contract required detection limits) for inorganics. Note, the detection limit may vary from that specified by EPA based on sample size, dilution or cleanup. (Refer to Factor, below)

EPA Method - The EPA specified method used to perform an analysis. EPA has specified standard methods for analysis of environmental samples. Radian will perform its analyses and accompanying QC tests in conformance with EPA methods unless otherwise specified.

Factor - Default method detection limits are based on analysis of clean water samples. A factor is required to calculate sample specific detection limits based on alternate matrices (soil or water), reporting units, use of cleanup procedures, or dilution of extracts/digestates. For example, extraction or digestion of 10 grams of soil in contrast to 1 liter of water will result in a factor of 100.

Matrix - The sample material. Generally, it will be soil, water, air, oil, or solid waste.

Radian Work Order - The unique Radian identification code assigned to the samples reported in the analytical summary.

Units - ug/L	micrograms per liter (parts per billion); liquids/water
ug/kg	micrograms per kilogram (parts per billion); soils/solids
ug/M3	micrograms per cubic meter; air samples
mg/L	milligrams per liter (parts per million); liquids/water
mg/kg	milligrams per kilogram (parts per million); soils/solids
%	percent; usually used for percent recovery of QC standards
uS/cm	conductance unit; microSiemens/centimeter
mL/hr	milliliters per hour; rate of settlement of matter in water
NTU	turbidity unit; nephelometric turbidity unit
CU	color unit; equal to 1 mg/L of chloroplatinate salt

Analytical Report
08/28/90

Giant Refining Company

Giant Refining Company
606 E. Highway 64
Farmington, NM 87401

Tim Kinney

Customer Work Identification Refinery Remediation 9834
Purchase Order Number RFE-9834

Contents:

- 1 Analytical Data Summary
- 2 Sample History
- 3 Comments Summary
- 4 Notes and Definitions

Radian Analytical Services
10395 Old Placerville Road
Sacramento, CA 95827

916-362-5332

Client Services Coordinator: LWKELLY

Certified by:

Paul H. Vale

Giant Refining Company
 Radian Work Order: S0-07-122

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	900717930	900717945	9007171004	9007171022
	RW-3	RW-4	RW-6	STRIPPER INF
Factor:	50	25	1	10
Results in:	ug/L	ug/L	ug/L	ug/L
	01A	03A	05A	07A
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Bromodichloromethane	ND	5.0	ND	2.5	ND	0.10	ND	1.0
Bromoform	ND	25	ND	12	ND	0.50	ND	5.0
Bromomethane	ND	59	ND	30	ND	1.2	ND	12
Carbon tetrachloride	ND	6.0	ND	3.0	ND	0.12	ND	1.2
Chlorobenzene	ND	12	ND	6.2	ND	0.25	ND	2.5
Chloroethane	ND	26	ND	13	ND	0.52	ND	5.2
2-Chloroethylvinylether	ND	25	ND	12	ND	0.50	ND	5.0
Chloroform	ND	5.0	ND	2.5	ND	0.10	ND	1.0
Chloromethane	ND	15	ND	7.5	ND	0.30	ND	3.0
Dibromochloromethane	ND	10	ND	5.0	ND	0.20	ND	2.0
1,2-Dichlorobenzene	ND	25	ND	12	ND	0.50	ND	5.0
1,3-Dichlorobenzene	ND	16	ND	8.0	ND	0.32	ND	3.2
1,4-Dichlorobenzene	ND	12	ND	6.0	ND	0.24	ND	2.4
1,1-Dichloroethane	ND	25	13 Ca	12	1.9 Ca	0.50	ND	5.0
1,2-Dichloroethane	ND	5.0	5.2 Ca	2.5	5.1 C	0.10	ND	1.0
1,1-Dichloroethene	ND	10	ND	5.0	ND	0.20	ND	2.0
cis-1,2-Dichloroethene	22 Ca	10	46 C	5.0	7.8 C	0.20	16 C	2.0
trans-1,2-Dichloroethene	ND	10	ND	5.0	ND	0.20	ND	2.0
1,2-Dichloropropane	ND	5.0	ND	2.5	ND	0.10	ND	1.0
cis-1,3-Dichloropropene	ND	10	ND	5.0	ND	0.20	ND	2.0
trans-1,3-Dichloropropene	ND	17	ND	8.5	ND	0.34	ND	3.4
Methylene chloride	ND	20	ND	10	ND	0.40	6.2 Xa	4.0
1,1,2,2-Tetrachloroethane	ND	7.5	ND	3.8	ND	0.15	ND	1.5
Tetrachloroethene	ND	5.0	ND	2.5	1.7 C	0.10	4.2 Ca	1.0
1,1,1-Trichloroethane	ND	10	ND	5.0	0.41 Ca	0.20	16 X	2.0
1,1,2-Trichloroethane	ND	10	ND	5.0	ND	0.20	ND	2.0
Trichloroethene	ND	10	10 Ca	5.0	1.5 C	0.20	36 C	2.0
Trichlorofluoromethane	ND	10	ND	5.0	0.34 Ca	0.20	ND	2.0
Vinyl chloride	ND	10	ND	5.0	ND	0.20	ND	2.0

 ND Not detected at specified detection limit
 a Est. result less than 5 times detection limit

 C Confirmed on second column or by GC/MS
 X See definition in report narrative

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-07-122

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	900717930	900717945	9007171004	9007171022
	RW-3	RW-4	RW-6	STRIPPER INF
Factor:	50	25	1	10
Results in:	ug/L	ug/L	ug/L	ug/L
	01A	03A	05A	07A
Matrix:	water	water	water	water

Surrogate Recovery(%)

1-Bromo-4-fluorobenzene

Control Limits: 40 to 140

Result Det. Limit

Result Det. Limit

Result Det. Limit

Result Det. Limit

115

112

106

110

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
Radian Work Order: SO-07-122

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	9007171035	9007171055	9007171215	9007171345
	STRIPPER EFF	RW-13	GBR-17	GBR-15
Factor:	1	1	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
	09A	11A	13A	15A
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Bromodichloromethane	ND	0.10	ND	0.10	ND	0.10	ND	0.10
Bromoform	ND	0.50	ND	0.50	ND	0.50	ND	0.50
Bromomethane	ND	1.2	ND	1.2	ND	1.2	ND	1.2
Carbon tetrachloride	ND	0.12	ND	0.12	ND	0.12	ND	0.12
Chlorobenzene	ND	0.25	ND	0.25	ND	0.25	ND	0.25
Chloroethane	ND	0.52	ND	0.52	ND	0.52	ND	0.52
2-Chloroethylvinylether	ND	0.50	ND	0.50	ND	0.50	ND	0.50
Chloroform	ND	0.10	ND	0.10	ND	0.10	ND	0.10
Chloromethane	ND	0.30	ND	0.30	ND	0.30	ND	0.30
Dibromochloromethane	ND	0.20	ND	0.20	ND	0.20	ND	0.20
1,2-Dichlorobenzene	ND	0.50	ND	0.50	ND	0.50	ND	0.50
1,3-Dichlorobenzene	ND	0.32	ND	0.32	ND	0.32	ND	0.32
1,4-Dichlorobenzene	ND	0.24	ND	0.24	ND	0.24	ND	0.24
1,1-Dichloroethane	ND	0.50	ND	0.50	ND	0.50	ND	0.50
1,2-Dichloroethane	ND	0.10	4.8 C	0.10	ND	0.10	33 C	0.10
1,1-Dichloroethene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
cis-1,2-Dichloroethene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
trans-1,2-Dichloroethene	ND	0.20	ND	0.20	ND	0.20	0.45 Xa	0.20
1,2-Dichloropropane	ND	0.10	ND	0.10	ND	0.10	ND	0.10
cis-1,3-Dichloropropene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
trans-1,3-Dichloropropene	ND	0.34	ND	0.34	ND	0.34	ND	0.34
Methylene chloride	0.69 Xa	0.40	ND	0.40	ND	0.40	ND	0.40
1,1,2,2-Tetrachloroethane	ND	0.15	ND	0.15	ND	0.15	ND	0.15
Tetrachloroethene	0.14 Xa	0.10	ND	0.10	0.19 Xa	0.10	ND	0.10
1,1,1-Trichloroethane	0.94 Ga	0.20	ND	0.20	0.30 Ca	0.20	ND	0.20
1,1,2-Trichloroethane	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Trichloroethene	6.8 G	0.20	3.0 X	0.20	1.5 X	0.20	ND	0.20
Trichlorofluoromethane	0.24 Xa	0.20	0.25 Xa	0.20	ND	0.20	ND	0.20
Vinyl chloride	ND	0.20	ND	0.20	ND	0.20	ND	0.20

ND Not detected at specified detection limit

a Est. result less than 5 times detection limit

C Confirmed on second column or by GC/MS

X See definition in report narrative

G Indicates an estimated GC value due to interferences.

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-07-122

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	9007171035	9007171055	9007171215	9007171345
	STRIPPER EFF	RW-13	GBR-17	GBR-15
Factor:	1	1	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
	09A	11A	13A	15A
Matrix:	water	water	water	water

	Result Det. Limit	Result Det. Limit	Result Det. Limit	Result Det. Limit
<u>Surrogate Recovery(%)</u>				
1-Bromo-4-fluorobenzene	101	111	110	105
Control Limits: 40 to 140				

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: 50-07-122

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	REAGENT BLANK	REAGENT BLANK
Factor:	1	1
Results in:	ug/L	ug/L
	17A	19A
Matrix:	water	water

	Result	Det. Limit	Result	Det. Limit
Bromodichloromethane	ND	0.10	ND	0.10
Bromoform	ND	0.50	ND	0.50
Bromomethane	ND	1.2	ND	1.2
Carbon tetrachloride	ND	0.12	ND	0.12
Chlorobenzene	ND	0.25	ND	0.25
Chloroethane	ND	0.52	ND	0.52
2-Chloroethylvinylether	ND	0.50	ND	0.50
Chloroform	ND	0.10	ND	0.10
Chloromethane	ND	0.30	ND	0.30
Dibromochloromethane	ND	0.20	ND	0.20
1,2-Dichlorobenzene	ND	0.50	ND	0.50
1,3-Dichlorobenzene	ND	0.32	ND	0.32
1,4-Dichlorobenzene	ND	0.24	ND	0.24
1,1-Dichloroethane	ND	0.50	ND	0.50
1,2-Dichloroethane	ND	0.10	ND	0.10
1,1-Dichloroethene	ND	0.20	ND	0.20
cis-1,2-Dichloroethene	ND	0.20	ND	0.20
trans-1,2-Dichloroethene	ND	0.20	ND	0.20
1,2-Dichloropropane	ND	0.10	ND	0.10
cis-1,3-Dichloropropene	ND	0.20	ND	0.20
trans-1,3-Dichloropropene	ND	0.34	ND	0.34
Methylene chloride	ND	0.40	ND	0.40
1,1,2,2-Tetrachloroethane	ND	0.15	ND	0.15
Tetrachloroethene	ND	0.10	ND	0.10
1,1,1-Trichloroethane	ND	0.20	ND	0.20
1,1,2-Trichloroethane	ND	0.20	ND	0.20
Trichloroethene	ND	0.20	ND	0.20
Trichlorofluoromethane	ND	0.20	ND	0.20
Vinyl chloride	ND	0.20	ND	0.20

ND Not detected at specified detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-07-122

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	REAGENT BLANK	REAGENT BLANK
Factor:	1	1
Results in:	ug/L	ug/L
	17A	19A
Matrix:	water	water

Surrogate Recovery(%)

1-Bromo-4-fluorobenzene

Control Limits: 40 to 140

Result Det. Limit

112

Result Det. Limit

110

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-07-122

Method: Aromatics by SW8020 (1)

List: Complete analyte list

Sample ID:	900717930	900717945	9007171004	9007171022
	RW-3	RW-4	RW-6	STRIPPER INF
Factor:	50	25	10	10
Results in:	ug/L	ug/L	ug/L	ug/L
	02A	04A	06A	08A
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Benzene	380 G	10	290 C	5.0	120 C	2.0	52 C	2.0
Chlorobenzene	ND	10	ND	5.0	ND	2.0	ND	2.0
1,2-Dichlorobenzene	ND	20	ND	10	ND	4.0	ND	4.0
1,3-Dichlorobenzene	ND	20	ND	10	ND	4.0	ND	4.0
1,4-Dichlorobenzene	ND	15	ND	7.5	ND	3.0	ND	3.0
Ethylbenzene	160 G	10	58 C	5.0	24 C	2.0	6.7 G@	2.0
Toluene	ND	10	ND	5.0	ND	2.0	2.2 C@	2.0
Xylenes (total)	57 G	10	9.3 C@	5.0	8.5 C@	2.0	36 C	2.0
Surrogate Recovery(%)								
1-Bromo-4-fluorobenzene	104		104		101		103	
Control Limits: 40 to 140								

G Indicates an estimated GC value due to interferences.

C Confirmed on second column or by GC/MS

ND Not detected at specified detection limit

@ Est. result less than 5 times detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-07-122

Method: Aromatics by SW8020 (1)

List: Complete analyte list

Sample ID:	9007171035	9007171055	9007171215	9007171345
	STRIPPER EFF	RW-13	GBR-17	GBR-15
Factor:	1	1	1	2
Results in:	ug/L	ug/L	ug/L	ug/L
	10A	12A	14A	16A
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Benzene	ND	0.20	ND	0.20	ND	0.20	39 C	0.40
Chlorobenzene	ND	0.20	ND	0.20	ND	0.20	ND	0.40
1,2-Dichlorobenzene	ND	0.40	ND	0.40	ND	0.40	ND	0.80
1,3-Dichlorobenzene	ND	0.40	ND	0.40	ND	0.40	ND	0.80
1,4-Dichlorobenzene	ND	0.30	ND	0.30	ND	0.30	ND	0.60
Ethylbenzene	ND	0.20	ND	0.20	ND	0.20	ND	0.40
Toluene	ND	0.20	ND	0.20	ND	0.20	ND	0.40
Xylenes (total)	ND	0.20	ND	0.20	ND	0.20	ND	0.40
<u>Surrogate Recovery(%)</u>								
1-Bromo-4-fluorobenzene	105		104		98		98	
Control Limits: 40 to 140								

ND Not detected at specified detection limit

C Confirmed on second column or by GC/MS

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-07-122

Method: Aromatics by SW8020 (1)

List: Complete analyte list

Sample ID:

REAGENT BLANK

DUP

Factor:

1

1

Results in:

ug/L

ug/L

18A

20A

Matrix:

water

water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Benzene	ND	0.20	ND	0.20				
Chlorobenzene	ND	0.20	ND	0.20				
1,2-Dichlorobenzene	ND	0.40	ND	0.40				
1,3-Dichlorobenzene	ND	0.40	ND	0.40				
1,4-Dichlorobenzene	ND	0.30	ND	0.30				
Ethylbenzene	ND	0.20	ND	0.20				
Toluene	ND	0.20	ND	0.20				
Xylenes (total)	ND	0.20	ND	0.20				
Surrogate Recovery(%)								
1-Bromo-4-fluorobenzene	104							
Control Limits:	to							

ND Not detected at specified detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-07-122

Sample Identifications and Dates

Sample ID	900717930	900717930	900717945	900717945	9007171004	9007171004
	RW-3	RW-3	RW-4	RW-4	RW-6	RW-6
Date Sampled	07/17/90	07/17/90	07/17/90	07/17/90	07/17/90	07/17/90
Date Received	07/18/90	07/18/90	07/18/90	07/18/90	07/18/90	07/18/90
Matrix	water	water	water	water	water	water
	01	02	03	04	05	06

Halocarbons by SW8010

 Prepared
 Analyzed 07/28/90
 Analyst BSJ
 File ID DB07284
 Blank ID QB07281
 Instrument B
 Report as received

 07/28/90
 BSJ
 DB07285
 QB07281
 B
 received

 07/27/90
 BSJ
 DB07276
 QB07271
 B
 received

Aromatics by SW8020

 Prepared
 Analyzed
 Analyst
 File ID
 Blank ID
 Instrument
 Report as

 07/30/90
 BSJ
 EB07304
 RB07301
 B
 received

 07/30/90
 BSJ
 EB07305
 RB07301
 B
 received

 07/30/90
 BSJ
 EB07306
 RB07301
 B
 received

Giant Refining Company
 Radian Work Order: S0-07-122

Sample Identifications and Dates

Sample ID	9007171022	9007171022	9007171035	9007171035	9007171055	9007171055
	STRIPPER I	STRIPPER INF	STRIPPER EFF	STRIPPER EFF	RW-13	RW-13
Date Sampled	07/17/90	07/17/90	07/17/90	07/17/90	07/17/90	07/17/90
Date Received	07/18/90	07/18/90	07/18/90	07/18/90	07/18/90	07/18/90
Matrix	water	water	water	water	water	water
	07	08	09	10	11	12

Halocarbons by SW8010

Prepared

Analyzed

Analyst

File ID

Blank ID

Instrument

Report as

07/27/90

BSJ

DB07277

QB07271

B

received

07/27/90

BSJ

DB07278

QB07271

B

received

07/27/90

BSJ

DB07279

QB07271

B

received

Aromatics by SW8020

Prepared

Analyzed

Analyst

File ID

Blank ID

Instrument

Report as

07/30/90

BSJ

EB07307

RB07301

B

received

07/30/90

BSJ

EB07308

RB07301

B

received

07/30/90

BSJ

EB07309

RB07301

B

received

Giant Refining Company

Radian Work Order: S0-07-122

Sample Identifications and Dates

Sample ID	9007171215	9007171215	9007171345	9007171345	REAGENT BLANK	REAGENT BLANK
	GBR-17	GBR-17	GBR-15	GBR-15		
Date Sampled	07/17/90	07/17/90	07/17/90	07/17/90		
Date Received	07/18/90	07/18/90	07/18/90	07/18/90	07/18/90	07/18/90
Matrix	water	water	water	water	water	water
	13	14	15	16	17	18

Halocarbons by SW8010

Prepared

Analyzed

Analyst

File ID

Blank ID

Instrument

Report as

07/27/90

BSJ

DB072710

QB07271

B

received

07/27/90

BSJ

DB072711

QB07271

B

received

07/27/90

BSJ

QB07271

B

received

Aromatics by SW8020

Prepared

Analyzed

Analyst

File ID

Blank ID

Instrument

Report as

07/30/90

BSJ

EB073010

RB07301

B

received

07/30/90

BSJ

EB073011

RB07301

B

received

07/30/90

BSJ

RB07301

B

received

Giant Refining Company
Radian Work Order: S0-07-122

Sample Identifications and Dates

Sample ID	REAGENT BLANK	DUP
Date Sampled		
Date Received	07/18/90	07/18/90
Matrix	water	water
	19	20

Halocarbons by SW8010

Prepared					
Analyzed	07/28/90				
Analyst	BSJ				
File ID	QB07281				
Blank ID					
Instrument	B				
Report as	received				

Aromatics by SW8020

Prepared					
Analyzed					
Analyst					
File ID					
Blank ID					
Instrument					
Report as		received			

Appendix A

Comments, Notes and Definitions

Giant Refining Company
Radian Work Order: S0-07-122

X Flag indicates the analyte was not found on a second column.

G Flag indicates the concentration is an estimated value due to a significant difference in the quantitation from the primary and the secondary columns.

Second column quantitation was as follows:

Fraction -02A Benzene 26 ug/L
Ethylbenzene 12 ug/L
Xylenes 10 ug/L

Fraction -08A Ethylbenzene 15 ug/L

Fraction -09A 1,1,1-Trichloroethane 0.21 ug/L
Trichloroethene 0.40 ug/L

Giant Refining Company
Radian Work Order: S0-07-122

Q ALL METHODS EXCEPT CLP

The results which are less than five times the method specified detection limit.

EXPLANATION

Uncertainty of the analysis will increase as the method detection limit is approached. These results should be considered approximate.

C ORGANIC CLP

pesticides require that single component results > 10ng/uL in the final extract be confirmed by GC/MS.

OTHER ORGANIC METHODS

This analysis has been confirmed on a second column or by GC/MS.

EXPLANATION

Most methods of analysis by gas chromatography recommend reanalysis on a second column of dissimilar phase to resolve compounds of interest from interferences that may occur and for analyte confirmation.

G ALL ORGANIC GC METHODS EXCEPT CLP

Indicates an estimated GC value due to interferences.

ND ALL METHODS EXCEPT CLP

This flag is used to denote analytes which are not detected at or above the specified detection limit.

EXPLANATION

The value to the right of the < symbol is the method specified detection limit for the analyte.

X ALL METHODS EXCEPT INORGANIC CLP

This is a general purpose flag for those situations not covered by the standard flags. The specific definition of this flag is described in the Comments Summary and/or in the case narrative.

Giant Refining Company
Radian Work Order: S0-07-122

TERMS USED IN THIS REPORT:

Analyte - A chemical for which a sample is to be analyzed. The analysis will meet EPA method and QC specifications.

Compound - See Analyte.

Detection Limit - The method specified detection limit, which is the lower limit of quantitation specified by EPA for a method. Radian staff regularly assess their laboratories' method detection limits to verify that they meet or are lower than those specified by EPA. Detection limits which are higher than method limits are based on experimental values at the 99% confidence level. The detection limits for EPA CLP (Contract Laboratory Program) methods are CRQLs (contract required quantitation limits) for organics and CRDLs (contract required detection limits) for inorganics. Note, the detection limit may vary from that specified by EPA based on sample size, dilution or cleanup. (Refer to Factor, below)

EPA Method - The EPA specified method used to perform an analysis. EPA has specified standard methods for analysis of environmental samples. Radian will perform its analyses and accompanying QC tests in conformance with EPA methods unless otherwise specified.

Factor - Default method detection limits are based on analysis of clean water samples. A factor is required to calculate sample specific detection limits based on alternate matrices (soil or water), reporting units, use of cleanup procedures, or dilution of extracts/digestates. For example, extraction or digestion of 10 grams of soil in contrast to 1 liter of water will result in a factor of 100.

Matrix - The sample material. Generally, it will be soil, water, air, oil, or solid waste.

Radian Work Order - The unique Radian identification code assigned to the samples reported in the analytical summary.

Units - ug/L	micrograms per liter (parts per billion); liquids/water
ug/kg	micrograms per kilogram (parts per billion); soils/solids
ug/M3	micrograms per cubic meter; air samples
mg/L	milligrams per liter (parts per million); liquids/water
mg/kg	milligrams per kilogram (parts per million); soils/solids
%	percent; usually used for percent recovery of QC standards
uS/cm	conductance unit; microSiemens/centimeter
mL/hr	milliliters per hour; rate of settlement of matter in water
NTU	turbidity unit; nephelometric turbidity unit
CU	color unit; equal to 1 mg/L of chloroplatinate salt

Analytical Report
08/28/90

Giant Refining Company

Giant Refining Company
606 E. Highway 64
Farmington, NM 87401

Tim Kinney

Customer Work Identification Refinery Remediation 9834
Purchase Order Number RFE-9834

Contents:

- 1 Analytical Data Summary
- 2 Sample History
- 3 Comments Summary
- 4 Notes and Definitions

Radian Analytical Services
10395 Old Placerville Road
Sacramento, CA 95827

916-362-5332

Client Services Coordinator: LWKELLY

Certified by: _____

Paul H. Cole

Giant Refining Company
 Radian Work Order: 50-07-146

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	900718937	9007181100	9007181305	9007181345
	GBR-31	GBR-24D	GBR-30	GBR-33
Factor:	10	5	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
	01A	03A	05A	07A
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Bromodichloromethane	ND	1.0	ND	0.50	ND	0.10	ND	0.10
Bromoform	ND	5.0	ND	2.5	ND	0.50	ND	0.50
Bromomethane	ND	12	ND	5.9	ND	1.2	ND	1.2
Carbon tetrachloride	ND	1.2	ND	0.60	ND	0.12	ND	0.12
Chlorobenzene	ND	2.5	ND	1.2	ND	0.25	ND	0.25
Chloroethane	ND	5.2	ND	2.6	ND	0.52	ND	0.52
2-Chloroethylvinylether	ND	5.0	ND	2.5	ND	0.50	ND	0.50
Chloroform	ND	1.0	ND	0.50	ND	0.10	ND	0.10
Chloromethane	ND	3.0	ND	1.5	ND	0.30	ND	0.30
Dibromochloromethane	ND	2.0	ND	1.0	ND	0.20	ND	0.20
1,2-Dichlorobenzene	ND	5.0	ND	2.5	ND	0.50	ND	0.50
1,3-Dichlorobenzene	ND	3.2	ND	1.6	ND	0.32	ND	0.32
1,4-Dichlorobenzene	ND	2.4	ND	1.2	ND	0.24	ND	0.24
1,1-Dichloroethane	5.5 X _a	5.0	ND	2.5	0.67 C _a	0.50	ND	0.50
1,2-Dichloroethane	ND	1.0	57 C	0.50	0.75 C	0.10	0.28 C _a	0.10
1,1-Dichloroethene	ND	2.0	ND	1.0	ND	0.20	ND	0.20
cis-1,2-Dichloroethene	81 C	2.0	ND	1.0	5.6 C	0.20	4.9 C	0.20
trans-1,2-Dichloroethene	ND	2.0	ND	1.0	ND	0.20	ND	0.20
1,2-Dichloropropane	ND	1.0	ND	0.50	ND	0.10	ND	0.10
cis-1,3-Dichloropropene	ND	2.0	ND	1.0	ND	0.20	ND	0.20
trans-1,3-Dichloropropene	ND	3.4	ND	1.7	ND	0.34	ND	0.34
Methylene chloride	ND	4.0	ND	2.0	ND	0.40	ND	0.40
1,1,2,2-Tetrachloroethane	ND	1.5	ND	0.75	ND	0.15	ND	0.15
Tetrachloroethene	12 G	1.0	4.0 C	0.50	0.44 C _a	0.10	0.60 C	0.10
1,1,1-Trichloroethane	15 X	2.0	6.8 X	1.0	ND	0.20	ND	0.20
1,1,2-Trichloroethane	ND	2.0	ND	1.0	ND	0.20	ND	0.20
Trichloroethene	34 G	2.0	56 X	1.0	0.44 C _a	0.20	3.2 G	0.20
Trichlorofluoromethane	ND	2.0	ND	1.0	ND	0.20	0.28 X _a	0.20
Vinyl chloride	ND	2.0	ND	1.0	ND	0.20	ND	0.20

ND Not detected at specified detection limit

a Est. result less than 5 times detection limit

G Indicates an estimated GC value due to interferences.

X See definition in report narrative

C Confirmed on second column or by GC/MS

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-07-146

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	900718937	9007181100	9007181305	9007181345
	GBR-31	GBR-24D	GBR-30	GBR-33
Factor:	10	5	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
	01A	03A	05A	07A
Matrix:	water	water	water	water

	Result Det. Limit	Result Det. Limit	Result Det. Limit	Result Det. Limit
<u>Surrogate Recovery(%)</u>				
1-Bromo-4-fluorobenzene	105	109	104	110
Control Limits: 40 to 140				

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-07-146

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	REAGENT BLANK	REAGENT BLANK
Factor:	1	1
Results in:	ug/L	ug/L
	09A	09B
Matrix:	water	water

	Result	Det. Limit	Result	Det. Limit
Bromodichloromethane	ND	0.10	ND	0.10
Bromoform	ND	0.50	ND	0.50
Bromomethane	ND	1.2	ND	1.2
Carbon tetrachloride	ND	0.12	ND	0.12
Chlorobenzene	ND	0.25	ND	0.25
Chloroethane	ND	0.52	ND	0.52
2-Chloroethylvinylether	ND	0.50	ND	0.50
Chloroform	ND	0.10	ND	0.10
Chloromethane	ND	0.30	ND	0.30
Dibromochloromethane	ND	0.20	ND	0.20
1,2-Dichlorobenzene	ND	0.50	ND	0.50
1,3-Dichlorobenzene	ND	0.32	ND	0.32
1,4-Dichlorobenzene	ND	0.24	ND	0.24
1,1-Dichloroethane	ND	0.50	ND	0.50
1,2-Dichloroethane	ND	0.10	ND	0.10
1,1-Dichloroethene	ND	0.20	ND	0.20
cis-1,2-Dichloroethene	ND	0.20	ND	0.20
trans-1,2-Dichloroethene	ND	0.20	ND	0.20
1,2-Dichloropropane	ND	0.10	ND	0.10
cis-1,3-Dichloropropene	ND	0.20	ND	0.20
trans-1,3-Dichloropropene	ND	0.34	ND	0.34
Methylene chloride	ND	0.40	ND	0.40
1,1,2,2-Tetrachloroethane	ND	0.15	ND	0.15
Tetrachloroethene	ND	0.10	ND	0.10
1,1,1-Trichloroethane	ND	0.20	ND	0.20
1,1,2-Trichloroethane	ND	0.20	ND	0.20
Trichloroethene	ND	0.20	ND	0.20
Trichlorofluoromethane	ND	0.20	ND	0.20
Vinyl chloride	ND	0.20	ND	0.20

ND Not detected at specified detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: SO-07-146

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	REAGENT BLANK	REAGENT BLANK
Factor:	1	1
Results in:	ug/L	ug/L
	09A	09B
Matrix:	water	water

	Result	Det. Limit	Result	Det. Limit
<u>Surrogate Recovery(%)</u>				
1-Bromo-4-fluorobenzene	112		110	
Control Limits: 40 to 140				

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-07-146

Method: Aromatics by SW8020 (1)

List: Complete analyte list

Sample ID:	900718937	9007181100	9007181305	9007181345
	GBR-31	GBR-24D	GBR-30	GBR-33
Factor:	10	5	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
	02A	04A	06A	08A
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Benzene	ND	2.0	39 C	1.0	ND	0.20	ND	0.20
Chlorobenzene	ND	2.0	16 X	1.0	1.8 X	0.20	2.5 X	0.20
1,2-Dichlorobenzene	ND	4.0	ND	2.0	ND	0.40	ND	0.40
1,3-Dichlorobenzene	ND	4.0	ND	2.0	ND	0.40	ND	0.40
1,4-Dichlorobenzene	ND	3.0	ND	1.5	ND	0.30	12 C	0.30
Ethylbenzene	ND	2.0	28 X	1.0	0.55 X@	0.20	3.7 C	0.20
Toluene	ND	2.0	4.8 C@	1.0	ND	0.20	0.35 C@	0.20
Xylenes (total)	ND	2.0	8.8 C	1.0	2.4 C	0.20	6.6 C	0.20
<u>Surrogate Recovery(%)</u>								
1-Bromo-4-fluorobenzene	102		96		106		45	
Control Limits: 40 to 140								

ND Not detected at specified detection limit

X See definition in report narrative

C Confirmed on second column or by GC/MS

@ Est. result less than 5 times detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-07-146

Method: Aromatics by SW8020 (1)

List: Complete analyte list

Sample ID: REAGENT BLANK

Factor: 1

Results in: ug/L

10A

Matrix: water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Benzene	ND	0.20						
Chlorobenzene	ND	0.20						
1,2-Dichlorobenzene	ND	0.40						
1,3-Dichlorobenzene	ND	0.40						
1,4-Dichlorobenzene	ND	0.30						
Ethylbenzene	ND	0.20						
Toluene	ND	0.20						
Xylenes (total)	ND	0.20						
Surrogate Recovery(%)								
1-Bromo-4-fluorobenzene	109							
Control Limits: 40 to 140								

ND Not detected at specified detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-07-146

Sample Identifications and Dates

Sample ID	900718937	900718937	9007181100	9007181100	9007181305	9007181305
	GBR-31	GBR-31	GBR-24D	GBR-24D	GBR-30	GBR-30
Date Sampled	07/18/90	07/18/90	07/18/90	07/18/90	07/18/90	07/18/90
Date Received	07/19/90	07/19/90	07/19/90	07/19/90	07/19/90	07/19/90
Matrix	water	water	water	water	water	water
	01	02	03	04	05	06

Halocarbons by SW8010

Prepared

Analyzed

Analyst

File ID

Blank ID

Instrument

Report as

07/28/90

MG

DB07287

QB07281

B

received

07/28/90

MG

DB07288

QB07281

B

received

07/27/90

MG

DB072714

QB07271

B

received

Aromatics by SW8020

Prepared

Analyzed

Analyst

File ID

Blank ID

Instrument

Report as

07/31/90

MG

EB07315

RB07311

B

received

07/31/90

MG

EB07316

RB07311

B

received

07/31/90

MG

EB07314

RB07311

B

received

Giant Refining Company
 Radian Work Order: S0-07-146

Sample Identifications and Dates

Sample ID	9007181345	9007181345	REAGENT BLANK	REAGENT BLANK
	GBR-33	GBR-33		
Date Sampled	07/18/90	07/18/90		
Date Received	07/19/90	07/19/90	07/19/90	07/19/90
Matrix	water	water	water	water
	07	08	09	10

Halocarbons by SW8010

 Prepared
 Analyzed
 Analyst
 File ID
 Blank ID
 Instrument
 Report as

 07/28/90
 MG
 DB07289
 QB07281
 B
 received

 07/27/90
 MG
 QB07271
 B
 received

Halocarbons by SW8010

 Prepared
 Analyzed
 Analyst
 File ID
 Blank ID
 Instrument
 Report as

 07/28/90
 MG
 QB07281
 B
 received

Aromatics by SW8020

 Prepared
 Analyzed
 Analyst
 File ID
 Blank ID
 Instrument
 Report as

 07/31/90
 MG
 EB07317
 RB07311
 B
 received

 07/31/90
 MG
 RB07311
 B
 received

Appendix A

Comments, Notes and Definitions

Giant Refining Company
Radian Work Order: S0-07-146

X Flag indicates not confirmed by analysis on a second column.

G Flag indicates an estimated value due to significant difference in quantitation between the primary and secondary columns. The quantitation on the second column is as follows:

Fraction -01A Tetrachloroethene 39 ug/L
Trichloroethene 7.7 ug/L

Fraction -07A Trichloroethene 0.22 ug/L

Giant Refining Company
Radian Work Order: S0-07-146

D ALL METHODS EXCEPT CLP

The results which are less than five times the method specified detection limit.

EXPLANATION

Uncertainty of the analysis will increase as the method detection limit is approached. These results should be considered approximate.

C ORGANIC CLP

pesticides require that single component results > 10ng/uL in the final extract be confirmed by GC/MS.

OTHER ORGANIC METHODS

This analysis has been confirmed on a second column or by GC/MS.

EXPLANATION

Most methods of analysis by gas chromatography recommend reanalysis on a second column of dissimilar phase to resolve compounds of interest from interferences that may occur and for analyte confirmation.

G ALL ORGANIC GC METHODS EXCEPT CLP

Indicates an estimated GC value due to interferences.

ND ALL METHODS EXCEPT CLP

This flag is used to denote analytes which are not detected at or above the specified detection limit.

EXPLANATION

The value to the right of the < symbol is the method specified detection limit for the analyte.

X ALL METHODS EXCEPT INORGANIC CLP

This is a general purpose flag for those situations not covered by the standard flags. The specific definition of this flag is described in the Comments Summary and/or in the case narrative.

Giant Refining Company
Radian Work Order: S0-07-146

TERMS USED IN THIS REPORT:

Analyte - A chemical for which a sample is to be analyzed. The analysis will meet EPA method and QC specifications.

Compound - See Analyte.

Detection Limit - The method specified detection limit, which is the lower limit of quantitation specified by EPA for a method. Radian staff regularly assess their laboratories' method detection limits to verify that they meet or are lower than those specified by EPA. Detection limits which are higher than method limits are based on experimental values at the 99% confidence level. The detection limits for EPA CLP (Contract Laboratory Program) methods are CRQLs (contract required quantitation limits) for organics and CRDLs (contract required detection limits) for inorganics. Note, the detection limit may vary from that specified by EPA based on sample size, dilution or cleanup. (Refer to Factor, below)

EPA Method - The EPA specified method used to perform an analysis. EPA has specified standard methods for analysis of environmental samples. Radian will perform its analyses and accompanying QC tests in conformance with EPA methods unless otherwise specified.

Factor - Default method detection limits are based on analysis of clean water samples. A factor is required to calculate sample specific detection limits based on alternate matrices (soil or water), reporting units, use of cleanup procedures, or dilution of extracts/digestates. For example, extraction or digestion of 10 grams of soil in contrast to 1 liter of water will result in a factor of 100.

Matrix - The sample material. Generally, it will be soil, water, air, oil, or solid waste.

Radian Work Order - The unique Radian identification code assigned to the samples reported in the analytical summary.

Units - ug/L	micrograms per liter (parts per billion);liquids/water
ug/kg	micrograms per kilogram (parts per billion); soils/solids
ug/M3	micrograms per cubic meter; air samples
mg/L	milligrams per liter (parts per million);liquids/water
mg/kg	milligrams per kilogram (parts per million);soils/solids
%	percent; usually used for percent recovery of QC standards
uS/cm	conductance unit; microSiemens/centimeter
mL/hr	milliliters per hour; rate of settlement of matter in water
NTU	turbidity unit; nephelometric turbidity unit
CU	color unit; equal to 1 mg/L of chloroplatinate salt

Analytical Report
09/26/90

Giant Refining Co.

Giant Refining Co.
606 E. Highway 64
Farmington, NM 87401

Tim Kinney

Customer Work Identification Monthly sample
Purchase Order Number RFE-9834

Contents:

- 1 Analytical Data Summary
- 2 Sample History
- 3 Comments Summary
- 4 Notes and Definitions

Radian Analytical Services
8501 Mo-Pac Boulevard
P. O. Box 201088
Austin, TX 78720-1088

512/454-4797

Client Services Coordinator: RRMAY

Certified by:

Clifford Mayen

Giant Refining Co.
 Radian Work Order: 90-07-230

Method: SW8310 PAHs by HPLC (1)

List: 8310 Method analytes

Sample ID:	900718937	9007181345
	GBR-31	GBR-33
Factor:	0.95	95
Results in:	ug/L	ug/L
	01A	02A
Matrix:	water	water

	Result	Det. Limit	Result	Det. Limit
Acenaphthene	ND	1.7	ND	170
Acenaphthylene	ND	2.2	103 D@	22
Anthracene	ND	0.63	67 @	63
Benzo(a)anthracene	ND	0.012	12	1.2
Benzo(a)pyrene	ND	0.022	ND D	0.55
Benzo(b)fluoranthene	ND	0.017	1.9 D@	0.86
Benzo(g,h,i)perylene	ND	0.072	ND D	1.8
Benzo(k)fluoranthene	ND	0.016	ND D	0.82
Chrysene	ND	0.14	63 @	14
Dibenzo(a,h)anthracene	ND	0.028	ND D	0.72
Fluoranthene	ND	0.20	140	20
Fluorene	ND	0.20	87 @	20
Indeno(1,2,3-cd)pyrene	ND	0.041	ND D	0.41
Naphthalene	ND	1.7	55 D@	17
Phenanthrene	ND	0.61	320	61
Pyrene	ND	0.26	110 @	26
Surrogate Recovery(%)				
Terphenyl-d14	88		NC	
Control Limits: 24 to 146				

ND Not detected at specified detection limit

@ Est. result less than 5 times detection limit

D Sample dilution necessary for this analyte

NC Not calculated

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Co.
 Radian Work Order: 90-07-230

Sample Identifications and Dates

Sample ID	900718937	9007181345
	GBR-31	GBR-33
Date Sampled	07/18/90	07/18/90
Date Received	07/21/90	07/21/90
Matrix	water	water
	01	02

SW8310 PAHs by HPLC

Prepared	07/24/90	07/24/90
Analyzed	07/29/90	08/20/90
Analyst	TLS	TLS
File ID	131 & 132	91 & 161
Blank ID	117 & 118	117 & 118
Instrument	HPLC 2	HPLC 2
Report as	received	received

Appendix A

Comments, Notes and Definitions

Giant Refining Co.
Radian Work Order: 90-07-230

@ ALL METHODS EXCEPT CLP

The results which are less than five times the method specified detection limit.

EXPLANATION

Uncertainty of the analysis will increase as the method detection limit is approached. These results should be considered approximate.

D ORGANICS METHODS

This flag identifies all analytes analyzed at a secondary dilution factor.

EXPLANATION

In an analysis some compounds can exceed the calibration range of the instrument. Therefore, two analyses are performed, one at the concentration of the majority of the analytes and a second with the sample diluted so that high concentration analyte(s) fall within the calibration range.

NC ALL METHODS EXCEPT CLP

The relative percent difference (RPD) and spike recovery are not calculated when a result value is less than five times the detection limit or obvious matrix interferences are present or a surrogate concentration is not calculated due to dilution.

EXPLANATION

See @ definition for data near the detection limit. A spike recovery is not calculated when the sample result is greater than four times the spike added concentration because the spike added concentration is insignificant. Surrogate recoveries are not calculated due to dilution to allow analyte quantitation.

ND ALL METHODS EXCEPT CLP

This flag is used to denote analytes which are not detected at or above the specified detection limit.

EXPLANATION

The value to the right of the < symbol is the method specified detection limit for the analyte.

Giant Refining Co.
Radian Work Order: 90-07-230

TERMS USED IN THIS REPORT:

Analyte - A chemical for which a sample is to be analyzed. The analysis will meet EPA method and QC specifications.

Compound - See Analyte.

Detection Limit - The method specified detection limit, which is the lower limit of quantitation specified by EPA for a method. Radian staff regularly assess their laboratories' method detection limits to verify that they meet or are lower than those specified by EPA. Detection limits which are higher than method limits are based on experimental values at the 99% confidence level. The detection limits for EPA CLP (Contract Laboratory Program) methods are CRQLs (contract required quantitation limits) for organics and CRDLs (contract required detection limits) for inorganics. Note, the detection limit may vary from that specified by EPA based on sample size, dilution or cleanup. (Refer to Factor, below)

EPA Method - The EPA specified method used to perform an analysis. EPA has specified standard methods for analysis of environmental samples. Radian will perform its analyses and accompanying QC tests in conformance with EPA methods unless otherwise specified.

Factor - Default method detection limits are based on analysis of clean water samples. A factor is required to calculate sample specific detection limits based on alternate matrices (soil or water), reporting units, use of cleanup procedures, or dilution of extracts/digestates. For example, extraction or digestion of 10 grams of soil in contrast to 1 liter of water will result in a factor of 100.

Matrix - The sample material. Generally, it will be soil, water, air, oil, or solid waste.

Radian Work Order - The unique Radian identification code assigned to the samples reported in the analytical summary.

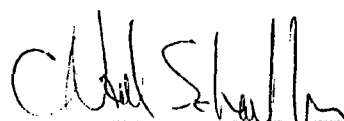
Units - ug/L	micrograms per liter (parts per billion); liquids/water
ug/kg	micrograms per kilogram (parts per billion); soils/solids
ug/M3	micrograms per cubic meter; air samples
mg/L	milligrams per liter (parts per million); liquids/water
mg/kg	milligrams per kilogram (parts per million); soils/solids
%	percent; usually used for percent recovery of QC standards
uS/cm	conductance unit; microSiemens/centimeter
mL/hr	milliliters per hour; rate of settlement of matter in water
NTU	turbidity unit; nephelometric turbidity unit
CU	color unit; equal to 1 mg/L of chloroplatinate salt

CLIENT: GBR
ID: Influent
SITE: Stripper
LAB NO: F4197

DATE REPORTED: 05/07/90
DATE RECEIVED: 05/02/90
DATE COLLECTED: 05/02/90

Lab pH (s.u.).....	7.51
Lab Conductivity, umhos/cm.....	4886
Lab resistivity, ohm-m.....	2.0467
Total Dissolved Solids (180), mg/l..	3580
Total Dissolved Solids (calc), mg/l.	3509
Total Alkalinity as CaCO3, mg/l.....	508.06
Total Acidity as CaCO3, mg/l.....	0.00
Total Hardness as CaCO3, mg/l.....	1355.40
Sodium Absorption Ratio.....	8.00

	mg/l	meq/l
Bicarbonate as HCO3.....	619.8	10.16
Carbonate as CO3.....	0.0	0.00
Chloride.....	583.5	16.46
Sulfate.....	1418.0	29.54
Calcium.....	485.9	24.25
Magnesium.....	34.8	2.86
Potassium.....	5.3	0.14
Sodium.....	677.0	29.45
Major Cations.....		56.69
Major Anions.....		56.16
Cation/Anion Difference.....		0.47 %



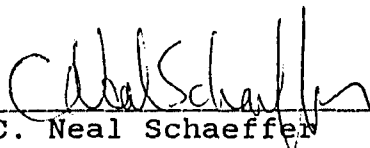
C. Neal Schaeffer
Lab Director

CLIENT: GBR
ID: Effluent
SITE: Stripper
LAB NO: F4196

DATE REPORTED: 05/07/90
DATE RECEIVED: 05/02/90
DATE COLLECTED: 05/02/90

Lab pH (s.u.).....	7.69
Lab Conductivity, umhos/cm.....	4806
Lab resistivity, ohm-m.....	2.0807
Total Dissolved Solids (180), mg/l..	3498
Total Dissolved Solids (calc), mg/l.	3436
Total Alkalinity as CaCO ₃ , mg/l.....	450.76
Total Acidity as CaCO ₃ , mg/l.....	0.00
Total Hardness as CaCO ₃ , mg/l.....	1295.16
Sodium Absorption Ratio.....	8.17

	mg/l	meq/l
Bicarbonate as HCO ₃	549.9	9.02
Carbonate as CO ₃	0.0	0.00
Chloride.....	572.8	16.16
Sulfate.....	1419.7	29.58
Calcium.....	449.8	22.44
Magnesium.....	42.1	3.46
Potassium.....	5.6	0.14
Sodium.....	676.0	29.40
Major Cations.....		55.45
Major Anions.....		54.75
Cation/Anion Difference.....		0.64 %


C. Neal Schaeffer
Lab Director

Analytical Report
05/30/90

Giant Refining Company

Giant Refining Company
606 E. Highway 64
Farmington, NM 87401

Tim Kinney

Customer Work Identification REFINERY
Purchase Order Number RFE-9830

Contents:

- 1 Analytical Data Summary
- 2 Sample History
- 3 Comments Summary
- 4 Notes and Definitions

Radian Analytical Services
10395 Old Placerville Road
Sacramento, CA 95827

916-362-5332

Client Services Coordinator: WLBROWN

Certified by:

Rand K. Gale

Giant Refining Company
 Radian Work Order: SO-05-043

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	9005021321/ STRIPPER I	9005021316/ STRIPPER E	REAGENT BLANK
Factor:	1	1	1
Results in:	ug/L	ug/L	ug/L
	01A	02A	03A
Matrix:	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Bromodichloromethane	ND	0.10	ND	0.10	ND	0.10
Bromoform	ND	0.50	ND	0.50	ND	0.50
Bromomethane	ND	1.2	ND	1.2	ND	1.2
Carbon tetrachloride	ND	0.12	ND	0.12	ND	0.12
Chlorobenzene	ND	0.25	ND	0.25	ND	0.25
Chloroethane	ND	0.52	ND	0.52	ND	0.52
2-Chloroethylvinylether	ND	0.50	ND	0.50	ND	0.50
Chloroform	ND	0.10	ND	0.10	ND	0.10
Chloromethane	ND	0.30	ND	0.30	ND	0.30
Dibromochloromethane	ND	0.20	ND	0.20	ND	0.20
1,2-Dichlorobenzene	ND	0.50	ND	0.50	ND	0.50
1,3-Dichlorobenzene	ND	0.32	ND	0.32	ND	0.32
1,4-Dichlorobenzene	ND	0.24	ND	0.24	ND	0.24
1,1-Dichloroethane	<u>2.2 ca</u>	0.50	ND	0.50	ND	0.50
1,2-Dichloroethane	<u>2.2 C</u>	0.10	<u>0.17 ca</u>	0.10	ND	0.10
1,1-Dichloroethene	ND	0.20	ND	0.20	ND	0.20
cis-1,2-Dichloroethene	<u>5.9 C</u>	0.20	ND	0.20	ND	0.20
trans-1,2-Dichloroethene	ND	0.20	ND	0.20	ND	0.20
1,2-Dichloropropane	ND	0.10	ND	0.10	ND	0.10
cis-1,3-Dichloropropene	ND	0.20	ND	0.20	ND	0.20
trans-1,3-Dichloropropene	ND	0.34	ND	0.34	ND	0.34
Methylene chloride	ND	0.40	ND	0.40	ND	0.40
1,1,2,2-Tetrachloroethane	ND	0.15	ND	0.15	ND	0.15
Tetrachloroethene	<u>2.7 C</u>	0.10	ND	0.10	ND	0.10
1,1,1-Trichloroethane	<u>0.53 ca</u>	0.20	ND	0.20	ND	0.20
1,1,2-Trichloroethane	ND	0.20	ND	0.20	ND	0.20
Trichloroethene	<u>2.6 C</u>	0.20	ND	0.20	ND	0.20
Trichlorofluoromethane	ND	0.20	ND	0.20	ND	0.20
Vinyl chloride	ND	0.20	ND	0.20	ND	0.20

ND: Not detected at specified detection limit

C: Confirmed on second column or by GC/MS

a: Est. result less than 5 times detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-05-043

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	9005021321/ STRIPPER I	9005021316/ STRIPPER E	REAGENT BLANK
Factor:	1	1	1
Results in:	ug/L 01A	ug/L 02A	ug/L 03A
Matrix:	water	water	water

Surrogate Recovery(%)

1-Bromo-4-fluorobenzene

Control Limits: 40 to 140

Result Det. Limit

118

Result Det. Limit

168 Q

Result Det. Limit

119

Q Outside control limits

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-05-043

Method: Aromatics by SW8020 (1)

List: Complete analyte list

Sample ID:	90050213221/ STRIPPER I	9005021316/ STRIPPER E	REAGENT BLANK
Factor:	1	1	1
Results in:	ug/L 04A	ug/L 05A	ug/L 06A
Matrix:	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Benzene	22 C	0.20	ND	0.20	ND	0.20
Chlorobenzene	ND	0.20	ND	0.20	ND	0.20
1,2-Dichlorobenzene	ND	0.40	ND	0.40	ND	0.40
1,3-Dichlorobenzene	ND	0.40	ND	0.40	ND	0.40
1,4-Dichlorobenzene	ND	0.30	ND	0.30	ND	0.30
Ethylbenzene	3.5 C	0.20	ND	0.20	ND	0.20
Toluene	ND	0.20	ND	0.20	ND	0.20
Xylenes (total)	3.8 C	0.20	ND	0.20	ND	0.20
Surrogate Recovery(%)						
1-Bromo-4-fluorobenzene	106		109		106	
Control Limits: 40 to 140						

C Confirmed on second column or by GC/MS

ND Not detected at specified detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-05-043

Sample Identifications and Dates

Sample ID	9005021321/ STRIPPER I	9005021316/ STRIPPER E	REAGENT BLANK	90050213221/ STRIPPER I	9005021316/ STRIPPER E	REAGENT BLANK
Date Sampled	05/02/90	05/02/90		05/02/90	05/02/90	
Date Received	05/03/90	05/03/90	05/03/90	05/03/90	05/03/90	05/03/90
Matrix	water 01	water 02	water 03	water 04	water 05	water 06

Halocarbons by SW8010

Prepared			
Analyzed	05/15/90	05/15/90	05/15/90
Analyst	MG	MG	MG
File ID	D505154	D505155	Q505151
Blank ID	Q505151	Q505151	
Instrument	5	5	5
Report as	received	received	received

Aromatics by SW8020

Prepared			
Analyzed			05/15/90
Analyst			MG
File ID			E505156
Blank ID			R505151
Instrument			5
Report as			received

Appendix A

Comments, Notes and Definitions

Giant Refining Company
Radian Work Order: S0-05-043

SURROGATE RECOVERY FOR SAMPLE 9005021316/ STRIPPER E WAS OUT OF QC LIMITS
DUE TO SAMPLE MATRIX INTERFERENCES.

Giant Refining Company
Radian Work Order: S0-05-043

Q ALL METHODS EXCEPT CLP

The results which are less than five times the method specified detection limit.

EXPLANATION

Uncertainty of the analysis will increase as the method detection limit is approached. These results should be considered approximate.

C ORGANIC CLP

pesticides require that single component results > 10ng/uL in the final extract be confirmed by GC/MS.

OTHER ORGANIC METHODS

This analysis has been confirmed on a second column or by GC/MS.

EXPLANATION

Most methods of analysis by gas chromatography recommend reanalysis on a second column of dissimilar phase to resolve compounds of interest from interferences that may occur and for analyte confirmation.

ND ALL METHODS EXCEPT CLP

This flag is used to denote analytes which are not detected at or above the specified detection limit.

EXPLANATION

The value to the right of the < symbol is the method specified detection limit for the analyte.

Q ALL METHODS EXCEPT CLP

This quality control standard is outside method or laboratory specified control limits.

EXPLANATION

This flag is applied to matrix spike, analytical QC spike, and surrogate recoveries; and to RPD(relative percent difference) values for duplicate analyses and matrix spike/matrix spike duplicate result.

Giant Refining Company
Radian Work Order: SO-05-043

TERMS USED IN THIS REPORT:

Analyte - A chemical for which a sample is to be analyzed. The analysis will meet EPA method and QC specifications.

Compound - See Analyte.

Detection Limit - The method specified detection limit, which is the lower limit of quantitation specified by EPA for a method. Radian staff regularly assess their laboratories' method detection limits to verify that they meet or are lower than those specified by EPA. Detection limits which are higher than method limits are based on experimental values at the 99% confidence level. The detection limits for EPA CLP (Contract Laboratory Program) methods are CRQLs (contract required quantitation limits) for organics and CRDLs (contract required detection limits) for inorganics. Note, the detection limit may vary from that specified by EPA based on sample size, dilution or cleanup. (Refer to Factor, below)

EPA Method - The EPA specified method used to perform an analysis. EPA has specified standard methods for analysis of environmental samples. Radian will perform its analyses and accompanying QC tests in conformance with EPA methods unless otherwise specified.

Factor - Default method detection limits are based on analysis of clean water samples. A factor is required to calculate sample specific detection limits based on alternate matrices (soil or water), reporting units, use of cleanup procedures, or dilution of extracts/digestates. For example, extraction or digestion of 10 grams of soil in contrast to 1 liter of water will result in a factor of 100.

Matrix - The sample material. Generally, it will be soil, water, air, oil, or solid waste.

Radian Work Order - The unique Radian identification code assigned to the samples reported in the analytical summary.

Units - ug/L	micrograms per liter (parts per billion); liquids/water
ug/kg	micrograms per kilogram (parts per billion); soils/solids
ug/M3	micrograms per cubic meter; air samples
mg/L	milligrams per liter (parts per million); liquids/water
mg/kg	milligrams per kilogram (parts per million); soils/solids
%	percent; usually used for percent recovery of QC standards
uS/cm	conductance unit; microSiemens/centimeter
mL/hr	milliliters per hour; rate of settlement of matter in water
NTU	turbidity unit; nephelometric turbidity unit
CU	color unit; equal to 1 mg/L of chloroplatinate salt



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

CLIENT: Giant Refinery
ID: Influent
SITE: Air stripper
LAB NO: F4366

DATE REPORTED: 06/13/90
DATE RECEIVED: 06/04/90
DATE COLLECTED: 06/04/90

Lab pH (s.u.).....	7.91
Lab conductivity, umhos/cm.....	4635
Lab resistivity, ohm-m.....	2.1575
Total dissolved solids (180), mg/l..	3124
Total dissolved solids (calc), mg/l.	3112
Total alkalinity as CaCO ₃ , mg/l.....	597.83
Total acidity as CaCO ₃ , mg/l.....	0.00
Total hardness as CaCO ₃ , mg/l.....	1084.32
Sodium absorption ratio.....	8.87

	mg/l	meq/l
Bicarbonate as HCO ₃	729.4	11.96
Carbonate as CO ₃	0.0	0.00
Chloride.....	613.9	17.32
Sulfate.....	1068.7	22.26
Calcium.....	333.3	16.63
Magnesium.....	61.4	5.05
Potassium.....	4.6	0.12
Sodium.....	671.5	29.21
Major cations.....	51.01	
Major anions.....	51.54	
Cation/anion difference.....	0.51	%

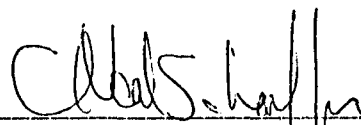
C. Neal Schaeffer
Lab Director

CLIENT: Giant Refinery
ID: Effluent
SITE: Air stripper
LAB NO: F4365

DATE REPORTED: 06/13/90
DATE RECEIVED: 06/04/90
DATE COLLECTED: 06/04/90

Lab pH (s.u.).....	8.01
Lab conductivity, umhos/cm.....	4646
Lab resistivity, ohm-m.....	2.1524
Total dissolved solids (180), mg/l..	3152
Total dissolved solids (calc), mg/l.	3227
Total alkalinity as CaCO ₃ , mg/l.....	485.14
Total acidity as CaCO ₃ , mg/l.....	0.00
Total hardness as CaCO ₃ , mg/l.....	1114.44
Sodium absorption ratio.....	9.19

	mg/l	meq/l
Bicarbonate as HCO ₃	591.9	9.70
Carbonate as CO ₃	0.0	0.00
Chloride.....	650.6	18.35
Sulfate.....	1160.8	24.18
Calcium.....	369.5	18.44
Magnesium.....	46.8	3.85
Potassium.....	2.9	0.07
Sodium.....	705.0	30.67
Major cations.....		53.03
Major anions.....		52.24
Cation/anion difference.....		0.75 %


C. Neal Schaeffer
Lab Director

Analytical Report
08/03/90

Giant Refining Company

Giant Refining Company
606 E. Highway 64
Farmington, NM 87401

Tim Kinney

Customer Work Identification Refinery 9834
Purchase Order Number RFE-9834

Contents:

- 1 Analytical Data Summary
- 2 Sample History
- 3 Comments Summary
- 4 Notes and Definitions

Radian Analytical Services
10395 Old Placerville Road
Sacramento, CA 95827

916-362-5332

Client Services Coordinator: WLBROWN

Certified by:

Paul Hale

Previously Reported on 06/21/90.

Giant Refining Company
 Radian Work Order: 50-06-023

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	9006041345 /STRIPPER INF	9006041355 /STRIPPER ENF	REAGENT BLANK	REAGENT BLANK
Factor:	1	1	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
	01A	03A	05A	05B
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Bromodichloromethane	ND	0.10	ND	0.10	ND	0.10	ND	0.10
Bromoform	1.2 C1a	0.50	ND	0.50	ND	0.50	ND	0.50
Bromomethane	ND	1.2	ND	1.2	ND	1.2	ND	1.2
Carbon tetrachloride	ND	0.12	ND	0.12	ND	0.12	ND	0.12
Chlorobenzene	ND	0.25	ND	0.25	ND	0.25	ND	0.25
Chloroethane	ND	0.52	ND	0.52	ND	0.52	ND	0.52
2-Chloroethylvinylether	ND	0.50	ND	0.50	ND	0.50	ND	0.50
Chloroform	ND	0.10	ND	0.10	ND	0.10	ND	0.10
Chloromethane	ND	0.30	ND	0.30	ND	0.30	ND	0.30
Dibromochloromethane	ND	0.20	ND	0.20	ND	0.20	ND	0.20
1,2-Dichlorobenzene	ND	0.50	ND	0.50	ND	0.50	ND	0.50
1,3-Dichlorobenzene	ND	0.32	ND	0.32	ND	0.32	ND	0.32
1,4-Dichlorobenzene	ND	0.24	ND	0.24	ND	0.24	ND	0.24
1,1-Dichloroethane	ND	0.50	ND	0.50	ND	0.50	ND	0.50
1,2-Dichloroethane	1.3 CI	0.10	ND	0.10	ND	0.10	ND	0.10
1,1-Dichloroethene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
cis-1,2-Dichloroethene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
trans-1,2-Dichloroethene	ND	0.20	5.2 XI	0.20	ND	0.20	ND	0.20
1,2-Dichloropropane	ND	0.10	ND	0.10	ND	0.10	ND	0.10
cis-1,3-Dichloropropene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
trans-1,3-Dichloropropene	ND	0.34	ND	0.34	ND	0.34	ND	0.34
Methylene chloride	ND	0.40	ND	0.40	ND	0.40	ND	0.40
1,1,2,2-Tetrachloroethane	0.89 GI	0.15	ND	0.15	ND	0.15	ND	0.15
Tetrachloroethene	ND	0.10	ND	0.10	ND	0.10	ND	0.10
1,1,1-Trichloroethane	ND	0.20	ND	0.20	ND	0.20	ND	0.20
1,1,2-Trichloroethane	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Trichloroethene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Trichlorofluoromethane	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Vinyl chloride	ND	0.20	ND	0.20	ND	0.20	ND	0.20

ND Not detected at specified detection limit

I Result differs from last report - see report narrative

G Indicates an estimated GC value due to interferences.

C Confirmed on second column or by GC/MS

@ Est. result less than 5 times detection limit

X See definition in report narrative

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-06-023

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	9006041345	9006041355	REAGENT BLANK	REAGENT BLANK
	/STRIPPER INF	/STRIPPER ENF		
Factor:	1	1	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
	01A	03A	05A	05B
Matrix:	water	water	water	water

Surrogate Recovery(%)

1-Bromo-4-fluorobenzene

Control Limits: 40 to 140

Result Det. Limit

101

Result Det. Limit

126

Result Det. Limit

126

Result Det. Limit

131

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-06-023

Method: Aromatics by SW8020 (1)

List: Complete analyte list

Sample ID:	9006041345	9006041355	REAGENT BLANK	REAGENT BLANK
	/STRIPPER INF	/STRIPPER ENF		
Factor:	1	1	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
	02A	04A	06A	06B
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Benzene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Chlorobenzene	4.5 C	0.20	ND	0.20	ND	0.20	ND	0.20
1,2-Dichlorobenzene	ND	0.40	ND	0.40	ND	0.40	ND	0.40
1,3-Dichlorobenzene	ND	0.40	ND	0.40	ND	0.40	ND	0.40
1,4-Dichlorobenzene	ND	0.30	ND	0.30	ND	0.30	ND	0.30
Ethylbenzene	7.1 C	0.20	ND	0.20	ND	0.20	ND	0.20
Toluene	1.2 G	0.20	ND	0.20	ND	0.20	ND	0.20
Xylenes (total)	16 G	0.20	ND	0.20	ND	0.20	ND	0.20

Surrogate Recovery(%)

1-Bromo-4-fluorobenzene	101	103	107	107
Control Limits: 40 to 140				

ND Not detected at specified detection limit

C Confirmed on second column or by GC/MS

G Indicates an estimated GC value due to interferences.

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-06-023

Sample Identifications and Dates

Sample ID	9006041345	9006041345	9006041355	9006041355	REAGENT BLANK	REAGENT BLANK
	/STRIPPER IN	/STRIPPER INF	/STRIPPER ENF	/STRIPPER ENF		
Date Sampled	06/04/90	06/04/90	06/04/90	06/04/90		
Date Received	06/05/90	06/05/90	06/05/90	06/05/90	06/05/90	06/05/90
Matrix	water	water	water	water	water	water
	01	02	03	04	05	06

Halocarbons by SW8010						
Prepared						
Analyzed	06/08/90		06/10/90		06/08/90	
Analyst	MG		MG		MG	
File ID	DB060814		DB06105		QB06081	
Blank ID	QB06081		QB06101			
Instrument	B		B		B	
Report as	received		received		received	
Halocarbons by SW8010						
Prepared						
Analyzed					06/10/90	
Analyst					MG	
File ID					QB06101	
Blank ID						
Instrument					B	
Report as					received	
Aromatics by SW8020						
Prepared						
Analyzed		06/08/90		06/10/90		06/08/90
Analyst		MG		MG		MG
File ID		EB060814		EB06105		RB06081
Blank ID		RB06081		RB06101		
Instrument		B		B		B
Report as		received		received		received
Aromatics by SW8020						
Prepared						
Analyzed						06/10/90
Analyst						MG
File ID						RB06101
Blank ID						
Instrument						B
Report as						received

Appendix A

Comments, Notes and Definitions

Giant Refining Company
Radian Work Order: S0-06-023

General Comments

I=RESULT CORRECTED. RESULTS WITH THE I FLAG HAVE BEEN REVISED
BASED ON CORRECTED RESPONSE FACTORS FOR GC INSTRUMENT B. SEE
ATTACHED LETTER FOR EXPLANATION.

THE X FLAG MEANS NOT CONFIRMED BY ANALYSIS ON A SECOND COLUMN.

1,1,2,2-TRICHLOROETHANE, TOLUENE AND XYLENE WERE REPORTED AS ESTIMATED
VALUES FOR SAMPLE 9006041345 /STRIPPER INF DUE TO SAMPLE MATRIX INTERFERENCES.

THE VALUES OBTAINED ON THE CONFIRMATION COLUMN WERE:

1,1,2,2 -TRICHLOROETHANE	2.7 PPB
TOLUENE	9.2 PPB
XYLENE	7.1 PPB

Giant Refining Company
Radian Work Order: S0-06-023

Q ALL METHODS EXCEPT CLP

The results which are less than five times the method specified detection limit.

EXPLANATION

Uncertainty of the analysis will increase as the method detection limit is approached. These results should be considered approximate.

C ORGANIC CLP

pesticides require that single component results > 10ng/uL in the final extract be confirmed by GC/MS.

OTHER ORGANIC METHODS

This analysis has been confirmed on a second column or by GC/MS.

EXPLANATION

Most methods of analysis by gas chromatography recommend reanalysis on a second column of dissimilar phase to resolve compounds of interest from interferences that may occur and for analyte confirmation.

G ALL ORGANIC GC METHODS EXCEPT CLP

Indicates an estimated GC value due to interferences.

I ALL METHODS EXCEPT CLP

This result has been modified since the last issue of this report.

EXPLANATION

The explanations are included in the report narrative.

ND ALL METHODS EXCEPT CLP

This flag is used to denote analytes which are not detected at or above the specified detection limit.

EXPLANATION

The value to the right of the < symbol is the method specified detection limit for the analyte.

X ALL METHODS EXCEPT INORGANIC CLP

This is a general purpose flag for those situations not covered by the standard flags. The specific definition of this flag is described in the Comments Summary and/or in the case narrative.

Giant Refining Company
Radian Work Order: S0-06-023

TERMS USED IN THIS REPORT:

Analyte - A chemical for which a sample is to be analyzed. The analysis will meet EPA method and QC specifications.

Compound - See Analyte.

Detection Limit - The method specified detection limit, which is the lower limit of quantitation specified by EPA for a method. Radian staff regularly assess their laboratories' method detection limits to verify that they meet or are lower than those specified by EPA. Detection limits which are higher than method limits are based on experimental values at the 99% confidence level. The detection limits for EPA CLP (Contract Laboratory Program) methods are CRQLs (contract required quantitation limits) for organics and CRDLs (contract required detection limits) for inorganics. Note, the detection limit may vary from that specified by EPA based on sample size, dilution or cleanup. (Refer to Factor, below)

EPA Method - The EPA specified method used to perform an analysis. EPA has specified standard methods for analysis of environmental samples. Radian will perform its analyses and accompanying QC tests in conformance with EPA methods unless otherwise specified.

Factor - Default method detection limits are based on analysis of clean water samples. A factor is required to calculate sample specific detection limits based on alternate matrices (soil or water), reporting units, use of cleanup procedures, or dilution of extracts/digestates. For example, extraction or digestion of 10 grams of soil in contrast to 1 liter of water will result in a factor of 100.

Matrix - The sample material. Generally, it will be soil, water, air, oil, or solid waste.

Radian Work Order - The unique Radian identification code assigned to the samples reported in the analytical summary.

Units - ug/L	micrograms per liter (parts per billion); liquids/water
ug/kg	micrograms per kilogram (parts per billion); soils/solids
ug/M3	micrograms per cubic meter; air samples
mg/L	milligrams per liter (parts per million); liquids/water
mg/kg	milligrams per kilogram (parts per million); soils/solids
%	percent; usually used for percent recovery of QC standards
uS/cm	conductance unit; microSiemens/centimeter
mL/hr	milliliters per hour; rate of settlement of matter in water
NTU	turbidity unit; nephelometric turbidity unit
CU	color unit; equal to 1 mg/L of chloroplatinate salt



RECEIVED JUN 29 1990

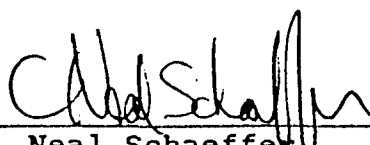
2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: GCL
ID: 9006181215
SITE: GBR-32
LAB NO: F4489

DATE REPORTED: 06/27/90
DATE RECEIVED: 06/20/90
DATE COLLECTED: 06/18/90

Lab pH (s.u.).....	7.77
Lab conductivity, umhos/cm.....	4840
Lab resistivity, ohm-m.....	2.0661
Total dissolved solids (180), mg/l..	3500
Total dissolved solids (calc), mg/l.	3479
Total alkalinity as CaCO ₃ , mg/l.....	267.40
Total acidity as CaCO ₃ , mg/l.....	0.00
Total hardness as CaCO ₃ , mg/l.....	1004.00
Sodium absorption ratio.....	10.30

	mg/l	meq/l
Bicarbonate as HCO ₃	326.2	5.35
Carbonate as CO ₃	0.0	0.00
Chloride.....	482.3	13.60
Sulfate.....	1698.7	35.39
Calcium.....	353.4	17.64
Magnesium.....	29.7	2.44
Potassium.....	4.6	0.12
Sodium.....	750.0	32.62
Major cations.....		52.82
Major anions.....		54.34
Cation/anion difference.....		1.42 %


C. Neal Schaeffer
Lab Director



Inter-Mountain
Laboratories, Inc.

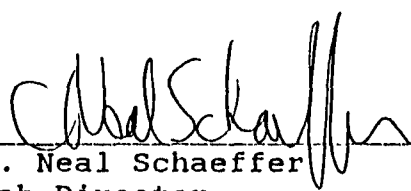
2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: GCL
ID: 9006181600
SITE: GBR-48
LAB NO: F4491

DATE REPORTED: 06/27/90
DATE RECEIVED: 06/20/90
DATE COLLECTED: 06/18/90

Lab pH (s.u.).....	7.70
Lab conductivity, umhos/cm.....	7378
Lab resistivity, ohm-m.....	1.3554
Total dissolved solids (180), mg/l..	5332
Total dissolved solids (calc), mg/l.	4891
Total alkalinity as CaCO ₃ , mg/l.....	439.30
Total acidity as CaCO ₃ , mg/l.....	0.00
Total hardness as CaCO ₃ , mg/l.....	1686.72
Sodium absorption ratio.....	11.07

	mg/l	meq/l
Bicarbonate as HCO ₃	535.9	8.79
Carbonate as CO ₃	0.0	0.00
Chloride.....	888.4	25.06
Sulfate.....	2055.9	42.83
Calcium.....	562.2	28.06
Magnesium.....	69.1	5.68
Potassium.....	7.0	0.18
Sodium.....	1045.2	45.46
Major cations.....		79.38
Major anions.....		76.68
Cation/anion difference.....		1.73 %


C. Neal Schaeffer
Lab Director



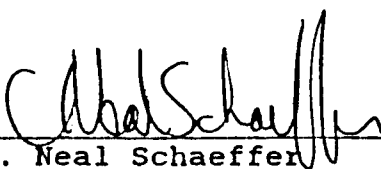
2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: GCL
ID: 9006181330
SITE: GBR-49
LAB NO: F4490

DATE REPORTED: 06/27/90
DATE RECEIVED: 06/20/90
DATE COLLECTED: 06/18/90

Lab pH (s.u.).....	7.95
Lab conductivity, umhos/cm.....	4040
Lab resistivity, ohm-m.....	2.4752
Total dissolved solids (180), mg/l..	2896
Total dissolved solids (calc), mg/l.	2860
Total alkalinity as CaCO ₃ , mg/l.....	296.05
Total acidity as CaCO ₃ , mg/l.....	0.00
Total hardness as CaCO ₃ , mg/l.....	843.36
Sodium absorption ratio.....	9.48

	mg/l	meq/l
Bicarbonate as HCO ₃	361.2	5.92
Carbonate as CO ₃	0.0	0.00
Chloride.....	482.3	13.60
Sulfate.....	1246.8	25.98
Calcium.....	285.1	14.23
Magnesium.....	32.1	2.64
Potassium.....	3.0	0.08
Sodium.....	633.0	27.53
Major cations.....		44.48
Major anions.....		45.50
Cation/anion difference.....		1.14 %


C. Neal Schaeffer
Lab Director



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

CLIENT: GCL
ID: 9006181700
SITE: GBR-50
LAB NO: F4492

DATE REPORTED: 06/27/90
DATE RECEIVED: 06/20/90
DATE COLLECTED: 06/18/90

Lab pH (s.u.).....	7.99
Lab conductivity, umhos/cm.....	3327
Lab resistivity, ohm-m.....	3.0057
Total dissolved solids (180), mg/l..	2602
Total dissolved solids (calc), mg/l.	2625
Total alkalinity as CaCO ₃ , mg/l.....	210.10
Total acidity as CaCO ₃ , mg/l.....	0.00
Total hardness as CaCO ₃ , mg/l.....	1074.28
Sodium absorption ratio.....	5.45

	mg/l	meq/l
Bicarbonate as HCO ₃	256.3	4.20
Carbonate as CO ₃	0.0	0.00
Chloride.....	126.9	3.58
Sulfate.....	1556.3	32.42
Calcium.....	357.4	17.84
Magnesium.....	44.4	3.65
Potassium.....	3.7	0.09
Sodium.....	410.4	17.85
Major cations.....		39.43
Major anions.....		40.20
Cation/anion difference.....		0.97 %

C. Neal Schaeffer
Lab Director

Analytical Report
08/17/90

RECEIVED AUG 29 1990

Geoscience Consultants, Ltd.

Geoscience Consultants, Ltd.
500 Copper N.W. Ste 200
Albuquerque, NM., 87102
(505) 842-0595
Sample Manager

Customer Work Identification M & A Onsite COC#3703
Purchase Order Number 469003

Contents:

- 1 Analytical Data Summary
- 2 Sample History
- 3 Comments Summary
- 4 Notes and Definitions

Radian Analytical Services
10395 Old Placerville Road
Sacramento, CA 95827

916-362-5332

Client Services Coordinator: LWKELLY

Certified by:

Frank H. Hale

Previously Reported on 07/16/90.

Geoscience Consultants, Ltd.
 Radian Work Order: S0-06-152

Method: Metals by SW6010 (1)

List: Ep Toxicity list

Sample ID:	9006181215	9006181330	9006181600	9006181700
	GBR 32	GBR 49	GBR 48	GBR 50
Factor:	1.00	1.00	1.00	1.00
Results in:	mg/L	mg/L	mg/L	mg/L
	07A	08A	09A	10A
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Arsenic	ND	0.053	ND	0.053	ND	0.053	ND	0.053
Barium	0.031	0.0020	0.027	0.0020	0.24	0.0020	0.56	0.0020
Cadmium	ND	0.0040	ND	0.0040	ND	0.0040	ND	0.0040
Chromium	0.27	0.0070	0.060	0.0070	0.043	0.0070	0.042	0.0070
Lead	ND	0.042	ND	0.042	ND	0.042	0.099 @	0.042
Selenium	ND	0.075	ND	0.075	ND	0.075	ND	0.075
Silver	ND	0.0070	ND	0.0070	ND	0.0070	ND	0.0070

ND Not detected at specified detection limit

@ Est. result less than 5 times detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Geoscience Consultants, Ltd.
 Radian Work Order: S0-06-152

Method: Metals by SW6010 (1)

List: Ep Toxicity list

Sample ID: REAGENT BLANK

Factor: 1.00

Results in: mg/L

11A

Matrix: water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Arsenic	ND	0.053						
Barium	ND	0.0020						
Cadmium	ND	0.0040						
Chromium	ND	0.0070						
Lead	ND	0.042						
Selenium	ND	0.075						
Silver	ND	0.0070						

ND Not detected at specified detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Geoscience Consultants, Ltd.
Radian Work Order: S0-06-152

Method: Halocarbons by EPA 601 (1)

List: Complete analyte list

Sample ID:	9006181215	9006181330	9006181600	9006181700
	GBR 32	GBR 49	GBR 48	GBR 50
Factor:	25	25	25	1
Results in:	ug/L	ug/L	ug/L	ug/L
	01A	02A	03A	04A
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Bromodichloromethane	ND	2.5	ND	2.5	ND	2.5	ND	0.10
Bromoform	ND	13	ND	12	ND	13	ND	0.50
Bromomethane	ND	30	ND	30	ND	30	ND	1.2
Carbon tetrachloride	ND	3.0	<u>3.5 Xa</u>	3.0	<u>3.3 Xa</u>	3.0	ND	0.12
Chlorobenzene	ND	6.3	ND	6.2	ND	6.3	ND	0.25
Chloroethane	ND	13	ND	13	ND	13	ND	0.52
2-Chloroethylvinyl ether	ND	13	ND	12	ND	13	ND	0.50
Chloroform	ND	2.5	<u>2.5 Xa</u>	2.5	ND	2.5	ND	0.10
Chloromethane	ND	7.5	ND	7.5	ND	7.5	ND	0.30
Dibromochloromethane	ND	5.0	ND	5.0	ND	5.0	ND	0.20
1,2-Dichlorobenzene	ND	13	ND	12	ND	13	ND	0.50
1,3-Dichlorobenzene	ND	8.0	ND	8.0	ND	8.0	ND	0.32
1,4-Dichlorobenzene	ND	6.0	ND	6.0	ND	6.0	ND	0.24
1,1-Dichloroethane	ND	13	ND	12	<u>14. Ca</u>	13	ND	0.50
1,2-Dichloroethane	ND	2.5	ND	2.5	ND	2.5	ND	0.10
1,1-Dichloroethene	ND	5.0	ND	5.0	<u>14 Xa</u>	5.0	ND	0.20
cis-1,2-Dichloroethene	<u>160 C</u>	5.0	<u>120 C</u>	5.0	<u>220 C</u>	5.0	<u>0.37 GIa</u>	0.20
trans-1,2-Dichloroethene	ND	5.0	ND	5.0	ND	5.0	ND	0.20
1,2-Dichloropropane	ND	2.5	ND	2.5	ND	2.5	ND	0.10
cis-1,3-Dichloropropene	ND	5.0	ND I	5.0	ND	5.0	ND	0.20
trans-1,3-Dichloropropene	ND	8.5	ND	8.5	ND	8.5	ND	0.34
Methylene chloride	<u>10 Xa</u>	10	<u>21 Xa</u>	10	ND	10	<u>0.43 Xa</u>	0.40
1,1,2,2-Tetrachloroethane	ND	3.8	ND	3.8	ND	3.8	<u>0.16 XIa</u>	0.15
Tetrachloroethene	<u>23 C</u>	2.5	<u>22 C</u>	2.5	<u>32 C</u>	2.5	<u>0.57 C</u>	0.10
1,1,1-Trichloroethane	ND	5.0	ND	5.0	<u>6.2 Ca</u>	5.0	ND	0.20
1,1,2-Trichloroethane	ND	5.0	ND	5.0	ND	5.0	ND	0.20
Trichloroethene	<u>17 Ca</u>	5.0	<u>14 Ca</u>	5.0	<u>30 C</u>	5.0	<u>0.31 Ca</u>	0.20
Trichlorofluoromethane	ND	5.0	ND	5.0	ND	5.0	ND	0.20
Vinyl chloride	ND	5.0	ND	5.0	ND	5.0	ND	0.20

ND Not detected at specified detection limit

X See definition in report narrative

I Result differs from last report - see report narrative

C Confirmed on second column or by GC/MS

a Est. result less than 5 times detection limit

G Indicates an estimated GC value due to interferences.

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Geoscience Consultants, Ltd.
 Radian Work Order: SO-06-152

 Method: Halocarbons by EPA 601 (1)
 List: Complete analyte list

Sample ID:	9006181215 GBR 32	9006181330 GBR 49	9006181600 GBR 48	9006181700 GBR 50
Factor:	25	25	25	1
Results in:	ug/L 01A	ug/L 02A	ug/L 03A	ug/L 04A
Matrix:	water	water	water	water

Surrogate Recovery(%)

1-Bromo-4-fluorobenzene

Control Limits: 40 to 140

Result Det. Limit

125

Result Det. Limit

119

Result Det. Limit

113

Result Det. Limit

75

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Geoscience Consultants, Ltd.
 Radian Work Order: SO-06-152

Method: Halocarbons by EPA 601 (1)

List: Complete analyte list

Sample ID:

REAGENT BLANK

Factor:

1

Results in:

ug/L

OSA

Matrix:

water

	Result	Det. Limit
Bromodichloromethane	ND	0.10
Bromoform	ND	0.50
Bromomethane	ND	1.2
Carbon tetrachloride	ND	0.12
Chlorobenzene	ND	0.25
Chloroethane	ND	0.52
2-Chloroethylvinyl ether	ND	0.50
Chloroform	ND	0.10
Chloromethane	ND	0.30
Dibromochloromethane	ND	0.20
1,2-Dichlorobenzene	ND	0.50
1,3-Dichlorobenzene	ND	0.32
1,4-Dichlorobenzene	ND	0.24
1,1-Dichloroethane	ND	0.50
1,2-Dichloroethane	ND	0.10
1,1-Dichloroethene	ND	0.20
cis-1,2-Dichloroethene	ND	0.20
trans-1,2-Dichloroethene	ND	0.20
1,2-Dichloropropane	ND	0.10
cis-1,3-Dichloropropene	ND	0.20
trans-1,3-Dichloropropene	ND	0.34
Methylene chloride	ND	0.40
1,1,2,2-Tetrachloroethane	ND	0.15
Tetrachloroethene	ND	0.10
1,1,1-Trichloroethane	ND	0.20
1,1,2-Trichloroethane	ND	0.20
Trichloroethene	ND	0.20
Trichlorofluoromethane	ND	0.20
Vinyl chloride	ND	0.20

ND Not detected at specified detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Geoscience Consultants, Ltd.
Radian Work Order: S0-06-152

Method: Halocarbons by EPA 601 (1)

List: Complete analyte list

Sample ID: REAGENT BLANK

Factor: 1

Results in: ug/L

05A

Matrix: water

Surrogate Recovery(%)

1-Bromo-4-fluorobenzene

Control Limits: 40 to 140

Result Det. Limit

42

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Geoscience Consultants, Ltd.

Radian Work Order: S0-06-152

Method: Aromatics by EPA 602 (1)

List: Complete analyte list

Sample ID:	9006181215 GBR 32	9006181330 GBR 49	9006181600 GBR 48	9006181700 GBR 50
Factor:	25	25	25	1
Results in:	ug/L	ug/L	ug/L	ug/L
	01C	02C	03C	04C
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Benzene	ND	5.0	ND	5.0	5.7 Xa	5.0	ND	0.20
Chlorobenzene	ND	5.0	ND	5.0	ND	5.0	ND	0.20
1,2-Dichlorobenzene	ND	10	ND	10	ND	10	ND	0.40
1,3-Dichlorobenzene	ND	10	ND	10	ND	10	ND	0.40
1,4-Dichlorobenzene	ND	7.5	ND	7.5	ND	7.5	ND	0.30
Ethylbenzene	ND	5.0	ND	5.0	ND	5.0	ND	0.20
Toluene	ND	5.0	ND	5.0	ND	5.0	ND	0.20
Xylenes (total)	ND	5.0	ND	5.0	ND	5.0	ND	0.20

Surrogate Recovery(%)

1-Bromo-4-fluorobenzene	102	104	100	110
-------------------------	-----	-----	-----	-----

Control Limits: 40 to 140

ND Not detected at specified detection limit

X See definition in report narrative

a Est. result less than 5 times detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Geoscience Consultants, Ltd.
 Radian Work Order: S0-06-152

Method: Aromatics by EPA 602 (1)

List: Complete analyte list

Sample ID: REAGENT BLANK

Factor: 1

Results in: ug/L

06A

Matrix: water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Benzene	ND	0.20						
Chlorobenzene	ND	0.20						
1,2-Dichlorobenzene	ND	0.40						
1,3-Dichlorobenzene	ND	0.40						
1,4-Dichlorobenzene	ND	0.30						
Ethylbenzene	ND	0.20						
Toluene	ND	0.20						
Xylenes (total)	ND	0.20						

Surrogate Recovery(%)

1-Bromo-4-fluorobenzene 64

Control Limits: 40 to 140

ND Not detected at specified detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Geoscience Consultants, Ltd.
Radian Work Order: S0-06-152

Method/Analyte		Sample Identifications					
		9006181215		9006181330		9006181600	
		GBR 32		GBR 49		GBR 48	
		07		08		09	
Matrix		water		water		water	
		Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Mercury by SW7470							
Mercury		ND	mg/L 0.0002	ND	mg/L 0.0002	0.0004 @	mg/L 0.0002

ND Not detected at specified detection limit @ Est. result less than 5 times detection limit

(1) For a detailed description of flags and technical terms in this report refer to the glossary.

Geoscience Consultants, Ltd.
Radian Work Order: S0-06-152

Method/Analyte		Sample Identifications	
		9006181700 GBR 50	REAGENT BLANK
Matrix		10 water	11 water
Mercury by SW7470		Result	Det. Limit
Mercury		0.0002 @ mg/L	0.0002
		Result	Det. Limit
		ND	mg/L 0.0002
@ Est. result less than 5 times detection limit ND: Not detected at specified detection limit (1) For a detailed description of flags and technical terms in this report refer to the glossary.			

Geoscience Consultants, Ltd.
 Radian Work Order: SO-06-152

Sample Identifications and Dates

Sample ID	9006181215 GBR 32	9006181330 GBR 49	9006181600 GBR 48	9006181700 GBR 50	REAGENT BLANK 05	REAGENT BLANK 06
Date Sampled	06/18/90	06/18/90	06/18/90	06/18/90		
Date Received	06/21/90	06/21/90	06/21/90	06/21/90	06/21/90	06/21/90
Matrix	water 01	water 02	water 03	water 04	water	water
Halocarbons by EPA 601						
Prepared						
Analyzed	07/02/90	07/02/90	07/02/90	07/02/90	07/02/90	
Analyst	MG	MG	MG	MG	MG	
File ID	D5070211	D5070212	D507028	D5070210	Q507021	
Blank ID	Q507021	Q507021	Q507021	Q507021		
Instrument	5	5	5	5	5	
Report as	received	received	received	received	received	
Aromatics by EPA 602						
Prepared						
Analyzed	07/02/90	07/02/90	07/02/90	07/02/90		07/02/90
Analyst	MG	MG	MG	MG		MG
File ID	E5070213	E5070214	E507029	E5070216		R507021
Blank ID	R507021	R507021	R507021	R507021		
Instrument	5	5	5	5		5
Report as	received	received	received	received		received

Geoscience Consultants, Ltd.
 Indian Work Order: SO-06-152

Sample Identifications and Dates

Sample ID	9006181215	9006181330	9006181600	9006181700	REAGENT BLANK
	GBR 32	GBR 49	GBR 48	GBR 50	
Date Sampled	06/18/90	06/18/90	06/18/90	06/18/90	
Date Received	06/21/90	06/21/90	06/21/90	06/21/90	06/21/90
Matrix	water	water	water	water	water
	07	08	09	10	11

Metals by SW6010

Prepared	06/27/90	06/27/90	06/27/90	06/27/90	06/27/90
Analyzed	06/29/90	06/29/90	06/29/90	06/29/90	06/28/90
Analyst	GE	GE	GE	GE	GE
File ID	S00615207A	S00615208A	S00615209A	S00615210A	S00600027
Blank ID	S00600027	S00600027	S00600027	S00600027	
Instrument	JA	JA	JA	JA	JA
Report as	received	received	received	received	received

Mercury by SW7470

Prepared	06/27/90	06/27/90	06/27/90	06/27/90	06/27/90
Analyzed	06/27/90	06/27/90	06/27/90	06/27/90	06/27/90
Analyst	MD	MD	MD	MD	MD
File ID	S00615207A	S00615208A	S00615209A	S00615210A	S00600027
Blank ID	S00600027	S00600027	S00600027	S00600027	
Instrument	PE503	PE503	PE503	PE503	PE503
Report as	received	received	received	received	received

Appendix A

Comments, Notes and Definitions

Science Consultants, Ltd.
Radian Work Order: S0-06-152

General Comments

I=RESULT CORRECTED. RESULTS WITH THE I FLAG HAVE BEEN REVISED
BASED ON CORRECTED RESPONSE FACTORS FOR SELECTED ANALYTES FOR
GC INSTRUMENT B.

THE X FLAG MEANS NOT CONFIRMED BY ANALYSIS ON A SECOND COLUMN.

ALL OF THE 601 AND 602 CONFIRMATION ANALYSES WERE RUN 1 DAY OUT
OF HOLD TIME DUE TO EQUIPMENT PROBLEMS IN THE GC LABORATORY.

osscience Consultants, Ltd.
Radian Work Order: S0-06-152

a ALL METHODS EXCEPT CLP

The results which are less than five times the method specified detection limit.

EXPLANATION

Uncertainty of the analysis will increase as the method detection limit is approached. These results should be considered approximate.

C ORGANIC CLP

pesticides require that single component results > 10ng/uL in the final extract be confirmed by GC/MS.

OTHER ORGANIC METHODS

This analysis has been confirmed on a second column or by GC/MS.

EXPLANATION

Most methods of analysis by gas chromatography recommend reanalysis on a second column of dissimilar phase to resolve compounds of interest from interferences that may occur and for analyte confirmation.

G ALL ORGANIC GC METHODS EXCEPT CLP

Indicates an estimated GC value due to interferences.

ALL METHODS EXCEPT CLP

This result has been modified since the last issue of this report.

EXPLANATION

The explanations are included in the report narrative.

ND ALL METHODS EXCEPT CLP

This flag is used to denote analytes which are not detected at or above the specified detection limit.

EXPLANATION

The value to the right of the < symbol is the method specified detection limit for the analyte.

X ALL METHODS EXCEPT INORGANIC CLP

This is a general purpose flag for those situations not covered by the standard flags. The specific definition of this flag is described in the Comments Summary and/or in the case narrative.

oscience Consultants, Ltd.
Radian Work Order: SO-06-152

TERMS USED IN THIS REPORT:

Analyte - A chemical for which a sample is to be analyzed. The analysis will meet EPA method and QC specifications.

Compound - See Analyte.

Detection Limit - The method specified detection limit, which is the lower limit of quantitation specified by EPA for a method. Radian staff regularly assess their laboratories' method detection limits to verify that they meet or are lower than those specified by EPA. Detection limits which are higher than method limits are based on experimental values at the 99% confidence level. The detection limits for EPA CLP (Contract Laboratory Program) methods are CRQLs (contract required quantitation limits) for organics and CRDLs (contract required detection limits) for inorganics. Note, the detection limit may vary from that specified by EPA based on sample size, dilution or cleanup. (Refer to Factor, below)

EPA Method - The EPA specified method used to perform an analysis. EPA has specified standard methods for analysis of environmental samples. Radian will perform its analyses and accompanying QC tests in conformance with EPA methods unless otherwise specified.

Factor - Default method detection limits are based on analysis of clean water samples. A factor is required to calculate sample specific detection limits based on alternate matrices (soil or water), reporting units, use of cleanup procedures, or dilution of extracts/digestates. For example, extraction or digestion of 10 grams of soil in contrast to 1 liter of water will result in a factor of 100.

Matrix - The sample material. Generally, it will be soil, water, air, oil, or solid waste.

Radian Work Order - The unique Radian identification code assigned to the samples reported in the analytical summary.

Units - ug/L	micrograms per liter (parts per billion); liquids/water
ug/kg	micrograms per kilogram (parts per billion); soils/solids
ug/M3	micrograms per cubic meter; air samples
mg/L	milligrams per liter (parts per million); liquids/water
mg/kg	milligrams per kilogram (parts per million); soils/solids
%	percent; usually used for percent recovery of QC standards
uS/cm	conductance unit; microSiemens/centimeter
mL/hr	milliliters per hour; rate of settlement of matter in water
NTU	turbidity unit; nephelometric turbidity unit
CU	color unit; equal to 1 mg/L of chloroplatinate salt

Analytical Report
10/02/90

Giant Refining Company

Giant Refining Company
606 E. Highway 64
Farmington, NM 87401

Tim Kinney

Customer Work Identification Farmington NM.
Purchase Order Number RFE-9834

Contents:

- 1 Analytical Data Summary
- 2 Sample History
- 3 Comments Summary
- 4 Notes and Definitions

Radian Analytical Services
10395 Old Placerville Road
Sacramento, CA 95827

916-362-5332

Client Services Coordinator: LWKELLY

Certified by:

Marilyn Melton

Previously Reported on 08/14/90.

Giant Refining Company
 Radian Work Order: SO-07-188

Method: Aromatics by SW8020 (1)

List: Complete analyte list

Sample ID:	9007231455	REAGENT BLANK
	RW-10	
Factor:	1	1
Results in:	ug/L	ug/L
	01A	02A
Matrix:	water	water

	Result	Det. Limit	Result	Det. Limit
Benzene	9.4 C	0.20	ND	0.20
Chlorobenzene	ND	0.20	ND	0.20
1,2-Dichlorobenzene	ND	0.40	ND	0.40
1,3-Dichlorobenzene	ND	0.40	ND	0.40
1,4-Dichlorobenzene	ND	0.30	ND	0.30
Ethylbenzene	17 C	0.20	ND	0.20
Toluene	ND	0.20	ND	0.20
Xylenes (total)	8.4 C	0.20	ND	0.20

Surrogate Recovery(%)

1-Bromo-4-fluorobenzene	89	107
Control Limits: 40 to 140		

C Confirmed on second column or by GC/MS

ND Not detected at specified detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-07-188

Sample Identifications and Dates

Sample ID	9007231455	REAGENT BLANK
	RW-10	
Date Sampled	07/23/90	
Date Received	07/24/90	07/24/90
Matrix	water	water
	01	02

Aromatics by SW8020

Prepared		
Analyzed	08/06/90	08/06/90
Analyst	MG	MG
File ID	EB080610	RB08061
Blank ID	RB08061	
Instrument	B	B
Report as	received	received

Appendix A

Comments, Notes and Definitions

Giant Refining Company
Radian Work Order: S0-07-188

C ORGANIC CLP

pesticides require that single component results > 10ng/uL in the final extract be confirmed by GC/MS.

OTHER ORGANIC METHODS

This analysis has been confirmed on a second column or by GC/MS.

EXPLANATION

Most methods of analysis by gas chromatography recommend reanalysis on a second column of dissimilar phase to resolve compounds of interest from interferences that may occur and for analyte confirmation.

ND ALL METHODS EXCEPT CLP

This flag is used to denote analytes which are not detected at or above the specified detection limit.

EXPLANATION

The value to the right of the < symbol is the method specified detection limit for the analyte.

Giant Refining Company
Radian Work Order: SO-07-188

TERMS USED IN THIS REPORT:

Analyte - A chemical for which a sample is to be analyzed. The analysis will meet EPA method and QC specifications.

Compound - See Analyte.

Detection Limit - The method specified detection limit, which is the lower limit of quantitation specified by EPA for a method. Radian staff regularly assess their laboratories' method detection limits to verify that they meet or are lower than those specified by EPA. Detection limits which are higher than method limits are based on experimental values at the 99% confidence level. The detection limits for EPA CLP (Contract Laboratory Program) methods are CRQLs (contract required quantitation limits) for organics and CRDLs (contract required detection limits) for inorganics. Note, the detection limit may vary from that specified by EPA based on sample size, dilution or cleanup. (Refer to Factor, below)

EPA Method - The EPA specified method used to perform an analysis. EPA has specified standard methods for analysis of environmental samples. Radian will perform its analyses and accompanying QC tests in conformance with EPA methods unless otherwise specified.

Factor - Default method detection limits are based on analysis of clean water samples. A factor is required to calculate sample specific detection limits based on alternate matrices (soil or water), reporting units, use of cleanup procedures, or dilution of extracts/digestates. For example, extraction or digestion of 10 grams of soil in contrast to 1 liter of water will result in a factor of 100.

Matrix - The sample material. Generally, it will be soil, water, air, oil, or solid waste.

Radian Work Order - The unique Radian identification code assigned to the samples reported in the analytical summary.

Units - ug/L	micrograms per liter (parts per billion); liquids/water
ug/kg	micrograms per kilogram (parts per billion); soils/solids
ug/M3	micrograms per cubic meter; air samples
mg/L	milligrams per liter (parts per million); liquids/water
mg/kg	milligrams per kilogram (parts per million); soils/solids
%	percent; usually used for percent recovery of QC standards
uS/cm	conductance unit; microSiemens/centimeter
mL/hr	milliliters per hour; rate of settlement of matter in water
NTU	turbidity unit; nephelometric turbidity unit
CU	color unit; equal to 1 mg/L of chloroplatinate salt

SECTION 8

MISCELLANEOUS SAMPLING DATA

Analytical Report
10/02/90

Giant Refining Company
Giant Refining Company 606 E. Highway 64 Farmington, NM 87401
Tim Kinney

Customer Work Identification Farmington NM. Purchase Order Number RFE-9834

Contents:	
1	Analytical Data Summary
2	Sample History
3	Comments Summary
4	Notes and Definitions

Radian Analytical Services
10395 Old Placerville Road
Sacramento, CA 95827

916-362-5332

Client Services Coordinator: LWKELLY

Certified by: Marilyn Melton

Previously Reported on 08/14/90.

Giant Refining Company

Radian Work Order: S0-07-188

Method: Aromatics by SW8020 (1)

List: Complete analyte list

Sample ID:	9007231455	REAGENT BLANK
	RW-10	
Factor:	1	1
Results in:	ug/L	ug/L
	01A	02A
Matrix:	water	water

	Result	Det. Limit	Result	Det. Limit
Benzene	9.4 C	0.20	ND	0.20
Chlorobenzene	ND	0.20	ND	0.20
1,2-Dichlorobenzene	ND	0.40	ND	0.40
1,3-Dichlorobenzene	ND	0.40	ND	0.40
1,4-Dichlorobenzene	ND	0.30	ND	0.30
Ethylbenzene	17 C	0.20	ND	0.20
Toluene	ND	0.20	ND	0.20
Xylenes (total)	8.4 C	0.20	ND	0.20

Surrogate Recovery(%)

1-Bromo-4-fluorobenzene

89

107

Control Limits: 40 to 140

C Confirmed on second column or by GC/MS

ND Not detected at specified detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-07-188

Sample Identifications and Dates

Sample ID	9007231455	REAGENT BLANK
	RW-10	
Date Sampled	07/23/90	
Date Received	07/24/90	07/24/90
Matrix	water	water
	01	02

Aromatics by SW8020

Prepared		
Analyzed	08/06/90	08/06/90
Analyst	MG	MG
File ID	EB080610	RB08061
Blank ID	RB08061	
Instrument	B	B
Report as	received	received

Appendix A

Comments, Notes and Definitions

Giant Refining Company
Radian Work Order: S0-07-188

C ORGANIC CLP

pesticides require that single component results > 10ng/uL in the final extract be confirmed by GC/MS.

OTHER ORGANIC METHODS

This analysis has been confirmed on a second column or by GC/MS.

EXPLANATION

Most methods of analysis by gas chromatography recommend reanalysis on a second column of dissimilar phase to resolve compounds of interest from interferences that may occur and for analyte confirmation.

ND ALL METHODS EXCEPT CLP

This flag is used to denote analytes which are not detected at or above the specified detection limit.

EXPLANATION

The value to the right of the < symbol is the method specified detection limit for the analyte.

Giant Refining Company
Radian Work Order: S0-07-188

TERMS USED IN THIS REPORT:

Analyte - A chemical for which a sample is to be analyzed. The analysis will meet EPA method and QC specifications.

Compound - See Analyte.

Detection Limit - The method specified detection limit, which is the lower limit of quantitation specified by EPA for a method. Radian staff regularly assess their laboratories' method detection limits to verify that they meet or are lower than those specified by EPA. Detection limits which are higher than method limits are based on experimental values at the 99% confidence level. The detection limits for EPA CLP (Contract Laboratory Program) methods are CRQLs (contract required quantitation limits) for organics and CRDLs (contract required detection limits) for inorganics. Note, the detection limit may vary from that specified by EPA based on sample size, dilution or cleanup. (Refer to Factor, below)

EPA Method - The EPA specified method used to perform an analysis. EPA has specified standard methods for analysis of environmental samples. Radian will perform its analyses and accompanying QC tests in conformance with EPA methods unless otherwise specified.

Factor - Default method detection limits are based on analysis of clean water samples. A factor is required to calculate sample specific detection limits based on alternate matrices (soil or water), reporting units, use of cleanup procedures, or dilution of extracts/digestates. For example, extraction or digestion of 10 grams of soil in contrast to 1 liter of water will result in a factor of 100.

Matrix - The sample material. Generally, it will be soil, water, air, oil, or solid waste.

Radian Work Order - The unique Radian identification code assigned to the samples reported in the analytical summary.

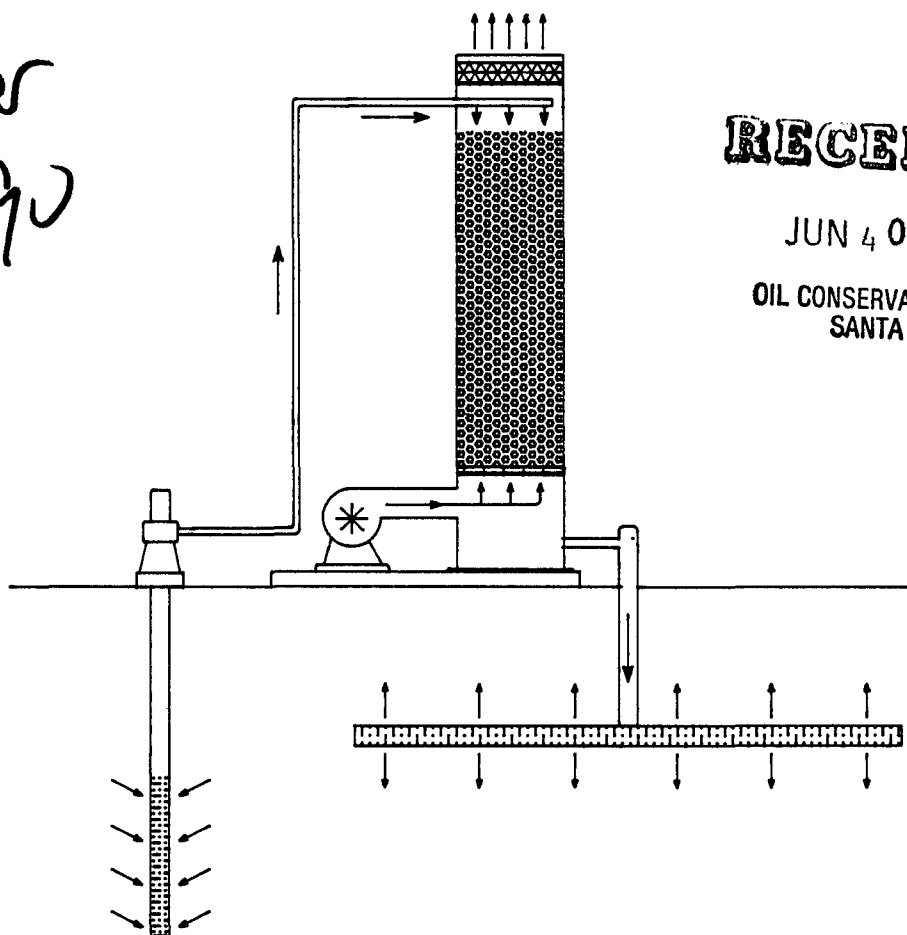
Units - ug/L	micrograms per liter (parts per billion); liquids/water
ug/kg	micrograms per kilogram (parts per billion); soils/solids
ug/M3	micrograms per cubic meter; air samples
mg/L	milligrams per liter (parts per million); liquids/water
mg/kg	milligrams per kilogram (parts per million); soils/solids
%	percent; usually used for percent recovery of QC standards
uS/cm	conductance unit; microSiemens/centimeter
mL/hr	milliliters per hour; rate of settlement of matter in water
NTU	turbidity unit; nephelometric turbidity unit
CU	color unit; equal to 1 mg/L of chloroplatinate salt

GIANT

REFINING CO.

BLOOMFIELD REFINERY
REMEDATION PROJECT

1st
Quarter
1990



RECEIVED

JUN 4 0 1990

OIL CONSERVATION DIV.
SANTA FE

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
FIRST QUARTER 1990

RECEIVED

JUN 4 0 1990

OIL CONSERVATION DIV.
SANTA FE

Prepared by:

GIANT REFINING CO
606 E. Highway 64
Post Office Box 256
Farmington, New Mexico 87401
(505) 632-3306
FAX (505) 632-2487

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1.0 QUARTERLY SAMPLING ANALYSES

Radian Work Order S0-04-020

Analytical Report
04/20/90

Giant Refining Company

Giant Refining Company
606 E. Highway 64
Farmington, NM 87401

Tim Kinney

Customer Work Identification Refinery Remediation RFE-9834
Purchase Order Number RFE-9834

Contents:

- 1 Analytical Data Summary
- 2 Sample History
- 3 Comments Summary
- 4 Notes and Definitions

Radian Analytical Services
10395 Old Placerville Road
Sacramento, CA 95827

916-362-5332

Client Services Coordinator: WLBROWN

Certified by:

Handwritten Signature

Giant Refining Company
 Radian Work Order: S0-04-020

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	9004031005	9004031109	9004031150	9004031359
	/GBR-17	/GBR-30	/GBR-24D	/GBR-15
Factor:	1	1	1	20
Results in:	ug/L	ug/L	ug/L	ug/L
	01A	02A	03A	04A
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Bromodichloromethane	ND	0.10	ND	0.10	ND	0.10	ND	2.0
Bromoform	ND	0.50	ND	0.50	ND	0.50	ND	10
Bromomethane	ND	1.2	ND	1.2	ND	1.2	ND	24
Carbon tetrachloride	ND	0.12	ND	0.12	ND	0.12	ND	2.4
Chlorobenzene	ND	0.25	ND	0.25	ND	0.25	ND	5.0
Chloroethane	ND	0.52	ND	0.52	ND	0.52	ND	10
2-Chloroethylvinylether	ND	0.50	ND	0.50	ND	0.50	ND	10
Chloroform	ND	0.10	ND	0.10	ND	0.10	ND	2.0
Chloromethane	ND	0.30	ND	0.30	ND	0.30	ND	6.0
Dibromochloromethane	ND	0.20	ND	0.20	ND	0.20	ND	4.0
1,2-Dichlorobenzene	ND	0.50	ND	0.50	ND	0.50	ND	10
1,3-Dichlorobenzene	ND	0.32	ND	0.32	ND	0.32	ND	6.4
1,4-Dichlorobenzene	ND	0.24	ND	0.24	ND	0.24	ND	4.8
1,1-Dichloroethane	ND	0.50	ND	0.50	ND	0.50	84 C	10
1,2-Dichloroethane	ND	0.10	ND	0.10	16 C	0.10	ND	2.0
1,1-Dichloroethene	ND	0.20	ND	0.20	ND	0.20	ND	4.0
cis-1,2-Dichloroethene	ND	0.20	ND	0.20	ND	0.20	ND	4.0
trans-1,2-Dichloroethene	ND	0.20	ND	0.20	ND	0.20	ND	4.0
1,2-Dichloropropane	ND	0.10	ND	0.10	ND	0.10	ND	2.0
cis-1,3-Dichloropropene	ND	0.20	ND	0.20	ND	0.20	ND	4.0
trans-1,3-Dichloropropene	ND	0.34	ND	0.34	ND	0.34	ND	6.8
Methylene chloride	ND	0.40	ND	0.40	ND	0.40	ND	8.0
1,1,2,2-Tetrachloroethane	ND	0.15	ND	0.15	ND	0.15	ND	3.0
Tetrachloroethene	0.37 Ca	0.10	ND	0.10	0.21 Ca	0.10	ND	2.0
1,1,1-Trichloroethane	1.7 C	0.20	ND	0.20	ND	0.20	ND	4.0
1,1,2-Trichloroethane	ND	0.20	ND	0.20	ND	0.20	ND	4.0
Trichloroethene	ND	0.20	ND	0.20	ND	0.20	ND	4.0
Trichlorofluoromethane	ND	0.20	ND	0.20	ND	0.20	ND	4.0
Vinyl chloride	ND	0.20	ND	0.20	ND	0.20	ND	4.0

ND Not detected at specified detection limit

C Confirmed on second column or by GC/MS

a Est. result less than 5 times detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: SO-04-020

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	9004031005	9004031109	9004031150	9004031359
	/GBR-17	/GBR-30	/GBR-24D	/GBR-15
Factor:	1	1	1	20
Results in:	ug/L	ug/L	ug/L	ug/L
	01A	02A	03A	04A
Matrix:	water	water	water	water

	Result Det. Limit	Result Det. Limit	Result Det. Limit	Result Det. Limit
Surrogate Recovery(%)				
1-Bromo-4-fluorobenzene	137	119	128	103
Control Limits: 40 to 140				

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-04-020

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	TRIP BLANK #5	REAGENT BLANK	REAGENT BLANK	REAGENT BLANK
Factor:	1	1	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
Matrix:	05A water	06A water	06B water	06C water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Bromodichloromethane	ND	0.10	ND	0.10	ND	0.10	ND	0.10
Bromoform	ND	0.50	ND	0.50	ND	0.50	ND	0.50
Bromomethane	ND	1.2	ND	1.2	ND	1.2	ND	1.2
Carbon tetrachloride	ND	0.12	ND	0.12	ND	0.12	ND	0.12
Chlorobenzene	ND	0.25	ND	0.25	ND	0.25	ND	0.25
Chloroethane	ND	0.52	ND	0.52	ND	0.52	ND	0.52
2-Chloroethylvinylether	ND	0.50	ND	0.50	ND	0.50	ND	0.50
Chloroform	ND	0.10	ND	0.10	ND	0.10	ND	0.10
Chloromethane	ND	0.30	ND	0.30	ND	0.30	ND	0.30
Dibromochloromethane	ND	0.20	ND	0.20	ND	0.20	ND	0.20
1,2-Dichlorobenzene	ND	0.50	ND	0.50	ND	0.50	ND	0.50
1,3-Dichlorobenzene	ND	0.32	ND	0.32	ND	0.32	ND	0.32
1,4-Dichlorobenzene	ND	0.24	ND	0.24	ND	0.24	ND	0.24
1,1-Dichloroethane	ND	0.50	ND	0.50	ND	0.50	ND	0.50
1,2-Dichloroethane	ND	0.10	ND	0.10	ND	0.10	ND	0.10
1,1-Dichloroethene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
cis-1,2-Dichloroethene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
trans-1,2-Dichloroethene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
1,2-Dichloropropane	ND	0.10	ND	0.10	ND	0.10	ND	0.10
cis-1,3-Dichloropropene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
trans-1,3-Dichloropropene	ND	0.34	ND	0.34	ND	0.34	ND	0.34
Methylene chloride	ND	0.40	ND	0.40	ND	0.40	ND	0.40
1,1,2,2-Tetrachloroethane	ND	0.15	ND	0.15	ND	0.15	ND	0.15
Tetrachloroethene	ND	0.10	ND	0.10	ND	0.10	ND	0.10
1,1,1-Trichloroethane	ND	0.20	ND	0.20	ND	0.20	ND	0.20
1,1,2-Trichloroethane	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Trichloroethene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Trichlorofluoromethane	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Vinyl chloride	ND	0.20	ND	0.20	ND	0.20	ND	0.20

ND: Not detected at specified detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-04-020

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	TRIP BLANK #5	REAGENT BLANK	REAGENT BLANK	REAGENT BLANK
Factor:	1	1	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
	05A	06A	06B	06C
Matrix:	water	water	water	water

	Result Det. Limit	Result Det. Limit	Result Det. Limit	Result Det. Limit
Surrogate Recovery(%)				
1-Bromo-4-fluorobenzene	139	132	137	131
Control Limits: 40 to 140				

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: SO-04-020

Method: Aromatics by SW8020 (1)

List: Complete analyte list

Sample ID:	9004031005	9004031109	9004031150	9004031359
/GBR-17	/GBR-30	/GBR-24D	/GBR-15	
Factor:	1	1	1	20
Results in:	ug/L	ug/L	ug/L	ug/L
	01C	02C	03C	04C
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Benzene	ND	0.20	ND	0.20	31 C	0.20	110 C	4.0
Chlorobenzene	ND	0.20	ND	0.20	ND	0.20	ND	4.0
1,2-Dichlorobenzene	ND	0.40	ND	0.40	ND	0.40	ND	8.0
1,3-Dichlorobenzene	ND	0.40	ND	0.40	ND	0.40	ND	8.0
1,4-Dichlorobenzene	ND	0.30	ND	0.30	ND	0.30	ND	6.0
Ethylbenzene	ND	0.20	2.0 C	0.20	13 C	0.20	ND	4.0
Toluene	ND	0.20	3.1 CG	0.20	2.3 C	0.20	ND	4.0
Xylenes (total)	ND	0.20	ND	0.20	6.7 C	0.20	ND	4.0
Surrogate Recovery(%)								
1-Bromo-4-fluorobenzene	99		111		90		86	
Control Limits: 40 to 140								

ND Not detected at specified detection limit

C Confirmed on second column or by GC/MS

G Indicates an estimated GC value due to interferences.

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-04-020

Method: Aromatics by SW8020 (1)

List: Complete analyte list

Sample ID:	TRIP BLANK #5	REAGENT BLANK	REAGENT BLANK	REAGENT BLANK
Factor:	1	1	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
	05A	07A	07B	07C
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Benzene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Chlorobenzene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
1,2-Dichlorobenzene	ND	0.40	ND	0.40	ND	0.40	ND	0.40
1,3-Dichlorobenzene	ND	0.40	ND	0.40	ND	0.40	ND	0.40
1,4-Dichlorobenzene	ND	0.30	ND	0.30	ND	0.30	ND	0.30
Ethylbenzene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Toluene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Xylenes (total)	ND	0.20	ND	0.20	ND	0.20	ND	0.20

Surrogate Recovery(%)

1-Bromo-4-fluorobenzene	99	101	100	98
-------------------------	----	-----	-----	----

Control Limits: 40 to 140

ND: Not detected at specified detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-04-020

Sample Identifications and Dates

Sample ID	9004031005	9004031109	9004031150	9004031359	TRIP BLANK #5	REAGENT BLANK
	/GBR-17	/GBR-30	/GBR-240	/GBR-15		
Date Sampled	04/03/90	04/03/90	04/03/90	04/03/90	04/03/90	
Date Received	04/04/90	04/04/90	04/04/90	04/04/90	04/04/90	04/04/90
Matrix	water	water	water	water	water	water
	01	02	03	04	05	06
Halocarbons by SW8010						
Prepared						
Analyzed	04/07/90	04/10/90	04/07/90	04/09/90	04/07/90	04/07/90
Analyst	MG	MG	MG	MG	MG	MG
File ID	DB04075	DB04104	DB04077	DB040912	QB04074	QB04071
Blank ID	QB04071	QB04101	QB04071	QB04091	QB04071	
Instrument	B	B	B	B	B	B
Report as	received	received	received	received	received	received
Halocarbons by SW8010						
Prepared						
Analyzed						04/09/90
Analyst						MG
File ID						QB04091
Blank ID						
Instrument						B
Report as						received
Halocarbons by SW8010						
Prepared						
Analyzed						04/10/90
Analyst						MG
File ID						QB04101
Blank ID						
Instrument						B
Report as						received
Aromatics by SW8020						
Prepared						
Analyzed	04/07/90	04/10/90	04/07/90	04/09/90	04/07/90	
Analyst	MG	MG	MG	MG	MG	
File ID	EB04075	EB04104	EB04077	EB040912	EB04074	
Blank ID	RB04071	RB04101	RB04071	RB04091	RB04071	
Instrument	B	B	B	B	B	
Report as	received	received	received	received	received	

Giant Refining Company
Radian Work Order: S0-04-020

Sample Identifications and Dates

Sample ID: REAGENT BLANK
Date Sampled:
Date Received: 04/04/90
Matrix: water
07

Aromatics by SW8020

Prepared
Analyzed: 04/07/90
Analyst: MG
File ID: RB04071
Blank ID:
Instrument: B
Report as: received

Aromatics by SW8020

Prepared
Analyzed: 04/09/90
Analyst: MG
File ID: RB04091
Blank ID:
Instrument: B
Report as: received

Giant Refining Company
 Radian Work Order: S0-04-020

Sample Identifications and Dates

Sample ID	REAGENT BLANK
Date Sampled	
Date Received	04/04/90
Matrix	water
	07

Aromatics by SW8020

Prepared	
Analyzed	04/10/90
Analyst	MG
File ID	RB04101
Blank ID	
Instrument	B
Report as	received

Appendix A

Comments, Notes and Definitions

Giant Refining Company
Radian Work Order: SO-04-020

General Comments

SOME ANALYTES REPORTED AS ESTIMATED VALUE DUE TO MATRIX
INTERFERENCES.

Giant Refining Company
Radian Work Order: S0-04-020

a ALL METHODS EXCEPT CLP

The results which are less than five times the method specified detection limit.

EXPLANATION

Uncertainty of the analysis will increase as the method detection limit is approached. These results should be considered approximate.

C ORGANIC CLP

pesticides require that single component results > 10ng/uL in the final extract be confirmed by GC/MS.

OTHER ORGANIC METHODS

This analysis has been confirmed on a second column or by GC/MS.

EXPLANATION

Most methods of analysis by gas chromatography recommend reanalysis on a second column of dissimilar phase to resolve compounds of interest from interferences that may occur and for analyte confirmation.

G ALL ORGANIC GC METHODS EXCEPT CLP

Indicates an estimated GC value due to interferences.

ND ALL METHODS EXCEPT CLP

This flag is used to denote analytes which are not detected at or above the specified detection limit.

EXPLANATION

The value to the right of the < symbol is the method specified detection limit for the analyte.

Giant Refining Company
Radian Work Order: SO-04-020

TERMS USED IN THIS REPORT:

Analyte - A chemical for which a sample is to be analyzed. The analysis will meet EPA method and QC specifications.

Compound - See Analyte.

Detection Limit - The method specified detection limit, which is the lower limit of quantitation specified by EPA for a method. Radian staff regularly assess their laboratories' method detection limits to verify that they meet or are lower than those specified by EPA. Detection limits which are higher than method limits are based on experimental values at the 99% confidence level. The detection limits for EPA CLP (Contract Laboratory Program) methods are CRQLs (contract required quantitation limits) for organics and CRDLs (contract required detection limits) for inorganics. Note, the detection limit may vary from that specified by EPA based on sample size, dilution or cleanup. (Refer to Factor, below)

EPA Method - The EPA specified method used to perform an analysis. EPA has specified standard methods for analysis of environmental samples. Radian will perform its analyses and accompanying QC tests in conformance with EPA methods unless otherwise specified.

Factor - Default method detection limits are based on analysis of clean water samples. A factor is required to calculate sample specific detection limits based on alternate matrices (soil or water), reporting units, use of cleanup procedures, or dilution of extracts/digestates. For example, extraction or digestion of 10 grams of soil in contrast to 1 liter of water will result in a factor of 100.

Matrix - The sample material. Generally, it will be soil, water, air, oil, or solid waste.

Radian Work Order - The unique Radian identification code assigned to the samples reported in the analytical summary.

Units - ug/L	micrograms per liter (parts per billion); liquids/water
ug/kg	micrograms per kilogram (parts per billion); soils/solids
ug/M3	micrograms per cubic meter; air samples
mg/L	milligrams per liter (parts per million); liquids/water
mg/kg	milligrams per kilogram (parts per million); soils/solids
%	percent; usually used for percent recovery of QC standards
uS/cm	conductance unit; microSiemens/centimeter
mL/hr	milliliters per hour; rate of settlement of matter in water
NTU	turbidity unit; nephelometric turbidity unit
CU	color unit; equal to 1 mg/L of chloroplatinate salt

Radian Work Order S0-04-013

Analytical Report
04/19/90

Giant Refining Company

Giant Refining Company
606 E. Highway 64
Farmington, NM 87401

Tim Kinney

Customer Work Identification Refinery Remediation RFE-9834
Purchase Order Number RFE-9834

Contents:

- 1 Analytical Data Summary
- 2 Sample History
- 3 Comments Summary
- 4 Notes and Definitions

Radian Analytical Services
10395 Old Placerville Road
Sacramento, CA 95827

916-362-5332

Client Services Coordinator: WLBROWN

Certified by:

Paul H. Gale

Giant Refining Company
 Radian Work Order: S0-04-013

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	9004021055	9004021130	9004021145	9004021245
	/GRW-3	/GRW-4	/GRW-6	/STRIPPER INFL
Factor:	10	20	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
	01A	02A	03A	04A
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Bromodichloromethane	ND	1.0	ND	2.0	ND	0.10	ND	0.10
Bromoform	ND	5.0	ND	10	ND	0.50	ND	0.50
Bromomethane	ND	12	ND	24	ND	1.2	ND	1.2
Carbon tetrachloride	ND	1.2	ND	2.4	ND	0.12	ND	0.12
Chlorobenzene	ND	2.5	ND	5.0	ND	0.25	ND	0.25
Chloroethane	ND	5.2	ND	10	ND	0.52	ND	0.52
2-Chloroethylvinylether	ND	5.0	ND	10	ND	0.50	ND	0.50
Chloroform	ND	1.0	ND	2.0	ND	0.10	ND	0.10
Chloromethane	ND	3.0	ND	6.0	ND	0.30	ND	0.30
Dibromochloromethane	ND	2.0	ND	4.0	ND	0.20	ND	0.20
1,2-Dichlorobenzene	ND	5.0	ND	10	ND	0.50	ND	0.50
1,3-Dichlorobenzene	ND	3.2	ND	6.4	ND	0.32	ND	0.32
1,4-Dichlorobenzene	ND	2.4	ND	4.8	ND	0.24	ND	0.24
1,1-Dichloroethane	ND	5.0	ND	10	2.1 C _a	0.50	3.1 C	0.50
1,2-Dichloroethane	ND	1.0	ND	2.0	7.9 C	0.10	4.5 C	0.10
1,1-Dichloroethene	ND	2.0	ND	4.0	ND	0.20	ND	0.20
cis-1,2-Dichloroethene	14 C	2.0	21 C	4.0	ND	0.20	25 C	0.20
trans-1,2-Dichloroethene	ND	2.0	ND	4.0	ND	0.20	ND	0.20
1,2-Dichloropropane	ND	1.0	ND	2.0	ND	0.10	ND	0.10
cis-1,3-Dichloropropene	ND	2.0	ND	4.0	ND	0.20	ND	0.20
trans-1,3-Dichloropropene	ND	3.4	ND	6.8	ND	0.34	ND	0.34
Methylene chloride	ND	4.0	ND	8.0	1.1 C _a	0.40	0.65 C _a	0.40
1,1,2,2-Tetrachloroethane	ND	1.5	ND	3.0	ND	0.15	ND	0.15
Tetrachloroethene	ND	1.0	ND	2.0	2.7 C	0.10	2.8 C	0.10
1,1,1-Trichloroethane	ND	2.0	ND	4.0	1.6 C	0.20	0.96 C _a	0.20
1,1,2-Trichloroethane	ND	2.0	ND	4.0	ND	0.20	ND	0.20
Trichloroethene	ND	2.0	8.6 C _a	4.0	2.3 C	0.20	2.4 C	0.20
Trichlorofluoromethane	ND	2.0	ND	4.0	ND	0.20	ND	0.20
Vinyl chloride	ND	2.0	ND	4.0	ND	0.20	ND	0.20

ND Not detected at specified detection limit

C Confirmed on second column or by GC/MS

a Est. result less than 5 times detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-04-013

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	9004021055	9004021130	9004021145	9004021245
	/GRW-3	/GRW-4	/GRW-6	/STRIPPER INFL
Factor:	10	20	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
	01A	02A	03A	04A
Matrix:	water	water	water	water

	Result Det. Limit	Result Det. Limit	Result Det. Limit	Result Det. Limit
<u>Surrogate Recovery(%)</u>				
1-Bromo-4-fluorobenzene	135	147 Q	93	106
Control Limits: 40 to 140				

Q: Outside control limits

(1). For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: SO-04-013

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	9004021255	9004021430	TRIP BLANK #2	REAGENT BLANK
	/STRIPPER EFFL	/GRW-13		
Factor:	1	1	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
	05A	06A	07A	08A
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Bromodichloromethane	ND	0.10	ND	0.10	ND	0.10	ND	0.10
Bromoform	ND	0.50	ND	0.50	ND	0.50	ND	0.50
Bromomethane	ND	1.2	ND	1.2	ND	1.2	ND	1.2
Carbon tetrachloride	ND	0.12	ND	0.12	ND	0.12	ND	0.12
Chlorobenzene	ND	0.25	ND	0.25	ND	0.25	ND	0.25
Chloroethane	ND	0.52	ND	0.52	ND	0.52	ND	0.52
2-Chloroethylvinylether	ND	0.50	ND	0.50	ND	0.50	ND	0.50
Chloroform	ND	0.10	ND	0.10	ND	0.10	ND	0.10
Chloromethane	ND	0.30	ND	0.30	ND	0.30	ND	0.30
Dibromochloromethane	ND	0.20	ND	0.20	ND	0.20	ND	0.20
1,2-Dichlorobenzene	ND	0.50	ND	0.50	ND	0.50	ND	0.50
1,3-Dichlorobenzene	ND	0.32	ND	0.32	ND	0.32	ND	0.32
1,4-Dichlorobenzene	ND	0.24	ND	0.24	ND	0.24	ND	0.24
1,1-Dichloroethane	ND	0.50	ND	0.50	ND	0.50	ND	0.50
1,2-Dichloroethane	ND	0.10	4,5 C	0.10	ND	0.10	ND	0.10
1,1-Dichloroethene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
cis-1,2-Dichloroethene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
trans-1,2-Dichloroethene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
1,2-Dichloropropane	ND	0.10	ND	0.10	ND	0.10	ND	0.10
cis-1,3-Dichloropropene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
trans-1,3-Dichloropropene	ND	0.34	ND	0.34	ND	0.34	ND	0.34
Methylene chloride	ND	0.40	ND	0.40	ND	0.40	ND	0.40
1,1,2,2-Tetrachloroethane	ND	0.15	ND	0.15	ND	0.15	ND	0.15
Tetrachloroethene	ND	0.10	ND	0.10	ND	0.10	ND	0.10
1,1,1-Trichloroethane	ND	0.20	ND	0.20	ND	0.20	ND	0.20
1,1,2-Trichloroethane	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Trichloroethene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Trichlorofluoromethane	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Vinyl chloride	ND	0.20	ND	0.20	ND	0.20	ND	0.20

ND: Not detected at specified detection limit

C: Confirmed on second column or by GC/MS

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: SO-04-013

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	9004021255 /STRIPPER EFFL	9004021430 /GRW-13	TRIP BLANK #2	REAGENT BLANK
Factor:	1	1	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
	05A	06A	07A	08A
Matrix:	water	water	water	water

Surrogate Recovery(%)

1-Bromo-4-fluorobenzene

Control Limits: 40 to 140

Result Det. Limit

101

Result Det. Limit

104

Result Det. Limit

105

Result Det. Limit

123

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: SO-04-013

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	REAGENT BLANK	REAGENT BLANK
Factor:	1	1
Results in:	ug/L	ug/L
	08B	08C
Matrix:	water	water

	Result	Det. Limit	Result	Det. Limit
Bromodichloromethane	ND	0.10	ND	0.10
Bromoform	ND	0.50	ND	0.50
Bromomethane	ND	1.2	ND	1.2
Carbon tetrachloride	ND	0.12	ND	0.12
Chlorobenzene	ND	0.25	ND	0.25
Chloroethane	ND	0.52	ND	0.52
2-Chloroethylvinylether	ND	0.50	ND	0.50
Chloroform	ND	0.10	ND	0.10
Chloromethane	ND	0.30	ND	0.30
Dibromochloromethane	ND	0.20	ND	0.20
1,2-Dichlorobenzene	ND	0.50	ND	0.50
1,3-Dichlorobenzene	ND	0.32	ND	0.32
1,4-Dichlorobenzene	ND	0.24	ND	0.24
1,1-Dichloroethane	ND	0.50	ND	0.50
1,2-Dichloroethane	ND	0.10	ND	0.10
1,1-Dichloroethene	ND	0.20	ND	0.20
cis-1,2-Dichloroethene	ND	0.20	ND	0.20
trans-1,2-Dichloroethene	ND	0.20	ND	0.20
1,2-Dichloropropane	ND	0.10	ND	0.10
cis-1,3-Dichloropropene	ND	0.20	ND	0.20
trans-1,3-Dichloropropene	ND	0.34	ND	0.34
Methylene chloride	ND	0.40	ND	0.40
1,1,2,2-Tetrachloroethane	ND	0.15	ND	0.15
Tetrachloroethene	ND	0.10	ND	0.10
1,1,1-Trichloroethane	ND	0.20	ND	0.20
1,1,2-Trichloroethane	ND	0.20	ND	0.20
Trichloroethene	ND	0.20	ND	0.20
Trichlorofluoromethane	ND	0.20	ND	0.20
Vinyl chloride	ND	0.20	ND	0.20

ND Not detected at specified detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-04-013

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	REAGENT BLANK	REAGENT BLANK
Factor:	1	1
Results in:	ug/L	ug/L
	088	08C
Matrix:	water	water

Surrogate Recovery(%)

1-Bromo-4-fluorobenzene

Control Limits: 40 to 140

Result Det. Limit

134

Result Det. Limit

106

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-04-013

Method: Aromatics by SW8020 (1)

List: Complete analyte list

Sample ID:	9004021055	9004021130	9004021145	9004021245
	/GRW-3	/GRW-4	/GRW-6	/STRIPPER INFL
Factor:	10	20	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
	01B	02B	03C	04C
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Benzene	280 C	2.0	440 C	4.0	16 C	0.20	23 C	0.20
Chlorobenzene	ND	2.0	ND	4.0	ND	0.20	ND	0.20
1,2-Dichlorobenzene	ND	4.0	ND	8.0	ND	0.40	ND	0.40
1,3-Dichlorobenzene	ND	4.0	ND	8.0	ND	0.40	ND	0.40
1,4-Dichlorobenzene	ND	3.0	ND	6.0	ND	0.30	ND	0.30
Ethylbenzene	98 C	2.0	65 C	4.0	ND	0.20	0.90 C@	0.20
Toluene	ND	2.0	ND	4.0	0.65 C@	0.20	ND	0.20
Xylenes (total)	33 C	2.0	ND	4.0	3.4 C	0.20	7.1 C	0.20
<u>Surrogate Recovery(%)</u>								
1-Bromo-4-fluorobenzene	91		104		69		84	
Control Limits: 40 to 140								

C Confirmed on second column or by GC/MS

ND Not detected at specified detection limit

@ Est. result less than 5 times detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-04-013

Method: Aromatics by SW8020 (1)

List: Complete analyte list

Sample ID:	9004021255	9004021430	TRIP BLANK #2	REAGENT BLANK
	/STRIPPER EFFL	/GRW-13		
Factor:	1	1	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
	05C	06C	07A	09A
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Benzene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Chlorobenzene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
1,2-Dichlorobenzene	ND	0.40	ND	0.40	ND	0.40	ND	0.40
1,3-Dichlorobenzene	ND	0.40	ND	0.40	ND	0.40	ND	0.40
1,4-Dichlorobenzene	ND	0.30	ND	0.30	ND	0.30	ND	0.30
Ethylbenzene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Toluene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Xylenes (total)	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Surrogate Recovery(%)								
1-Bromo-4-fluorobenzene	92		89		89		101	
Control Limits: 40 to 140								

ND Not detected at specified detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-04-013

Method: Aromatics by SW8020 (1)

List: Complete analyte list

Sample ID:

REAGENT BLANK

REAGENT BLANK

Factor:

1

1

Results in:

ug/L

ug/L

09B

09C

Matrix:

water

water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Benzene	ND	0.20	ND	0.20				
Chlorobenzene	ND	0.20	ND	0.20				
1,2-Dichlorobenzene	ND	0.40	ND	0.40				
1,3-Dichlorobenzene	ND	0.40	ND	0.40				
1,4-Dichlorobenzene	ND	0.30	ND	0.30				
Ethylbenzene	ND	0.20	ND	0.20				
Toluene	ND	0.20	ND	0.20				
Xylenes (total)	ND	0.20	ND	0.20				
<u>Surrogate Recovery(%)</u>								
1-Bromo-4-fluorobenzene	100		102					
Control Limits: 40 to 140								

ND Not detected at specified detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-04-013

Sample Identifications and Dates

Sample ID	9004021055	9004021130	9004021145	9004021245	9004021255	9004021430
	/GRW-3	/GRW-4	/GRW-6	/STRIPPER INFL	/STRIPPER EFFL	/GRW-13
Date Sampled	04/02/90	04/02/90	04/02/90	04/02/90	04/02/90	04/02/90
Date Received	04/03/90	04/03/90	04/03/90	04/03/90	04/03/90	04/03/90
Matrix	water	water	water	water	water	water
	01	02	03	04	05	06

Halocarbons by SW8010

	9004021055	9004021130	9004021145	9004021245	9004021255	9004021430
Prepared						
Analyzed	04/06/90	04/08/90	04/05/90	04/05/90	04/05/90	04/05/90
Analyst	MG	MG	MG	MG	MG	MG
File ID	DB04065	DB04084	DB040512	DB040513	DB040514	DB040515
Blank ID	QB04061	QB04081	QB04051	QB04051	QB04051	QB04051
Instrument	B	B	B	B	B	B
Report as	received	received	received	received	received	received

Aromatics by SW8020

	9004021055	9004021130	9004021145	9004021245	9004021255	9004021430
Prepared						
Analyzed	04/06/90	04/08/90	04/05/90	04/05/90	04/05/90	04/05/90
Analyst	MG	MG	MG	MG	MG	MG
File ID	EB04065	EB04084	EB040512	EB040513	EB040514	EB040515
Blank ID	RB04061	RB04081	RB04051	RB04051	RB04051	RB04051
Instrument	B	B	B	B	B	B
Report as	received	received	received	received	received	received

Giant Refining Company
 Radian Work Order: S0-04-013

Sample Identifications and Dates

Sample ID	TRIP BLANK #2	REAGENT BLANK	REAGENT BLANK
Date Sampled	04/02/90		
Date Received	04/03/90	04/03/90	04/03/90
Matrix	water	water	water
	07	08	09

Halocarbons by SW8010

Prepared		
Analyzed	04/05/90	04/05/90
Analyst	MG	MG
File ID	DB040516	QB04051
Blank ID	QB04051	
Instrument	B	B
Report as	received	received

Halocarbons by SW8010

Prepared		
Analyzed		04/08/90
Analyst		MG
File ID		QB04081
Blank ID		
Instrument		B
Report as		received

Halocarbons by SW8010

Prepared		
Analyzed		04/06/90
Analyst		MG
File ID		QB04061
Blank ID		
Instrument		B
Report as		received

Aromatics by SW8020

Prepared		
Analyzed	04/05/90	04/05/90
Analyst	MG	MG
File ID	EB040516	RB04051
Blank ID	RB04051	
Instrument	B	B
Report as	received	received

Aromatics by SW8020

Prepared		
Analyzed		04/06/90
Analyst		MG
File ID		RB04061
Blank ID		
Instrument		B
Report as		received

Giant Refining Company
 Radian Work Order: S0-04-013

Sample Identifications and Dates

Sample ID	TRIP BLANK #2	REAGENT BLANK	REAGENT BLANK
Date Sampled	04/02/90		
Date Received	04/03/90	04/03/90	04/03/90
Matrix	07	08	water 09

Aromatics by SW8020

Prepared

Analyzed

Analyst

File ID

Blank ID

Instrument

Report as

04/08/90

MG

RB04081

B

received

Appendix A

Comments, Notes and Definitions

Giant Refining Company
Radian Work Order: S0-04-013

General Comments

SAMPLE 9004021130 SURROGATE RECOVERY OUT OF QC LIMITS DUE TO
MATRIX INTERFERENCES.

Giant Refining Company
Radian Work Order: S0-04-013

- Q** ALL METHODS EXCEPT CLP
The results which are less than five times the method specified detection limit.
EXPLANATION
Uncertainty of the analysis will increase as the method detection limit is approached. These results should be considered approximate.
- C** ORGANIC CLP
pesticides require that single component results > 10ng/uL in the final extract be confirmed by GC/MS.
OTHER ORGANIC METHODS
This analysis has been confirmed on a second column or by GC/MS.
EXPLANATION
Most methods of analysis by gas chromatography recommend reanalysis on a second column of dissimilar phase to resolve compounds of interest from interferences that may occur and for analyte confirmation.
- ND** ALL METHODS EXCEPT CLP
This flag is used to denote analytes which are not detected at or above the specified detection limit.
EXPLANATION
The value to the right of the < symbol is the method specified detection limit for the analyte.
- Q** ALL METHODS EXCEPT CLP
This quality control standard is outside method or laboratory specified control limits.
EXPLANATION
This flag is applied to matrix spike, analytical QC spike, and surrogate recoveries; and to RPD(relative percent difference) values for duplicate analyses and matrix spike/matrix spike duplicate result.

Giant Refining Company
Radian Work Order: SO-04-013

TERMS USED IN THIS REPORT:

Analyte - A chemical for which a sample is to be analyzed. The analysis will meet EPA method and QC specifications.

Compound - See Analyte.

Detection Limit - The method specified detection limit, which is the lower limit of quantitation specified by EPA for a method. Radian staff regularly assess their laboratories' method detection limits to verify that they meet or are lower than those specified by EPA. Detection limits which are higher than method limits are based on experimental values at the 99% confidence level. The detection limits for EPA CLP (Contract Laboratory Program) methods are CRQLs (contract required quantitation limits) for organics and CRDLs (contract required detection limits) for inorganics. Note, the detection limit may vary from that specified by EPA based on sample size, dilution or cleanup. (Refer to Factor, below)

EPA Method - The EPA specified method used to perform an analysis. EPA has specified standard methods for analysis of environmental samples. Radian will perform its analyses and accompanying QC tests in conformance with EPA methods unless otherwise specified.

Factor - Default method detection limits are based on analysis of clean water samples. A factor is required to calculate sample specific detection limits based on alternate matrices (soil or water), reporting units, use of cleanup procedures, or dilution of extracts/digestates. For example, extraction or digestion of 10 grams of soil in contrast to 1 liter of water will result in a factor of 100.

Matrix - The sample material. Generally, it will be soil, water, air, oil, or solid waste.

Radian Work Order - The unique Radian identification code assigned to the samples reported in the analytical summary.

Units - ug/L	micrograms per liter (parts per billion); liquids/water
ug/kg	micrograms per kilogram (parts per billion); soils/solids
ug/M3	micrograms per cubic meter; air samples
mg/L	milligrams per liter (parts per million); liquids/water
mg/kg	milligrams per kilogram (parts per million); soils/solids
%	percent; usually used for percent recovery of QC standards
uS/cm	conductance unit; microSiemens/centimeter
mL/hr	milliliters per hour; rate of settlement of matter in water
NTU	turbidity unit; nephelometric turbidity unit
CU	color unit; equal to 1 mg/L of chloroplatinate salt

Radian Work Order S0-05-045

Analytical Report
05/06/90

Giant Refining Company

Giant Refining Company
606 E. Highway 64
Farmington, NM 87401

Tim Kinney

Customer Work Identification REFINERY
Purchase Order Number RFE-9003-39

Contents:

- 1 Analytical Data Summary
- 2 Sample History
- 3 Comments Summary
- 4 Notes and Definitions

Radian Analytical Services
10395 Old Placerville Road
Sacramento, CA 95827

916-362-5332

Client Services Coordinator: WLBROWN

Certified by: *Rand N. Hale*

Previously Reported on 04/19/90.

Giant Refining Company
 Radian Work Order: SO-05-045

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	9004041025	9004041120	TRIP BLANK	REAGENT BLANK
	/GBR-33	/GBR-31		
Factor:	1	1	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
	01A	02A	06A	07A
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Bromodichloromethane	ND	0.10	ND	0.10	ND	0.10	ND	0.10
Bromoform	ND	0.50	ND	0.50	ND	0.50	ND	0.50
Bromomethane	ND	1.2	ND	1.2	ND	1.2	ND	1.2
Carbon tetrachloride	ND	0.12	ND	0.12	ND	0.12	ND	0.12
Chlorobenzene	ND	0.25	ND	0.25	ND	0.25	ND	0.25
Chloroethane	ND	0.52	ND	0.52	ND	0.52	ND	0.52
2-Chloroethylvinylether	ND	0.50	ND	0.50	ND	0.50	ND	0.50
Chloroform	ND	0.10	ND	0.10	ND	0.10	ND	0.10
Chloromethane	ND	0.30	ND	0.30	ND	0.30	ND	0.30
Dibromochloromethane	ND	0.20	ND	0.20	ND	0.20	ND	0.20
1,2-Dichlorobenzene	ND	0.50	ND	0.50	ND	0.50	ND	0.50
1,3-Dichlorobenzene	ND	0.32	ND	0.32	ND	0.32	ND	0.32
1,4-Dichlorobenzene	ND	0.24	ND	0.24	ND	0.24	ND	0.24
1,1-Dichloroethane	1.3 ca	0.50	ND	0.50	ND	0.50	ND	0.50
1,2-Dichloroethane	0.21 ca	0.10	1.0 C	0.10	ND	0.10	ND	0.10
1,1-Dichloroethene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
cis-1,2-Dichloroethene	12 C	0.20	6.2 C	0.20	ND	0.20	ND	0.20
trans-1,2-Dichloroethene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
1,2-Dichloropropane	ND	0.10	ND	0.10	ND	0.10	ND	0.10
cis-1,3-Dichloropropene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
trans-1,3-Dichloropropene	ND	0.34	ND	0.34	ND	0.34	ND	0.34
Methylene chloride	ND	0.40	ND	0.40	ND	0.40	ND	0.40
1,1,2,2-Tetrachloroethane	ND	0.15	ND	0.15	ND	0.15	ND	0.15
Tetrachloroethene	2.5 C	0.10	0.64 C	0.10	ND	0.10	ND	0.10
1,1,1-Trichloroethane	0.24 ca	0.20	ND	0.20	ND	0.20	ND	0.20
1,1,2-Trichloroethane	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Trichloroethene	1.1 C	0.20	0.86 ca	0.20	ND	0.20	ND	0.20
Trichlorofluoromethane	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Vinyl chloride	ND	0.20	ND	0.20	ND	0.20	ND	0.20

 ND Not detected at specified detection limit
 ca Est. result less than 5 times detection limit

C Confirmed on second column or by GC/MS

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-05-045

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	9004041025 /GBR-33	9004041120 /GBR-31	TRIP BLANK	REAGENT BLANK
Factor:	1	1	1	1
Results in:	ug/L 01A	ug/L 02A	ug/L 06A	ug/L 07A
Matrix:	water	water	water	water

	Result Det. Limit	Result Det. Limit	Result Det. Limit	Result Det. Limit
<u>Surrogate Recovery(%)</u>				
1-Bromo-4-fluorobenzene	128	117	125	132
Control Limits: 40 to 140				

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-05-045

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID: REAGENT BLANK

Factor: 1

Results in: ug/L

078

Matrix: water

	Result	Det. Limit
Bromodichloromethane	ND	0.10
Bromoform	ND	0.50
Bromomethane	ND	1.2
Carbon tetrachloride	ND	0.12
Chlorobenzene	ND	0.25
Chloroethane	ND	0.52
2-Chloroethylvinylether	ND	0.50
Chloroform	ND	0.10
Chloromethane	ND	0.30
Dibromochloromethane	ND	0.20
1,2-Dichlorobenzene	ND	0.50
1,3-Dichlorobenzene	ND	0.32
1,4-Dichlorobenzene	ND	0.24
1,1-Dichloroethane	ND	0.50
1,2-Dichloroethane	ND	0.10
1,1-Dichloroethene	ND	0.20
cis-1,2-Dichloroethene	ND	0.20
trans-1,2-Dichloroethene	ND	0.20
1,2-Dichloropropane	ND	0.10
cis-1,3-Dichloropropene	ND	0.20
trans-1,3-Dichloropropene	ND	0.34
Methylene chloride	ND	0.40
1,1,2,2-Tetrachloroethane	ND	0.15
Tetrachloroethene	ND	0.10
1,1,1-Trichloroethane	ND	0.20
1,1,2-Trichloroethane	ND	0.20
Trichloroethene	ND	0.20
Trichlorofluoromethane	ND	0.20
Vinyl chloride	ND	0.20

ND Not detected at specified detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-05-045

Method: Halocarbons by SW8010 (1)
 List: Table 3 analyte list
 Sample ID: REAGENT BLANK
 Factor: 1
 Results in: ug/L
 07B
 Matrix: water

	Result	Det. Limit		
<u>Surrogate Recovery(%)</u>				
1-Bromo-4-fluorobenzene	119			
Control Limits: 40 to 140				

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-05-045

Method: Aromatics by SW8020 (1)

List: Complete analyte list

Sample ID:	9004041025	9004041120	TRIP BLANK	REAGENT BLANK
	/GBR-33	/GBR-31		
Factor:	1	1	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
	01C	02C	06A	08A
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Benzene	ND	0.20	0.98 C ^a	0.20	ND	0.20	ND	0.20
Chlorobenzene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
1,2-Dichlorobenzene	ND	0.40	ND	0.40	ND	0.40	ND	0.40
1,3-Dichlorobenzene	ND	0.40	ND	0.40	ND	0.40	ND	0.40
1,4-Dichlorobenzene	ND	0.30	ND	0.30	ND	0.30	ND	0.30
Ethylbenzene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Toluene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
Xylenes (total)	ND	0.20	6.0 C	0.20	ND	0.20	ND	0.20
Surrogate Recovery(%)								
1-Bromo-4-fluorobenzene	98		29 Q		100		101	
Control Limits: 40 to 140								

ND Not detected at specified detection limit

C Confirmed on second column or by GC/MS

^a Est. result less than 5 times detection limit

Q Outside control limits

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-05-045

Method: Aromatics by SW8020 (1)

List: Complete analyte list

Sample ID: REAGENT BLANK

Factor: 1

Results in: ug/L

088

Matrix: water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Benzene	ND	0.20						
Chlorobenzene	ND	0.20						
1,2-Dichlorobenzene	ND	0.40						
1,3-Dichlorobenzene	ND	0.40						
1,4-Dichlorobenzene	ND	0.30						
Ethylbenzene	ND	0.20						
Toluene	ND	0.20						
Xylenes (total)	ND	0.20						
Surrogate Recovery(%)								
1-Bromo-4-fluorobenzene	98							
Control Limits: 40 to 140								

ND Not detected at specified detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-05-045

Sample Identifications and Dates

Sample ID	9004041025 /GBR-33	9004041120 /GBR-31	TRIP BLANK	REAGENT BLANK	REAGENT BLANK
Date Sampled	04/04/90	04/04/90			
Date Received	04/05/90	04/05/90	04/05/90	04/05/90	04/05/90
Matrix	water 01	water 02	water 06	water 07	water 08

Halocarbons by SW8010

Prepared				
Analyzed	04/07/90	04/10/90	04/07/90	04/07/90
Analyst	MG	MG	MG	MG
File ID	DB040710	DB04105	DB04079	QB04071
Blank ID	QB04071	QB04101	QB04071	
Instrument	B	B	B	B
Report as	received	received	received	received

Halocarbons by SW8010

Prepared				
Analyzed				04/10/90
Analyst				MG
File ID				QB04101
Blank ID				
Instrument				B
Report as				received

Aromatics by SW8020

Prepared				
Analyzed	04/07/90	04/10/90	04/07/90	04/07/90
Analyst	MG	MG	MG	MG
File ID	EB040710	EB04105	EB04079	RB04071
Blank ID	RB04071	RB04101	RB04071	
Instrument	B	B	B	B
Report as	received	received	received	received

Aromatics by SW8020

Prepared				
Analyzed				04/10/90
Analyst				MG
File ID				RB04101
Blank ID				
Instrument				B
Report as				received

Appendix A

Comments, Notes and Definitions

Giant Refining Company
Radian Work Order: S0-05-045

General Comments

Sample 9004041120 had low surrogate recovery due to matrix interference with the internal standard.

Giant Refining Company
Radian Work Order: S0-05-045

Q ALL METHODS EXCEPT CLP

The results which are less than five times the method specified detection limit.

EXPLANATION

Uncertainty of the analysis will increase as the method detection limit is approached. These results should be considered approximate.

C ORGANIC CLP

pesticides require that single component results > 10ng/uL in the final extract be confirmed by GC/MS.

OTHER ORGANIC METHODS

This analysis has been confirmed on a second column or by GC/MS.

EXPLANATION

Most methods of analysis by gas chromatography recommend reanalysis on a second column of dissimilar phase to resolve compounds of interest from interferences that may occur and for analyte confirmation.

ND ALL METHODS EXCEPT CLP

This flag is used to denote analytes which are not detected at or above the specified detection limit.

EXPLANATION

The value to the right of the < symbol is the method specified detection limit for the analyte.

Q ALL METHODS EXCEPT CLP

This quality control standard is outside method or laboratory specified control limits.

EXPLANATION

This flag is applied to matrix spike, analytical QC spike, and surrogate recoveries; and to RPD(relative percent difference) values for duplicate analyses and matrix spike/matrix spike duplicate result.

Giant Refining Company
Radian Work Order: S0-05-045

TERMS USED IN THIS REPORT:

Analyte - A chemical for which a sample is to be analyzed. The analysis will meet EPA method and QC specifications.

Compound - See Analyte.

Detection Limit - The method specified detection limit, which is the lower limit of quantitation specified by EPA for a method. Radian staff regularly assess their laboratories' method detection limits to verify that they meet or are lower than those specified by EPA. Detection limits which are higher than method limits are based on experimental values at the 99% confidence level. The detection limits for EPA CLP (Contract Laboratory Program) methods are CRQLs (contract required quantitation limits) for organics and CRDLs (contract required detection limits) for inorganics. Note, the detection limit may vary from that specified by EPA based on sample size, dilution or cleanup. (Refer to Factor, below)

EPA Method - The EPA specified method used to perform an analysis. EPA has specified standard methods for analysis of environmental samples. Radian will perform its analyses and accompanying QC tests in conformance with EPA methods unless otherwise specified.

Factor - Default method detection limits are based on analysis of clean water samples. A factor is required to calculate sample specific detection limits based on alternate matrices (soil or water), reporting units, use of cleanup procedures, or dilution of extracts/digestates. For example, extraction or digestion of 10 grams of soil in contrast to 1 liter of water will result in a factor of 100.

Matrix - The sample material. Generally, it will be soil, water, air, oil, or solid waste.

Radian Work Order - The unique Radian identification code assigned to the samples reported in the analytical summary.

Units - ug/L	micrograms per liter (parts per billion); liquids/water
ug/kg	micrograms per kilogram (parts per billion); soils/solids
ug/M3	micrograms per cubic meter; air samples
mg/L	milligrams per liter (parts per million); liquids/water
mg/kg	milligrams per kilogram (parts per million); soils/solids
%	percent; usually used for percent recovery of QC standards
uS/cm	conductance unit; microSiemens/centimeter
mL/hr	milliliters per hour; rate of settlement of matter in water
NTU	turbidity unit; nephelometric turbidity unit
CU	color unit; equal to 1 mg/L of chloroplatinate salt

Radian Work Order 90-04-031

Analytical Report
05/03/90

Giant Refining Co.

Giant Refining Co.
606 E. Highway 64
Farmington, NM 87401

Tim Kinney

Customer Work Identification Refinery
Purchase Order Number RFE-9834

Contents:

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- 2 Sample History
- 3 Comments Summary
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Radian Analytical Services
8501 Mo-Pac Boulevard
P. O. Box 201088
Austin, TX 78720-1088

512/454-4797

Client Services Coordinator: WLBROWN

Certified by:

Clifford Wagon

Giant Refining Co.
 Radian Work Order: 90-04-031

Method: SW8310 PAHs by HPLC (1)

List: 8310 Method analytes

Sample ID:	9004021055	9004021130	9004021145	9004021245
	GRW-3	GRW-4	GRW-6	STRIP INFLUE
Factor:	9.4	0.94	4.7	4.8
Results in:	ug/L	ug/L	ug/L	ug/L
	01A	02A	03A	04A
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Acenaphthalene	ND	22	ND	2.3	ND	11	ND	11
Acenaphthene	ND	17	ND	1.8	ND	8.5	ND	8.6
Anthracene	ND	6.2	ND	0.66	ND	3.1	ND	3.2
Benzo(a)anthracene	ND	0.12	ND	0.013	ND	0.061	ND	0.062
Benzo(a)pyrene	ND	0.22	ND	0.023	ND	0.11	ND	0.11
Benzo(b)fluoranthene	ND	0.17	ND	0.018	ND	0.085	ND	0.086
Benzo(g,h,i)perylene	ND	0.71	ND	0.076	ND	0.36	ND	0.36
Benzo(k)fluoranthene	ND	0.16	ND	0.017	ND	0.080	ND	0.082
Chrysene	ND	0.12	ND	0.013	ND	0.061	ND	0.062
Dibenzo(a,h)anthracene	ND	0.28	ND	0.030	ND	0.14	ND	0.14
Fluoranthene	ND	2.0	ND	0.21	ND	0.99	ND	1.0
Fluorene	6.7 *	2.0	ND	0.21	2.8 *	0.99	2.2 *	1.0
Indeno(1,2,3-cd)pyrene	ND	0.40	ND	0.043	ND	0.20	ND	0.21
Naphthalene	ND	17	ND	1.8	ND	8.5	ND	8.6
Phenanthrene	7.3 *	6.0	ND	0.64	ND	3.0	3.3 *	3.1
Pyrene	ND	2.5	ND	0.27	ND	1.3	ND	1.3
Surrogate Recovery(%)								
Terphenyl-d14	221 Q		4 Q		89		87	
Control Limits: 24 to 146								

ND Not detected at specified detection limit

* Est. result less than 5 times detection limit

Q Outside control limits

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Co.
 Radian Work Order: 90-04-031

Method: SW8310 PAHs by HPLC (1)

List: 8310 Method analytes

Sample ID:	9004021255	9004021215	REAGENT BLANK
	STRIP EFFLUE	GRW-13	
Factor:	4.7	0.94	1
Results in:	ug/L	ug/L	ug/L
	05A	06A	07A
Matrix:	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Acenaphthalene	ND	11	ND	2.2	ND	2.3		
Acenaphthene	ND	8.5	ND	1.7	ND	1.8		
Anthracene	ND	3.1	ND	0.62	ND	0.66		
Benzo(a)anthracene	ND	0.061	ND	0.012	ND	0.013		
Benzo(a)pyrene	ND	0.11	ND	0.022	ND	0.023		
Benzo(b)fluoranthene	ND	0.085	ND	0.017	ND	0.018		
Benzo(g,h,i)perylene	ND	0.36	ND	0.071	ND	0.076		
Benzo(k)fluoranthene	ND	0.080	ND	0.016	ND	0.017		
Chrysene	ND	0.061	ND	0.012	ND	0.013		
Dibenzo(a,h)anthracene	ND	0.14	ND	0.028	ND	0.030		
Fluoranthene	ND	0.99	ND	0.20	ND	0.21		
Fluorene	ND	0.99	ND	0.20	ND	0.21		
Indeno(1,2,3-cd)pyrene	ND	0.20	ND	0.040	ND	0.043		
Naphthalene	ND	8.5	ND	1.7	ND	1.8		
Phenanthrene	ND	3.0	ND	0.60	ND	0.64		
Pyrene	ND	1.3	ND	0.25	ND	0.27		
Surrogate Recovery(%)								
Terphenyl-d14	86		54		62			
Control Limits: 24 to 146								

ND Not detected at specified detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Co.
 Radian Work Order: 90-04-031

Method: SW8310 PAHs by HPLC (1)

List: Matrix Spike Analyte List

Sample ID:	RECOVERY CHECK	RECOVERY CHECK- K DUP
Factor:	1	1
Results in:	%	%
	08A	09A
Matrix:	water	water

	Result	Det. Limit	Result	Det. Limit
Acenaphthalene	77		80	
Acenaphthene	82		78	
Anthracene	98		95	
Benzo(k)fluoranthene	98		95	
Dibenzo(a,h)anthracene	100		97	
Fluorene	98		94	
Naphthalene	138		140	
Phenanthrene	117		118	
Surrogate Recovery(%)				
Terphenyl-d14	87		86	
Control Limits: 24 to 146				

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Co.
 Radian Work Order: 90-04-031

Sample Identifications and Dates

Sample ID	9004021055	9004021130	9004021145	9004021245	9004021255	9004021215
	GRW-3	GRW-4	GRW-6	STRIP INFLUE	STRIP EFFLUE	GRW-13
Date Sampled	04/02/90	04/02/90	04/02/90	04/02/90	04/02/90	04/02/90
Date Received	04/04/90	04/04/90	04/04/90	04/04/90	04/04/90	04/04/90
Matrix	water	water	water	water	water	water
	01	02	03	04	05	06

SW8310 PAHs by HPLC

	9004021055	9004021130	9004021145	9004021245	9004021255	9004021215
Prepared	04/05/90	04/05/90	04/05/90	04/05/90	04/05/90	04/05/90
Analyzed	05/01/90	05/01/90	05/01/90	05/01/90	05/01/90	05/01/90
Analyst	TLS	TLS	TLS	TLS	TLS	TLS
File ID	658 & 371	655 & 368	660 & 373	661 & 374	662 & 375	664 & 377
Blank ID	628 & 340	628 & 340	628 & 340	628 & 340	628 & 340	628 & 340
Instrument	HPLC 2	HPLC 2	HPLC 2	HPLC 2	HPLC 2	HPLC 2
Report as	received	received	received	received	received	received

Giant Refining Co.
 Radian Work Order: 90-04-031

Sample Identifications and Dates

Sample ID	REAGENT BLANK	RECOVERY CHECK	RECOVERY CHECK	K DUP		
Date Sampled						
Date Received	04/04/90	04/04/90	04/04/90			
Matrix	water	water	water			
	07	08	09			
SW8310 PAHs by HPLC						
Prepared	04/05/90					
Analyzed	05/01/90					
Analyst	TLS					
File ID	628 & 340					
Blank ID	628 & 340					
Instrument	HPLC 2					
Report as	received					
SW8310 PAHs by HPLC						
Prepared		04/05/90	04/05/90			
Analyzed		05/02/90	05/01/90			
Analyst		TLS	TLS			
File ID		674 & 4	652 & 365			
Blank ID		628 & 340	628 & 340			
Instrument		HPLC 2	HPLC 2			
Report as		received	received			

Appendix A

Comments, Notes and Definitions

Giant Refining Co.
Radian Work Order: 90-04-031

- ND This flag (or <) is used to denote analytes which are not detected at or above the specified detection limit. The value to the right of the < symbol is the method specified detection limit for the sample.
- Q This quality control standard is outside method or laboratory specified control limits. This flag is applied to matrix spike, analytical QC spike, and surrogate recoveries; and to RPD(relative percent difference) values for duplicate analyses and matrix spike/matrix spike duplicate result.
- * The asterisk(*) is used to flag results which are less than five times the method specified detection limit. Studies have shown that the uncertainty of the analysis will increase exponentially as the method detection limit is approached. These results should be considered approximate.

Giant Refining Co.
Radian Work Order: 90-04-031

TERMS USED IN THIS REPORT:

Analyte - A chemical for which a sample is to be analyzed. The analysis will meet EPA method and QC specifications.

Compound - See Analyte.

Detection Limit - The method specified detection limit, which is the lower limit of quantitation specified by EPA for a method. Radian staff regularly assess their laboratories' method detection limits to verify that they meet or are lower than those specified by EPA. Detection limits which are higher than method limits are based on experimental values at the 99% confidence level. The detection limits for EPA CLP (Contract Laboratory Program) methods are CRQLs (contract required quantitation limits) for organics and CRDLs (contract required detection limits) for inorganics. Note, the detection limit may vary from that specified by EPA based on sample size, dilution or cleanup. (Refer to Factor, below)

EPA Method - The EPA specified method used to perform an analysis. EPA has specified standard methods for analysis of environmental samples. Radian will perform its analyses and accompanying QC tests in conformance with EPA methods unless otherwise specified.

Factor - Default method detection limits are based on analysis of clean water samples. A factor is required to calculate sample specific detection limits based on alternate matrices (soil or water), reporting units, use of cleanup procedures, or dilution of extracts/digestates. For example, extraction or digestion of 10 grams of soil in contrast to 1 liter of water will result in a factor of 100.

Matrix - The sample material. Generally, it will be soil, water, air, oil, or solid waste.

Radian Work Order - The unique Radian identification code assigned to the samples reported in the analytical summary.

Units - ug/L	micrograms per liter (parts per billion); liquids/water
ug/kg	micrograms per kilogram (parts per billion); soils/solids
ug/M3	micrograms per cubic meter; air samples
mg/L	milligrams per liter (parts per million); liquids/water
mg/kg	milligrams per kilogram (parts per million); soils/solids
%	percent; usually used for percent recovery of QC standards
uS/cm	conductance unit; microSiemens/centimeter
mL/hr	milliliters per hour; rate of settlement of matter in water
NTU	turbidity unit; nephelometric turbidity unit
CU	color unit; equal to 1 mg/L of chloroplatinate salt

Radian Work Order 90-04-043

Analytical Report
05/03/90

Giant Refining Co.

Giant Refining Co.
606 E. Highway 64
Farmington, NM 87401

Tim Kinney

Customer Work Identification Refinery
Purchase Order Number RFE-9834

Contents:

- 1 Analytical Data Summary
- 2 Sample History
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Radian Analytical Services
8501 Mo-Pac Boulevard
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Austin, TX 78720-1088

512/454-4797

Client Services Coordinator: WLBROWN

Certified by:

Clifford Meyer

Giant Refining Co.
 Radian Work Order: 90-04-043

Method: SW8310 PAHs by HPLC (1)

List: 8310 Method analytes

Sample ID:	9004031005	9004031109	9004031150	9004031359
	GBR-17	GBR-30	GBR-24D	GBR-15
Factor:	0.94	9.6	4.7	0.94
Results in:	ug/L	ug/L	ug/L	ug/L
	01A	02A	03A	04A
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Acenaphthalene	ND	2.2	ND	22	ND	11	ND	2.2
Acenaphthene	ND	1.7	ND	17	ND	8.5	ND	1.7
Anthracene	ND	0.62	ND	6.3	ND	3.1	ND	0.62
Benzo(a)anthracene	ND	0.012	ND	0.12	ND	0.061	ND	0.012
Benzo(a)pyrene	ND	0.022	ND	0.22	ND	0.11	ND	0.022
Benzo(b)fluoranthene	ND	0.017	ND	0.17	ND	0.085	ND	0.017
Benzo(g,h,i)perylene	ND	0.071	ND	0.73	ND	0.36	ND	0.071
Benzo(k)fluoranthene	ND	0.016	ND	0.16	ND	0.080	ND	0.016
Chrysene	ND	0.012	ND	0.12	ND	0.061	ND	0.012
Dibenzo(a,h)anthracene	ND	0.028	ND	0.29	ND	0.14	ND	0.028
Fluoranthene	ND	0.20	ND	2.0	ND	0.99	ND	0.20
Fluorene	ND	0.20	2.8 *	2.0	2.0 *	0.99	0.35 *	0.20
Indeno(1,2,3-cd)pyrene	ND	0.040	ND	0.41	ND	0.20	ND	0.040
Naphthalene	ND	1.7	ND	17	ND	8.5	ND	1.7
Phenanthrene	ND	0.60	ND	6.1	ND	3.0	ND	0.60
Pyrene	ND	0.25	ND	2.6	ND	1.3	ND	0.25
Surrogate Recovery(%)								
Terphenyl-d14	54		234 Q		69		72	
Control Limits: 24 to 146								

 ND Not detected at specified detection limit
 Q Outside control limits

* Est. result less than 5 times detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Co.
 Radian Work Order: 90-04-043

Method: SW8310 PAHs by HPLC (1)

List: 8310 Method analytes

Sample ID:

REAGENT BLANK

Factor:

1

Results in:

ug/L

05A

Matrix:

water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Acenaphthalene	ND	2.3						
Acenaphthene	ND	1.8						
Anthracene	ND	0.66						
Benzo(a)anthracene	ND	0.013						
Benzo(a)pyrene	ND	0.023						
Benzo(b)fluoranthene	ND	0.018						
Benzo(g,h,i)perylene	ND	0.076						
Benzo(k)fluoranthene	ND	0.017						
Chrysene	ND	0.013						
Dibenzo(a,h)anthracene	ND	0.030						
Fluoranthene	ND	0.21						
Fluorene	ND	0.21						
Indeno(1,2,3-cd)pyrene	ND	0.043						
Naphthalene	ND	1.8						
Phenanthrene	ND	0.64						
Pyrene	ND	0.27						
<u>Surrogate Recovery(%)</u>								
Terphenyl-d14	62							
Control Limits: 24 to 146								

ND Not detected at specified detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Co.
 Radian Work Order: 90-04-043

Sample Identifications and Dates

Sample ID	9004031005	9004031109	9004031150	9004031359	REAGENT BLANK
	GBR-17	GBR-30	GBR-24D	GBR-15	
Date Sampled	04/03/90	04/03/90	04/03/90	04/03/90	
Date Received	04/05/90	04/05/90	04/05/90	04/05/90	04/05/90
Matrix	water	water	water	water	water
	01	02	03	04	05

SW8310 PAHs by HPLC					
Prepared	04/05/90	04/05/90	04/05/90	04/05/90	04/05/90
Analyzed	05/01/90	05/01/90	05/01/90	05/01/90	05/01/90
Analyst	TLS	TLS	TLS	TLS	TLS
File ID	665 & 378	667 & 380	668 & 381	669 & 382	628 & 340
Blank ID	628 & 340	628 & 340	628 & 340	628 & 340	628 & 340
Instrument	HPLC 2	HPLC 2	HPLC 2	HPLC 2	HPLC 2
Report as	received	received	received	received	received

Appendix A

Comments, Notes and Definitions

Giant Refining Co.
Radian Work Order: 90-04-043

- ND This flag (or <) is used to denote analytes which are not detected at or above the specified detection limit. The value to the right of the < symbol is the method specified detection limit for the sample.
- Q This quality control standard is outside method or laboratory specified control limits. This flag is applied to matrix spike, analytical QC spike, and surrogate recoveries; and to RPD(relative percent difference) values for duplicate analyses and matrix spike/matrix spike duplicate result.
- * The asterisk(*) is used to flag results which are less than five times the method specified detection limit. Studies have shown that the uncertainty of the analysis will increase exponentially as the method detection limit is approached. These results should be considered approximate.

Giant Refining Co.
Radian Work Order: 90-04-043

TERMS USED IN THIS REPORT:

Analyte - A chemical for which a sample is to be analyzed. The analysis will meet EPA method and QC specifications.

Compound - See Analyte.

Detection Limit - The method specified detection limit, which is the lower limit of quantitation specified by EPA for a method. Radian staff regularly assess their laboratories' method detection limits to verify that they meet or are lower than those specified by EPA. Detection limits which are higher than method limits are based on experimental values at the 99% confidence level. The detection limits for EPA CLP (Contract Laboratory Program) methods are CRQLs (contract required quantitation limits) for organics and CRDLs (contract required detection limits) for inorganics. Note, the detection limit may vary from that specified by EPA based on sample size, dilution or cleanup. (Refer to Factor, below)

EPA Method - The EPA specified method used to perform an analysis. EPA has specified standard methods for analysis of environmental samples. Radian will perform its analyses and accompanying QC tests in conformance with EPA methods unless otherwise specified.

Factor - Default method detection limits are based on analysis of clean water samples. A factor is required to calculate sample specific detection limits based on alternate matrices (soil or water), reporting units, use of cleanup procedures, or dilution of extracts/digestates. For example, extraction or digestion of 10 grams of soil in contrast to 1 liter of water will result in a factor of 100.

Matrix - The sample material. Generally, it will be soil, water, air, oil, or solid waste.

Radian Work Order - The unique Radian identification code assigned to the samples reported in the analytical summary.

Units - ug/L	micrograms per liter (parts per billion); liquids/water
ug/kg	micrograms per kilogram (parts per billion); soils/solids
ug/M3	micrograms per cubic meter; air samples
mg/L	milligrams per liter (parts per million); liquids/water
mg/kg	milligrams per kilogram (parts per million); soils/solids
%	percent; usually used for percent recovery of QC standards
uS/cm	conductance unit; microSiemens/centimeter
mL/hr	milliliters per hour; rate of settlement of matter in water
NTU	turbidity unit; nephelometric turbidity unit
CU	color unit; equal to 1 mg/L of chloroplatinate salt



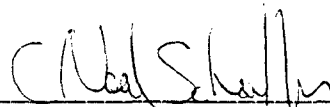
2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Giant Refinery
ID: GBR-30
SITE: GBR
LAB NO: F4089

DATE REPORTED: 04/17/90
DATE RECEIVED: 04/03/90
DATE COLLECTED: 04/03/90

Lab pH (s.u.).....	7.42
Lab Conductivity, umhos/cm.....	4526
Lab resistivity, ohm-m.....	2.2095
Total Dissolved Solids (180), mg/l..	3238
Total Dissolved Solids (calc), mg/l.	3096
Total Alkalinity as CaCO ₃ , mg/l.....	355.26
Total Acidity as CaCO ₃ , mg/l.....	0.00
Total Hardness as CaCO ₃ , mg/l.....	1184.72
Sodium Absorption Ratio.....	7.71

	mg/l	meq/l
Bicarbonate as HCO ₃	433.4	7.11
Carbonate as CO ₃	0.0	0.00
Chloride.....	527.9	14.89
Sulfate.....	1350.5	28.14
Calcium.....	265.3	13.24
Magnesium.....	127.1	10.46
Potassium.....	2.1	0.05
Sodium.....	610.0	26.53
Major Cations.....		50.28
Major Anions.....		50.13
Cation/Anion Difference.....		0.15 %


C. Neal Schaeffer
Lab Director



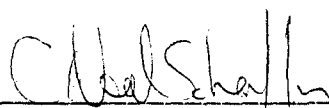
2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Giant Refinery
ID: GBR-24-D
SITE: GBR
LAB NO: F4090

DATE REPORTED: 04/17/90
DATE RECEIVED: 04/03/90
DATE COLLECTED: 04/03/90

Lab pH (s.u.).....	7.75
Lab Conductivity, umhos/cm.....	4699
Lab resistivity, ohm-m.....	2.1281
Total Dissolved Solids (180), mg/l..	3534
Total Dissolved Solids (calc), mg/l.	3106
Total Alkalinity as CaCO ₃ , mg/l.....	245.63
Total Acidity as CaCO ₃ , mg/l.....	0.00
Total Hardness as CaCO ₃ , mg/l.....	1586.32
Sodium Absorption Ratio.....	4.60

	mg/l	meq/l
Bicarbonate as HCO ₃	299.7	4.91
Carbonate as CO ₃	0.0	0.00
Chloride.....	548.3	15.47
Sulfate.....	1381.8	28.79
Calcium.....	551.6	27.53
Magnesium.....	51.1	4.20
Potassium.....	4.3	0.11
Sodium.....	421.4	18.33
Major Cations.....		50.17
Major Anions.....		49.17
Cation/Anion Difference.....		1.01 %


C. Neal Schaeffer
Lab Director



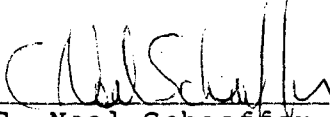
2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Giant Refinery
ID: GBR-15
SITE: GBR
LAB NO: F4091

DATE REPORTED: 04/17/90
DATE RECEIVED: 04/03/90
DATE COLLECTED: 04/03/90

Lab pH (s.u.).....	7.74
Lab Conductivity, umhos/cm.....	4840
Lab resistivity, ohm-m.....	2.0661
Total Dissolved Solids (180), mg/l..	3746
Total Dissolved Solids (calc), mg/l.	3699
Total Alkalinity as CaCO ₃ , mg/l.....	187.18
Total Acidity as CaCO ₃ , mg/l.....	0.00
Total Hardness as CaCO ₃ , mg/l.....	1124.48
Sodium Absorption Ratio.....	9.72

	mg/l	meq/l
Bicarbonate as HCO ₃	228.4	3.74
Carbonate as CO ₃	0.0	0.00
Chloride.....	355.4	10.02
Sulfate.....	2029.5	42.28
Calcium.....	433.7	21.64
Magnesium.....	10.3	0.85
Potassium.....	9.3	0.24
Sodium.....	749.0	32.58
Major Cations.....	55.31	
Major Anions.....	56.05	
Cation/Anion Difference.....	0.67	%

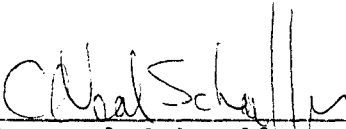

C. Neal Schaeffer
Lab Director

CLIENT: Giant Refinery
ID: GBR-17
SITE: GBR
LAB NO: F4088

DATE REPORTED: 04/17/90
DATE RECEIVED: 04/03/90
DATE COLLECTED: 04/03/90

Lab pH (s.u.).....	7.59
Lab Conductivity, umhos/cm.....	2928
Lab resistivity, ohm-m.....	3.4153
Total Dissolved Solids (180), mg/l..	2344
Total Dissolved Solids (calc), mg/l.	2258
Total Alkalinity as CaCO ₃ , mg/l.....	210.10
Total Acidity as CaCO ₃ , mg/l.....	0.00
Total Hardness as CaCO ₃ , mg/l.....	1052.19
Sodium Absorption Ratio.....	3.94

	mg/l	meq/l
Bicarbonate as HCO ₃	256.3	4.20
Carbonate as CO ₃	0.0	0.00
Chloride.....	111.3	3.14
Sulfate.....	1314.3	27.38
Calcium.....	393.7	19.65
Magnesium.....	17.0	1.40
Potassium.....	1.4	0.03
Sodium.....	293.8	12.78
Major Cations.....		33.86
Major Anions.....		34.72
Cation/Anion Difference.....		1.26 %

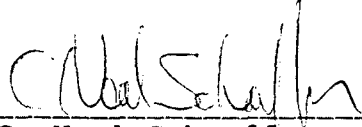

C. Neal Schaeffer
Lab Director

CLIENT: Giant Refinery
ID: GRW-3
SITE: GBR
LAB NO: F4078

DATE REPORTED: 04/13/90
DATE RECEIVED: 04/02/90
DATE COLLECTED: 04/02/90

Lab pH (s.u.).....	7.30
Lab Conductivity, umhos/cm.....	4548
Lab resistivity, ohm-m.....	2.1988
Total Dissolved Solids (180), mg/l..	3186
Total Dissolved Solids (calc), mg/l.	3115
Total Alkalinity as CaCO ₃ , mg/l.....	721.98
Total Acidity as CaCO ₃ , mg/l.....	0.00
Total Hardness as CaCO ₃ , mg/l.....	957.87
Sodium Absorption Ratio.....	9.70

	mg/l	meq/l
Bicarbonate as HCO ₃	880.8	14.44
Carbonate as CO ₃	0.0	0.00
Chloride.....	416.3	11.74
Sulfate.....	1218.0	25.38
Calcium.....	307.4	15.34
Magnesium.....	46.4	3.82
Potassium.....	3.6	0.09
Sodium.....	690.0	30.01
Major Cations.....		49.26
Major Anions.....		51.56
Cation/Anion Difference.....		2.28 %


C. Neal Schaeffer
Lab Director



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

CLIENT: Giant Refinery
ID: GRW-4
SITE: GBR
LAB NO: F4079

DATE REPORTED: 04/13/90
DATE RECEIVED: 04/02/90
DATE COLLECTED: 04/02/90

Lab pH (s.u.).....	7.32
Lab Conductivity, umhos/cm.....	5121
Lab resistivity, ohm-m.....	1.9527
Total Dissolved Solids (180), mg/l..	3636
Total Dissolved Solids (calc), mg/l.	3601
Total Alkalinity as CaCO ₃ , mg/l.....	855.68
Total Acidity as CaCO ₃ , mg/l.....	0.00
Total Hardness as CaCO ₃ , mg/l.....	1389.43
Sodium Absorption Ratio.....	8.38

	mg/l	meq/l
Bicarbonate as HCO ₃	1043.9	17.11
Carbonate as CO ₃	0.0	0.00
Chloride.....	556.7	15.70
Sulfate.....	1281.4	26.70
Calcium.....	484.3	24.16
Magnesium.....	44.1	3.62
Potassium.....	2.8	0.07
Sodium.....	718.5	31.25
Major Cations.....		59.11
Major Anions.....		59.51
Cation/Anion Difference.....		0.34 %

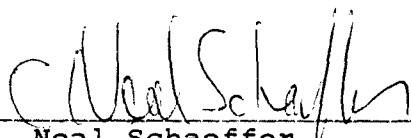

C. Neal Schaeffer
Lab Director

CLIENT: Giant Refinery
ID: GRW-6
SITE: GBR
LAB NO: F4080

DATE REPORTED: 04/13/90
DATE RECEIVED: 04/02/90
DATE COLLECTED: 04/02/90

Lab pH (s.u.).....	7.39
Lab Conductivity, umhos/cm.....	4818
Lab resistivity, ohm-m.....	2.0756
Total Dissolved Solids (180), mg/l..	3100
Total Dissolved Solids (calc), mg/l.	3075
Total Alkalinity as CaCO ₃ , mg/l.....	691.42
Total Acidity as CaCO ₃ , mg/l.....	0.00
Total Hardness as CaCO ₃ , mg/l.....	1221.02
Sodium Absorption Ratio.....	8.04

	mg/l	meq/l
Bicarbonate as HCO ₃	843.5	13.83
Carbonate as CO ₃	0.0	0.00
Chloride.....	811.5	22.89
Sulfate.....	737.4	15.36
Calcium.....	421.1	21.01
Magnesium.....	41.4	3.41
Potassium.....	2.3	0.06
Sodium.....	646.0	28.10
Major Cations.....		52.58
Major Anions.....		52.08
Cation/Anion Difference.....		0.47 %

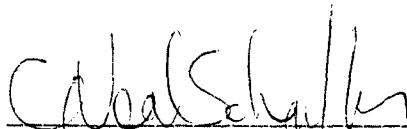

C. Neal Schaeffer
Lab Director

CLIENT: Giant Refinery
ID: GRW-13
SITE: GBR
LAB NO: F4081

DATE REPORTED: 04/13/90
DATE RECEIVED: 04/02/90
DATE COLLECTED: 04/02/90

Lab pH (s.u.).....	7.30
Lab Conductivity, umhos/cm.....	4699
Lab resistivity, ohm-m.....	2.1281
Total Dissolved Solids (180), mg/l..	3288
Total Dissolved Solids (calc), mg/l.	3258
Total Alkalinity as CaCO ₃ , mg/l.....	382.00
Total Acidity as CaCO ₃ , mg/l.....	0.00
Total Hardness as CaCO ₃ , mg/l.....	1273.65
Sodium Absorption Ratio.....	7.42

	mg/l	meq/l
Bicarbonate as HCO ₃	466.0	7.64
Carbonate as CO ₃	0.0	0.00
Chloride.....	639.6	18.04
Sulfate.....	1274.4	26.55
Calcium.....	492.7	24.59
Magnesium.....	10.8	0.89
Potassium.....	2.8	0.07
Sodium.....	608.5	26.47
Major Cations.....		52.01
Major Anions.....		52.23
Cation/Anion Difference.....		0.21 %


C. Neal Schaeffer
Lab Director



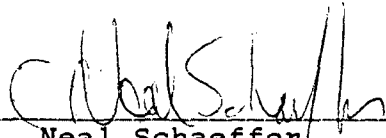
2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Giant Refinery
ID: GBR
SITE: Stripper Influent
LAB NO: F4082

DATE REPORTED: 04/13/90
DATE RECEIVED: 04/02/90
DATE COLLECTED: 04/02/90

Lab pH (s.u.).....	7.72
Lab Conductivity, umhos/cm.....	4764
Lab resistivity, ohm-m.....	2.0991
Total Dissolved Solids (180), mg/l..	3488
Total Dissolved Solids (calc), mg/l.	3388
Total Alkalinity as CaCO ₃ , mg/l.....	488.96
Total Acidity as CaCO ₃ , mg/l.....	0.00
Total Hardness as CaCO ₃ , mg/l.....	1305.22
Sodium Absorption Ratio.....	7.78

	mg/l	meq/l
Bicarbonate as HCO ₃	596.5	9.78
Carbonate as CO ₃	0.0	0.00
Chloride.....	477.2	13.46
Sulfate.....	1472.3	30.67
Calcium.....	454.8	22.69
Magnesium.....	41.5	3.41
Potassium.....	2.9	0.07
Sodium.....	645.9	28.09
Major Cations.....		54.27
Major Anions.....		53.91
Cation/Anion Difference.....		0.33 %

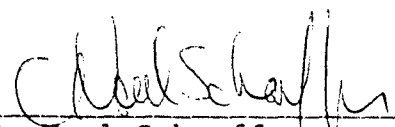

C. Neal Schaeffer
Lab Director

CLIENT: Giant Refinery
ID: GBR
SITE: Stripper Effluent
LAB NO: F4083

DATE REPORTED: 04/13/90
DATE RECEIVED: 04/02/90
DATE COLLECTED: 04/02/90

Lab pH (s.u.).....	8.11
Lab Conductivity, umhos/cm.....	4699
Lab resistivity, ohm-m.....	2.1281
Total Dissolved Solids (180), mg/l..	3416
Total Dissolved Solids (calc), mg/l.	3318
Total Alkalinity as CaCO ₃ , mg/l.....	374.36
Total Acidity as CaCO ₃ , mg/l.....	0.00
Total Hardness as CaCO ₃ , mg/l.....	1199.96
Sodium Absorption Ratio.....	8.21

	mg/l	meq/l
Bicarbonate as HCO ₃	456.7	7.49
Carbonate as CO ₃	0.0	0.00
Chloride.....	497.5	14.03
Sulfate.....	1483.9	30.91
Calcium.....	416.9	20.80
Magnesium.....	38.9	3.20
Potassium.....	3.1	0.08
Sodium.....	653.5	28.43
Major Cations.....		52.50
Major Anions.....		52.43
Cation/Anion Difference.....		0.06 %

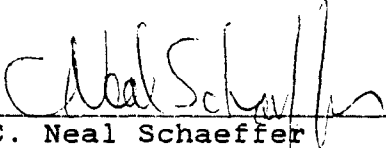

C. Neal Schaeffer
Lab Director

CLIENT: Giant Refinery
ID: GRW-13 LS
SITE: GBR
LAB NO: F4084

DATE REPORTED: 04/13/90
DATE RECEIVED: 04/02/90
DATE COLLECTED: 04/02/90

Lab pH (s.u.).....	7.61
Lab Conductivity, umhos/cm.....	4699
Lab resistivity, ohm-m.....	2.1281
Total Dissolved Solids (180), mg/l..	3298
Total Dissolved Solids (calc), mg/l.	3220
Total Alkalinity as CaCO ₃ , mg/l.....	382.00
Total Acidity as CaCO ₃ , mg/l.....	0.00
Total Hardness as CaCO ₃ , mg/l.....	1231.54
Sodium Absorption Ratio.....	7.54

	mg/l	meq/l
Bicarbonate as HCO ₃	466.0	7.64
Carbonate as CO ₃	0.0	0.00
Chloride.....	619.3	17.47
Sulfate.....	1273.6	26.53
Calcium.....	475.8	23.74
Magnesium.....	10.8	0.89
Potassium.....	2.8	0.07
Sodium.....	608.5	26.47
Major Cations.....		51.17
Major Anions.....		51.64
Cation/Anion Difference.....		0.46 %


C. Neal Schaeffer
Lab Director

CLIENT: Giant Refinery
ID: GBR-31
SITE: GBR
LAB NO: F4092

DATE REPORTED: 04/13/90
DATE RECEIVED: 04/04/90
DATE COLLECTED: 04/04/90

Lab pH (s.u.).....	7.54
Lab Conductivity, umhos/cm.....	5059
Lab resistivity, ohm-m.....	1.9767
Total Dissolved Solids (180), mg/l..	3310
Total Dissolved Solids (calc), mg/l.	3201
Total Alkalinity as CaCO ₃ , mg/l.....	425.17
Total Acidity as CaCO ₃ , mg/l.....	0.00
Total Hardness as CaCO ₃ , mg/l.....	1204.80
Sodium Absorption Ratio.....	7.56

	mg/l	meq/l
Bicarbonate as HCO ₃	491.7	8.06
Carbonate as CO ₃	13.3	0.44
Chloride.....	568.6	16.04
Sulfate.....	1294.6	26.97
Calcium.....	457.8	22.85
Magnesium.....	15.2	1.25
Potassium.....	6.5	0.17
Sodium.....	603.0	26.23
Major Cations.....		50.49
Major Anions.....		51.51
Cation/Anion Difference.....		1.00 %


C. Neal Schaeffer
Lab Director



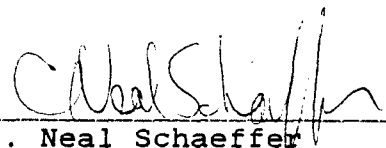
2506 West Main Street
Farmington, New Mexico 87401
Tel. (505) 326-4737

CLIENT: Giant Refinery
ID: GBR-33
SITE: GBR
LAB NO: F4093

DATE REPORTED: 04/13/90
DATE RECEIVED: 04/04/90
DATE COLLECTED: 04/04/90

Lab pH (s.u.).....	7.23
Lab Conductivity, umhos/cm.....	5283
Lab resistivity, ohm-m.....	1.8929
Total Dissolved Solids (180), mg/l..	3488
Total Dissolved Solids (calc), mg/l.	3384
Total Alkalinity as CaCO ₃ , mg/l.....	435.48
Total Acidity as CaCO ₃ , mg/l.....	0.00
Total Hardness as CaCO ₃ , mg/l.....	1345.36
Sodium Absorption Ratio.....	7.16

	mg/l	meq/l
Bicarbonate as HCO ₃	461.4	7.56
Carbonate as CO ₃	34.4	1.15
Chloride.....	599.0	16.90
Sulfate.....	1395.8	29.08
Calcium.....	481.9	24.05
Magnesium.....	34.8	2.86
Potassium.....	6.7	0.17
Sodium.....	604.0	26.27
Major Cations.....		53.35
Major Anions.....		54.69
Cation/Anion Difference.....		1.24 %


C. Neal Schaeffer
Lab Director

2.0 MONTHLY SAMPLING ANALYSES

2.1 JANUARY 1990



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

CLIENT: GBR

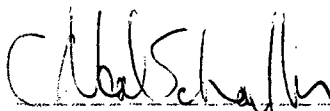
DATE REPORTED: 01/24/90

SITE: Stripper Influent
LAB NO: F3785

DATE RECEIVED: 01/15/90
DATE COLLECTED: 01/15/90

Lab pH (s.u.).....	7.75
Lab Conductivity, umhos/cm.....	5318
Lab resistivity, ohm-m.....	1.8804
Total Dissolved Solids (180), mg/l..	3458
Total Dissolved Solids (calc), mg/l.	3437
Total Alkalinity as CaCO ₃ , mg/l.....	605.88
Total Acidity as CaCO ₃ , mg/l.....	0.00
Total Hardness as CaCO ₃ , mg/l.....	1284.17
Sodium Absorption Ratio.....	8.16

	mg/l	meq/l
Bicarbonate as HCO ₃	739.17	12.12
Carbonate as CO ₃	0.00	0.00
Chloride.....	588.87	16.61
Sulfate.....	1309.39	27.28
Calcium.....	475.84	23.74
Magnesium.....	23.58	1.94
Potassium.....	2.85	0.07
Sodium.....	672.50	29.25
Major Cations.....		55.01
Major Anions.....		56.01
Cation/Anion Difference.....		0.90 %


C. Neal Schaeffer
Lab Director



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

CLIENT: GBR
ID:
SITE: Stripper Influent
LAB NO: F3785
DATE REPORTED: 01/24/90
DATE ANALYZED: 01/16/90
DATE RECEIVED: 01/15/90
DATE COLLECTED: 01/15/90
Analysis Requested: Purgeable aromatics in water.

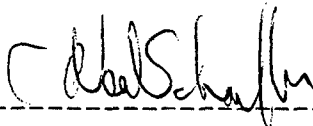
Parameter	Concentration	Units
Benzene	112.5 (1.0)	ug/l
Toluene	ND (1.0)	ug/l
Ethylbenzene	20.5 (1.0)	ug/l
m/p-Xylene	3.25 (1.0)	ug/l
o-Xylene	3 (1.0)	ug/l

Method:

8020 Aromatic Volatile Organics, SW-846, USEPA (1982).
602 Purgeable Aromatics, 40 CFR, Part 136.

(Detection limit in parenthesis.)

ND - Parameter not detected at the stated detection limit.


C. Neal Schaeffer
Senior Chemist



Inter-Mountain
Laboratories, Inc.

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

CLIENT: GBR

SITE: Influent

LAB NO: F3785

Analysis Requested: Purgeable halocarbons in water.

DATE REPORTED: 02/21/90

DATE ANALYZED: 01/19/90

DATE RECEIVED: 01/15/90

DATE COLLECTED: 01/15/90

Parameter	Concentration	Units
Bromobenzene	ND (10)	ug/l
Bromodichloromethane	ND (10)	ug/l
Bromoform	ND (10)	ug/l
Carbon Tetrachloride	ND (10)	ug/l
Chlorobenzene	ND (10)	ug/l
Chloroethane	ND (10)	ug/l
Chloroform	ND (10)	ug/l
Chloromethane	ND (10)	ug/l
Dibromochloromethane	ND (10)	ug/l
Dibromomethane	ND (10)	ug/l
1,2-Dichlorobenzene	ND (10)	ug/l
1,3-Dichlorobenzene	ND (10)	ug/l
1,4-Dichlorobenzene	ND (10)	ug/l
Dichlorodifluoromethane	ND (10)	ug/l
1,1-Dichloroethane	ND (10)	ug/l
1,2-Dichloroethane	ND (10)	ug/l
1,1-Dichloroethene	ND (10)	ug/l
trans-1,2-Dichloroethene	ND (10)	ug/l
1,2-Dichloropropane	ND (10)	ug/l
1,3-Dichloropropylene	ND (10)	ug/l
2,2-Dichloropropane	ND (10)	ug/l
Dichloromethane	ND (10)	ug/l
1,1,1,2-Tetrachloroethane	ND (10)	ug/l
1,1,2,2-Tetrachloroethane	ND (10)	ug/l
Tetrachloroethene	ND (10)	ug/l
1,1,1-Trichloroethane	ND (10)	ug/l
1,1,2-Trichloroethane	ND (10)	ug/l
Trichloroethene	ND (10)	ug/l
Trichlorofluoromethane	ND (10)	ug/l
1,2,3-Trichloropropane	ND (10)	ug/l
Bromochloromethane	ND (10)	ug/l
1,2-Dibromoethane	ND (10)	ug/l
cis-1,2-Dichloroethene	ND (10)	ug/l
1,1-Dichloropropene	ND (10)	ug/l
Vinyl Chloride	ND (10)	ug/l

Method:

601 Purgeable Halocarbons, 40 CFR Part 136, USEPA (1984).
(Detection limit in parenthesis.)

ND - Parameter not detected at the stated detection limit.

C. Neal Schaeffer
Senior Chemist
2.1.3



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

CLIENT: GBR
SITE: Stripper Influent
LAB NO: F3785
Analysis Requested: Polynuclear aromatic hydrocarbons in water.

DATE REPORTED: 01/24/90
DATE RECEIVED: 01/15/90
DATE COLLECTED: 01/15/90

Parameter	Concentration	Units
Acenaphthene	ND (0.02)	mg/l
Acenaphthylene	ND (0.02)	mg/l
Anthracene	ND (0.02)	mg/l
Benzo(a)Anthracene	ND (0.02)	mg/l
Benzo(a)pyrene	ND (0.02)	mg/l
Benzo(k)fluoranthene	ND (0.02)	mg/l
Benzo(b)fluoranthene	ND (0.02)	mg/l
Benzo(g,h,i)perylene	ND (0.02)	mg/l
Dibenzo(a,h)anthracene	ND (0.02)	mg/l
Chrysene	ND (0.02)	mg/l
Fluoranthene	ND (0.02)	mg/l
Fluorene	ND (0.02)	mg/l
Indeno(1,2,3-cd)pyrene	ND (0.02)	mg/l
Naphthalene	ND (0.02)	mg/l
Phenanthrene	ND (0.02)	mg/l
Pyrene	ND (0.02)	mg/l

Method:

8100 Polynuclear Aromatic Hydrocarbons, SW-846, USEPA (1982).
610 Polyaromatic Hydrocarbons, 40 CFR Part 136 (1984).

(Detection limit in parenthesis.)

ND - Parameter not detected at the stated detection limit.

C. Neal Schaeffer
Senior Chemist



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

CLIENT: GBR

DATE REPORTED: 01/24/90

SITE: Stripper Effluent

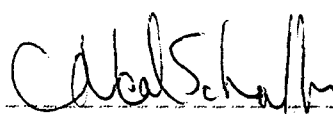
DATE RECEIVED: 01/15/90

LAB NO: F3784

DATE COLLECTED: 01/15/90

Lab pH (s.u.).....	7.79
Lab Conductivity, umhos/cm.....	5279
Lab resistivity, ohm-m.....	1.8943
Total Dissolved Solids (180), mg/l..	3432
Total Dissolved Solids (calc), mg/l..	3432
Total Alkalinity as CaCO ₃ , mg/l.....	504.90
Total Acidity as CaCO ₃ , mg/l.....	0.00
Total Hardness as CaCO ₃ , mg/l.....	1231.54
Sodium Absorption Ratio.....	8.15

	mg/l	meq/l
Bicarbonate as HCO ₃	615.98	10.10
Carbonate as CO ₃	0.00	0.00
Chloride.....	599.02	16.90
Sulfate.....	1293.76	26.95
Calcium.....	469.53	23.43
Magnesium.....	14.61	1.20
Potassium.....	2.89	0.07
Sodium.....	657.50	28.60
Major Cations.....		53.30
Major Anions.....		53.95
Cation/Anion Difference.....		0.60 %


C. Neal Schaeffer
Lab Director



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

CLIENT: GBR
ID:
SITE: Stripper Effluent
LAB NO: F3784
Analysis Requested: Purgeable aromatics in water.

DATE REPORTED: 01/24/90
DATE ANALYZED: 01/16/90
DATE RECEIVED: 01/15/90
DATE COLLECTED: 01/15/90

Parameter	Concentration	Units
Benzene	ND (1.0)	ug/l
Toluene	ND (1.0)	ug/l
Ethylbenzene	ND (1.0)	ug/l
m/p-Xylene	ND (1.0)	ug/l
o-Xylene	ND (1.0)	ug/l

Method:

8020 Aromatic Volatile Organics, SW-846, USEPA (1982).
602 Purgeable Aromatics, 40 CFR, Part 136.

(Detection limit in parenthesis.)

ND - Parameter not detected at the stated detection limit.

C. Neal Schaeffer
Senior Chemist



Inter-Mountain
Laboratories, Inc.

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

CLIENT: GBR

DATE REPORTED: 02/21/90

DATE ANALYZED: 01/19/90

DATE RECEIVED: 01/15/90

DATE COLLECTED: 01/15/90

SITE: Effluent

LAB NO: F3784

Analysis Requested: Purgeable halocarbons in water.

Parameter	Concentration	Units
Bromobenzene	ND (10)	ug/l
Bromodichloromethane	ND (10)	ug/l
Bromoform	ND (10)	ug/l
Carbon Tetrachloride	ND (10)	ug/l
Chlorobenzene	ND (10)	ug/l
Chloroethane	ND (10)	ug/l
Chloroform	ND (10)	ug/l
Chloromethane	ND (10)	ug/l
Dibromochloromethane	ND (10)	ug/l
Dibromomethane	ND (10)	ug/l
1,2-Dichlorobenzene	ND (10)	ug/l
1,3-Dichlorobenzene	ND (10)	ug/l
1,4-Dichlorobenzene	ND (10)	ug/l
Dichlorodifluoromethane	ND (10)	ug/l
1,1-Dichloroethane	ND (10)	ug/l
1,2-Dichloroethane	ND (10)	ug/l
1,1-Dichloroethene	ND (10)	ug/l
trans-1,2-Dichloroethene	ND (10)	ug/l
1,2-Dichloropropane	ND (10)	ug/l
1,3-Dichloropropylene	ND (10)	ug/l
2,2-Dichloropropane	ND (10)	ug/l
Dichloromethane	ND (10)	ug/l
1,1,1,2-Tetrachloroethane	ND (10)	ug/l
1,1,2,2-Tetrachloroethane	ND (10)	ug/l
Tetrachloroethene	ND (10)	ug/l
1,1,1-Trichloroethane	ND (10)	ug/l
1,1,2-Trichloroethane	ND (10)	ug/l
Trichloroethene	ND (10)	ug/l
Trichlorofluoromethane	ND (10)	ug/l
1,2,3-Trichloropropane	ND (10)	ug/l
Bromochloromethane	ND (10)	ug/l
1,2-Dibromoethane	ND (10)	ug/l
cis-1,2-Dichloroethene	ND (10)	ug/l
1,1-Dichloropropene	ND (10)	ug/l
Vinyl Chloride	ND (10)	ug/l

Method:

601 Purgeable Halocarbons, 40 CFR Part 136, USEPA (1984).
(Detection limit in parenthesis.)

ND - Parameter not detected at the stated detection limit.

C. Neal Schaeffer
Senior Chemist



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

CLIENT: GBR
SITE: Stripper Effluent
LAB NO: F3784
DATE REPORTED: 01/24/90
DATE RECEIVED: 01/15/90
DATE COLLECTED: 01/15/90
Analysis Requested: Polynuclear aromatic hydrocarbons in water.

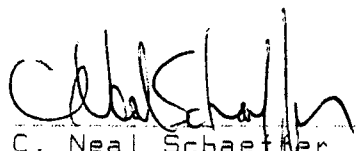
Parameter	Concentration	Units
Acenaphthene	ND (0.02)	mg/l
Acenaphthylene	ND (0.02)	mg/l
Anthracene	ND (0.02)	mg/l
Benzo(a)Anthracene	ND (0.02)	mg/l
Benzo(a)pyrene	ND (0.02)	mg/l
Benzo(k)fluoranthene	ND (0.02)	mg/l
Benzo(b)fluoranthene	ND (0.02)	mg/l
Benzo(g,h,i)perylene	ND (0.02)	mg/l
Dibenzo(a,h)anthracene	ND (0.02)	mg/l
Chrysene	ND (0.02)	mg/l
Fluoranthene	ND (0.02)	mg/l
Fluorene	ND (0.02)	mg/l
Indeno(1,2,3-cd)pyrene	ND (0.02)	mg/l
Naphthalene	ND (0.02)	mg/l
Phenanthrene	ND (0.02)	mg/l
Pyrene	ND (0.02)	mg/l

Method:

8100 Polynuclear Aromatic Hydrocarbons, SW-846, USEPA (1982).
610 Polyaromatic Hydrocarbons, 40 CFR Part 136 (1984).

(Detection limit in parenthesis.)

ND - Parameter not detected at the stated detection limit.


C. Neal Schaeffer
Senior Chemist

2.2 FEBRUARY 1990



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

CLIENT: GBR
ID: Influent
SITE: Stripper
LAB NO: F3878

DATE REPORTED: 02/19/90
DATE RECEIVED: 02/14/90
DATE COLLECTED: 02/14/90

Lab pH (s.u.)	7.74
Lab Conductivity, umhos/cm	4893
Lab resistivity, ohm-m	2.0437
Total Dissolved Solids (180), mg/l	3352
Total Dissolved Solids (calc), mg/l	3236
Total Alkalinity as CaCO ₃ , mg/l	586.37
Total Acidity as CaCO ₃ , mg/l	0.00
Total Hardness as CaCO ₃ , mg/l	1178.91
Sodium Absorption Ratio	8.53

	mg/l	meq/l
Bicarbonate as HCO ₃	715.37	11.73
Carbonate as CO ₃	0.00	0.00
Chloride	619.33	17.47
Sulfate	1139.44	23.74
Calcium	410.15	20.47
Magnesium	37.84	3.11
Potassium	3.36	0.09
Sodium	673.60	29.30
Major Cations		52.96
Major Anions		52.94
Cation/Anion Difference		0.03 %


C. Neal Schaeffer
Lab Director



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

CLIENT: GBR
ID: Effluent
SITE: Stripper
LAB NO: F3879

DATE REPORTED: 02/19/90
DATE RECEIVED: 02/14/90
DATE COLLECTED: 02/14/90

Lab pH (s.u.)	7.82
Lab Conductivity, umhos/cm	4916
Lab resistivity, ohm-m	2.0342
Total Dissolved Solids (180), mg/l	3348
Total Dissolved Solids (calc), mg/l	3287
Total Alkalinity as CaCO ₃ , mg/l	603.56
Total Acidity as CaCO ₃ , mg/l	0.00
Total Hardness as CaCO ₃ , mg/l	1176.81
Sodium Absorption Ratio	8.86

	mg/l	meq/l
Bicarbonate as HCO ₃	736.34	12.07
Carbonate as CO ₃	0.00	0.00
Chloride	629.48	17.76
Sulfate	1147.67	23.91
Calcium	405.94	20.26
Magnesium	39.88	3.28
Potassium	3.36	0.09
Sodium	698.40	30.38
Major Cations		54.00
Major Anions		53.74
Cation/Anion Difference		0.24 %


C. Neal Schaeffer
Lab Director

Radian Work Order S0-02-151

Analytical Report
03/15/90

Giant Refining Company

Giant Refining Company
606 E. Highway 64
Farmington, NM 87401

Tim Kinney

Customer Work Identification Refinery
Purchase Order Number RFE-9834

Contents:

- 1 Analytical Data Summary
- 2 Sample History
- 3 Comments Summary
- 4 Notes and Definitions

Radian Analytical Services
10395 Old Placerville Road
Sacramento, CA 95827

916-362-5332

Client Services Coordinator: WLBROWN

Certified by:

Paul H. Hale

Giant Refining Company
 Radian Work Order: SO-02-151

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	9002121620	9002126002	TB-4	REAGENT BLANK
Factor:	STRIPPER INFL	STRIPPER EFFL		
Results in:	10	1	1	1
Matrix:	ug/L	ug/L	ug/L	ug/L
	03A	04A	05A	06A
	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Bromodichloromethane	ND	1.0	ND	0.10	ND	0.10	ND	0.10
Bromoform	ND	5.0	ND	0.50	ND	0.50	ND	0.50
Bromomethane	ND	12	ND	1.2	ND	1.2	ND	1.2
Carbon tetrachloride	ND	1.2	ND	0.12	ND	0.12	ND	0.12
Chlorobenzene	ND	2.5	ND	0.25	ND	0.25	ND	0.25
Chloroethane	ND	5.2	ND	0.52	ND	0.52	ND	0.52
2-Chloroethylvinylether	ND	5.0	ND	0.50	ND	0.50	ND	0.50
Chloroform	ND	1.0	ND	0.10	ND	0.10	ND	0.10
Chloromethane	ND	3.0	ND	0.30	ND	0.30	ND	0.30
Dibromochloromethane	ND	2.0	ND	0.20	ND	0.20	ND	0.20
1,2-Dichlorobenzene	ND	5.0	ND	0.50	ND	0.50	ND	0.50
1,3-Dichlorobenzene	ND	3.2	ND	0.32	ND	0.32	ND	0.32
1,4-Dichlorobenzene	ND	2.4	ND	0.24	ND	0.24	ND	0.24
1,1-Dichloroethane	ND	5.0	ND	0.50	ND	0.50	ND	0.50
1,2-Dichloroethane	6.3 C	1.0	0.84 C	0.10	ND	0.10	ND	0.10
1,1-Dichloroethene	ND	2.0	ND	0.20	ND	0.20	ND	0.20
cis-1,2-Dichloroethene	28 C	2.0	0.70 C*	0.20	ND	0.20	ND	0.20
trans-1,2-Dichloroethene	ND	2.0	ND	0.20	ND	0.20	ND	0.20
1,2-Dichloropropane	ND	1.0	ND	0.10	ND	0.10	ND	0.10
cis-1,3-Dichloropropene	ND	2.0	ND	0.20	ND	0.20	ND	0.20
trans-1,3-Dichloropropene	ND	3.4	ND	0.34	ND	0.34	ND	0.34
Methylene chloride	ND	4.0	ND	0.40	ND	0.40	ND	0.40
1,1,2,2-Tetrachloroethane	ND	1.5	ND	0.15	ND	0.15	ND	0.15
Tetrachloroethene	ND	1.0	ND	0.10	ND	0.10	ND	0.10
1,1,1-Trichloroethane	4.5 C*	2.0	ND	0.20	ND	0.20	ND	0.20
1,1,2-Trichloroethane	ND	2.0	ND	0.20	ND	0.20	ND	0.20
Trichloroethene	2.0 C*	2.0	ND	0.20	ND	0.20	ND	0.20
Trichlorofluoromethane	ND	2.0	ND	0.20	ND	0.20	ND	0.20
Vinyl chloride	ND	2.0	ND	0.20	ND	0.20	ND	0.20

ND Not detected at specified detection limit

C Confirmed on second column

* Est. result less than 5 times detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: SD-02-151

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:	9002121620	9002126002	TB-4	REAGENT BLANK
	STRIPPER INFL	STRIPPER EFFL		
Factor:	10	1	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
	03A	04A	05A	06A
Matrix:	water	water	water	water

	Result Det. Limit	Result Det. Limit	Result Det. Limit	Result Det. Limit
Surrogate Recovery(%)				
1-Bromo-4-fluorobenzene	99	99	114	104
Control Limits: 40 to 140				

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-02-151

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:

REAGENT BLANK

Factor:

1

Results in:

ug/L

068

Matrix:

water

	Result	Det. Limit
Bromodichloromethane	ND	0.10
Bromoform	ND	0.50
Bromomethane	ND	1.2
Carbon tetrachloride	ND	0.12
Chlorobenzene	ND	0.25
Chloroethane	ND	0.52
2-Chloroethylvinylether	ND	0.50
Chloroform	ND	0.10
Chloromethane	ND	0.30
Dibromochloromethane	ND	0.20
1,2-Dichlorobenzene	ND	0.50
1,3-Dichlorobenzene	ND	0.32
1,4-Dichlorobenzene	ND	0.24
1,1-Dichloroethane	ND	0.50
1,2-Dichloroethane	ND	0.10
1,1-Dichloroethene	ND	0.20
cis-1,2-Dichloroethene	ND	0.20
trans-1,2-Dichloroethene	ND	0.20
1,2-Dichloropropane	ND	0.10
cis-1,3-Dichloropropene	ND	0.20
trans-1,3-Dichloropropene	ND	0.34
Methylene chloride	ND	0.40
1,1,2,2-Tetrachloroethane	ND	0.15
Tetrachloroethene	ND	0.10
1,1,1-Trichloroethane	ND	0.20
1,1,2-Trichloroethane	ND	0.20
Trichloroethene	ND	0.20
Trichlorofluoromethane	ND	0.20
Vinyl chloride	ND	0.20

ND Not detected at specified detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-02-151

Method: Halocarbons by SW8010 (1)

List: Table 3 analyte list

Sample ID:

REAGENT BLANK

Factor:

1

Results in:

ug/L

068

Matrix:

water

	Result	Det. Limit			
Surrogate Recovery(%)					
1-Bromo-4-fluorobenzene	106				
Control Limits: 40 to 140					

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-02-151

Method: Aromatics by SW8020 (1)

List: Complete analyte list

Sample ID:	9002121558	9002121618	TB-4	REAGENT BLANK
	STRIPPER EFFL	STRIPPER INFL		
Factor:	1	10	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
	01A	02A	05A	06A
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Benzene	5.3 C	0.20	240 C	2.0	ND	0.20	ND	0.20
Chlorobenzene	ND	0.20	ND	2.0	ND	0.20	ND	0.20
1,2-Dichlorobenzene	ND	0.40	ND	4.0	ND	0.40	ND	0.40
1,3-Dichlorobenzene	ND	0.40	ND	4.0	ND	0.40	ND	0.40
1,4-Dichlorobenzene	ND	0.30	ND	3.0	ND	0.30	ND	0.30
Ethylbenzene	ND	0.20	19 C	2.0	ND	0.20	ND	0.20
Toluene	ND	0.20	ND	2.0	ND	0.20	ND	0.20
Xylenes (total)	ND	0.20	ND	2.0	ND	0.20	ND	0.20
Surrogate Recovery(%)								
1-Bromo-4-fluorobenzene	83		86		87		112	
Control Limits: 40 to 140								

C Confirmed on second column

ND Not detected at specified detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-02-151

Method: Aromatics by SW8020 (1)

List: Complete analyte list

Sample ID:

REAGENT BLANK

Factor:

1

Results in:

ug/L

068

Matrix:

water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Benzene	ND	0.20						
Chlorobenzene	ND	0.20						
1,2-Dichlorobenzene	ND	0.40						
1,3-Dichlorobenzene	ND	0.40						
1,4-Dichlorobenzene	ND	0.30						
Ethylbenzene	ND	0.20						
Toluene	ND	0.20						
Xylenes (total)	ND	0.20						
Surrogate Recovery(%)								
1-Bromo-4-fluorobenzene	93							
Control Limits: 40 to 140								

ND Not detected at specified detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Company
 Radian Work Order: S0-02-151

Sample Identifications and Dates

Sample ID	9002121558	9002121618	9002121620	9002126002	TB-4	REAGENT BLANK
	STRIPPER EFF	STRIPPER INFL	STRIPPER INFL	STRIPPER EFFL		
Date Sampled	02/12/90	02/12/90	02/12/90	02/12/90	01/29/90	
Date Received	02/13/90	02/13/90	02/13/90	02/13/90	02/13/90	02/13/90
Matrix	water	water	water	water	water	water
	01	02	03	04	05	06
Halocarbons by SW8010						
Prepared						
Analyzed			02/18/90	02/18/90	02/20/90	02/18/90
Analyst			BSJ	BSJ	BSJ	BSJ
File ID			D4021815	D4021816	D4022014	Q402181
Blank ID			Q402181	Q402181	Q402201	
Instrument			4	4	4	4
Report as			received	received	received	received
Halocarbons by SW8010						
Prepared						
Analyzed						02/20/90
Analyst						BSJ
File ID						Q402201
Blank ID						
Instrument						4
Report as						received
Aromatics by SW8020						
Prepared						
Analyzed	02/19/90	02/19/90			02/20/90	02/19/90
Analyst	BSJ	BSJ			BSJ	BSJ
File ID	E4021912	E4021913			E4022014	R402191
Blank ID	R402191	R402191			R402201	
Instrument	4	4			4	4
Report as	received	received			received	received
Aromatics by SW8020						
Prepared						
Analyzed						02/20/90
Analyst						BSJ
File ID						R402201
Blank ID						
Instrument						4
Report as						received

Appendix A

Comments, Notes and Definitions

Giant Refining Company
Radian Work Order: S0-02-151

- C Most methods of analysis by gas chromatography recommend reanalysis on a second column of dissimilar phase to resolve compounds of interest from interferences that may occur and for analyte confirmation. The C flag indicates that the analyte has been confirmed by analysis on a second column.
- ND This flag (or <) is used to denote analytes which are not detected at or above the specified detection limit. The value to the right of the < symbol is the method specified detection limit for the sample.
- * The asterisk(*) is used to flag results which are less than five times the method specified detection limit. Studies have shown that the uncertainty of the analysis will increase exponentially as the method detection limit is approached. These results should be considered approximate.

Giant Refining Company
Radian Work Order: S0-02-151

TERMS USED IN THIS REPORT:

Analyte - A chemical for which a sample is to be analyzed. The analysis will meet EPA method and QC specifications.

Compound - See Analyte.

Detection Limit - The method specified detection limit, which is the lower limit of quantitation specified by EPA for a method. Radian staff regularly assess their laboratories' method detection limits to verify that they meet or are lower than those specified by EPA. Detection limits which are higher than method limits are based on experimental values at the 99% confidence level. Note, the detection limit may vary from that specified by EPA based on sample size, dilution or cleanup.
(Refer to Factor, below)

EPA Method - The EPA specified method used to perform an analysis. EPA has specified standard methods for analysis of environmental samples. Radian will perform its analyses and accompanying QC tests in conformance with EPA methods unless otherwise specified.

Factor - Default method detection limits are based on analysis of clean water samples. A factor is required to calculate sample specific detection limits based on alternate matrices (soil or water), use of cleanup procedures, or dilution of extracts/digestates. For example, extraction or digestion of 10 grams of soil in contrast to 1 liter of water will result in a factor of 100.

Matrix - The sample material. Generally, it will be soil, water, air, oil, or solid waste.

Radian Work Order - The unique Radian identification code assigned to the samples reported in the analytical summary.

Units - ug/L	micrograms per liter (parts per billion); liquids/water
ug/Kg	micrograms per kilogram (parts per billion); soils/solids
ug/M3	micrograms per cubic meter; air samples
mg/L	milligrams per liter (parts per million); liquids/water
mg/Kg	milligrams per kilogram (parts per million); soils/solids
%	percent; usually used for percent recovery of QC standards
uS/cm	conductance unit; microSiemens/centimeter
mL/hr	milliliters per hour; rate of settlement of matter in water
NTU	turbidity unit; nephelometric turbidity unit
CU	color unit; equal to 1 mg/L of chloroplatinate salt

Radian Work Order 90-02-164

Analytical Report
03/08/90

Giant Refining Co.

Giant Refining Co.
606 E. Highway 64
Farmington, NM 87401

Tim Kinney

Customer Work Identification Refinery
Number RFE-9834

Contents:

- 1 Analytical Data Summary
- 2 Sample History
- 3 Comments Summary
- 4 Notes and Definitions

Radian Analytical Services
8501 Mo-Pac Boulevard
P. O. Box 201088
Austin, TX 78720-1088

512/454-4797

Client Services Coordinator: WLBROWN

Certified by:

Clifford Mayer

Giant Refining Co.
 Radian Work Order: 90-02-164

Method: SW8310 PAH's by HPLC (1)

List: 8310 Method analytes

Sample ID:	9002121530 ST- RIP EFFLUENT	9002121614 ST- RIP INFLUENT	REAGENT BLANK
Factor:	4.8	4.9	1
Results in:	ug/L	ug/L	ug/L
	01A	02A	03A
Matrix:	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Acenaphthalene	ND	11	ND	11	ND	2.3		
Acenaphthene	ND	8.6	ND	8.8	ND	1.8		
Anthracene	ND	3.2	ND	3.2	ND	0.66		
Benzo(a)anthracene	ND	0.062	ND	0.064	ND	0.013		
Benzo(a)pyrene	ND	0.11	ND	0.11	ND	0.023		
Benzo(b)fluoranthene	ND	0.086	ND	0.088	ND	0.018		
Benzo(g,h,i)perylene	ND	0.36	ND	0.37	ND	0.076		
Benzo(k)fluoranthene	ND	0.082	ND	0.083	ND	0.017		
Chrysene	ND	0.062	ND	0.064	ND	0.013		
Dibenzo(a,h)anthracene	ND	0.14	ND	0.15	ND	0.030		
Fluoranthene	ND	1.0	ND	1.0	ND	0.21		
Fluorene	1.4 *	1.0	2.9 *	1.0	ND	0.21		
Indeno(1,2,3-cd)pyrene	ND	0.21	ND	0.21	ND	0.043		
Naphthalene	ND	8.6	ND	8.8	ND	1.8		
Phenanthrene	ND	3.1	5.0 *	3.1	ND	0.64		
Pyrene	ND	1.3	ND	1.3	ND	0.27		
<u>Surrogate Recovery(%)</u>								
Terphenyl-d14	106		90		62			
Control Limits: 24 to 146								

ND Not detected at specified detection limit

* Est. result less than 5 times detection limit

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Co.
Radian Work Order: 90-02-164

Method: SW8310 PAH's by HPLC (1)

List: Matrix Spike Analyte List

Sample ID:	RECOVERY CHECK	RECOVERY CHECK DUP
Factor:	1	1
Results in:	%	%
	05A	06A
Matrix:	water	water

	Result	Det. Limit	Result	Det. Limit
Acenaphthalene	70		83	
Acenaphthene	65		81	
Anthracene	93		74	
Benzo(k)fluoranthene	93		91	
Dibenzo(a,h)anthracene	104		103	
Fluorene	89		93	
Naphthalene	106		118	
Phenanthrene	85		86	
 <u>Surrogate Recovery(%)</u>				
Terphenyl-d14	98		98	
Control Limits: 24 to 146				

(1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.

Giant Refining Co.
 Radian Work Order: 90-02-164

Sample Identifications and Dates

Sample ID	9002121530 ST- RIP EFFLUENT	9002121614 ST- TRIP INFLUENT	REAGENT BLANK	RECOVERY CHECK	RECOVERY CHECK- K DUP
Date Sampled	02/12/90	02/12/90			
Date Received	02/15/90	02/15/90	02/15/90	02/15/90	02/15/90
Matrix	water 01	water 02	water 03	water 05	water 06

SW8310 PAH's by HPLC

Prepared	02/15/90	02/15/90	02/15/90
Analyzed	02/20/90	02/20/90	02/19/90
Analyst	TLS	TLS	TLS
File ID	145&148	146&149	131&134
Blank ID	131&134	131&134	131&134
Instrument	HPLC 2	HPLC 2	HPLC 2
Report as	received	received	received

SW8310 PAH's by HPLC

Prepared		02/15/90	02/15/90
Analyzed		02/21/90	02/21/90
Analyst		TLS	TLS
File ID		156&159	157&160
Blank ID		131&134	131&134
Instrument		HPLC 2	HPLC 2
Report as		received	received

Appendix A

Comments, Notes and Definitions

Giant Refining Co.
Radian Work Order: 90-02-164

- ND This flag (or <) is used to denote analytes which are not detected at or above the specified detection limit. The value to the right of the < symbol is the method specified detection limit for the sample.
- * The asterisk(*) is used to flag results which are less than five times the method specified detection limit. Studies have shown that the uncertainty of the analysis will increase exponentially as the method detection limit is approached. These results should be considered approximate.

Giant Refining Co.
Radian Work Order: 90-02-164

TERMS USED IN THIS REPORT:

Analyte - A chemical for which a sample is to be analyzed. The analysis will meet EPA method and QC specifications.

Compound - See Analyte.

Detection Limit - The method specified detection limit, which is the lower limit of quantitation specified by EPA for a method. Radian staff regularly assess their laboratories' method detection limits to verify that they meet or are lower than those specified by EPA. Detection limits which are higher than method limits are based on experimental values at the 99% confidence level. Note, the detection limit may vary from that specified by EPA based on sample size, dilution or cleanup.
(Refer to Factor, below)

EPA Method - The EPA specified method used to perform an analysis. EPA has specified standard methods for analysis of environmental samples. Radian will perform its analyses and accompanying QC tests in conformance with EPA methods unless otherwise specified.

Factor - Default method detection limits are based on analysis of clean water samples. A factor is required to calculate sample specific detection limits based on alternate matrices (soil or water), use of cleanup procedures, or dilution of extracts/digestates. For example, extraction or digestion of 10 grams of soil in contrast to 1 liter of water will result in a factor of 100.

Matrix - The sample material. Generally, it will be soil, water, air, oil, or solid waste.

Radian Work Order - The unique Radian identification code assigned to the samples reported in the analytical summary.

Units - ug/L	micrograms per liter (parts per billion); liquids/water
ug/Kg	micrograms per kilogram (parts per billion); soils/solids
ug/M3	micrograms per cubic meter; air samples
mg/L	milligrams per liter (parts per million); liquids/water
mg/Kg	milligrams per kilogram (parts per million); soils/solids
%	percent; usually used for percent recovery of QC standards
uS/cm	conductance unit; microSiemens/centimeter
mL/hr	milliliters per hour; rate of settlement of matter in water
NTU	turbidity unit; nephelometric turbidity unit
CU	color unit; equal to 1 mg/L of chloroplatinate salt

2.3 MARCH 1990

NOTE: MARCH RESULTS ARE INCLUDED IN QUARTERLY DATA SECTION 1.0

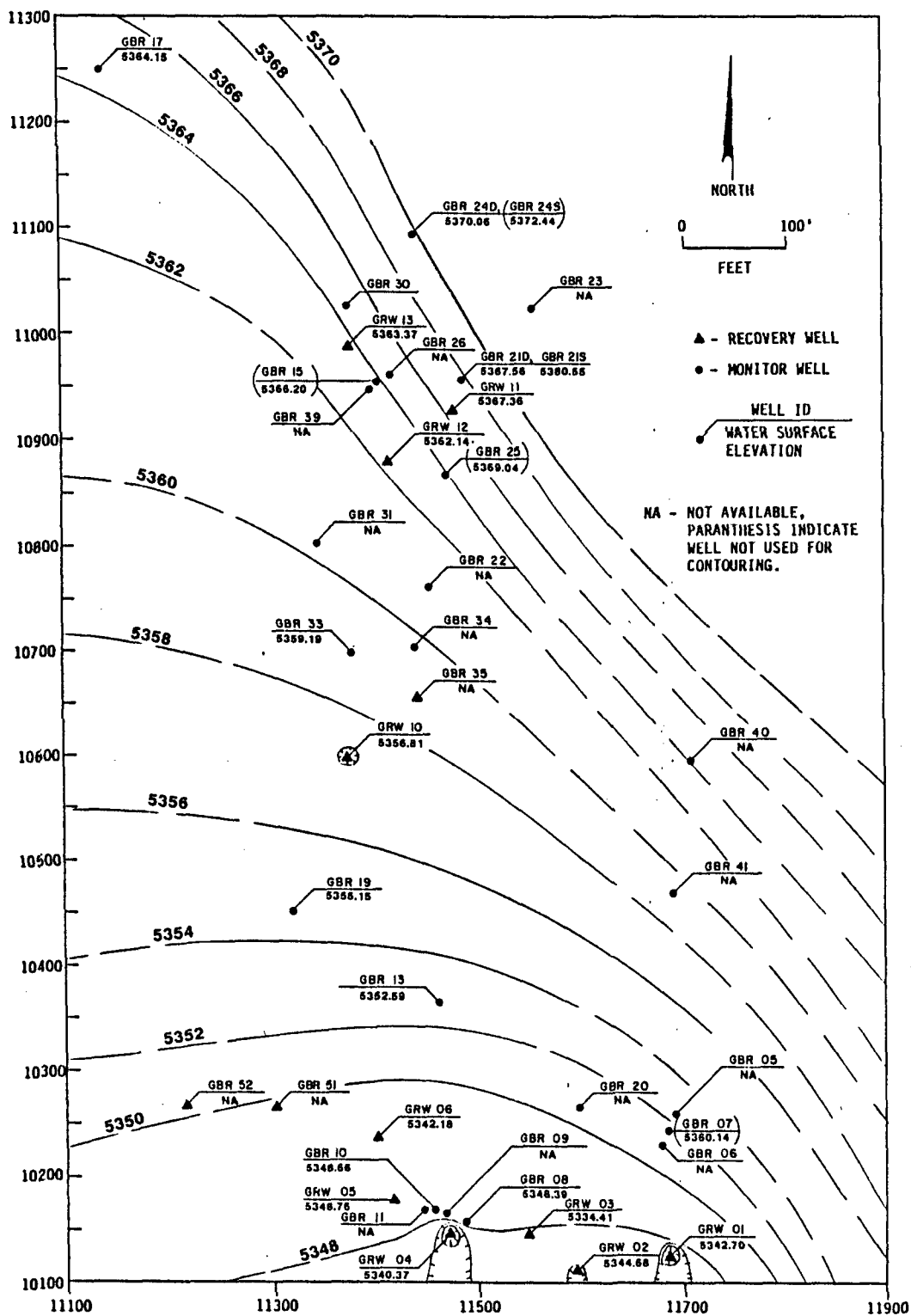
3.0 MONTHLY POTENTIOMETRIC MAPS

GIANT REFINING BLOOMFIELD REFINERY
MONTHLY POTENTIOMETRIC SURFACE

MONTH/YEAR: January, 1990

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	5394.3	51.6	51.6	0	5342.70
GRW-2	5391.28	46.6	46.6	0	5344.68
GRW-3	5388.77	54.36	54.36	0	5334.41
GRW-4	5390.02	49.65	49.65	0	5340.37
GRW-5	5390.56	41.8	41.8	0	5348.76
GRW-6	5390.81	48.63	48.63	0	5342.18
GRW-10	5395.02	44.83	36.55	8.28	5356.81
GRW-11	5397.85	30.49	30.49	0	5367.36
GRW-12	5397.24	35.1	35.1	0	5362.14
GRW-13	5396.9	33.53	33.53	0	5363.37
GBR-7	5395.85	40.35	34.55	5.8	5360.14
GBR-8	5390.5	42.16	42.1	0.06	5348.39
GBR-10	5390.57	41.95	41.9	0.05	5348.66
GBR-13	5393.04	41.52	40.18	1.34	5352.59
GBR-15	5397.99	31.79	31.79	0	5366.20
GBR-17	5402.69	38.54	38.54	0	5364.15
GBR-19	5393.83	38.68	38.68	0	5355.15
GBR-21S	5400.65	20.15	20.09	0.06	5380.55
GBR-21D	5400.19	32.63	32.63	0	5367.56
GBR-24S	5396.08	23.7	23.63	0.07	5372.44
GBR-24D	5396.77	26.71	26.71	0	5370.06
GBR-25	5396.72	27.68	27.68	0	5369.04
GBR-33	5396.28	37.09	37.09	0	5359.19

* WSEL - WATER SURFACE ELEVATION ADJUSTED FOR PRODUCT DEPTH



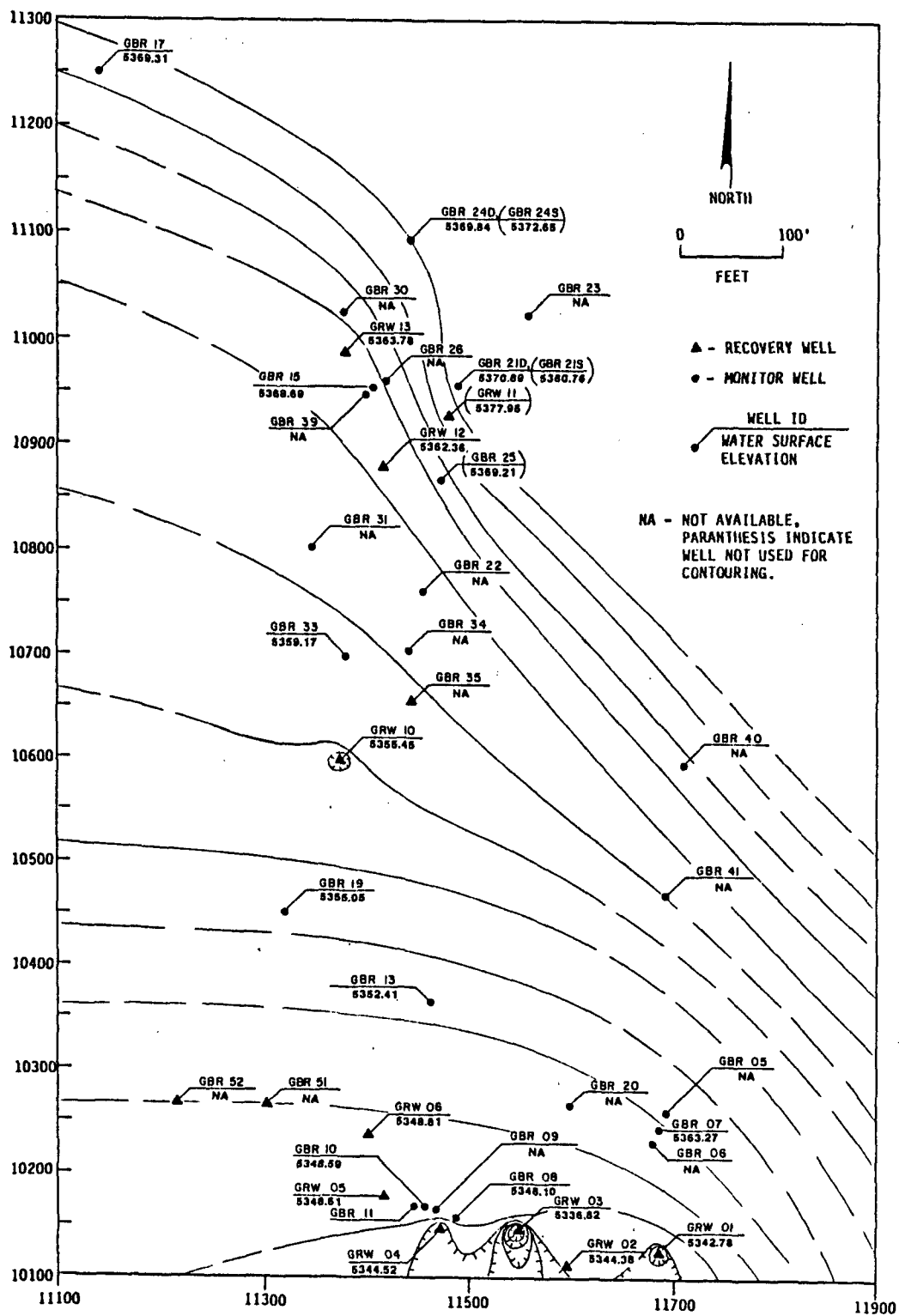
JANUARY WATER SURFACE CONTOUR MAP GIANT-BLOOMFIELD REFINERY

GIANT REFINING BLOOMFIELD REFINERY
MONTHLY POTENTIOMETRIC SURFACE

MONTH/YEAR: FEBRUARY 1990

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	5394.3	51.52	51.52	0	5342.78
GRW-2	5391.28	46.9	46.9	0	5344.38
GRW-3	5388.77	51.95	51.95	0	5336.82
GRW-4	5390.02	45.5	45.5	0	5344.52
GRW-5	5390.56	41.95	41.95	0	5348.61
GRW-6	5390.81	42	42	0	5348.81
GRW-10	5395.02	49.2	37.16	12.04	5355.45
GRW-11	5397.85	19.9	19.9	0	5377.95
GRW-12	5397.24	34.88	34.88	0	5362.36
GRW-13	5396.9	33.12	33.12	0	5363.78
GBR-7	5395.85	40.09	30.7	9.39	5363.27
GBR-8	5390.5	42.8	42.3	0.5	5348.10
GBR-10	5390.57	42.2	41.92	0.28	5348.59
GBR-13	5393.04	41.85	40.33	1.52	5352.41
GBR-15	5397.99	29.3	29.3	0	5368.69
GBR-17	5402.69	33.38	33.38	0	5369.31
GBR-19	5393.83	38.78	38.78	0	5355.05
GBR-21S	5400.65	19.97	19.87	0.1	5380.76
GBR-21D	5400.19	29.3	29.3	0	5370.89
GBR-24S	5396.08	23.45	23.42	0.03	5372.65
GBR-24D	5396.77	26.93	26.93	0	5369.84
GBR-25	5396.72	27.51	27.51	0	5369.21
GBR-33	5396.28	37.12	37.11	0.01	5359.17

* WSEL - WATER SURFACE ELEVATION ADJUSTED FOR PRODUCT DEPTH



FEBRUARY WATER SURFACE CONTOUR MAP GIANT-BLOOMFIELD REFINERY

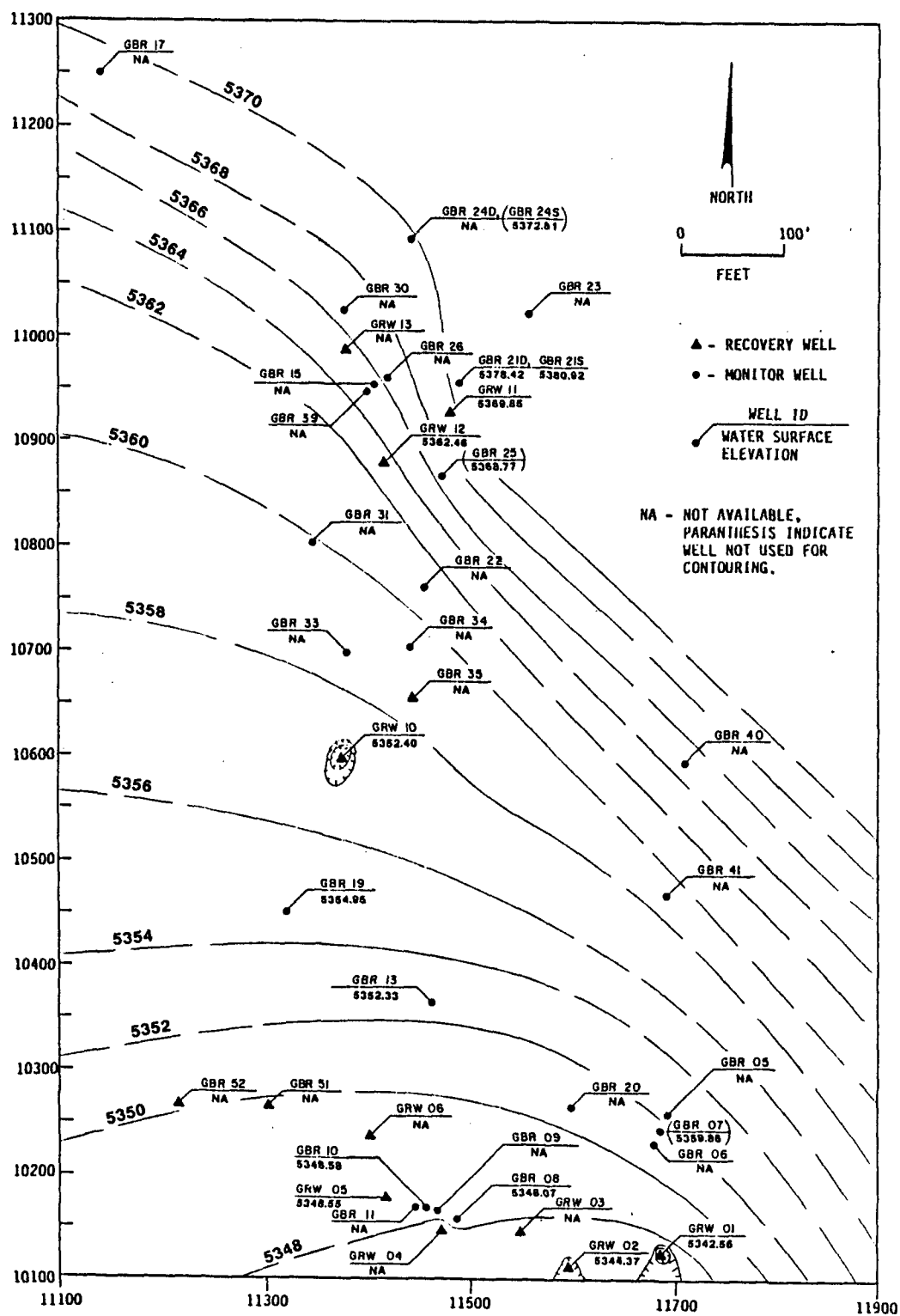
GIANT REFINING BLOOMFIELD REFINERY
MONTHLY POTENTIOMETRIC SURFACE

MONTH/YEAR: April, 1990

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	5394.3	51.74	51.74	0	5342.56
GRW-2	5391.28	46.91	46.91	0	5344.37
GRW-5	5390.56	42.01	42.01	0	5348.55
GRW-10	5395.02	46.02	41.77	4.25	5352.40
GRW-11	5397.85	28	28	0	5369.85
GRW-12	5397.24	34.78	34.78	0	5362.46
GBR-7	5395.85	40.65	34.83	5.82	5359.86
GBR-8	5390.5	42.95	42.3	0.65	5348.07
GBR-10	5390.57	42.21	41.94	0.27	5348.58
GBR-13	5393.04	41.94	40.4	1.54	5352.33
GBR-19	5393.83	38.89	38.88	0.01	5354.95
GBR-21S	5400.65	19.75	19.72	0.03	5380.92
GBR-21D	5400.19	29.56	29.56	0	5370.63
GBR-24S	5396.08	23.34	23.25	0.09	5372.81
GBR-25	5396.72	27.95	27.95	0	5368.77

Note: Beginning with May, 1990 we will measure levels in all wells instead of just the wells referred to in the discharge plan.

* WSEL - WATER SURFACE ELEVATION ADJUSTED FOR PRODUCT DEPTH



APRIL WATER SURFACE CONTOUR MAP GIANT-BLOOMFIELD REFINERY

4.0 WEEKLY MONITORING & TANK VOLUMES

GIANT REFINING BLOOMFIELD REFINERY
WEEKLY MONITORING REPORT

WEEK OF: January 1, 1990

LOCATION	TANK OUTAGE FEET	WATER DEPTH FEET	PRODUCT DEPTH INCHES	WATER VOLUME GALLONS	PRODUCT VOLUME GALLONS
TANK 102	12.8	3.2	0.0	4508	0
TANK 106	10.4	5.7	0.5	8010	58
TANK 21	24.7	0.0	0.0	0	0
TANK 22	3.8	21.1	0.0	386899	0
TANK 27	4.1	28.2	0.0	185631	0
TANK 32	8.1	24.2	1.8	159291	960
TANK 34	1.6	30.5	0.0	200948	0
TANK 35	32.3	0.0	0.0	0	0
TANK 37	7.3	33.2	0.0	352232	0
TOTAL WATER VOLUME IN STORAGE				1297519 GALLONS	
TOTAL PRODUCT VOLUME IN STORAGE				1019 GALLONS	

COMMENTS:

GIANT REFINING BLOOMFIELD REFINERY
WEEKLY MONITORING REPORT

WEEK OF: January 8, 1990

LOCATION	TANK OUTAGE FEET	WATER DEPTH FEET	PRODUCT DEPTH INCHES	WATER VOLUME GALLONS	PRODUCT VOLUME GALLONS
TANK 102	9.3	6.7	0.0	9438	0
TANK 106	10.4	5.7	0.5	8010	58
TANK 21	24.7	0.0	0.0	0	0
TANK 22	4.5	20.4	0.0	374033	0
TANK 27	4.1	28.2	0.0	185631	0
TANK 32	8.1	24.2	1.8	159291	960
TANK 34	1.6	30.5	0.0	200948	0
TANK 35	32.3	0.0	0.0	0	0
TANK 37	7.3	33.2	0.0	352232	0
TOTAL WATER VOLUME IN STORAGE				1289583 GALLONS	
TOTAL PRODUCT VOLUME IN STORAGE				1019 GALLONS	

COMMENTS:

GIANT REFINING BLOOMFIELD REFINERY
WEEKLY MONITORING REPORT

WEEK OF: January 15, 1990

LOCATION	TANK OUTAGE FEET	WATER DEPTH FEET	PRODUCT DEPTH INCHES	WATER VOLUME GALLONS	PRODUCT VOLUME GALLONS
TANK 102	2.8	13.2	0.0	18595	0
TANK 106	10.4	5.7	0.5	8010	58
TANK 21	24.7	0.0	0.0	0	0
TANK 22	2.4	22.5	0.0	412631	0
TANK 27	4.1	28.2	0.0	185631	0
TANK 32	8.1	24.2	1.8	159291	960
TANK 34	1.6	30.5	0.0	200948	0
TANK 35	32.3	0.0	0.0	0	0
TANK 37	7.3	33.2	0.0	352232	0
TOTAL WATER VOLUME IN STORAGE				1337338 GALLONS	
TOTAL PRODUCT VOLUME IN STORAGE				1019 GALLONS	

COMMENTS:

GIANT REFINING BLOOMFIELD REFINERY
WEEKLY MONITORING REPORT

WEEK OF: January 22, 1990

LOCATION	TANK OUTAGE FEET	WATER DEPTH FEET	PRODUCT DEPTH INCHES	WATER VOLUME GALLONS	PRODUCT VOLUME GALLONS
TANK 102	9.0	7.0	0.0	9861	0
TANK 106	10.4	5.7	0.5	8010	58
TANK 21	24.7	0.0	0.0	0	0
TANK 22	5.4	19.5	0.0	357491	0
TANK 27	4.1	28.2	0.0	185631	0
TANK 32	8.1	24.2	1.8	159291	960
TANK 34	1.6	30.5	0.0	200948	0
TANK 35	32.3	0.0	0.0	0	0
TANK 37	7.3	33.2	0.0	352232	0
TOTAL WATER VOLUME IN STORAGE				1273464 GALLONS	
TOTAL PRODUCT VOLUME IN STORAGE				1019 GALLONS	

COMMENTS:

GIANT REFINING BLOOMFIELD REFINERY
WEEKLY MONITORING REPORT

WEEK OF: January 29, 1990

LOCATION	TANK OUTAGE FEET	WATER DEPTH FEET	PRODUCT DEPTH INCHES	WATER VOLUME GALLONS	PRODUCT VOLUME GALLONS
TANK 102	6.9	9.1	0.0	12819	0
TANK 106	10.4	5.7	0.5	8010	58
TANK 21	24.7	0.0	0.0	0	0
TANK 22	4.1	20.8	0.0	381385	0
TANK 27	4.1	28.2	0.0	185631	0
TANK 32	8.1	24.2	1.8	159291	960
TANK 34	1.6	30.5	0.0	200948	0
TANK 35	32.3	0.0	0.0	0	0
TANK 37	7.3	33.2	0.0	352232	0
TOTAL WATER VOLUME IN STORAGE				1300316 GALLONS	
TOTAL PRODUCT VOLUME IN STORAGE				1019 GALLONS	

COMMENTS:

GIANT REFINING BLOOMFIELD REFINERY
WEEKLY MONITORING REPORT

WEEK OF: February 5, 1990

LOCATION	TANK OUTAGE FEET	WATER DEPTH FEET	PRODUCT DEPTH INCHES	WATER VOLUME GALLONS	PRODUCT VOLUME GALLONS
TANK 102	8.6	7.4	0.0	10448	0
TANK 106	10.4	5.7	0.5	8010	58
TANK 21	24.7	0.0	0.0	0	0
TANK 22	5.5	19.4	0.0	356419	0
TANK 27	4.1	28.2	0.0	185631	0
TANK 32	8.1	24.2	1.8	159291	960
TANK 34	1.6	30.5	0.0	200948	0
TANK 35	32.3	0.0	0.0	0	0
TANK 37	7.3	33.2	0.0	352232	0
TOTAL WATER VOLUME IN STORAGE				1272980 GALLONS	
TOTAL PRODUCT VOLUME IN STORAGE				1019 GALLONS	

COMMENTS:

GIANT REFINING BLOOMFIELD REFINERY
WEEKLY MONITORING REPORT

WEEK OF: February 12 1990

LOCATION	TANK OUTAGE FEET	WATER DEPTH FEET	PRODUCT DEPTH INCHES	WATER VOLUME GALLONS	PRODUCT VOLUME GALLONS
TANK 102	12.8	3.2	0.0	4461	0
TANK 106	10.4	5.7	0.5	8010	58
TANK 21	24.7	0.0	0.0	0	0
TANK 22	9.2	15.7	0.0	288259	0
TANK 27	4.1	28.2	0.0	185631	0
TANK 32	8.1	24.2	1.8	159291	960
TANK 34	1.6	30.5	0.0	200948	0
TANK 35	32.3	0.0	0.0	0	0
TANK 37	7.3	33.2	0.0	352232	0
TOTAL WATER VOLUME IN STORAGE				1198832 GALLONS	
TOTAL PRODUCT VOLUME IN STORAGE				1019 GALLONS	

COMMENTS:

GIANT REFINING BLOOMFIELD REFINERY
WEEKLY MONITORING REPORT

WEEK OF: February 19 1990

LOCATION	TANK OUTAGE FEET	WATER DEPTH FEET	PRODUCT DEPTH INCHES	WATER VOLUME GALLONS	PRODUCT VOLUME GALLONS
TANK 102	6.6	9.4	0.0	13265	0
TANK 106	10.4	5.7	0.5	8010	58
TANK 21	24.7	0.0	0.0	0	0
TANK 22	9.8	15.0	0.0	276007	0
TANK 27	4.1	28.2	0.0	185631	0
TANK 32	8.1	24.2	1.8	159291	960
TANK 34	1.6	30.5	0.0	200948	0
TANK 35	32.3	0.0	0.0	0	0
TANK 37	7.3	33.2	0.0	352232	0
TOTAL WATER VOLUME IN STORAGE				1195384 GALLONS	
TOTAL PRODUCT VOLUME IN STORAGE				1019 GALLONS	

COMMENTS:

GIANT REFINING BLOOMFIELD REFINERY
WEEKLY MONITORING REPORT

WEEK OF: February 26 1990

LOCATION	TANK OUTAGE FEET	WATER DEPTH FEET	PRODUCT DEPTH INCHES	WATER VOLUME GALLONS	PRODUCT VOLUME GALLONS
TANK 102	8.3	7.7	0.0	10800	0
TANK 106	10.4	5.7	0.5	8010	58
TANK 21	24.7	0.0	0.0	0	0
TANK 22	12.9	11.9	0.0	219334	0
TANK 27	4.1	28.2	0.0	185631	0
TANK 32	8.1	24.2	1.8	159291	960
TANK 34	1.6	30.5	0.0	200948	0
TANK 35	32.3	0.0	0.0	0	0
TANK 37	7.3	33.2	0.0	352232	0
TOTAL WATER VOLUME IN STORAGE				1136246 GALLONS	
TOTAL PRODUCT VOLUME IN STORAGE				1019 GALLONS	

COMMENTS:

GIANT REFINING BLOOMFIELD REFINERY
WEEKLY MONITORING REPORT

WEEK OF: March 5, 1990

LOCATION	TANK OUTAGE FEET	WATER DEPTH FEET	PRODUCT DEPTH INCHES	WATER VOLUME GALLONS	PRODUCT VOLUME GALLONS
TANK 102	5.6	10.4	0.0	14674	0
TANK 106	10.4	5.7	0.5	8010	58
TANK 21	24.7	0.0	0.0	0	0
TANK 22	17.9	6.9	0.0	127434	0
TANK 27	4.1	28.2	0.0	185631	0
TANK 32	8.1	24.2	1.8	159291	960
TANK 34	1.6	30.5	0.0	200948	0
TANK 35	32.3	0.0	0.0	0	0
TANK 37	7.3	33.2	0.0	352232	0
TOTAL WATER VOLUME IN STORAGE				1048220 GALLONS	
TOTAL PRODUCT VOLUME IN STORAGE				1019 GALLONS	

COMMENTS:

GIANT REFINING BLOOMFIELD REFINERY
WEEKLY MONITORING REPORT

WEEK OF: March 12, 1990

LOCATION	TANK OUTAGE FEET	WATER DEPTH FEET	PRODUCT DEPTH INCHES	WATER VOLUME GALLONS	PRODUCT VOLUME GALLONS
TANK 102	12.1	3.9	0.0	5494	0
TANK 106	10.4	5.7	0.5	8010	58
TANK 21	24.7	0.0	0.0	0	0
TANK 22	21.1	3.8	0.0	68925	0
TANK 27	4.1	28.2	0.0	185631	0
TANK 32	8.1	24.2	1.8	159291	960
TANK 34	1.6	30.5	0.0	200948	0
TANK 35	32.3	0.0	0.0	0	0
TANK 37	7.3	33.2	0.0	352232	0
TOTAL WATER VOLUME IN STORAGE				980531 GALLONS	
TOTAL PRODUCT VOLUME IN STORAGE				1019 GALLONS	

COMMENTS:

GIANT REFINING BLOOMFIELD REFINERY
WEEKLY MONITORING REPORT

WEEK OF: March 19, 1990

LOCATION	TANK OUTAGE FEET	WATER DEPTH FEET	PRODUCT DEPTH INCHES	WATER VOLUME GALLONS	PRODUCT VOLUME GALLONS
TANK 102	7.3	8.7	0.0	12256	0
TANK 106	10.4	5.7	0.5	8010	58
TANK 21	24.7	0.0	0.0	0	0
TANK 22	22.5	2.4	0.0	43193	0
TANK 27	4.1	28.2	0.0	185631	0
TANK 32	8.1	24.2	1.8	159291	960
TANK 34	1.6	30.5	0.0	200948	0
TANK 35	32.3	0.0	0.0	0	0
TANK 37	7.3	33.2	0.0	352232	0
TOTAL WATER VOLUME IN STORAGE				961561 GALLONS	
TOTAL PRODUCT VOLUME IN STORAGE				1019 GALLONS	

COMMENTS:

GIANT REFINING BLOOMFIELD REFINERY
WEEKLY MONITORING REPORT

WEEK OF: March 26, 1990

LOCATION	TANK OUTAGE FEET	WATER DEPTH FEET	PRODUCT DEPTH INCHES	WATER VOLUME GALLONS	PRODUCT VOLUME GALLONS
TANK 102	4.6	11.4	0.0	16059	0
TANK 106	10.4	5.7	0.5	8010	58
TANK 21	24.7	0.0	0.0	0	0
TANK 22	23.9	1.0	0.0	17461	0
TANK 27	4.1	28.2	0.0	185631	0
TANK 32	8.1	24.2	1.8	159291	960
TANK 34	1.6	30.5	0.0	200948	0
TANK 35	32.3	0.0	0.0	0	0
TANK 37	7.3	33.2	0.0	352232	0
TOTAL WATER VOLUME IN STORAGE				939632 GALLONS	
TOTAL PRODUCT VOLUME IN STORAGE				1019 GALLONS	

COMMENTS:

5.0 METER READINGS

GIANT REFINING CO. BLOOMFIELD REFINERY
MONTHLY VOLUME TABULATION

MONTH OF: January 1990

LOCATION	WEEK #1	WEEK #2	WEEK #3	WEEK #4	WEEK #5	VOLUME PUMPED
GRW-1 SUBMERSIBLE	0	4080	1800	1770	1650	9300
GRW-1 AIR LIFT	0	0	0	0	0	0
GRW-2 SUBMERSIBLE	4400	1190	2310	2430	2320	12650
GRW-2 AIR LIFT	0	0	0	0	0	0
GRW-3 SUBMERSIBLE	4420	4036	10894	12310	11510	43170
GRW-3 AIR LIFT	0	0	0	0	0	0
GRW-4 SUBMERSIBLE	7540	7670	8020	9930	6800	39960
GRW-4 AIR LIFT	0	0	0	0	0	0
GRW-5 SUBMERSIBLE	0	0	0	0	0	0
GRW-5 AIR LIFT	0	0	0	0	0	0
GRW-6 SUBMERSIBLE	8400	8740	6690	7060	6600	37490
GRW-6 AIR LIFT	0	0	0	0	0	0
GRW-10 SUBMERSIBLE	10590	10810	11020	22980	18540	73940
GRW-10 AIR LIFT	0	0	0	0	0	0
GRW-11 AIR LIFT	4617	4625	37	0	0	9279
GRW-12 AIR LIFT	744	2595	30	222	617	4208
GRW-13 AIR LIFT	794	1713	23	718	1163	4411
STRIPPER INFLUENT	40400	52100	47400	23700	44100	207700
TANK 102 INFLUENT	47060	55100	47100	23900	47500	220660
TOTAL SUBMERSIBLE PUMP VOLUME, GALLONS						216510
TOTAL AIR LIFT VOLUME, GALLONS						17898
TOTAL VOLUME PUMPED FOR THE MONTH, GALLONS						234408
CALCULATED AIR STRIPPER EFFLUENT VOLUME, GALLONS						206661.5
TOTAL VOLUME TO STORAGE, GALLONS						26708

GIANT REFINING CO. BLOOMFIELD REFINERY
METER READINGS REPORT

WEEK OF: January 1, 1990

LOCATION	PREVIOUS READING	MONDAY	WEDNESDAY	FRIDAY	VOLUME PUMPED
GRW-1 SUBMERSIBLE	20490	*	20490	20490	0
GRW-1 AIR LIFT					0
GRW-2 SUBMERSIBLE	160310	*	162300	164710	4400
GRW-2 AIR LIFT					0
GRW-3 SUBMERSIBLE	159610	*	163910	164030	4420
GRW-3 AIR LIFT					0
GRW-4 SUBMERSIBLE	98580	*	104180	106120	7540
GRW-4 AIR LIFT					0
GRW-5 SUBMERSIBLE	22070	*	22070	22070	0
GRW-5 AIR LIFT					0
GRW-6 SUBMERSIBLE	514350	*	520520	522750	8400
GRW-6 AIR LIFT					0
GRW-10 SUBMERSIBLE	687190	*	694690	697780	10590
GRW-10 AIR LIFT					0
GRW-11 AIR LIFT	203680	*	216098	219070	4617
GRW-12 AIR LIFT	49225	*	51705	51705	744
GRW-13 AIR LIFT	79805	*	82450	82450	794
STRIPPER INFLUENT	192000	*	223600	232400	40400
TANK 102 INFLUENT	163840	*	187500	210900	47060
TOTAL SUBMERSIBLE PUMP VOLUME, GALLONS					35350
TOTAL AIR LIFT VOLUME, GALLONS					6155
TOTAL VOLUME PUMPED FOR THE WEEK, GALLONS					41505

COMMENTS: Holiday, no data recorded

NOTE: AIR LIFT METER READINGS ARE AN INDICATION OF THE NUMBER OF CYCLES, NOT GALLONS. THE NUMBER OF GALLONS IS AN ESTIMATE BASED ON THE APPROXIMATE VOLUME PUMPED PER CYCLE. SUBMERSIBLE PUMP METER READINGS ARE INDICATED IN GALLONS

GIANT REFINING CO. BLOOMFIELD REFINERY
METER READINGS REPORT

WEEK OF: January 8, 1990

LOCATION	PREVIOUS READING	MONDAY	WEDNESDAY	FRIDAY	VOLUME PUMPED
GRW-1 SUBMERSIBLE	20490	20490	23920	24570	4080
GRW-1 AIR LIFT					0
GRW-2 SUBMERSIBLE	164710	164310	165190	165900	1190
GRW-2 AIR LIFT					0
GRW-3 SUBMERSIBLE	164030	165140	166760	168066	4036
GRW-3 AIR LIFT					0
GRW-4 SUBMERSIBLE	106120	105910	111850	113790	7670
GRW-4 AIR LIFT					0
GRW-5 SUBMERSIBLE	22070	22070	22070	22070	0
GRW-5 AIR LIFT					0
GRW-6 SUBMERSIBLE	522750	526590	529260	531490	8740
GRW-6 AIR LIFT					0
GRW-10 SUBMERSIBLE	697780	701470	705320	708590	10810
GRW-10 AIR LIFT					0
GRW-11 AIR LIFT	219070	226715	230972	234487	4625
GRW-12 AIR LIFT	51705	56303	58481	60355	2595
GRW-13 AIR LIFT	82450	82748	85654	88159	1713
STRIPPER INFLUENT	232400	256000	284500	284500	52100
TANK 102 INFLUENT	210900	217600	242500	266000	55100
TOTAL SUBMERSIBLE PUMP VOLUME, GALLONS					36526
TOTAL AIR LIFT VOLUME, GALLONS					8933
TOTAL VOLUME PUMPED FOR THE WEEK, GALLONS					45459

COMMENTS:

NOTE: AIR LIFT METER READINGS ARE AN INDICATION OF THE NUMBER OF CYCLES, NOT GALLONS. THE NUMBER OF GALLONS IS AN ESTIMATE BASED ON THE APPROXIMATE VOLUME PUMPED PER CYCLE. SUBMERSIBLE PUMP METER READINGS ARE INDICATED IN GALLONS

GIANT REFINING CO. BLOOMFIELD REFINERY
METER READINGS REPORT

WEEK OF: January 15, 1990

LOCATION	PREVIOUS READING	MONDAY	WEDNESDAY	FRIDAY	VOLUME PUMPED
GRW-1 SUBMERSIBLE	24570	25470	25800	26370	1800
GRW-1 AIR LIFT					0
GRW-2 SUBMERSIBLE	165900	167020	167490	168210	2310
GRW-2 AIR LIFT					0
GRW-3 SUBMERSIBLE	168066	173360	175540	178960	10894
GRW-3 AIR LIFT					0
GRW-4 SUBMERSIBLE	113790	117900	119200	121810	8020
GRW-4 AIR LIFT					0
GRW-5 SUBMERSIBLE	22070	22070	22070	22070	0
GRW-5 AIR LIFT					0
GRW-6 SUBMERSIBLE	531490	534810	536140	538180	6690
GRW-6 AIR LIFT					0
GRW-10 SUBMERSIBLE	708590	708900	713200	719610	11020
GRW-10 AIR LIFT	0	0	0	0	0
GRW-11 AIR LIFT	234487	235087	237543	237804	37
GRW-12 AIR LIFT	60355	60830	62992	63109	30
GRW-13 AIR LIFT	88159	88785	90236	90237	23
STRIPPER INFLUENT	284500	306500	317300	331900	47400
TANK 102 INFLUENT	266000	271600	296400	313100	47100
TANK 103 EFFLUENT	2730	2730	2780	2820	90
TOTAL SUBMERSIBLE PUMP VOLUME, GALLONS					40734
TOTAL AIR LIFT VOLUME, GALLONS					90
TOTAL VOLUME PUMPED FOR THE WEEK, GALLONS					40824

COMMENTS:

NOTE: AIR LIFT METER READINGS ARE AN INDICATION OF THE NUMBER OF CYCLES, NOT GALLONS. THE NUMBER OF GALLONS IS AN ESTIMATE BASED ON THE APPROXIMATE VOLUME PUMPED PER CYCLE. SUBMERSIBLE PUMP METER READINGS ARE INDICATED IN GALLONS

GIANT REFINING CO. BLOOMFIELD REFINERY
METER READINGS REPORT

WEEK OF: January 22, 1990

LOCATION	PREVIOUS READING	MONDAY	WEDNESDAY	FRIDAY	VOLUME PUMPED
GRW-1 SUBMERSIBLE	26370	27170	27650	28140	1770
GRW-1 AIR LIFT					0
GRW-2 SUBMERSIBLE	168210	169290	169950	170640	2430
GRW-2 AIR LIFT					0
GRW-3 SUBMERSIBLE	178960	184470	187770	191270	12310
GRW-3 AIR LIFT					0
GRW-4 SUBMERSIBLE	121810	126230	128910	131740	9930
GRW-4 AIR LIFT					0
GRW-5 SUBMERSIBLE	22070	22070	22070	22070	0
GRW-5 AIR LIFT					0
GRW-6 SUBMERSIBLE	538180	541290	543200	545240	7060
GRW-6 AIR LIFT					0
GRW-10 SUBMERSIBLE	719610	730040	736230	742590	22980
GRW-10 AIR LIFT					0
GRW-11 AIR LIFT	237804	237808	237808	237808	0
GRW-12 AIR LIFT	63109	63409	63433	64975	222
GRW-13 AIR LIFT	90237	90622	93367	96270	718
STRIPPER INFLUENT	331900	333500	355500	355600	23700
TANK 102 INFLUENT	313100	313600	336000	337000	23900
TANK 103 EFFLUENT	2820	2910	3600	3760	940
TOTAL SUBMERSIBLE PUMP VOLUME, GALLONS					56480
TOTAL AIR LIFT VOLUME, GALLONS					940
TOTAL VOLUME PUMPED FOR THE WEEK, GALLONS					57420

COMMENTS:

NOTE: AIR LIFT METER READINGS ARE AN INDICATION OF THE NUMBER OF CYCLES, NOT GALLONS. THE NUMBER OF GALLONS IS AN ESTIMATE BASED ON THE APPROXIMATE VOLUME PUMPED PER CYCLE. SUBMERSIBLE PUMP METER READINGS ARE INDICATED IN GALLONS

GIANT REFINING CO. BLOOMFIELD REFINERY
METER READINGS REPORT

WEEK OF: January 29, 1990

LOCATION	PREVIOUS READING	MONDAY	WEDNESDAY	FRIDAY	VOLUME PUMPED
GRW-1 SUBMERSIBLE	28140	28900	29330	29790	1650
GRW-1 AIR LIFT					0
GRW-2 SUBMERSIBLE	170640	171700	172320	172960	2320
GRW-2 AIR LIFT					0
GRW-3 SUBMERSIBLE	191270	196670	199800	202780	11510
GRW-3 AIR LIFT					0
GRW-4 SUBMERSIBLE	131740	134860	136730	138540	6800
GRW-4 AIR LIFT					0
GRW-5 SUBMERSIBLE	22070	22070	22070	22070	0
GRW-5 AIR LIFT					0
GRW-6 SUBMERSIBLE	545240	548260	550070	551840	6600
GRW-6 AIR LIFT					0
GRW-10 SUBMERSIBLE	742590	751780	756360	761130	18540
GRW-10 AIR LIFT	0	0	0	0	0
GRW-11 AIR LIFT	237808	237808	237808	237808	0
GRW-12 AIR LIFT	64975	66293	67727	69322	617
GRW-13 AIR LIFT	96270	98786	101476	104466	1163
STRIPPER INFLUENT	355600	367000	372600	399700	44100
TANK 102 INFLUENT	337000	345300	356300	384500	47500
TANK 103 EFFLUENT	3760	4090	4640	5540	1780
TOTAL SUBMERSIBLE PUMP VOLUME, GALLONS					47420
TOTAL AIR LIFT VOLUME, GALLONS					1780
TOTAL VOLUME PUMPED FOR THE WEEK, GALLONS					49200

COMMENTS:

NOTE: AIR LIFT METER READINGS ARE AN INDICATION OF THE NUMBER OF CYCLES, NOT GALLONS. THE NUMBER OF GALLONS IS AN ESTIMATE BASED ON THE APPROXIMATE VOLUME PUMPED PER CYCLE. SUBMERSIBLE PUMP METER READINGS ARE INDICATED IN GALLONS

GIANT REFINING CO. BLOOMFIELD REFINERY
MONTHLY VOLUME TABULATION

MONTH OF: February 1990

LOCATION	WEEK #1	WEEK #2	WEEK #3	WEEK #4	WEEK #5	VOLUME PUMPED
GRW-1 SUBMERSIBLE	1680	1520	1550	1490	0	6240
GRW-1 AIR LIFT	0	0	0	0	0	0
GRW-2 SUBMERSIBLE	2380	2170	2280	2330	0	9160
GRW-2 AIR LIFT	0	0	0	0	0	0
GRW-3 SUBMERSIBLE	12510	11220	12150	11440	0	47320
GRW-3 AIR LIFT	0	0	0	0	0	0
GRW-4 SUBMERSIBLE	7750	7870	6770	4470	0	26860
GRW-4 AIR LIFT	0	0	0	0	0	0
GRW-5 SUBMERSIBLE	0	0	0	0	0	0
GRW-5 AIR LIFT	0	0	0	0	0	0
GRW-6 SUBMERSIBLE	6700	5900	6040	5800	0	24440
GRW-6 AIR LIFT	0	0	0	0	0	0
GRW-10 SUBMERSIBLE	18830	17910	21590	29070	0	87400
GRW-10 AIR LIFT	0	0	0	0	0	0
GRW-11 AIR LIFT	0	0	0	0	0	0
GRW-12 AIR LIFT	1106	908	655	1103	0	3772
GRW-13 AIR LIFT	2074	1642	1235	2067	0	7018
STRIPPER INFLUENT	128700	100800	46700	144700	0	420900
TANK 102 INFLUENT	126800	99200	58400	151900	0	436300
TOTAL SUBMERSIBLE PUMP VOLUME, GALLONS						201420
TOTAL AIR LIFT VOLUME, GALLONS						10790
TOTAL VOLUME PUMPED FOR THE MONTH, GALLONS						212210
CALCULATED AIR STRIPPER EFFLUENT VOLUME, GALLONS						418795.5
TOTAL VOLUME TO STORAGE, GALLONS						-206585.

GIANT REFINING CO. BLOOMFIELD REFINERY
METER READINGS REPORT

WEEK OF: February 5 1990

LOCATION	PREVIOUS READING	MONDAY	WEDNESDAY	FRIDAY	VOLUME PUMPED
GRW-1 SUBMERSIBLE	29790	30530	30940	31470	1680
GRW-1 AIR LIFT					0
GRW-2 SUBMERSIBLE	172960	174010	174600	175340	2380
GRW-2 AIR LIFT					0
GRW-3 SUBMERSIBLE	202780	208160	211300	215290	12510
GRW-3 AIR LIFT					0
GRW-4 SUBMERSIBLE	138540	141820	143810	146290	7750
GRW-4 AIR LIFT					0
GRW-5 SUBMERSIBLE	22070	22070	22070	22070	0
GRW-5 AIR LIFT					0
GRW-6 SUBMERSIBLE	551840	554770	556450	558540	6700
GRW-6 AIR LIFT					0
GRW-10 SUBMERSIBLE	761130	770120	774540	779960	18830
GRW-10 AIR LIFT	0	0	0	0	0
GRW-11 AIR LIFT	237808	237808	237808	237808	0
GRW-12 AIR LIFT	69322	71675	73047	74786	1106
GRW-13 AIR LIFT	104466	108881	111453	114711	2074
STRIPPER INFLUENT	399700	452900	485300	528400	128700
TANK 102 INFLUENT	384500	437200	465600	511300	126800
TANK 103 EFFLUENT	5540	6940	7420	8720	3180
TOTAL SUBMERSIBLE PUMP VOLUME, GALLONS					49850
TOTAL AIR LIFT VOLUME, GALLONS					3180
TOTAL VOLUME PUMPED FOR THE WEEK, GALLONS					53030
TOTAL VOLUME TO INFILTRATION GALLERY, GALLONS					128700
TOTAL VOLUME TO STORAGE					-75670
COMMENTS:					

NOTE: AIR LIFT METER READINGS ARE AN INDICATION OF THE NUMBER OF CYCLES, NOT GALLONS. THE NUMBER OF GALLONS IS AN ESTIMATE BASED ON THE APPROXIMATE VOLUME PUMPED PER CYCLE. SUBMERSIBLE PUMP METER READINGS ARE INDICATED IN GALLONS

GIANT REFINING CO. BLOOMFIELD REFINERY
METER READINGS REPORT

WEEK OF: February 12, 1990

LOCATION	PREVIOUS READING	MONDAY	WEDNESDAY	FRIDAY	VOLUME PUMPED
GRW-1 SUBMERSIBLE	31470	32090	32530	32990	1520
GRW-1 AIR LIFT					0
GRW-2 SUBMERSIBLE	175340	176210	176830	177510	2170
GRW-2 AIR LIFT					0
GRW-3 SUBMERSIBLE	215290	220080	222830	226510	11220
GRW-3 AIR LIFT					0
GRW-4 SUBMERSIBLE	146290	149470	151260	154160	7870
GRW-4 AIR LIFT					0
GRW-5 SUBMERSIBLE	22070	22070	22070	22070	0
GRW-5 AIR LIFT					0
GRW-6 SUBMERSIBLE	558540	561160	562650	564440	5900
GRW-6 AIR LIFT					0
GRW-10 SUBMERSIBLE	779960	786400	791220	797870	17910
GRW-10 AIR LIFT	0	0	0	0	0
GRW-11 AIR LIFT	237808	237808	237808	237808	0
GRW-12 AIR LIFT	74786	76862	78470	80062	908
GRW-13 AIR LIFT	114711	118600	121607	124250	1642
STRIPPER INFLUENT	528400	571600	629200	629200	100800
TANK 102 INFLUENT	511300	559000	608100	610500	99200
TANK 103 EFFLUENT	8720	9700	10940	11270	2550
TOTAL SUBMERSIBLE PUMP VOLUME, GALLONS					46590
TOTAL AIR LIFT VOLUME, GALLONS					2550
TOTAL VOLUME PUMPED FOR THE WEEK, GALLONS					49140
TOTAL VOLUME TO INFILTRATION GALLERY, GALLONS					100800
TOTAL VOLUME TO STORAGE, GALLONS					-51660
COMMENTS:					

NOTE: AIR LIFT METER READINGS ARE AN INDICATION OF THE NUMBER OF CYCLES, NOT GALLONS. THE NUMBER OF GALLONS IS AN ESTIMATE BASED ON THE APPROXIMATE VOLUME PUMPED PER CYCLE. SUBMERSIBLE PUMP METER READINGS ARE INDICATED IN GALLONS

GIANT REFINING CO. BLOOMFIELD REFINERY
METER READINGS REPORT

WEEK OF: February 19, 1990

LOCATION	PREVIOUS READING	MONDAY	WEDNESDAY	FRIDAY	VOLUME PUMPED
GRW-1 SUBMERSIBLE	32990	33890	34110	34540	1550
GRW-1 AIR LIFT					0
GRW-2 SUBMERSIBLE	177510	178800	179120	179790	2280
GRW-2 AIR LIFT					0
GRW-3 SUBMERSIBLE	226510	233660	235250	238660	12150
GRW-3 AIR LIFT					0
GRW-4 SUBMERSIBLE	154160	159730	160930	160930	6770
GRW-4 AIR LIFT					0
GRW-5 SUBMERSIBLE	22070	22070	22070	22070	0
GRW-5 AIR LIFT					0
GRW-6 SUBMERSIBLE	564440	567840	568640	570480	6040
GRW-6 AIR LIFT					0
GRW-10 SUBMERSIBLE	797870	810610	813560	819460	21590
GRW-10 AIR LIFT	0	0	0	0	0
GRW-11 AIR LIFT	237808	237808	237808	237808	0
GRW-12 AIR LIFT	80062	80270	81038	82567	655
GRW-13 AIR LIFT	124560	124984	126422	129287	1235
STRIPPER INFLUENT	629200	632200	652500	675900	46700
TANK 102 INFLUENT	610500	617500	631500	668900	58400
TANK 103 EFFLUENT	11270	11660	12200	13160	1890
TOTAL SUBMERSIBLE PUMP VOLUME, GALLONS					50380
TOTAL AIR LIFT VOLUME, GALLONS					1890
TOTAL VOLUME PUMPED FOR THE WEEK, GALLONS					52270
TOTAL VOLUME TO INFILTRATION GALLERY, GALLONS					46700
TOTAL VOLUME TO STORAGE, GALLONS					5570
COMMENTS:					

NOTE: AIR LIFT METER READINGS ARE AN INDICATION OF THE NUMBER OF CYCLES, NOT GALLONS. THE NUMBER OF GALLONS IS AN ESTIMATE BASED ON THE APPROXIMATE VOLUME PUMPED PER CYCLE. SUBMERSIBLE PUMP METER READINGS ARE INDICATED IN GALLONS

GIANT REFINING CO. BLOOMFIELD REFINERY
METER READINGS REPORT

WEEK OF: February 26, 1990

LOCATION	PREVIOUS READING	MONDAY	WEDNESDAY	FRIDAY	VOLUME PUMPED
GRW-1 SUBMERSIBLE	34540	35610	*	36030	1490
GRW-1 AIR LIFT					0
GRW-2 SUBMERSIBLE	179790	181460	*	182120	2330
GRW-2 AIR LIFT					0
GRW-3 SUBMERSIBLE	238660	246910	*	250100	11440
GRW-3 AIR LIFT					0
GRW-4 SUBMERSIBLE	160930	163280	*	165400	4470
GRW-4 AIR LIFT					0
GRW-5 SUBMERSIBLE	22070	22070	*	22070	0
GRW-5 AIR LIFT					0
GRW-6 SUBMERSIBLE	570480	574750	*	576280	5800
GRW-6 AIR LIFT					0
GRW-10 SUBMERSIBLE	819460	837000	*	848530	29070
GRW-10 AIR LIFT					0
GRW-11 AIR LIFT	237808	237808	*	237808	0
GRW-12 AIR LIFT	82567	86328	*	87857	1103
GRW-13 AIR LIFT	129287	136332	*	139197	2067
STRIPPER INFLUENT	675900	781000	*	820600	144700
TANK 102 INFLUENT	668900	771500	*	820800	151900
TANK 103 EFFLUENT	13160	15360	*	16330	3170
TOTAL SUBMERSIBLE PUMP VOLUME, GALLONS					54600
TOTAL AIR LIFT VOLUME, GALLONS					3170
TOTAL VOLUME PUMPED FOR THE WEEK, GALLONS					57770
TOTAL VOLUME TO INFILTRATION GALLERY, GALLONS					144700
TOTAL VOLUME TO STORAGE, GALLONS					-86930
COMMENTS:					

NOTE: AIR LIFT METER READINGS ARE AN INDICATION OF THE NUMBER OF CYCLES, NOT GALLONS. THE NUMBER OF GALLONS IS AN ESTIMATE BASED ON THE APPROXIMATE VOLUME PUMPED PER CYCLE. SUBMERSIBLE PUMP METER READINGS ARE INDICATED IN GALLONS

GIANT REFINING CO. BLOOMFIELD REFINERY
MONTHLY VOLUME TABULATION

MONTH OF: March 1990

LOCATION	WEEK #1	WEEK #2	WEEK #3	WEEK #4	WEEK #5	VOLUME PUMPED
GRW-1 SUBMERSIBLE	1510	1080	1530	1050	0	5170
GRW-1 AIR LIFT	0	0	0	0	0	0
GRW-2 SUBMERSIBLE	2330	1680	2450	1740	0	8200
GRW-2 AIR LIFT	0	0	0	0	0	0
GRW-3 SUBMERSIBLE	11040	5300	11370	8460	0	36170
GRW-3 AIR LIFT	0	0	0	0	0	0
GRW-4 SUBMERSIBLE	8550	7100	9210	6860	0	31720
GRW-4 AIR LIFT	0	0	0	0	0	0
GRW-5 SUBMERSIBLE	0	0	0	0	0	0
GRW-5 AIR LIFT	0	0	0	0	0	0
GRW-6 SUBMERSIBLE	6060	4570	6230	4890	0	21750
GRW-6 AIR LIFT	0	0	0	0	0	0
GRW-10 SUBMERSIBLE	44400	32720	48990	31620	0	157730
GRW-10 AIR LIFT	0	0	0	0	0	0
GRW-11 AIR LIFT	0	2500	2312	1179	0	5991
GRW-12 AIR LIFT	1181	1330	1052	839	0	4402
GRW-13 AIR LIFT	2209	2500	1916	1633	0	8258
STRIPPER INFLUENT	159700	102600	99900	71900	0	434100
TANK 102 INFLUENT	183900	136100	105300	97700	0	523000
TOTAL SUBMERSIBLE PUMP VOLUME, GALLONS						260740
TOTAL AIR LIFT VOLUME, GALLONS						18651
TOTAL VOLUME PUMPED FOR THE MONTH, GALLONS						279391
CALCULATED AIR STRIPPER EFFLUENT VOLUME, GALLONS						431929.5
TOTAL VOLUME TO STORAGE, GALLONS						-152538.

GIANT REFINING CO. BLOOMFIELD REFINERY
METER READINGS REPORT

WEEK OF: March 5, 1990

LOCATION	PREVIOUS READING	MONDAY	WEDNESDAY	FRIDAY	VOLUME PUMPED
GRW-1 SUBMERSIBLE	36030	36700	37100	37540	1510
GRW-1 AIR LIFT					0
GRW-2 SUBMERSIBLE	182120	183170	183780	184450	2330
GRW-2 AIR LIFT					0
GRW-3 SUBMERSIBLE	250100	254810	257790	261140	11040
GRW-3 AIR LIFT					0
GRW-4 SUBMERSIBLE	165400	168910	171170	173950	8550
GRW-4 AIR LIFT					0
GRW-5 SUBMERSIBLE	22070	22070	22070	22070	0
GRW-5 AIR LIFT					0
GRW-6 SUBMERSIBLE	576280	578880	580500	1840	6060
GRW-6 AIR LIFT					0
GRW-10 SUBMERSIBLE	848530	867550	878820	14110	44400
GRW-10 AIR LIFT	0	0	0	0	0
GRW-11 AIR LIFT	237808	237808	237808	237808	0
GRW-12 AIR LIFT	87857	90191	91652	93225	1181
GRW-13 AIR LIFT	139197	143565	146307	149238	2209
STRIPPER INFLUENT	820600	893700	934500	980300	159700
TANK 102 INFLUENT	820800	901000	949600	1004700	183900
TANK 103 EFFLUENT	16330	17770	18670	19720	3390
TOTAL SUBMERSIBLE PUMP VOLUME, GALLONS					73890
TOTAL AIR LIFT VOLUME, GALLONS					3390
TOTAL VOLUME PUMPED FOR THE WEEK, GALLONS					77280
CALCULATED AIR STRIPPER EFFLUENT VOLUME, GALLONS					158901.5
TOTAL VOLUME TO STORAGE, GALLONS					-81621.5
COMMENTS:					

NOTE: AIR LIFT METER READINGS ARE AN INDICATION OF THE NUMBER OF CYCLES, NOT GALLONS. THE NUMBER OF GALLONS IS AN ESTIMATE BASED ON THE APPROXIMATE VOLUME PUMPED PER CYCLE. SUBMERSIBLE PUMP METER READINGS ARE INDICATED IN GALLONS

GIANT REFINING CO. BLOOMFIELD REFINERY
METER READINGS REPORT

WEEK OF: March 12, 1990

LOCATION	PREVIOUS READING	MONDAY	WEDNESDAY	FRIDAY	VOLUME PUMPED
GRW-1 SUBMERSIBLE	37540	38190	38610	38620	1080
GRW-1 AIR LIFT					0
GRW-2 SUBMERSIBLE	184450	185440	186120	186130	1680
GRW-2 AIR LIFT					0
GRW-3 SUBMERSIBLE	261140	264690	266430	266440	5300
GRW-3 AIR LIFT					0
GRW-4 SUBMERSIBLE	173950	178200	181010	181050	7100
GRW-4 AIR LIFT					0
GRW-5 SUBMERSIBLE	22070	22070	22070	22070	0
GRW-5 AIR LIFT					0
GRW-6 SUBMERSIBLE	1840	4540	6380	6410	4570
GRW-6 AIR LIFT					0
GRW-10 SUBMERSIBLE	14110	14110	30940	46830	32720
GRW-10 AIR LIFT	0	0	0	0	0
GRW-11 AIR LIFT	237808	242277	245137	248050	2500
GRW-12 AIR LIFT	93225	95577	97111	98676	1330
GRW-13 AIR LIFT	149238	153679	156548	159480	2500
STRIPPER INFLUENT	980300	1044700	1066100	1082900	102600
TANK 102 INFLUENT	1004700	1085500	1120800	1140800	136100
TANK 103 EFFLUENT	19720	22720	24460	26050	6330
TOTAL SUBMERSIBLE PUMP VOLUME, GALLONS					52450
TOTAL AIR LIFT VOLUME, GALLONS					6330
TOTAL VOLUME PUMPED FOR THE WEEK, GALLONS					58780
CALCULATED AIR STRIPPER EFFLUENT VOLUME, GALLONS					102087
TOTAL VOLUME TO STORAGE, GALLONS					-43307
COMMENTS: Power to submersibles was off for a period of time from 3-14-90 to 3-16-90.					

NOTE: AIR LIFT METER READINGS ARE AN INDICATION OF THE NUMBER OF CYCLES, NOT GALLONS. THE NUMBER OF GALLONS IS AN ESTIMATE BASED ON THE APPROXIMATE VOLUME PUMPED PER CYCLE. SUBMERSIBLE PUMP METER READINGS ARE INDICATED IN GALLONS

GIANT REFINING CO. BLOOMFIELD REFINERY
METER READINGS REPORT

WEEK OF: March 19, 1990

LOCATION	PREVIOUS READING	MONDAY	WEDNESDAY	FRIDAY	VOLUME PUMPED
GRW-1 SUBMERSIBLE	38620	39300	39750	40150	1530
GRW-1 AIR LIFT					0
GRW-2 SUBMERSIBLE	186130	187230	187980	188580	2450
GRW-2 AIR LIFT					0
GRW-3 SUBMERSIBLE	266440	271220	274620	3190	11370
GRW-3 AIR LIFT					0
GRW-4 SUBMERSIBLE	181050	184880	187750	190260	9210
GRW-4 AIR LIFT					0
GRW-5 SUBMERSIBLE	22070	22070	22070	22070	0
GRW-5 AIR LIFT					0
GRW-6 SUBMERSIBLE	6410	8980	10970	12640	6230
GRW-6 AIR LIFT					0
GRW-10 SUBMERSIBLE	46830	66740	87220	95820	48990
GRW-10 AIR LIFT	0	0	0	0	0
GRW-11 AIR LIFT	248050	251955	255030	259740	2312
GRW-12 AIR LIFT	98676	100769	102419	103996	1052
GRW-13 AIR LIFT	159480	163406	166497	169171	1916
STRIPPER INFLUENT	1082900	1120000	1161700	1182800	99900
TANK 102 INFLUENT	1140800	1187000	1221800	1246100	105300
TANK 103 EFFLUENT	26050	28150	29820	31330	5280
TOTAL SUBMERSIBLE PUMP VOLUME, GALLONS					79780
TOTAL AIR LIFT VOLUME, GALLONS					5280
TOTAL VOLUME PUMPED FOR THE WEEK, GALLONS					85060
CALCULATED AIR STRIPPER EFFLUENT VOLUME, GALLONS					99400.5
TOTAL VOLUME TO STORAGE, GALLONS					-14340.5
COMMENTS:					

NOTE: AIR LIFT METER READINGS ARE AN INDICATION OF THE NUMBER OF CYCLES, NOT GALLONS. THE NUMBER OF GALLONS IS AN ESTIMATE BASED ON THE APPROXIMATE VOLUME PUMPED PER CYCLE. SUBMERSIBLE PUMP METER READINGS ARE INDICATED IN GALLONS

GIANT REFINING CO. BLOOMFIELD REFINERY
METER READINGS REPORT

WEEK OF: March 26, 1990

LOCATION	PREVIOUS READING	MONDAY	WEDNESDAY	FRIDAY	VOLUME PUMPED
GRW-1 SUBMERSIBLE	40150	80750	41200	41200	1050
GRW-1 AIR LIFT					0
GRW-2 SUBMERSIBLE	188580	189520	190320	190320	1740
GRW-2 AIR LIFT					0
GRW-3 SUBMERSIBLE	3190	8040	11650	11650	8460
GRW-3 AIR LIFT					0
GRW-4 SUBMERSIBLE	190260	194190	197120	197120	6860
GRW-4 AIR LIFT					0
GRW-5 SUBMERSIBLE	22070	22070	22070	22070	0
GRW-5 AIR LIFT					0
GRW-6 SUBMERSIBLE	12640	15440	17530	17530	4890
GRW-6 AIR LIFT					0
GRW-10 SUBMERSIBLE	95820	115460	127440	127440	31620
GRW-10 AIR LIFT					0
GRW-11 AIR LIFT	259740	261962	265031	265031	1179
GRW-12 AIR LIFT	103996	106124	107760	107760	839
GRW-13 AIR LIFT	169171	173433	176500	176500	1633
STRIPPER INFLUENT	1182800	1223700	1244700	1254700	71900
TANK 102 INFLUENT	1246100	1314700	1343800	1343800	97700
TANK 103 EFFLUENT	31330	33400	34980	34980	3650
TOTAL SUBMERSIBLE PUMP VOLUME, GALLONS					54620
TOTAL AIR LIFT VOLUME, GALLONS					3650
TOTAL VOLUME PUMPED FOR THE WEEK, GALLONS					58270
CALCULATED AIR STRIPPER EFFLUENT VOLUME, GALLONS					71540.5
TOTAL VOLUME TO STORAGE, GALLONS					-13270.5
COMMENTS: No meter readings were taken on 3/30/90					

NOTE: AIR LIFT METER READINGS ARE AN INDICATION OF THE NUMBER OF CYCLES, NOT GALLONS. THE NUMBER OF GALLONS IS AN ESTIMATE BASED ON THE APPROXIMATE VOLUME PUMPED PER CYCLE. SUBMERSIBLE PUMP METER READINGS ARE INDICATED IN GALLONS

6.0 VOLUME TABULATIONS

Giant Refining Co. Bloomfield Refinery
Total Volume Summary

First Quarter 1990

```
=====
Total Volume Of Water Recovered      726009
Net Change In Storage Volume         -357887
=====
Total Water Pumped To The            1083896
Air Stripper

Air Stripped Water Volume            1062700
As Indicated On The Air
Stripper Influent Meter
=====
Difference                           21196
```

Comments: The difference indicated is
within the accuracy tolerance
of the meters

Giant Refining Co. Bloomfield Refinery
Quarterly Recovery Well
Volume Tabulation

1st Quarter 1990

	Well	Month #1	Month #2	Month #3	Total
	GRW-1	9300	6240	5170	20710
	GRW-2	12650	9160	8200	30010
	GRW-3	43170	47320	36170	126660
	GRW-4	39960	26860	31720	98540
	GRW-5	0	0	0	0
	GRW-6	37490	24440	21750	83680
	GRW-10	73940	87400	157730	319070
	GRW-11	9279	0	5991	15270
	GRW-12	4208	3772	4402	12382
	GRW-13	4411	7018	8258	19687
Total Volume Pumped In Gallons					726009

Giant Refining Co. Bloomfield Refinery
Quarterly Net Tank
Volume Change

First Quarter 1990

Tank Number	Beginning Volume	Ending Volume	Net Change
102	4508	16059	11551
106	8010	8010	0
21	0	0	0
22	386899	17461	-369438
27	185631	185631	0
32	159291	159291	0
34	200948	200948	0
35	0	0	0
37	352232	352232	0
Total Net Volume Change			-357887

7.0 SPECIFIC CONDUCTANCE VALUES

SPECIFIC CONDUCTANCE VALUES
FOR GRW-13 IN umhos/cm
FIRST QUARTER 1990

<u>1/90</u>	<u>2/90</u>	<u>3/90</u>
6343	5000	6000

8.0 DATA COLLECTED BY GROUNDWATER TECHNOLOGY, INC.

In August, 1989, the Bureau of Land Management ("BLM") requested that Giant provide all well and soil sample data collected by Giant on its property. In response, Giant provided BLM with extensive information concerning Giant's investigation of soil and ground water conditions south of the Lee Acres Landfill. In transmitting this information to BLM and the Oil Conservation Division, Giant noted that the only well and soil sample data not provided related to an investigation conducted by Groudwater Technology, Inc. The data were collected from boreholes for the purpose of providing background information about the site. The following pages of the report contain the data from that investigation.



A division of Groundwater Technology, Inc.

Western Region

4080-C Pike Lane, Concord, CA 94520

(415) 685-7852

(800) 544-3422 *from inside California*

(800) 423-7143 *from outside California*

12-22-87 MH

Page 1 of 2

PROJECT MGR: Tom Fox

Groundwater Technology, Inc.

6879 S. Emporia

Englewood, CO 80112

PROJECT #: 230-799-5009-4

LOCATION: Farmington, NM

SAMPLED: 12-15/15-87

BY: M. Wood

RECEIVED: 12-18-87

BY: K. Biava

ANALYZED: 12-19-87

BY: J. Floro

MATRIX: Water

TEST RESULTS (ppb)

COMPOUNDS	MDL	LAB #	11071	11056	11057	11058	11059
		I.I.D. #	TH-8	TH-9	TH-11	TH-12	TH-13
Benzene	0.5		1	1	<0.5	<0.5	<0.5
Ethylbenzene	0.5		<0.5	1	<0.5	<0.5	18
Toluene	0.5		2	3	<0.5	<0.5	1
Xylenes	0.5		<0.5	5	<0.5	<0.5	58
Total BTEX	0.5		3	10	<0.5	<0.5	77
Misc. Hydrocarbons (C4-12)	1		5	13	<1	<1	380
Total Petroleum Hydrocarbons as Gasoline	1		8	23	<1	<1	460

MDL = Method Detection Limit; compounds below this level would not be detected.

Results rounded to two significant figures.

METHODS: Modified EPA 5030/8015/8020.



A division of Groundwater Technology, Inc.

Western Region

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Page 2 of 2

PROJECT MGR: Tom Fox

PROJECT #: 230-799-5009-4

LOCATION: Farmington, NM

TEST RESULTS

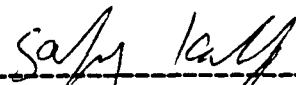
(ppb)

COMPOUNDS	MDL	LAB # I.D.#	11060 TH-14	11061 TH-15
Benzene	0.5		2	70
Ethylbenzene	0.5		2	13
Toluene	0.5		1	6
Xylenes	0.5		8	70
Total BTEX	0.5		13	160
Misc. Hydrocarbons (C4-C12)	1		25	8600
Total Petroleum Hydrocarbons as Gasoline	1		38	8800

Results rounded to two significant figures.

MDL = Method Detection Limit; compound below this level would not be detected.

METHODS: Modified EPA 5030/8015/8020.


SAFY KHALIFA, Ph.D., Director

Western Region

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12-22-87 MH

Page 1 of 2

PROJECT MGR: Tom Fox

Groundwater Technology, Inc.

6879 S. Emporia, #4

Englewood, CO 80112

PROJECT #: 230-799-5009-5

LOCATION: Farmington, NM

SAMPLED: 12-11/15/87 BY: M. Wood

RECEIVED: 12-18-87 BY: K. Biava

ANALYZED: 12-21-87 BY: E. Popek

MATRIX:

TEST RESULTS		(ppb)					
COMPOUND	MDL	LAB # I.I.D. #	11072 TH-8	11073 TH-9	11074 TH-11	11075 TH-12	
Bromodichloromethane	0.5		0.5	0.5	0.5	0.5	
Bromoform	0.5		0.5	0.5	0.5	0.5	
Bromomethane	0.5		0.5	0.5	0.5	0.5	
Carbon tetrachloride	0.5		0.5	0.5	0.5	0.5	
Chlorobenzene	0.5		0.5	0.5	0.5	0.5	
Chloroethane	0.5		20	0.5	0.5	0.5	
2-Chloroethylvinyl ether	1.0		1.0	1.0	1.0	1.0	
Chloroform	2.0		2.0	2.0	2.0	2.0	
Chloromethane	0.5		0.5	0.5	0.5	0.5	
Dibromochloromethane	0.5		0.5	0.5	0.5	0.5	
1,2-Dichlorobenzene	0.5		0.5	0.5	0.5	0.5	
1,3-Dichlorobenzene	0.5		0.5	0.5	0.5	0.5	
1,4-Dichlorobenzene	0.5		0.5	0.5	0.5	0.5	
1,1-Dichloroethane	0.5		12	0.5	0.5	0.5	
1,2-Dichloroethane	0.5		0.5	0.5	0.5	0.5	
1,1-Dichloroethene	0.2		0.2	0.2	0.2	6.0	
trans-1,2-Dichloroethene	2.0		2.0	2.0	2.0	2.0	
1,2-Dichloropropane	0.5		0.5	0.5	0.5	0.5	
cis-1,3-Dichloropropene	0.5		0.5	0.5	0.5	0.5	
trans-1,3-Dichloropropene	0.5		0.5	0.5	0.5	0.5	
Methylene chloride	2.0		7.0	7.0	8	28	
1,1,2,2-Tetrachloroethane	0.5		0.5	0.5	0.5	0.5	
Tetrachloroethene	0.5		0.5	0.5	0.5	1.0	
1,1,1-Trichloroethane	0.5		1.0	0.5	0.5	0.5	
1,1,2-Trichloroethane	0.5		0.5	0.5	0.5	0.5	
Trichloroethene	0.5		0.5	0.5	0.5	0.5	
Trichlorofluoromethane	0.5		0.5	0.5	0.5	0.5	
Vinyl Chloride	1.0		1.0	1.0	1.0	1.0	

MDL = Method Detection Limit.

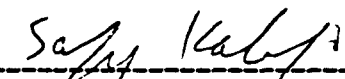
METHOD: EPA 8010.

Western Region
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(415) 685-7852
(800) 544-3422 from inside California
(800) 423-7143 from outside California

PROJECT MGR: Tom Fox
PROJECT ID#: 230-799-5009-5
LOCATION: Farmington, NM

TEST RESULTS		(ppb)			
COMPOUND	MDL	LAB # I.I.D.#	11076 TH-13	11077 TH-14	11078 TH-15
Bromodichloromethane	0.5		0.5	0.5	0.5
Bromoform	0.5		0.5	0.5	0.5
Bromomethane	0.5		0.5	0.5	0.5
Carbon tetrachloride	0.5		0.5	0.5	0.5
Chlorobenzene	0.5		0.5	0.5	0.5
Chloroethane	0.5		0.5	0.5	0.5
2-Chloroethylvinyl ether	1.0		1.0	1.0	1.0
Chloroform	2.0		2.0	2.0	2.0
Chloromethane	0.5		0.5	0.5	0.5
Dibromochloromethane	0.5		0.5	0.5	0.5
1,2-Dichlorobenzene	0.5		0.5	0.5	0.5
1,3-Dichlorobenzene	0.5		0.5	0.5	0.5
1,4-Dichlorobenzene	0.5		0.5	0.5	0.5
1,1-Dichloroethane	0.5		16	0.5	8.0
1,2-Dichloroethane	0.5		2.0	0.5	54
1,1-Dichloroethene	0.2		0.2	0.2	0.2
trans-1,2-Dichloroethene	2.0		23	2.0	2.0
1,2-Dichloropropane	0.5		0.5	0.5	0.5
cis-1,3-Dichloropropene	0.5		0.5	0.5	0.5
trans-1,3-Dichloropropene	0.5		0.5	0.5	0.5
Methylene chloride	2.0		31	10	10
1,1,2,2-Tetrachloroethane	0.5		0.5	0.5	0.5
Tetrachloroethene	0.5		12	0.5	7.0
1,1,1-Trichloroethane	0.5		9.0	0.5	0.5
1,1,2-Trichloroethane	0.5		0.5	0.5	0.5
Trichloroethene	0.5		7.0	0.5	4.0
Trichlorofluoromethane	0.5		0.5	0.5	0.5
Vinyl Chloride	1.0		1.0	1.0	1.0

MDL = Method Detection Limit.
METHOD: EPA 8010.


SAFY KHALIFA, Ph.D., Director



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1/07/88 rw

PROJECT MGR: Tom Fox

Groundwater Technology, Inc.

6879 S. Emporia

Englewood, CO 80112

PROJECT #:230-799-5009-3

LOCATION: Farmington, NM

SAMPLED: 12/11-15/87

BY: M. Wood

RECEIVED: 12/18/87

BY: K. Biava

ANALYZED: 12/25/87

BY: L. Hinson

MATRIX: Soil

R. Craven

TEST RESULTS

ppm (mg/kg)

PARAMETER	MDL	LAB # I.D.#	11062C	11063C	11064C	11065C
			14-45	8-30	12-30	11-30

Total Petroleum
Hydrocarbons as
Diesel

5

< 5

< 5

< 5

< 5

MDL = Method Detection Limit.

METHOD: Modified 8270/3550.

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PROJECT MGR: Tom Fox
PROJECT #: 230-799-5009-3
LOCATION: Farmington, NM

TEST RESULTS		(ppm)				
PARAMETER	MDL	LAB #	11066C	11067C	11068C	11069C
		I.D.#	16-20	6-20	9-30	13-35
Total Petroleum Hydrocarbons as Diesel	5		1500	< 5	< 5	450

MDL = Method Detection Limit.
METHOD: Modified 8270/3550.

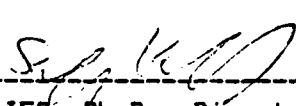
Western Region
 4080-C Pike Lane, Concord, CA 94520
 (415) 685-7852
 (800) 544-3422 from inside California
 (800) 423-7143 from outside California

PROJECT MGR: Tom Fox
 PROJECT #: 230-799-5009-3
 LOCATION: Farmington, NM

TEST RESULTS		(ppm)
PARAMETER	MDL	I.D.#
		LAB #
		11070C
		15-30

Total Petroleum 5 < 5
 Hydrocarbons as
 Diesel

MDL = Method Detection Limit.
 METHOD: Modified 8270/3550.


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Page 1 of 2

12/30/87 rw

PROJECT MGR: Tom Fox
Groundwater Technology, Inc.
6879 S. Emporia
Englewood, CO 80112

PROJECT #: 230-799-5009-6

LOCATION: Farmington, NM

SAMPLED: 12/11-15/87 BY: M. Wood

RECEIVED: 12/18/87 BY: K. Biava

ANALYZED: 12/29/87 BY: L. Hinson

MATRIX: Water R. Craven

TEST RESULTS (ppb)

PARAMETER	MDL	LAB #	11079	11080	11081	11082
		I.D.#	TH-8	TH-9	TH-11	TH-12

Total Petroleum	250	< 250	< 250	< 250	< 250
Hydrocarbons as					
Diesel					

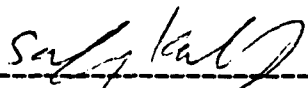
MDL = Method Detection Limit.
METHOD: Modified 625/3510.

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(800) 423-7143 *from outside California*

PROJECT MGR: Tom Fox
PROJECT #: 230-799-5009-6
LOCATION: Farmington, NM

TEST RESULTS		(ppb)			
PARAMETER	MDL	LAB #	11083	11084	11085
		I.D. #	TH-13	TH-14	TH-15
Total Petroleum Hydrocarbons as Diesel	250		< 250	< 250	< 250

MDL = Method Detection Limit.
METHOD: Modified 625/3510.


SAFY KHALIFA, Ph.D., Director

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PROJECT MGR: Tom Fox

Groundwater Technology, Inc.

6879 S. Emporia, #4

Englewood, CO 80112

PROJECT #: 230-799-5009-7

LOCATION: Farmington, NM

SAMPLED: 12-11/15-87

BY: M. Wood

RECEIVED: 12-18-87

BY: K. Biava

ANALYZED: 12-30-87

BY: C. Miller

MATRIX: Water

P. Voitoff

TEST RESULTS

PARAMETER	MDL	LAB # I.D.#	11086 TH-9	11087 TH-11	11088 TH-12
pH			7.5	7.4	7.5
Methyl Orange Alkalinity (mg CaCO ₃ /L)	10		184	202	194
Calcium Hardness (mg CaCO ₃ /L)	1		1750	1200	1350
TDS (mg/L)	10		5810	2670	3040

MDL = Method Detection Limit.

METHODS: pH by Standard Method 423, Ion Specific Electrode

Alkalinity by Standard Method 403 (Total Alkalinity calculations)

TDS by Standard Method 209B.

Calcium Hardness by Standard Method 314A, RCRA 6010.

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PROJECT MGR: Tom Fox

PROJECT #: 230-799-5009-7

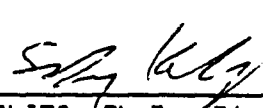
LOCATION: Farmington, NM

TEST RESULTS

PARAMETER	MDL	LAB #	11089	11090	
		I.D.#	TH-13	TH-14	
pH			7.0	7.7	
Methyl Orange Alkalinity (mg CaCO ₃ /L)	10		300	137	
Calcium Hardness (mg CaCO ₃ /L)	1		800	1200	
TDS (mg/L)	10		4560	4030	

MDL = Method Detection Limit.

METHODS: pH by Standard Method 423, Ion Specific Electrode
Alkalinity by Standard Method 403 (Total Alkalinity calculations)
TDS by Standard Method 209B
Calcium Hardness by Standard Method 314A, RCRA 6010


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1/04/88 rw

PROJECT MGR: Tom Fox

Groundwater Technology, Inc.

6879 S. Emporia, #4

Englewood, CO 80112

PROJECT #: 230-799-5009-2

LOCATION: Farmington, NM

SAMPLED: 12/11-14/87

BY: M. Wood

RECEIVED: 12-18-87

BY: K. Biava

ANALYZED: 12-23-87

BY: K. Patton

MATRIX: Soil

TEST RESULTS (mg/kg = ppm)

COMPOUNDS	MDL	LAB # I.I.D.#	11062B 14-45	11063B 8-30	11064B 12-30	11065B 11-30	11066B 16-20
Benzene	0.5		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene	0.5		< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Toluene	0.5		< 0.5	< 0.5	< 0.5	< 0.5	1
Xylenes	0.5		< 0.5	< 0.5	< 0.5	< 0.5	3
Total BTEX	0.5		< 0.5	< 0.5	< 0.5	< 0.5	4
Misc. Hydrocarbons (C4-12)	1.0		4	4	< 1.0	< 1.0	360
Total Petroleum Hydrocarbons as Gasoline	1.0		4	4	< 1.0	< 1.0	370

MDL = Method Detection Limit; compounds below this level would not be detected.

Results rounded to two significant figures.

METHODS: Modified EPA Methods 5030/8015/8020.

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PROJECT MGR: Tom Fox
PROJECT #: 230-799-5009-2
LOCATION: Farmington, NM

TEST RESULTS

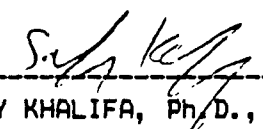
(mg/kg = ppm)

COMPOUNDS	MDL	LAB #	11067B	11068B	11069B	11070B
		I.D. #	6-20	9-30	13-35	15-30
Benzene	0.5		< 0.5	< 0.5	< 0.5	< 0.5
Ethylbenzene	0.5		< 0.5	< 0.5	2	< 0.5
Toluene	0.5		< 0.5	< 0.5	< 0.5	< 0.5
Xylenes	0.5		< 0.5	< 0.5	15	< 0.5
Total BTEX	0.5		< 0.5	< 0.5	17	< 0.5
Misc. Hydrocarbons (C4-C12)	1.0		< 1.0	< 1.0	410	< 1.0
Total Petroleum Hydrocarbons as Gasoline	1.0		< 1.0	< 1.0	430	< 1.0

Results rounded to two significant figures.

MDL = Method Detection Limit; compound below this level would not be detected.

METHODS: Modified EPA Methods 5030/8020/8015.


SAFY KHALIFA, Ph.D., Director