

GW - 40

MONITORING REPORTS

DATE:

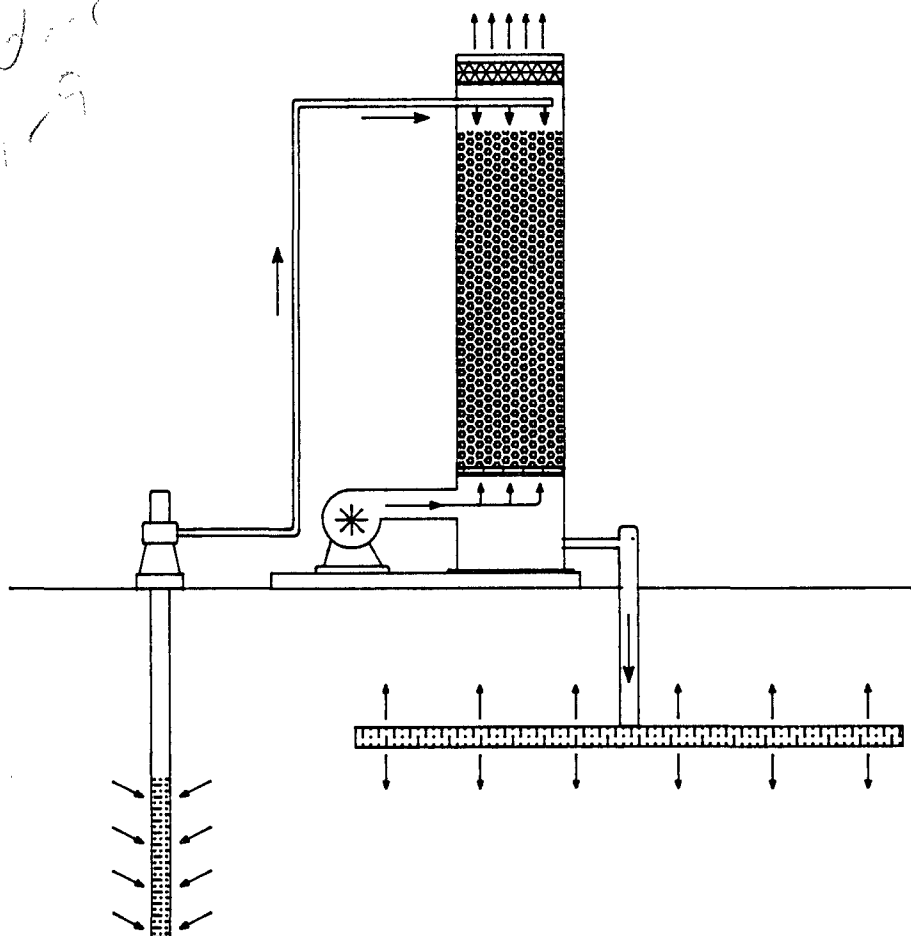
1989

GIANT

REFINING CO.

BLOOMFIELD REFINERY REMEDATION PROJECT

4th Dec
17-9



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

(505) 632-3306
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QUARTERLY DATA REPORT
GIANT BLOOMFIELD REFINERY
FOURTH QUARTER 1989

Prepared by:

GIANT REFINING CO
606 E. Highway 64
Post Office Box 256
Farmington, New Mexico 87401
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- 1.2 Purgeable Aromatics EPA 602/8020
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1.0 MONTHLY AIR STRIPPER ANALYSES

1.1 GENERAL WATER CHEMISTRY

CLIENT: Geoscience Consultants

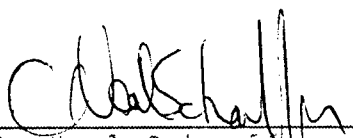
DATE REPORTED: 12/20/89

SITE: Stripper Influent
LAB NO: F3672

DATE RECEIVED: 12/13/89
DATE COLLECTED: 12/12/89

Lab pH (s.u.).....	7.75
Lab Conductivity, umhos/cm.....	4780
Lab resistivity, ohm-m.....	2.0921
Total Dissolved Solids (180), mg/l..	3452
Total Dissolved Solids (calc), mg/l.	3421
Total Alkalinity as CaCO ₃ , mg/l.....	586.08
Total Acidity as CaCO ₃ , mg/l.....	0.00
Total Hardness as CaCO ₃ , mg/l.....	1310.49
Sodium Absorption Ratio.....	8.21

	mg/l	meq/l
Bicarbonate as HCO ₃	715.02	11.72
Carbonate as CO ₃	0.00	0.00
Chloride.....	599.53	16.91
Sulfate.....	1311.86	27.33
Calcium.....	389.52	19.44
Magnesium.....	82.36	6.77
Potassium.....	2.96	0.08
Sodium.....	683.60	29.73
Major Cations.....		56.02
Major Anions.....		55.96
Cation/Anion Difference.....		0.05 %


C. Neal Schaeffer
Senior Chemist

CLIENT: Geoscience Consultants

DATE REPORTED: 12/20/89

SITE: Effluent

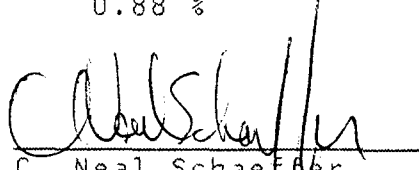
DATE RECEIVED: 12/13/89

LAB NO: F3673

DATE COLLECTED: 12/12/89

Lab pH (s.u.).....	7.92
Lab Conductivity, umhos/cm.....	4767
Lab resistivity, ohm-m.....	2.0978
Total Dissolved Solids (180), mg/l..	3416
Total Dissolved Solids (calc), mg/l.	3433
Total Alkalinity as CaCO ₃ , mg/l.....	562.32
Total Acidity as CaCO ₃ , mg/l.....	0.00
Total Hardness as CaCO ₃ , mg/l.....	1268.38
Sodium Absorption Ratio.....	8.21

	mg/l	meq/l
Bicarbonate as HCO ₃	686.03	11.25
Carbonate as CO ₃	0.00	0.00
Chloride.....	604.88	17.06
Sulfate.....	1311.86	27.33
Calcium.....	496.90	24.80
Magnesium.....	6.96	0.57
Potassium.....	2.92	0.07
Sodium.....	672.00	29.23
Major Cations.....		54.67
Major Anions.....		55.64
Cation/Anion Difference.....		0.88 %


C. Neal Schaeffer
Senior Chemist

CLIENT: GBR-Giant Refinery

DATE REPORTED: 11/20/89

SITE: Inlet

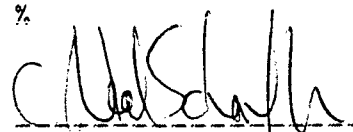
DATE RECEIVED: 11/15/89

LAB NO: F3528

DATE COLLECTED: 11/15/89

Lab pH.....	7.43
Lab Conductivity, umhos/cm.....	4958
Lab resistivity, ohm-m.....	2.0169
Total Dissolved Solids (180), mg/l..	3492
Total Dissolved Solids (calc), mg/l..	3311
Total Alkalinity as CaCO ₃ , mg/l.....	554.40
Total Acidity as CaCO ₃ , mg/l.....	0.00
Total Hardness as CaCO ₃ , mg/l.....	1347.33
Sodium Absorption Ratio.....	7.73

	mg/l	meq/l
Bicarbonate as HCO ₃	676.37	11.09
Carbonate as CO ₃	0.00	0.00
Chloride.....	555.06	15.66
Sulfate.....	1364.95	28.44
Calcium.....	192.02	9.58
Magnesium.....	211.15	17.36
Potassium.....	2.60	0.07
Sodium.....	652.50	28.38
Major Cations.....		55.39
Major Anions.....		55.18
Cation/Anion Difference.....		0.19 %


C. Neal Schaeffer
Lab Director

CLIENT: GBR-Giant Refinery

DATE REPORTED: 11/20/89

SITE: Outlet

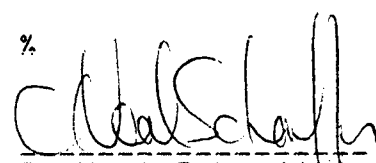
DATE RECEIVED: 11/15/89

LAB NO: F3529

DATE COLLECTED: 11/15/89

Lab pH.....	7.83
Lab Conductivity, umhos/cm.....	4946
Lab resistivity, ohm-m.....	2.0218
Total Dissolved Solids (180), mg/l..	3490
Total Dissolved Solids (calc), mg/l..	3457
Total Alkalinity as CaCO ₃ , mg/l.....	524.70
Total Acidity as CaCO ₃ , mg/l.....	0.00
Total Hardness as CaCO ₃ , mg/l.....	1273.65
Sodium Absorption Ratio.....	8.25

	mg/l	meq/l
Bicarbonate as HCO ₃	640.13	10.49
Carbonate as CO ₃	0.00	0.00
Chloride.....	594.71	16.78
Sulfate.....	1366.18	28.46
Calcium.....	488.48	24.38
Magnesium.....	13.35	1.10
Potassium.....	2.65	0.07
Sodium.....	677.00	29.45
Major Cations.....		54.99
Major Anions.....		55.73
Cation/Anion Difference.....		0.67 %


C. Neal Schaeffer
Lab Director

CLIENT: GBR-Giant Refinery

DATE REPORTED: 11/02/89

SITE: Inlet

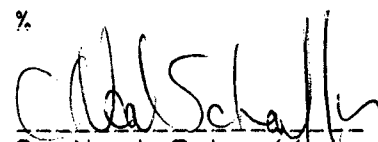
DATE RECEIVED: 10/19/89

LAB NO: F3378

DATE COLLECTED: 10/19/89

Lab pH.....	7.54
Lab Conductivity, umhos/cm.....	2710
Lab resistivity, ohm-m.....	3.6900
Total Dissolved Solids (180), mg/l..	3492
Total Dissolved Solids (calc), mg/l..	3351
Total Alkalinity as CaCO ₃ , mg/l.....	546.48
Total Acidity as CaCO ₃ , mg/l.....	0.00
Total Hardness as CaCO ₃ , mg/l.....	1305.22
Sodium Absorption Ratio.....	7.55

	mg/l	meq/l
Bicarbonate as HCO ₃	666.71	10.93
Carbonate as CO ₃	0.00	0.00
Chloride.....	525.33	14.82
Sulfate.....	1360.83	28.35
Calcium.....	479.21	23.91
Magnesium.....	26.65	2.19
Potassium.....	3.90	0.10
Sodium.....	627.50	27.29
Major Cations.....		53.50
Major Anions.....		54.10
Cation/Anion Difference.....		0.56 %


C. Neal Schaeffer
Lab Director

CLIENT: GBR-Giant Refinery

DATE REPORTED: 11/02/89

SITE: Outlet

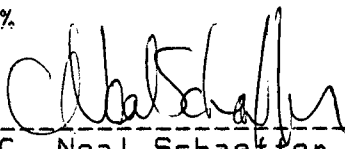
DATE RECEIVED: 10/19/89

LAB NO: F3379

DATE COLLECTED: 10/19/89

Lab pH.....	8.15
Lab Conductivity, umhos/cm.....	3187
Lab resistivity, ohm-m.....	3.1377
Total Dissolved Solids (180), mg/l..	3468
Total Dissolved Solids (calc), mg/l..	3362
Total Alkalinity as CaCO ₃ , mg/l.....	534.60
Total Acidity as CaCO ₃ , mg/l.....	0.00
Total Hardness as CaCO ₃ , mg/l.....	1303.12
Sodium Absorption Ratio.....	7.74

	mg/l	meq/l
Bicarbonate as HCO ₃	652.21	10.69
Carbonate as CO ₃	0.00	0.00
Chloride.....	535.24	15.10
Sulfate.....	1357.95	28.29
Calcium.....	471.63	23.53
Magnesium.....	30.74	2.53
Potassium.....	2.85	0.07
Sodium.....	642.50	27.95
Major Cations.....		54.08
Major Anions.....		54.08
Cation/Anion Difference.....		0.00 %


C. Neal Schaeffer
Lab Director

1.2 PURGEABLE AROMATICS EPA 602/8020

Geoscience Consultants, Ltd.
 Radian Work Order: 89-12-112

Method: Volatile aromatics (1)	SHS-1	Stripper Eff	Stripper Inf	GBR-24D
List: SW8020				
Sample ID:	8912121410	8912121145E	8912121145I	8912121130
Factor:	250	1	5	10
Results in:	ug/L	ug/L	ug/L	ug/L
	05B	06B	07B	08B
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Benzene	ND	50	<u>3.3</u>	0.20	<u>110</u>	1.0	<u>21</u>	2.0
Chlorobenzene	ND	50	ND	0.20	ND	1.0	ND	2.0
1,2-Dichlorobenzene	ND	100	ND	0.40	ND	2.0	ND	4.0
1,3-Dichlorobenzene	ND	100	ND	0.40	ND	2.0	ND	4.0
1,4-Dichlorobenzene	ND	75	<u>1.4 *</u>	0.30	<u>8.6</u>	1.5	ND	3.0
Ethylbenzene	ND	50	<u>0.55 *</u>	0.20	<u>18</u>	1.0	<u>27</u>	2.0
Toluene	ND	50	ND	0.20	ND	1.0	ND	2.0
Total xylenes	<u>330</u>	50	ND	0.20	<u>9.1</u>	1.0	<u>6.9 *</u>	2.0
Surrogate Recovery(%)								
1-Bromo-4-fluorobenzene	113		94		114		110	
Control Limits: 76 to 140								

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.

CLIENT: GBR- Giant Refinery

DATE REPORTED: 11/21/89

DATE ANALYZED: 11/17/89

SITE: Inlet

DATE RECEIVED: 11/15/89

LAB NO: F3528

DATE COLLECTED: 11/15/89

Analysis Requested: Purgeable aromatics in water.

Parameter	Concentration	Units
-----	-----	-----
Benzene	23.6 (0.5)	ug/l
Toluene	ND (0.5)	ug/l
Ethylbenzene	3.01 (0.5)	ug/l
m,p-Xylene	13.2 (0.5)	ug/l
o-Xylene	5.66 (0.5)	ug/l
1,4-Dichlorobenzene	ND (0.5)	ug/l
1,3-Dichlorobenzene	ND (0.5)	ug/l
1,2-Dichlorobenzene	ND (0.5)	ug/l
Chlorobenzene	ND (0.5)	ug/l

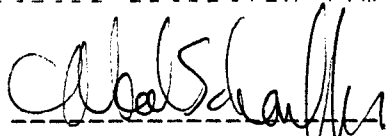
Method:

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

CLIENT: GBR- Giant Refinery DATE REPORTED: 11/21/89
SITE: Outlet DATE ANALYZED: 11/17/89
LAB NO: F3529 DATE RECEIVED: 11/15/89
DATE COLLECTED: 11/15/89
Analysis Requested: Purgeable aromatics in water.

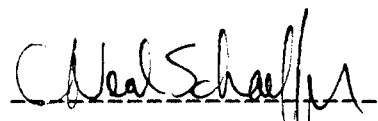
Parameter	Concentration	Units
Benzene	ND (0.5)	ug/l
Toluene	ND (0.5)	ug/l
Ethylbenzene	ND (0.5)	ug/l
m,p-Xylene	ND (0.5)	ug/l
o-Xylene	ND (0.5)	ug/l
1,4-Dichlorobenzene	ND (0.5)	ug/l
1,3-Dichlorobenzene	ND (0.5)	ug/l
1,2-Dichlorobenzene	ND (0.5)	ug/l
Chlorobenzene	ND (0.5)	ug/l

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

CLIENT: GBR- Giant Refinery

DATE REPORTED: 11/14/89

SITE: Inlet

DATE ANALYZED: 10/26/89

LAB NO: F3378

DATE RECEIVED: 10/19/89

DATE COLLECTED: 10/19/89

Analysis Requested: Purgeable aromatics in water.

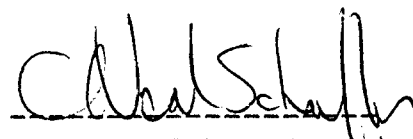
Parameter -----	Concentration -----	Units -----
Benzene	129.58 (0.2)	ug/l
Toluene	69.33 (0.2)	ug/l
Ethylbenzene	23.67 (0.2)	ug/l
m,p-Xylene	26.41 (0.2)	ug/l
o-Xylene	21.03 (0.2)	ug/l
1,4-Dichlorobenzene	ND (0.2)	ug/l
1,3-Dichlorobenzene	ND (0.2)	ug/l
1,2-Dichlorobenzene	ND (0.2)	ug/l
Chlorobenzene	ND (0.2)	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

CLIENT: GBR- Giant Refinery

DATE REPORTED: 11/14/89

DATE ANALYZED: 10/26/89

DATE RECEIVED: 10/19/89

SITE: Outlet

LAB NO: F3379

DATE COLLECTED: 10/19/89

Analysis Requested: Purgeable aromatics in water.

Parameter -----	Concentration -----	Units -----
Benzene	12.43 (0.2)	ug/l
Toluene	5.42 (0.2)	ug/l
Ethylbenzene	1.48 (0.2)	ug/l
m,p-Xylene	1.89 (0.2)	ug/l
o-Xylene	1.65 (0.2)	ug/l
1,4-Dichlorobenzene	ND (0.2)	ug/l
1,3-Dichlorobenzene	ND (0.2)	ug/l
1,2-Dichlorobenzene	ND (0.2)	ug/l
Chlorobenzene	ND (0.2)	ug/l

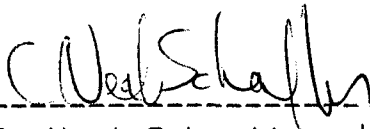
Method:

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

1.3 POLYNUCLEAR AROMATIC HYDROCARBONS EPA 610

Geoscience Consultants, Ltd.
 Radian Work Order: 89-12-112

Method: PAHs by GC 8100 (1) List: 8100, special list	Stripper Eff	Stripper Inf	GBR-24D	GRW-13
Sample ID:	8912121145E	8912121145I	8912121130	8912121200
Factor:	0.94	0.94	0.94	0.94
Results in:	ug/L	ug/L	ug/L	ug/L
	06C	07C	08C	09C
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
1-Methylnaphthalene	<u>2.0 *</u>	0.94	<u>6.3</u>	0.94	<u>5.8</u>	0.94	ND	0.94
2-Methylnaphthalene	<u>2.8 *</u>	0.94	<u>2.8 *</u>	0.94	ND	0.94	ND	0.94

* 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 Appendix A in this report.

Geoscience Consultants, Ltd.
Radian Work Order: 89-12-112

Method: SW8310 PAH's by HPLC (1)	Stripper Eff	Stripper Inf	GBR-24D	GRW-13
List: 8310 Method analytes				
Sample ID:	8912121145E	8912121145I	8912121130	8912121200
Factor:	0.94	1.9	0.94	0.94
Results in:	ug/L	ug/L	ug/L	ug/L
	06C	07C	08C	09C
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Acenaphthalene	ND	2.2	ND	4.4	ND	2.2	ND	2.2
Acenaphthene	ND	1.7	ND	3.4	<u>144 D</u>	1.7	ND	1.7
Anthracene	ND	0.62	ND	1.3	ND	0.62	ND	0.62
Benzo(a)anthracene	ND	0.012	ND	0.025	ND	0.012	ND	0.012
Benzo(a)pyrene	ND	0.022	ND	0.044	ND	0.022	ND	0.022
Benzo(b)fluoranthene	ND	0.017	ND	0.034	ND	0.017	ND	0.017
Benzo(g,h,i)perylene	ND	0.071	ND	0.14	ND	0.071	ND	0.071
Benzo(k)fluoranthene	ND	0.016	ND	0.032	ND	0.016	ND	0.016
Chrysene	ND	0.012	ND	0.025	ND	0.012	ND	0.012
Dibenzo(a,h)anthracene	ND	0.028	ND	0.057	ND	0.028	ND	0.028
Fluoranthene	ND	0.20	ND	0.40	ND	0.20	ND	0.20
Fluorene	<u>3.4 D</u>	0.20	<u>4.0 D</u>	0.40	<u>2.6 D</u>	0.20	ND	0.20
Indeno(1,2,3-cd)pyrene	ND	0.040	ND	0.082	ND	0.040	ND	0.040
Naphthalene	<u>8.9 D</u>	1.7	<u>14 *D</u>	3.4	<u>1.9 *D</u>	1.7	<u>4.3 *D</u>	1.7
Phenanthrene	<u>11</u>	0.60	<u>13</u>	1.2	<u>3.0</u>	0.60	ND	0.60
Pyrene	<u>0.62 *</u>	0.25	<u>0.54 *</u>	0.51	<u>0.29 *</u>	0.25	ND	0.25
Surrogate Recovery(%)								
Terphenyl-d14	93		80		79		80	
Control Limits: 37 to 139								

ND Not detected at specified detection limit

D Sample diluted for this analyte

* 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.



Inter-Mountain
Laboratories, Inc.

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

CLIENT: Giant Refinery

DATE REPORTED: 12/28/89

SITE: Stripper Influent

DATE ANALYZED: 11/27/89

LAB NO: F3528

DATE RECEIVED: 11/11/89

DATE COLLECTED: 11/11/89

Analysis Requested: Polynuclear aromatic hydrocarbons in water.

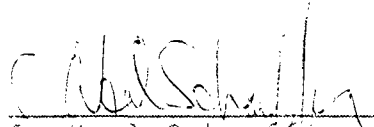
Parameter	Concentration	Units
Acenaphthene	ND (2.0)	mg/l
Acenaphthylene	ND (2.0)	mg/l
Anthracene	2.4 (2.0)	mg/l
Benzo(a)Anthracene	ND (2.0)	mg/l
Benzo(a)pyrene	ND (2.0)	mg/l
Benzo(k)fluoranthene	ND (2.0)	mg/l
Benzo(g,h,i)perylene	ND (2.0)	mg/l
Dibenzo(a,h)anthracene	ND (2.0)	mg/l
Chrysene	ND (2.0)	mg/l
Fluoranthene	ND (2.0)	mg/l
Fluorene	ND (2.0)	mg/l
Indeno(1,2,3-cd)pyrene	ND (2.0)	mg/l
Naphthalene	ND (2.0)	mg/l
Phenanthrene	4.7 (2.0)	mg/l
Pyrene	ND (2.0)	mg/l
Benzo(b)fluoranthene	ND (0.02)	mg/l

Method:

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



Inter-Mountain
Laboratories, Inc.

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

CLIENT: Giant Refinery

DATE REPORTED: 12/28/89

DATE ANALYZED: 11/27/89

DATE RECEIVED: 11/11/89

DATE COLLECTED: 11/11/89

SITE: Stripper Effluent

LAB NO: F3529

Analysis Requested: Polynuclear aromatic hydrocarbons in water.

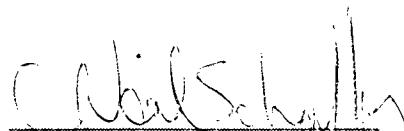
Parameter	Concentration	Units
Acenaphthene	ND (2.0)	mg/l
Acenaphthylene	ND (2.0)	mg/l
Anthracene	ND (2.0)	mg/l
Benzo(a)Anthracene	ND (2.0)	mg/l
Benzo(a)pyrene	ND (2.0)	mg/l
Benzo(k)fluoranthene	ND (2.0)	mg/l
Benzo(g,h,i)perylene	ND (2.0)	mg/l
Dibenzo(a,h)anthracene	ND (2.0)	mg/l
Chrysene	ND (2.0)	mg/l
Fluoranthene	ND (2.0)	mg/l
Fluorene	2.5 (2.0)	mg/l
Indeno(1,2,3-cd)pyrene	ND (2.0)	mg/l
Naphthalene	ND (2.0)	mg/l
Phenanthrene	3.4 (2.0)	mg/l
Pyrene	ND (2.0)	mg/l
Benzo(b)fluoranthene	ND (0.02)	mg/l

Method:

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



Inter-Mountain
Laboratories, Inc.

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

CLIENT: Giant Refinery

DATE REPORTED: 12/28/89

SITE: Inlet

DATE ANALYZED: 11/27/89

LAB NO: F3378

DATE RECEIVED: 10/19/89

DATE COLLECTED: 10/19/89

Analysis Requested: Polynuclear aromatic hydrocarbons in water.

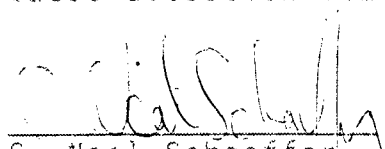
Parameter	Concentration	Units
Adenaphthene	ND (5.0)	mg/l
Acenaphthylene	ND (5.0)	mg/l
Anthracene	ND (5.0)	mg/l
Benzo(a)Anthracene	ND (5.0)	mg/l
Benzo(a)pyrene	ND (5.0)	mg/l
Benzo(k)fluoranthene	ND (5.0)	mg/l
Benzo(g,h,i)perylene	ND (5.0)	mg/l
Dibenzo(a,h)anthracene	ND (5.0)	mg/l
Chrysene	ND (5.0)	mg/l
Fluoranthene	ND (5.0)	mg/l
Fluorene	ND (5.0)	mg/l
Indeno(1,2,3-cd)pyrene	ND (5.0)	mg/l
Naphthalene	ND (5.0)	mg/l
Phenanthrene	ND (5.0)	mg/l
Pyrene	ND (5.0)	mg/l
Benzo(b)fluoranthene	ND (5.0)	mg/l

Method:

610 Polycyclic Aromatic Hydrocarbons, 40 CFR Part 136 (1984).

(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: Giant Refinery

DATE REPORTED: 12/28/89

SITE: Outlet

DATE ANALYZED: 11/27/89

LAB NO: F3379

DATE RECEIVED: 10/19/89

DATE COLLECTED: 10/19/89

Analysis Requested: Polynuclear aromatic hydrocarbons in water.

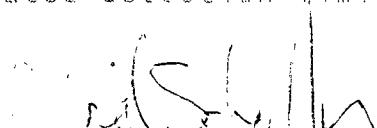
Parameter	Concentration	Units
Acenaphthene	ND (5.0)	mg/l
Acenaphthylene	ND (5.0)	mg/l
Anthracene	ND (5.0)	mg/l
Benzo(a)Anthracene	ND (5.0)	mg/l
Benzo(a)pyrene	ND (5.0)	mg/l
Benzo(k)fluoranthene	ND (5.0)	mg/l
Benzo(g,h,i)perylene	ND (5.0)	mg/l
Dibenzo(a,h)anthracene	ND (5.0)	mg/l
Chrysene	ND (5.0)	mg/l
Fluoranthene	ND (5.0)	mg/l
Fluorene	ND (5.0)	mg/l
Indeno(1,2,3-cd)pyrene	ND (5.0)	mg/l
Naphthalene	ND (5.0)	mg/l
Phenanthrene	ND (5.0)	mg/l
Pyrene	ND (5.0)	mg/l
Benzo(b)fluoranthene	ND (5.0)	mg/l

Method:

610 Polycyclic Aromatic Hydrocarbons, 40 CFR Part 136 (1984).

(Detection limit in parenthesis.)

ND - Parameter not detected at the stated detection limit.


C. Neal Schaeffer
Senior Chemist

1.4 PURGEABLE HALOCARBONS EPA 601/8010

Geoscience Consultants, Ltd.
 Radian Work Order: 89-12-112

Method: Halogenated volatiles (1)	SHS-1	Stripper Eff	Stripper Inf	GBR-24D
List: SW8010				
Sample ID:	8912121410	8912121145E	8912121145I	8912121130
Factor:	5	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	0.50	ND	0.10	ND	0.10	ND	0.10
Bromoform	ND	2.5	ND	0.50	ND	0.50	ND	0.50
Bromomethane	ND	5.9	ND	1.2	ND	1.2	ND	1.2
Carbon Tetrachloride	ND	0.60	ND	0.12	ND	0.12	ND	0.12
Chlorobenzene	ND	1.3	ND	0.25	ND	0.25	ND	0.25
Chloroethane	ND	2.6	ND	0.52	ND	0.52	ND	0.52
2-Chloroethylvinylether	ND	2.5	ND	0.50	ND	0.50	ND	0.50
Chloroform	5.7	0.50	ND	0.10	ND	0.10	ND	0.10
Chloromethane	ND	1.5	ND	0.30	ND	0.30	ND	0.30
Dibromochloromethane-(2)	ND	1.0	ND	0.20	ND	0.20	ND	0.20
1,2-Dichlorobenzene	ND	2.5	ND	0.50	ND	0.50	0.60 *	0.50
1,3-Dichlorobenzene	ND	1.6	ND	0.32	ND	0.32	ND	0.32
1,4-Dichlorobenzene	ND	1.2	ND	0.24	ND	0.24	ND	0.24
1,1-Dichloroethane	0.72 *	2.5	ND	0.50	1.9 *	0.50	ND	0.50
1,2-Dichloroethane	7.1	0.50	1.0	0.10	3.5	0.10	18	0.10
1,1-Dichloroethene	ND	1.0	ND	0.20	ND	0.20	ND	0.20
trans-1,2-Dichloroethene	21	1.0	0.97 *	0.20	9.3	0.20	ND	0.20
1,2-Dichloropropane	ND	0.50	ND	0.10	ND	0.10	ND	0.10
cis-1,3-Dichloropropene-(2)	N\A	N\A	N\A	N\A	N\A	N\A	N\A	N\A
trans-1,3-Dichloropropene	ND	1.5	ND	0.30	ND	0.30	ND	0.30
Methylene Chloride	ND	2.0	ND	0.40	1.0 *	0.40	ND	0.40
1,1,2,2-Tetrachloroethane-(3)	ND	0.75	ND	0.15	ND	0.15	ND	0.15
Tetrachloroethene-(3)	ND	0.50	ND	0.10	1.3	0.10	ND	0.10
1,1,2-Trichloroethane-(2)	ND	1.0	ND	0.20	ND	0.20	ND	0.20
1,1,1-Trichloroethane	ND	1.0	ND	0.20	0.80 *	0.20	ND	0.20
Trichloroethene	6.2	1.0	ND	0.20	2.0	0.20	ND	0.20
Trichlorofluoromethane	ND	1.0	ND	0.20	ND	0.20	ND	0.20
Vinyl Chloride	ND	1.0	ND	0.20	ND	0.20	ND	0.20

ND Not detected at specified detection limit

* Est. result less than 5 times detection limit

N\A Not available

- (1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.
- (2) Dibromochloromethane, 1,1,2-Trichloroethane, and cis-1,3-Dichloropropene coelute. Quantitated as Dibromochloromethane unless otherwise noted.
- (3) Tetrachloroethene and 1,1,2,2-Tetrachloroethane coelute. Quantitated as Tetrachloroethene unless otherwise noted.

Geoscience Consultants, Ltd.
 Radian Work Order: 89-12-112

Method: Halogenated volatiles (1)	SHS-1	Stripper Eff	Stripper Inf	GBR-24D
List: SW8010				
Sample ID:	8912121410	8912121145E	8912121145I	8912121130
Factor:	5	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
<u>Surrogate Recovery(%)</u>				
1-Bromo-4-fluorobenzene	117	117	107	104
Control Limits: 76 to 140				

- (1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.
- (2) Dibromochloromethane, 1,1,2-Trichloroethane, and cis-1,3-Dichloropropene coelute. Quantitated as Dibromochloromethane unless otherwise noted.
- (3) Tetrachloroethene and 1,1,2,2-Tetrachloroethane coelute. Quantitated as Tetrachloroethene unless otherwise noted.

CLIENT: GBR- Giant Refinery

DATE REPORTED: 11/14/89

DATE ANALYZED: 10/31/89

DATE RECEIVED: 10/19/89

SITE: Inlet

LAB NO: F3378

DATE COLLECTED: 10/19/89

Analysis Requested: Purgeable halocarbons in water.

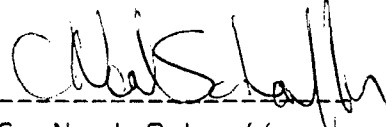
Parameter	Concentration	Units
Bromobenzene	ND (1.0)	ug/l
Bromodichloromethane	ND (1.0)	ug/l
Bromoform	ND (1.0)	ug/l
Carbon Tetrachloride	ND (1.0)	ug/l
Chlorobenzene	ND (1.0)	ug/l
Chloroethane	ND (1.0)	ug/l
Chloroform	ND (1.0)	ug/l
Chloromethane	ND (1.0)	ug/l
Dibromochloromethane	ND (1.0)	ug/l
Dibromomethane	ND (1.0)	ug/l
1,2-Dichlorobenzene	ND (1.0)	ug/l
1,3-Dichlorobenzene	ND (1.0)	ug/l
1,4-Dichlorobenzene	ND (1.0)	ug/l
Dichlorodifluoromethane	ND (1.0)	ug/l
1,1-Dichloroethane	ND (1.0)	ug/l
1,2-Dichloroethane	ND (1.0)	ug/l
1,1-Dichloroethene	ND (1.0)	ug/l
trans-1,2-Dichloroethene	ND (1.0)	ug/l
1,2-Dichloropropane	ND (1.0)	ug/l
1,3-Dichloropropylene	ND (1.0)	ug/l
2,2-Dichloropropane	ND (1.0)	ug/l
Dichloromethane	ND (1.0)	ug/l
1,1,1,2-Tetrachloroethane	ND (1.0)	ug/l
1,1,2,2-Tetrachloroethane	ND (1.0)	ug/l
Tetrachloroethene	ND (1.0)	ug/l
1,1,1-Trichloroethane	ND (1.0)	ug/l
1,1,2-Trichloroethane	ND (1.0)	ug/l
Trichloroethene	ND (1.0)	ug/l
Trichlorofluoromethane	ND (1.0)	ug/l
1,2,3-Trichloropropane	ND (1.0)	ug/l

Method:

601 Purgeable Halocarbons, 40 CFR Part 136, USEPA (1984).
8010 Halogenated Volatile Organics, SW-846, USEPA (1982).

(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- Giant Refinery

DATE REPORTED: 11/14/89

SITE: Outlet

DATE ANALYZED: 10/31/89

LAB NO: F3379

DATE RECEIVED: 10/19/89

DATE COLLECTED: 10/19/89

Analysis Requested: Purgeable halocarbons in water.

Parameter	Concentration	Units
Bromobenzene	ND (1.0)	ug/l
Bromodichloromethane	ND (1.0)	ug/l
Bromoform	ND (1.0)	ug/l
Carbon Tetrachloride	ND (1.0)	ug/l
Chlorobenzene	ND (1.0)	ug/l
Chloroethane	ND (1.0)	ug/l
Chloroform	ND (1.0)	ug/l
Chloromethane	ND (1.0)	ug/l
Dibromochloromethane	ND (1.0)	ug/l
Dibromomethane	ND (1.0)	ug/l
1,2-Dichlorobenzene	ND (1.0)	ug/l
1,3-Dichlorobenzene	ND (1.0)	ug/l
1,4-Dichlorobenzene	ND (1.0)	ug/l
Dichlorodifluoromethane	ND (1.0)	ug/l
1,1-Dichloroethane	ND (1.0)	ug/l
1,2-Dichloroethane	ND (1.0)	ug/l
1,1-Dichloroethene	ND (1.0)	ug/l
trans-1,2-Dichloroethene	ND (1.0)	ug/l
1,2-Dichloropropane	ND (1.0)	ug/l
1,3-Dichloropropylene	ND (1.0)	ug/l
2,2-Dichloropropane	ND (1.0)	ug/l
Dichloromethane	ND (1.0)	ug/l
1,1,1,2-Tetrachloroethane	ND (1.0)	ug/l
1,1,2,2-Tetrachloroethane	ND (1.0)	ug/l
Tetrachloroethene	ND (1.0)	ug/l
1,1,1-Trichloroethane	ND (1.0)	ug/l
1,1,2-Trichloroethane	ND (1.0)	ug/l
Trichloroethene	ND (1.0)	ug/l
Trichlorofluoromethane	ND (1.0)	ug/l
1,2,3-Trichloropropane	ND (1.0)	ug/l

Method:

601 Purgeable Halocarbons, 40 CFR Part 136, USEPA (1984).
8010 Halogenated Volatile Organics, SW-846, USEPA (1982).

(Detection limit in parenthesis.)

ND - Parameter not detected at the stated detection limit.

C. Neal Schaeffer
1.4.4 Senior Chemist



Inter-Mountain
Laboratories, Inc.

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

CLIENT: GBR- Giant Refinery

DATE REPORTED: 03/09/90

SITE: Inlet

DATE ANALYZED: 11/17/89

LAB NO: F3528

DATE RECEIVED: 11/15/89

DATE COLLECTED: 11/15/89

Analysis Requested: Purgeable halocarbons in water.

Parameter	Concentration	Units
Bromobenzene	ND (1.0)	ug/l
Bromodichloromethane	ND (1.0)	ug/l
Bromoform	ND (1.0)	ug/l
Carbon Tetrachloride	ND (1.0)	ug/l
Chlorobenzene	ND (1.0)	ug/l
Chloroethane	ND (1.0)	ug/l
Chloroform	ND (1.0)	ug/l
Chloromethane	ND (1.0)	ug/l
Dibromochloromethane	ND (1.0)	ug/l
Dibromomethane	ND (1.0)	ug/l
1,2-Dichlorobenzene	ND (1.0)	ug/l
1,3-Dichlorobenzene	ND (1.0)	ug/l
1,4-Dichlorobenzene	ND (1.0)	ug/l
Dichlorodifluoromethane	ND (1.0)	ug/l
1,1-Dichloroethane	ND (1.0)	ug/l
1,2-Dichloroethane	ND (1.0)	ug/l
1,1-Dichloroethene	ND (1.0)	ug/l
trans-1,2-Dichloroethene	5.6 (1.0)	ug/l
1,2-Dichloropropane	ND (1.0)	ug/l
1,3-Dichloropropylene	ND (1.0)	ug/l
2,2-Dichloropropane	ND (1.0)	ug/l
Dichloromethane	ND (1.0)	ug/l
1,1,1,2-Tetrachloroethane	ND (1.0)	ug/l
1,1,1,2-Tetrachloroethane	2.3 (1.0)	ug/l
Tetrachloroethene	ND (1.0)	ug/l
1,1,1-Trichloroethane	ND (1.0)	ug/l
1,1,2-Trichloroethane	2.3 (1.0)	ug/l
Trichloroethene	ND (1.0)	ug/l
Trichlorofluoromethane	ND (1.0)	ug/l
1,2,3-Trichloropropane	ND (1.0)	ug/l
Bromochloromethane	ND (1.0)	ug/l
1,2-Dibromoethane	ND (1.0)	ug/l
cis-1,2-Dichloroethene	ND (1.0)	ug/l
1,1-Dichloropropene	ND (1.0)	ug/l
Vinyl Chloride	ND (1.0)	ug/l

Method:

601 Purgeable Halocarbons, 40 CFR Part 136, USEPA (1984).

8010 Halogenated Volatile Organics, SW-846, USEPA (1982).

(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- Giant Refinery

DATE REPORTED: 03/09/90

DATE ANALYZED: N/A *

DATE RECEIVED: 11/15/89

DATE COLLECTED: 11/15/89

SITE: Outlet

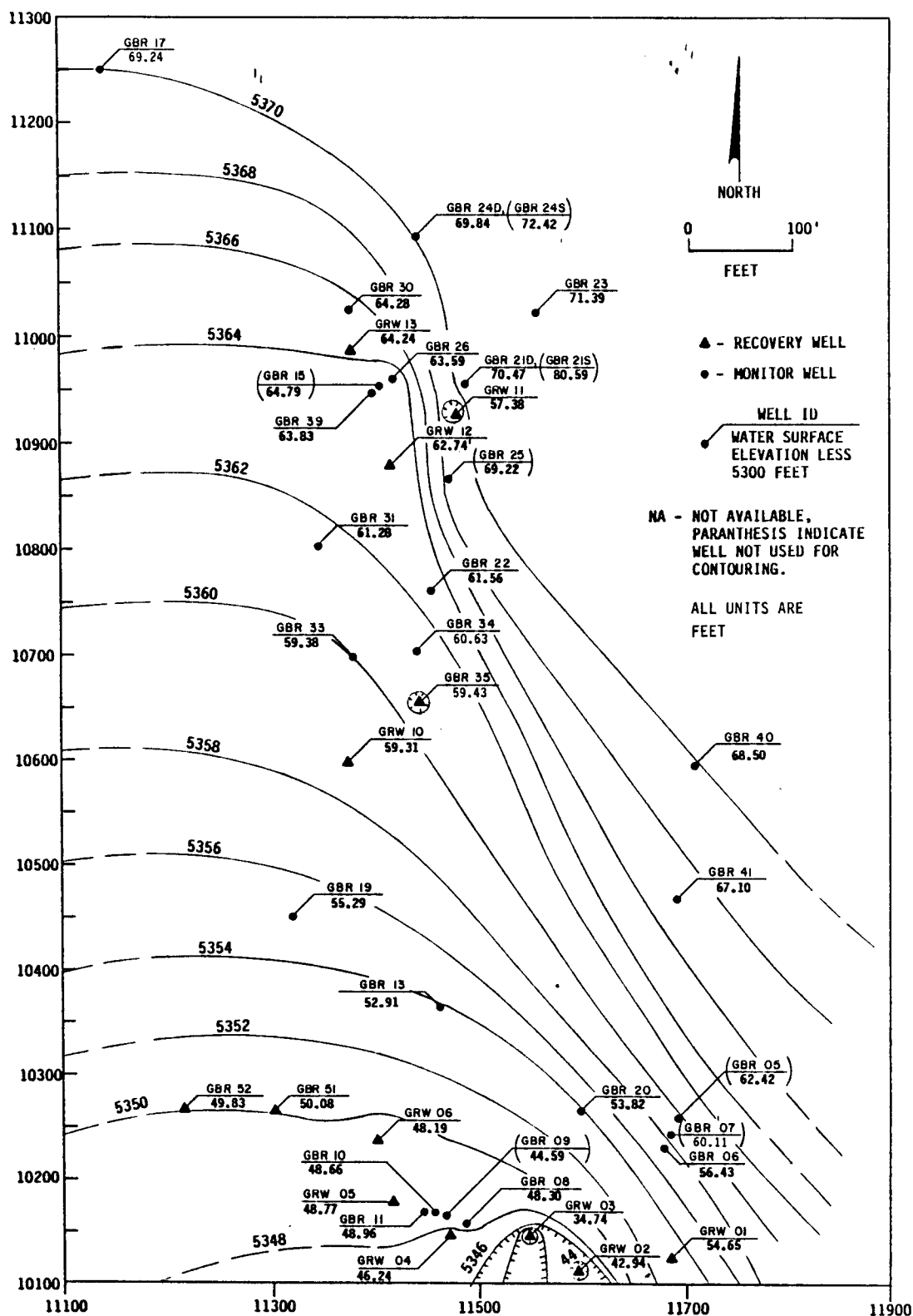
LAB NO: F3529

Analysis Requested: Purgeable halocarbons in water.

* Analysis could not be performed due to loss of sample in shipment.
Due to laboratory error this was not reported to the Giant Refinery
staff in a timely manner.

C. Neal Schaeffer
Senior Chemist

2.0 MONTHLY POTENTIOMETRIC MAPS

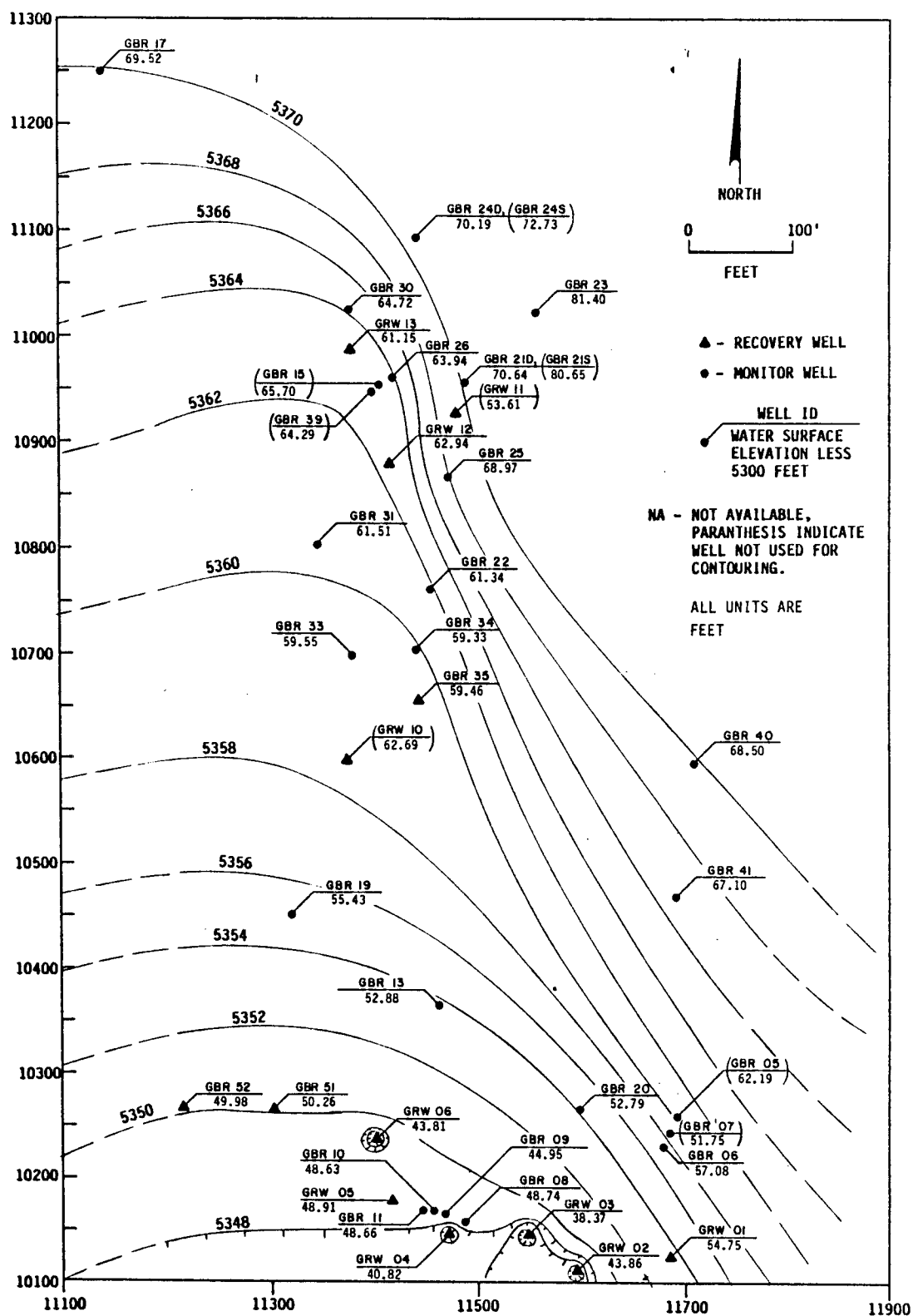


DECEMBER 1989 WATER SURFACE CONTOUR MAP GIANT-BLOOMFIELD REFINERY

GIANT INDUSTRIES BLOOMFIELD REFINERY
MONTHLY POTENTIOMETRIC SURFACE

MEASUREMENT DATE
12/14/89

<u>WELL ID</u>	<u>WELL HEAD ELEVATION</u>	<u>DEPTH TO WATER</u>	<u>DEPTH TO PRODUCT</u>	<u>PRODUCT THICKNESS</u>	<u>ADJUSTED WSEL</u>
GBR-05	5395.07	32.65	32.65	0.00	5362.42
GBR-06	5395.70	39.27	39.27	0.00	5356.43
GBR-07	5395.85	41.32	34.35	6.97	5360.11
GBR-08	5390.50	42.20	42.20	0.00	5348.30
GBR-09	5389.92	45.33	45.33	0.00	5344.59
GBR-10	5390.57	41.91	41.91	0.00	5348.66
GBR-11	5389.43	40.47	40.47	0.00	5348.96
GBR-13	5393.04	40.13	40.13	0.00	5352.91
GBR-15	5397.99	33.20	33.20	0.00	5364.79
GBR-17	5402.69	33.45	33.45	0.00	5369.24
GBR-18	5421.68	17.09	17.09	0.00	5404.59
GBR-19	5393.83	38.54	38.54	0.00	5355.29
GBR-20	5393.47	39.65	39.65	0.00	5353.82
GBR-21D	5400.19	29.72	29.72	0.00	5370.47
GBR-21S	5400.65	20.06	20.06	0.00	5380.59
GBR-22	5395.91	34.35	34.37	0.02	5361.56
GBR-23	5403.72	32.33	32.33	0.00	5371.39
GBR-24D	5396.77	26.93	26.93	0.00	5369.84
GBR-24S	5396.08	23.66	23.67	0.01	5372.42
GBR-25	5396.72	27.50	27.50	0.00	5369.22
GBR-26	5395.59	32.00	32.00	0.00	5363.59
GBR-30	5396.58	32.30	32.30	0.00	5364.28
GBR-31	5394.86	33.58	33.58	0.00	5361.28
GBR-32	5416.77	35.39	35.39	0.00	5381.38
GBR-33	5396.28	36.90	39.90	0.00	5359.38
GBR-34	5394.00	34.09	35.00	0.91	5359.91
GBR-35	5393.66	34.25	34.22	0.03	5360.63
GBR-39	5397.55	33.72	33.72	0.00	5359.43
GBR-40	5400.76	32.26	32.26	0.00	5368.50
GBR-41	5396.35	29.25	29.25	0.00	5367.10
GBR-48	5419.09	NA	NA	0.00	NA
GBR-49	5412.45	33.32	33.32	0.00	5379.13
GBR-50	5416.59	33.98	NA	0.00	5382.61
GBR-51	5389.68	39.60	39.60	0.00	5350.08
GBR-52	5387.74	37.91	37.91	0.00	5349.83
GRW-01	5394.30	39.65	39.65	0.00	5354.65
GRW-02	5391.28	48.34	48.34	0.00	5342.94
GRW-03	5388.77	54.03	54.03	0.00	5334.74
GRW-04	5390.02	43.78	43.78	0.00	5346.24
GRW-05	5390.56	41.79	41.79	0.00	5348.77
GRW-06	5390.81	42.62	42.64	0.00	5348.19
GRW-10	5395.02	35.71	35.71	0.00	5359.31
GRW-11	5397.85	40.47	40.47	2.17	5357.38
GRW-12	5397.24	34.50	34.50	0.00	5362.74
GRW-13	5396.90	32.66	32.66	0.00	5364.24



NOVEMBER 1989 WATER SURFACE CONTOUR MAP GIANT-BLOOMFIELD REFINERY

GIANT INDUSTRIES BLOOMFIELD REFINERY
MONTHLY POTENTIOMETRIC SURFACE

MEASUREMENT DATE
11/15/89

<u>WELL ID</u>	<u>WELL HEAD ELEVATION</u>	<u>DEPTH TO WATER</u>	<u>DEPTH TO PRODUCT</u>	<u>PRODUCT THICKNESS</u>	<u>ADJUSTED WSEL</u>
GBR-05	5395.07	32.72	32.52	0.20	5362.19
GBR-06	5395.70	38.55	38.47	0.08	5357.08
GBR-07	5395.85	39.70	34.15	5.55	5356.75
GBR-08	5390.50	42.32	42.00	0.32	5348.74
GBR-09	5389.92	44.97	44.97	0.00	5344.95
GBR-10	5390.57	42.21	41.88	0.33	5448.36
GBR-11	5389.43	42.50	40.33	2.17	5348.66
GBR-13	5393.04	40.80	40.00	0.80	5352.08
GBR-15	5397.99	32.29	32.29	0.00	5365.70
GBR-17	5402.69	33.17	33.17	0.00	5369.52
GBR-18	5421.68	17.00	17.00	0.00	5404.68
GBR-19	5393.83	38.40	38.40	0.00	5355.43
GBR-20	5393.47	40.20	39.60	0.60	5352.79
GBR-21D	5400.19	29.55	29.55	0.00	5370.64
GBR-21S	5400.65	20.00	20.01	0.01	5380.65
GBR-22	5395.91	34.57	34.30	0.00	5361.34
GBR-23	5403.72	22.32	22.32	0.00	5381.40
GBR-24D	5396.77	26.58	26.58	0.00	5370.19
GBR-24S	5396.08	23.35	23.35	0.00	5372.73
GBR-25	5396.72	27.75	27.75	0.00	5368.97
GBR-26	5395.59	31.65	31.65	0.00	5363.94
GBR-30	5396.58	31.86	31.86	0.00	5364.72
GBR-31	5394.86	33.35	33.35	0.00	5361.51
GBR-32	5416.77	35.26	35.26	0.00	5381.51
GBR-33	5396.28	36.73	39.73	0.00	5359.55
GBR-34	5394.00	34.35	33.95	0.40	5359.33
GBR-35	5393.66	34.20	34.20	0.00	5359.46
GBR-39	5397.55	33.26	33.26	0.00	5364.29
GBR-40	5400.76	32.26	32.26	0.00	5368.50
GBR-41	5396.35	29.25	29.25	0.00	5367.10
GBR-48	5419.09	NA	NA	0.00	5419.09
GBR-49	5412.45	33.18	33.18	0.00	5379.27
GBR-50	5416.59	32.85	32.85	0.00	5383.74
GBR-51	5389.68	39.42	39.42	0.00	5350.26
GBR-52	5387.74	37.76	37.76	0.00	5349.98
GRW-01	5394.30	39.55	39.55	0.00	5354.75
GRW-02	5391.28	47.42	47.42	0.00	5343.86
GRW-03	5388.77	50.40	50.40	0.00	5338.37
GRW-04	5390.02	49.20	49.20	0.00	5340.82
GRW-05	5390.56	41.65	41.65	0.00	5348.91
GRW-06	5390.81	47.00	47.00	0.00	5343.81
GRW-10	5395.02	32.33	32.33	0.00	5362.69
GRW-11	5397.85	42.50	40.33	2.17	5353.61
GRW-12	5397.24	34.30	34.30	0.00	5362.94
GRW-13	5396.90	35.75	35.75	0.00	5361.15

GIANT INDUSTRIES BLOOMFIELD REFINERY
MONTHLY POTENTIOMETRIC SURFACE

MEASUREMENT DATE
10/12/89

<u>WELL ID</u>	<u>WELL HEAD ELEVATION</u>	<u>DEPTH TO WATER</u>	<u>DEPTH TO PRODUCT</u>	<u>PRODUCT THICKNESS</u>	<u>ADJUSTED WSEL</u>
GBR-05	5395.07	32.64	32.42	0.22	5362.61
GBR-06	5395.70	38.40	38.31	0.09	5357.37
GBR-07	5395.85	37.06	33.93	3.13	5361.29
GBR-08	5390.50	42.03	42.03	0.00	5348.47
GBR-09	5389.92	44.92	44.92	0.00	5345.00
GBR-10	5390.57	42.09	41.88	0.21	5348.65
GBR-11	5389.43	42.41	40.25	2.16	5348.75
GBR-13	5393.04	40.08	39.87	0.21	5353.13
GBR-15	5397.99	34.05	34.05	0.00	5363.94
GBR-17	5402.69	32.86	32.86	0.00	5369.83
GBR-18	5421.68	16.32	16.32	0.00	5405.36
GBR-19	5393.83	38.05	38.05	0.00	5355.78
GBR-20	5393.47	39.64	39.21	0.43	5354.17
GBR-21D	5400.19	30.24	30.24	0.00	5369.65
GBR-21S	5400.65	19.79	19.70	0.09	5380.93
GBR-22	5395.91	32.62	32.62	0.00	5363.29
GBR-23	5403.72	21.83	21.83	0.00	5381.89
GBR-24D	5396.77	26.89	26.89	0.00	5369.88
GBR-24S	5396.08	23.35	23.35	0.00	5372.73
GBR-25	5396.72	27.50	27.50	0.00	5369.22
GBR-26	5395.59	30.73	30.73	0.00	5364.86
GBR-30	5396.58	31.46	31.46	0.00	5365.12
GBR-31	5394.86	32.87	32.87	0.00	5361.99
GBR-32	5416.77	35.09	35.09	0.00	5381.68
GBR-33	5396.28	35.84	35.84	0.00	5360.44
GBR-34	5394.00	33.54	33.54	0.00	5360.46
GBR-35	5393.66	33.71	33.71	0.00	5359.95
GBR-39	5397.55	33.04	33.04	0.00	5364.51
GBR-40	5400.76	31.60	31.60	0.00	5369.16
GBR-41	5396.35	28.81	28.81	0.00	5367.54
GBR-48	5419.09	NA	NA	0.00	5419.09
GBR-49	5412.45	33.02	33.02	0.00	5379.43
GBR-50	5416.59	32.90	32.90	0.00	5383.69
GBR-51	5389.68	38.54	38.54	0.00	5351.14
GBR-52	5387.74	36.21	36.21	0.00	5351.53
GRW-01	5394.30	39.56	39.56	0.00	5354.74
GRW-02	5391.28	48.44	48.44	0.00	5342.84
GRW-03	5388.77	49.80	49.80	0.00	5338.97
GRW-04	5390.02	44.85	44.85	0.00	5345.17
GRW-05	5390.56	41.55	41.55	0.00	5349.01
GRW-06	5390.81	48.25	48.25	0.00	5342.56
GRW-10	5395.02	36.85	35.57	1.28	5359.19
GRW-11	5397.85	39.55	39.55	2.17	5358.30
GRW-12	5397.24	33.67	33.67	0.00	5363.57
GRW-13	5396.90	33.06	33.06	0.00	5363.84

3.0 QUARTERLY SAMPLING ANALYSES

3.1 GENERAL WATER CHEMISTRY

CLIENT: Geoscience Consultants

DATE REPORTED: 12/20/89

SITE: GBR-6

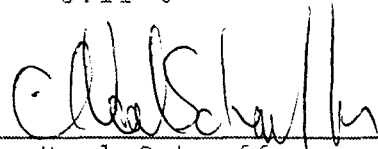
DATE RECEIVED: 12/13/89

LAB NO: F3674

DATE COLLECTED: 12/12/89

Lab pH (s.u.).....	7.30
Lab Conductivity, umhos/cm.....	3784
Lab resistivity, ohm-m.....	2.6427
Total Dissolved Solids (180), mg/l..	2486
Total Dissolved Solids (calc), mg/l.	2559
Total Alkalinity as CaCO ₃ , mg/l.....	1235.52
Total Acidity as CaCO ₃ , mg/l.....	0.00
Total Hardness as CaCO ₃ , mg/l.....	1236.81
Sodium Absorption Ratio.....	5.91

	mg/l	meq/l
Bicarbonate as HCO ₃	1507.33	24.71
Carbonate as CO ₃	0.00	0.00
Chloride.....	294.41	8.31
Sulfate.....	609.02	12.69
Calcium.....	336.88	16.81
Magnesium.....	96.38	7.93
Potassium.....	3.48	0.09
Sodium.....	477.60	20.77
Major Cations.....		45.60
Major Anions.....		45.70
Cation/Anion Difference.....		0.11 %


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DATE REPORTED: 12/20/89

SITE: G8R-8

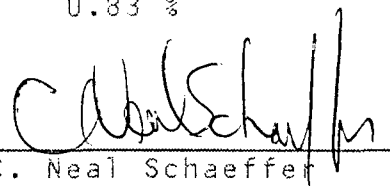
DATE RECEIVED: 12/13/89

LAB NO: F3668

DATE COLLECTED: 12/13/89

Lab pH (s.u.).....	7.22
Lab Conductivity, umhos/cm.....	4816
Lab resistivity, ohm-m.....	2.0764
Total Dissolved Solids (180), mg/l..	3388
Total Dissolved Solids (calc), mg/l.	3425
Total Alkalinity as CaCO ₃ , mg/l.....	934.56
Total Acidity as CaCO ₃ , mg/l.....	0.00
Total Hardness as CaCO ₃ , mg/l.....	1247.33
Sodium Absorption Ratio.....	8.99

	mg/l	meq/l
Bicarbonate as HCO ₃	1140.16	18.69
Carbonate as CO ₃	0.00	0.00
Chloride.....	591.50	16.69
Sulfate.....	1071.55	22.32
Calcium.....	421.10	21.01
Magnesium.....	47.83	3.93
Potassium.....	2.00	0.05
Sodium.....	730.00	31.75
Major Cations.....		56.75
Major Anions.....		57.70
Cation/Anion Difference.....		0.83 %


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DATE REPORTED: 12/20/89

SITE: GBR-13

DATE RECEIVED: 12/13/89

LAB NO: F3669

DATE COLLECTED: 12/12/89

Lab pH (s.u.).....	7.16
Lab Conductivity, umhos/cm.....	5222
Lab resistivity, ohm-m.....	1.9150
Total Dissolved Solids (180), mg/l..	3968
Total Dissolved Solids (calc), mg/l.	3958
Total Alkalinity as CaCO ₃ , mg/l.....	744.48
Total Acidity as CaCO ₃ , mg/l.....	0.00
Total Hardness as CaCO ₃ , mg/l.....	1584.16
Sodium Absorption Ratio.....	8.14

	mg/l	meq/l
Bicarbonate as HCO ₃	908.27	14.89
Carbonate as CO ₃	0.00	0.00
Chloride.....	594.18	16.76
Sulfate.....	1559.59	32.49
Calcium.....	570.59	28.47
Magnesium.....	39.04	3.21
Potassium.....	2.64	0.07
Sodium.....	744.80	32.40
Major Cations.....		64.15
Major Anions.....		64.14
Cation/Anion Difference.....		0.00 %


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CLIENT: Geoscience Consultants

DATE REPORTED: 12/20/89

SITE: GRW-13

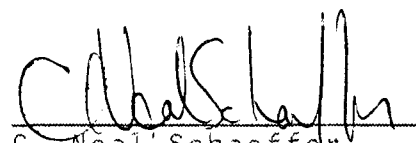
DATE RECEIVED: 12/13/89

LAB NO: F3670

DATE COLLECTED: 12/12/89

Lab pH (s.u.).....	8.06
Lab Conductivity, umhos/cm.....	4325
Lab resistivity, ohm-m.....	2.3121
Total Dissolved Solids (180), mg/l..	3242
Total Dissolved Solids (calc), mg/l.	3075
Total Alkalinity as CaCO ₃ , mg/l.....	278.63
Total Acidity as CaCO ₃ , mg/l.....	0.00
Total Hardness as CaCO ₃ , mg/l.....	1384.17
Sodium Absorption Ratio.....	5.76

	mg/l	meq/l
Bicarbonate as HCO ₃	339.93	5.57
Carbonate as CO ₃	0.00	0.00
Chloride.....	567.41	16.01
Sulfate.....	1318.45	27.47
Calcium.....	484.26	24.16
Magnesium.....	42.78	3.52
Potassium.....	2.12	0.05
Sodium.....	492.80	21.44
Major Cations.....		49.17
Major Anions.....		49.05
Cation/Anion Difference.....		0.13 %


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DATE REPORTED: 12/20/89

SITE: G8R-15

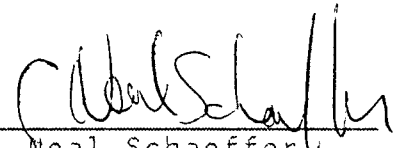
DATE RECEIVED: 12/13/89

LAB NO: F3664

DATE COLLECTED: 12/13/89

Lab pH (s.u.).....	8.41
Lab Conductivity, umhos/cm.....	4571
Lab resistivity, ohm-m.....	2.1877
Total Dissolved Solids (180), mg/l..	3694
Total Dissolved Solids (calc), mg/l.	3726
Total Alkalinity as CaCO ₃ , mg/l.....	177.65
Total Acidity as CaCO ₃ , mg/l.....	0.00
Total Hardness as CaCO ₃ , mg/l.....	1326.28
Sodium Absorption Ratio.....	8.46

	mg/l	meq/l
Bicarbonate as HCO ₃	212.17	3.48
Carbonate as CO ₃	2.24	0.07
Chloride.....	337.24	9.51
Sulfate.....	2043.51	42.57
Calcium.....	511.64	25.53
Magnesium.....	12.10	0.99
Potassium.....	6.80	0.17
Sodium.....	708.40	30.81
Major Cations.....		57.51
Major Anions.....		55.64
Cation/Anion Difference.....		1.66 %


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CLIENT: Geoscience Consultants

DATE REPORTED: 12/20/89

SITE: GBR-17

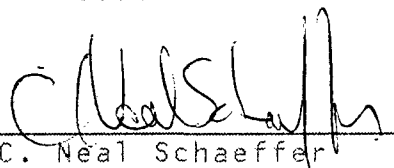
DATE RECEIVED: 12/11/89

LAB NO: F3655

DATE COLLECTED: 12/11/89

Lab pH (s.u.).....	8.24
Lab Conductivity, umhos/cm.....	2850
Lab resistivity, ohm-m.....	3.5088
Total Dissolved Solids (180), mg/l..	2310
Total Dissolved Solids (calc), mg/l.	2283
Total Alkalinity as CaCO ₃ , mg/l.....	198.00
Total Acidity as CaCO ₃ , mg/l.....	0.00
Total Hardness as CaCO ₃ , mg/l.....	1063.13
Sodium Absorption Ratio.....	3.98

	mg/l	meq/l
Bicarbonate as HCO ₃	241.56	3.96
Carbonate as CO ₃	0.00	0.00
Chloride.....	117.76	3.32
Sulfate.....	1326.68	27.64
Calcium.....	412.68	20.59
Magnesium.....	8.14	0.67
Potassium.....	0.81	0.02
Sodium.....	298.50	12.98
Major Cations.....		34.27
Major Anions.....		34.92
Cation/Anion Difference.....		0.95 %

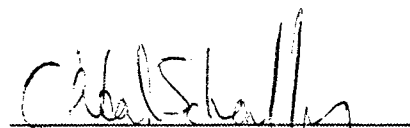

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CLIENT: Geoscience Consultants DATE REPORTED: 12/20/89

SITE: GBR-24D DATE RECEIVED: 12/13/89
LAB NO: F3671 DATE COLLECTED: 12/12/89

Lab pH (s.u.).....	7.59
Lab Conductivity, umhos/cm.....	4718
Lab resistivity, ohm-m.....	2.1195
Total Dissolved Solids (180), mg/l..	3700
Total Dissolved Solids (calc), mg/l.	3573
Total Alkalinity as CaCO ₃ , mg/l.....	253.44
Total Acidity as CaCO ₃ , mg/l.....	0.00
Total Hardness as CaCO ₃ , mg/l.....	1789.42
Sodium Absorption Ratio.....	4.93

	mg/l	meq/l
Bicarbonate as HCO ₃	309.20	5.07
Carbonate as CO ₃	0.00	0.00
Chloride.....	658.41	18.57
Sulfate.....	1658.35	34.55
Calcium.....	467.42	23.32
Magnesium.....	151.56	12.46
Potassium.....	5.52	0.14
Sodium.....	479.40	20.85
Major Cations.....		56.78
Major Anions.....		58.19
Cation/Anion Difference.....		1.23 %


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DATE REPORTED: 12/20/89

SITE: GBR-30

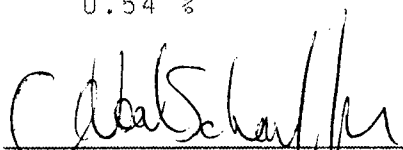
DATE RECEIVED: 12/13/89

LAB NO: F3665

DATE COLLECTED: 12/13/89

Lab pH (s.u.).....	8.07
Lab Conductivity, umhos/cm.....	4362
Lab resistivity, ohm-m.....	2.2925
Total Dissolved Solids (180), mg/l..	3250
Total Dissolved Solids (calc), mg/l.	3108
Total Alkalinity as CaCO ₃ , mg/l.....	306.68
Total Acidity as CaCO ₃ , mg/l.....	0.00
Total Hardness as CaCO ₃ , mg/l.....	1178.91
Sodium Absorption Ratio.....	7.35

	mg/l	meq/l
Bicarbonate as HCO ₃	374.15	6.13
Carbonate as CO ₃	0.00	0.00
Chloride.....	567.41	16.01
Sulfate.....	1308.57	27.26
Calcium.....	454.79	22.69
Magnesium.....	10.75	0.88
Potassium.....	2.60	0.07
Sodium.....	580.00	25.23
Major Cations.....		48.87
Major Anions.....		49.40
Cation/Anion Difference.....		0.54 %


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SITE: GBR-31
LAB NO: F3667

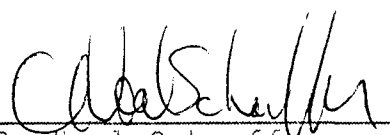
DATE REPORTED: 12/20/89

DATE RECEIVED: 12/13/89

DATE COLLECTED: 12/13/89

Lab pH (s.u.).....	7.18
Lab Conductivity, umhos/cm.....	5210
Lab resistivity, ohm-m.....	1.9194
Total Dissolved Solids (180), mg/l..	4128
Total Dissolved Solids (calc), mg/l.	4045
Total Alkalinity as CaCO ₃ , mg/l.....	354.42
Total Acidity as CaCO ₃ , mg/l.....	0.00
Total Hardness as CaCO ₃ , mg/l.....	1668.37
Sodium Absorption Ratio.....	7.16

	mg/l	meq/l
Bicarbonate as HCO ₃	432.39	7.09
Carbonate as CO ₃	0.00	0.00
Chloride.....	618.27	17.44
Sulfate.....	1873.97	39.04
Calcium.....	661.13	32.99
Magnesium.....	4.58	0.38
Potassium.....	2.36	0.06
Sodium.....	672.40	29.25
Major Cations.....		62.68
Major Anions.....		63.57
Cation/Anion Difference.....		0.71 %


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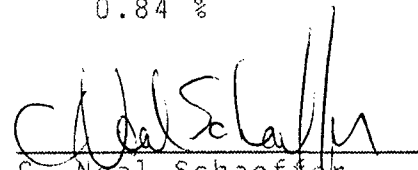
DATE REPORTED: 12/20/89

SITE: GBR-32
LAB NO: F3653

DATE RECEIVED: 12/11/89
DATE COLLECTED: 12/11/89

Lab pH (s.u.).....	7.44
Lab Conductivity, umhos/cm.....	3721
Lab resistivity, ohm-m.....	2.6874
Total Dissolved Solids (180), mg/l..	2716
Total Dissolved Solids (calc), mg/l.	2770
Total Alkalinity as CaCO ₃ , mg/l.....	334.62
Total Acidity as CaCO ₃ , mg/l.....	0.00
Total Hardness as CaCO ₃ , mg/l.....	757.87
Sodium Absorption Ratio.....	9.91

	mg/l	meq/l
Bicarbonate as HCO ₃	408.24	6.69
Carbonate as CO ₃	0.00	0.00
Chloride.....	331.88	9.36
Sulfate.....	1304.46	27.18
Calcium.....	301.09	15.02
Magnesium.....	1.62	0.13
Potassium.....	2.40	0.06
Sodium.....	627.50	27.29
Major Cations.....		42.51
Major Anions.....		43.23
Cation/Anion Difference.....		0.84 %


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CLIENT: Geoscience Consultants

DATE REPORTED: 12/20/89

SITE: GBR-33

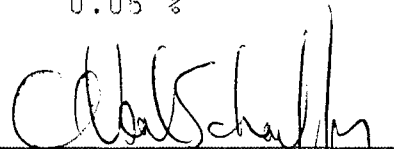
DATE RECEIVED: 12/13/89

LAB NO: F3666

DATE COLLECTED: 12/13/89

Lab pH (s.u.).....	7.21
Lab Conductivity, umhos/cm.....	4045
Lab resistivity, ohm-m.....	2.4722
Total Dissolved Solids (180), mg/l..	2916
Total Dissolved Solids (calc), mg/l.	2890
Total Alkalinity as CaCO ₃ , mg/l.....	457.38
Total Acidity as CaCO ₃ , mg/l.....	0.00
Total Hardness as CaCO ₃ , mg/l.....	1105.23
Sodium Absorption Ratio.....	7.33

	mg/l	meq/l
Bicarbonate as HCO ₃	558.00	9.15
Carbonate as CO ₃	0.00	0.00
Chloride.....	519.24	14.65
Sulfate.....	1092.94	22.77
Calcium.....	437.94	21.85
Magnesium.....	3.05	0.25
Potassium.....	1.52	0.04
Sodium.....	560.40	24.38
Major Cations.....		46.52
Major Anions.....		46.56
Cation/Anion Difference.....		0.05 %


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CLIENT: Geoscience Consultants

DATE REPORTED: 12/20/89

SITE: GBR-49

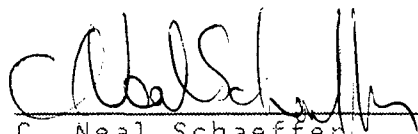
DATE RECEIVED: 12/11/89

LAB NO: F3654

DATE COLLECTED: 12/11/89

Lab pH (s.u.).....	7.33
Lab Conductivity, umhos/cm.....	4227
Lab resistivity, ohm-m.....	2.3657
Total Dissolved Solids (180), mg/l..	3224
Total Dissolved Solids (calc), mg/l.	3266
Total Alkalinity as CaCO ₃ , mg/l.....	356.40
Total Acidity as CaCO ₃ , mg/l.....	0.00
Total Hardness as CaCO ₃ , mg/l.....	1098.91
Sodium Absorption Ratio.....	8.44

	mg/l	meq/l
Bicarbonate as HCO ₃	434.81	7.13
Carbonate as CO ₃	0.00	0.00
Chloride.....	385.41	10.87
Sulfate.....	1554.65	32.39
Calcium.....	507.43	25.32
Magnesium.....	-40.64	-3.34
Potassium.....	1.80	0.05
Sodium.....	643.50	27.99
Major Cations.....		50.01
Major Anions.....		50.39
Cation/Anion Difference.....		0.37 %


C. Neal Schaeffer
Senior Chemist



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Tel. (505) 326-4737

CLIENT: Geoscience Consultants

DATE REPORTED: 12/20/89

SITE: GBR-50

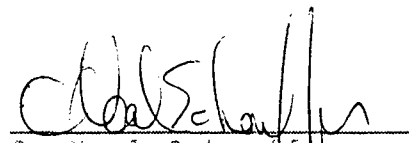
DATE RECEIVED: 12/11/89

LAB NO: F3652

DATE COLLECTED: 12/11/89

Lab pH (s.u.).....	7.30
Lab Conductivity, umhos/cm.....	2791
Lab resistivity, ohm-m.....	3.5829
Total Dissolved Solids (180), mg/l..	2154
Total Dissolved Solids (calc), mg/l.	2125
Total Alkalinity as CaCO ₃ , mg/l.....	209.88
Total Acidity as CaCO ₃ , mg/l.....	0.00
Total Hardness as CaCO ₃ , mg/l.....	814.71
Sodium Absorption Ratio.....	5.51

	mg/l	meq/l
Bicarbonate as HCO ₃	256.05	4.20
Carbonate as CO ₃	0.00	0.00
Chloride.....	141.85	4.00
Sulfate.....	1171.95	24.42
Calcium.....	313.72	15.65
Magnesium.....	7.78	0.64
Potassium.....	2.55	0.07
Sodium.....	361.50	15.72
Major Cations.....		32.08
Major Anions.....		32.61
Cation/Anion Difference.....		0.82 %


C. Neal Schaeffer
Senior Chemist

3.2 PURGEABLE AROMATICS EPA 602/8020

Geoscience Consultants, Ltd.
 Radian Work Order: 89-12-089

Method: Volatile aromatics (1)

List: SW8020

Sample ID:	GBR-17	GBR-32	GBR-49	GBR-50	Trip Blank	Reagent Blank
Factor:	1	1	5	1	1	1
Results in:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
	01C	02C	03C	04C	05A	06A
Matrix:	water	water	water	water	water	water

Benzene	<0.20	<u>96</u>	<u>74</u>	<0.20	<0.20	<0.20
Chlorobenzene	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20
1,2-Dichlorobenzene	<0.40	<0.40	<2.0	<0.40	<0.40	<0.40
1,3-Dichlorobenzene	<0.40	<0.40	<2.0	<0.40	<0.40	<0.40
1,4-Dichlorobenzene	<0.30	<0.30	<1.5	<0.30	<0.30	<0.30
Ethylbenzene	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20
Toluene	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20
Total xylenes	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20

Surrogate Recovery(%)

1-Bromo-4-fluorobenzene

Control Limits: 76 to 140

98	101	111	104	112	N/A
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N/A Not available

(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: 89-12-112

Method: Volatile aromatics (1)	SHS-1	Stripper Eff	Stripper Inf	GBR-24D
List: SW8020				
Sample ID:	8912121410	8912121145E	8912121145I	8912121130
Factor:	250	1	5	10
Results in:	ug/L	ug/L	ug/L	ug/L
	05B	06B	07B	08B
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Benzene	ND	50	<u>3.3</u>	0.20	<u>110</u>	1.0	<u>21</u>	2.0
Chlorobenzene	ND	50	ND	0.20	ND	1.0	ND	2.0
1,2-Dichlorobenzene	ND	100	ND	0.40	ND	2.0	ND	4.0
1,3-Dichlorobenzene	ND	100	ND	0.40	ND	2.0	ND	4.0
1,4-Dichlorobenzene	ND	75	<u>1.4 *</u>	0.30	<u>8.6</u>	1.5	ND	3.0
Ethylbenzene	ND	50	<u>0.55 *</u>	0.20	<u>18</u>	1.0	<u>27</u>	2.0
Toluene	ND	50	ND	0.20	ND	1.0	ND	2.0
Total xylenes	<u>330</u>	50	ND	0.20	<u>9.1</u>	1.0	<u>6.9 *</u>	2.0
Surrogate Recovery(%)								
1-Bromo-4-fluorobenzene	113		94		114		110	
Control Limits: 76 to 140								

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: 89-12-112

Method: Volatile aromatics (1)	GRW-13	GBR-13	GBR-8	
List: SW8020				
Sample ID:	8912121200	8912121530	8912121600	TRIP BLANK
Factor:	1	500	250	1
Results in:	ug/L	ug/L	ug/L	ug/L
	09B	10B	11B	12A
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Benzene	ND	0.20	<u>710</u>	100	<u>2000</u>	50	ND	0.20
Chlorobenzene	ND	0.20	ND	100	ND	50	ND	0.20
1,2-Dichlorobenzene	ND	0.40	ND	200	ND	100	ND	0.40
1,3-Dichlorobenzene	ND	0.40	ND	200	ND	100	ND	0.40
1,4-Dichlorobenzene	ND	0.30	ND	150	ND	75	ND	0.30
Ethylbenzene	ND	0.20	<u>820</u>	100	<u>560</u>	50	ND	0.20
Toluene	ND	0.20	<u>130 *</u>	100	ND	50	ND	0.20
Total xylenes	ND	0.20	<u>3100</u>	100	<u>2200</u>	50	ND	0.20
<u>Surrogate Recovery(%)</u>								
1-Bromo-4-fluorobenzene	92		98		105		94	
Control Limits: 76 to 140								

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: 89-12-112

Method: Volatile aromatics (1)	GBR-15	GBR-33	GBR-31	GBR-6
List: SW8020				
Sample ID:	8912131000	8912131210	8912131300	8912131600
Factor:	1	25	1	50
Results in:	ug/L	ug/L	ug/L	ug/L
	138	148	158	168
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Benzene	<u>63 D</u>	1.0	<u>73</u>	5.0	ND	0.20	<u>110</u>	10
Chlorobenzene	ND	0.20	ND	5.0	ND	0.20	ND	10
1,2-Dichlorobenzene	ND	0.40	ND	10	ND	0.40	ND	20
1,3-Dichlorobenzene	ND	0.40	ND	10	ND	0.40	ND	20
1,4-Dichlorobenzene	ND	0.30	ND	7.5	ND	0.30	ND	15
Ethylbenzene	<u>2.8</u>	0.20	<u>120</u>	5.0	ND	0.20	<u>85</u>	10
Toluene	<u>0.45 *</u>	0.20	ND	5.0	ND	0.20	ND	10
Total xylenes	<u>1.5</u>	0.20	<u>170</u>	5.0	ND	0.20	<u>140</u>	10
Surrogate Recovery(%)								
1-Bromo-4-fluorobenzene	98		116		108		136	
Control Limits: 76 to 140								

D Sample diluted for this analyte

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: 89-12-112

Method: Volatile aromatics (1) GBR-30
 List: SW8020
 Sample ID: 8912131030 Reagent blank
 Factor: 1 1
 Results in: ug/L ug/L
 17B 22A
 Matrix: water water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Benzene	<u>1.1</u>	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	<u>0.28 *</u>	0.20	ND	0.20				
Total xylenes	<u>1.3</u>	0.20	ND	0.20				
<u>Surrogate Recovery(%)</u>								
1-Bromo-4-fluorobenzene	110		97					
Control Limits: 76 to 140								

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.

3.3 POLYNUCLEAR AROMATIC HYDROCARBONS EPA 610

Geoscience Consultants, Ltd.
 Radian Work Order: 89-12-112

Method: PAHs by GC 8100 (1) List: 8100, special list	Stripper Eff	Stripper Inf	GBR-24D	GRW-13
Sample ID:	8912121145E	8912121145I	8912121130	8912121200
Factor:	0.94	0.94	0.94	0.94
Results in:	ug/L	ug/L	ug/L	ug/L
	06C	07C	08C	09C
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
1-Methylnaphthalene	<u>2.0</u> *	0.94	<u>6.3</u>	0.94	<u>5.8</u>	0.94	ND	0.94
2-Methylnaphthalene	<u>2.8</u> *	0.94	<u>2.8</u> *	0.94	ND	0.94	ND	0.94

* 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 Appendix A in this report.

Geoscience Consultants, Ltd.
 Radian Work Order: 89-12-112

Method:PAHs by GC 8100 (1) List:8100, special list	GBR-13	GBR-8	GBR-15	GBR-33
Sample ID:	8912121530	8912121600	8912131000	8912131210
Factor:	94	94	0.94	9.4
Results in:	ug/L	ug/L	ug/L	ug/L
	10C	11C	13C	14C
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
1-Methylnaphthalene	1600	94	ND	94	ND	0.94	43 *	9.4
2-Methylnaphthalene	2000	94	280 *	94	ND	0.94	ND	9.4

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: 89-12-112

Method: PAHs by GC 8100 (1) List: 8100, special list	GBR-31	GBR-6	GBR-30	GBR-17
Sample ID:	8912131300	8912131600	8912131030	8912120950
Factor:	0.94	94	0.94	0.94
Results in:	ug/L	ug/L	ug/L	ug/L
	15C	16C	17C	18A
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
1-Methylnaphthalene	ND	0.94	ND	94	ND	0.94	ND	0.94
2-Methylnaphthalene	ND	0.94	ND	94	10	0.94	ND	0.94

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: 89-12-112

Method: PAHs by GC 8100 (1)
 List: 8100, special list
 Sample ID: METHOD BLANK
 Factor: 1
 Results in: ug/L
 19A
 Matrix: water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
1-Methylnaphthalene	ND	0.94						
2-Methylnaphthalene	ND	0.94						

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: 89-12-112

Method:SW8310 PAH's by HPLC (1)	Stripper Eff	Stripper Inf	GBR-24D	GRW-13
List:8310 Method analytes				
Sample ID:	8912121145E	8912121145I	8912121130	8912121200
Factor:	0.94	1.9	0.94	0.94
Results in:	ug/L	ug/L	ug/L	ug/L
	06C	07C	08C	09C
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Acenaphthalene	ND	2.2	ND	4.4	ND	2.2	ND	2.2
Acenaphthene	ND	1.7	ND	3.4	144 D	1.7	ND	1.7
Anthracene	ND	0.62	ND	1.3	ND	0.62	ND	0.62
Benzo(a)anthracene	ND	0.012	ND	0.025	ND	0.012	ND	0.012
Benzo(a)pyrene	ND	0.022	ND	0.044	ND	0.022	ND	0.022
Benzo(b)fluoranthene	ND	0.017	ND	0.034	ND	0.017	ND	0.017
Benzo(g,h,i)perylene	ND	0.071	ND	0.14	ND	0.071	ND	0.071
Benzo(k)fluoranthene	ND	0.016	ND	0.032	ND	0.016	ND	0.016
Chrysene	ND	0.012	ND	0.025	ND	0.012	ND	0.012
Dibenzo(a,h)anthracene	ND	0.028	ND	0.057	ND	0.028	ND	0.028
Fluoranthene	ND	0.20	ND	0.40	ND	0.20	ND	0.20
Fluorene	3.4 D	0.20	4.0 D	0.40	2.6 D	0.20	ND	0.20
Indeno(1,2,3-cd)pyrene	ND	0.040	ND	0.082	ND	0.040	ND	0.040
Naphthalene	8.9 D	1.7	14 *D	3.4	1.9 *D	1.7	4.3 *D	1.7
Phenanthrene	11	0.60	13	1.2	3.0	0.60	ND	0.60
Pyrene	0.62 *	0.25	0.54 *	0.51	0.29 *	0.25	ND	0.25
Surrogate Recovery(%)								
Terphenyl-d14	93		80		79		80	
Control Limits: 37 to 139								

ND Not detected at specified detection limit

D Sample diluted for this analyte

* 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: 89-12-112

Method:SW8310 PAH's by HPLC (1)	GBR-13	GBR-8	GBR-15	GBR-33
List:8310 Method analytes				
Sample ID:	8912121530	8912121600	8912131000	8912131210
Factor:	380	9.4	0.94	1.9
Results in:	ug/L	ug/L	ug/L	ug/L
	10C	11C	13C	14C
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Acenaphthalene	ND	870	ND	22	<u>4.1 *D</u>	2.2	ND	4.4
Acenaphthene	ND	680	ND	17	ND	1.7	<u>6.0 *D</u>	3.4
Anthracene	ND	250	ND	6.2	ND	0.62	ND	1.3
Benzo(a)anthracene	<u>25</u>	4.9	ND	0.12	<u>0.012 *</u>	0.012	<u>0.20</u>	0.025
Benzo(a)pyrene	ND	8.7	ND	0.22	ND	0.022	ND	0.044
Benzo(b)fluoranthene	ND	6.8	ND	0.17	ND	0.017	<u>0.10 *</u>	0.034
Benzo(g,h,i)perylene	ND	29	ND	0.71	ND	0.071	ND	0.14
Benzo(k)fluoranthene	ND	6.5	ND	0.16	ND	0.016	ND	0.032
Chrysene	<u>86</u>	4.9	ND	0.12	ND	0.012	<u>0.88</u>	0.025
Dibenzo(a,h)anthracene	ND	11	ND	0.28	ND	0.028	ND	0.057
Fluoranthene	ND	80	ND	2.0	ND	0.20	ND	0.40
Fluorene	<u>360 *D</u>	80	<u>8.7 *D</u>	2.0	<u>0.47 *D</u>	0.20	<u>3.5 D</u>	0.40
Indeno(1,2,3-cd)pyrene	ND	16	ND	0.40	ND	0.040	ND	0.082
Naphthalene	ND	680	<u>88</u>	17	ND	1.7	ND	3.4
Phenanthrene	<u>1600</u>	240	<u>20 *</u>	6.0	<u>0.68 *</u>	0.60	<u>6.8</u>	1.2
Pyrene	<u>290 *</u>	100	ND	2.5	ND	0.25	<u>1.6 *</u>	0.51
Surrogate Recovery(%)								
Terphenyl-d14	NC		27 Q		134		120	
Control Limits: 37 to 139								

ND Not detected at specified detection limit
* Est. result less than 5 times detection limit
Q Outside control limits

D Sample diluted 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.

Geoscience Consultants, Ltd.
 Radian Work Order: 89-12-112

Method:SW8310 PAH's by HPLC (1)	GBR-31	GBR-6	GBR-30	GBR-17
List:8310 Method analytes				
Sample ID:	8912131300	8912131600	8912131030	8912120950
Factor:	0.94	24	1.9	0.94
Results in:	ug/L	ug/L	ug/L	ug/L
	15C	16C	17C	18A
Matrix:	water	water	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Acenaphthalene	ND	2.2	ND	55	ND	2.2	ND	2.2
Acenaphthene	ND	1.7	ND	43	<u>14 D</u>	1.7	ND	1.7
Anthracene	ND	0.62	ND	16	ND	1.3	ND	0.62
Benzo(a)anthracene	ND	0.012	<u>0.57 *</u>	0.31	<u>0.026 *</u>	0.025	<u>0.026 *</u>	0.012
Benzo(a)pyrene	ND	0.022	ND	0.55	ND	0.044	ND	0.022
Benzo(b)fluoranthene	ND	0.017	ND	0.43	ND	0.034	ND	0.017
Benzo(g,h,i)perylene	ND	0.071	ND	1.8	ND	0.14	ND	0.071
Benzo(k)fluoranthene	ND	0.016	ND	0.41	ND	0.032	ND	0.016
Chrysene	ND	0.012	<u>7.3</u>	0.31	<u>0.27</u>	0.025	<u>0.20</u>	0.012
Dibenzo(a,h)anthracene	ND	0.028	ND	0.72	ND	0.057	ND	0.028
Fluoranthene	ND	0.20	ND	5.0	ND	0.40	<u>0.40 *</u>	0.20
Fluorene	ND	0.20	<u>13 *D</u>	5.0	<u>4.1 D</u>	0.20	<u>2.3 D</u>	0.20
Indeno(1,2,3-cd)pyrene	ND	0.040	ND	1.0	ND	0.040	ND	0.040
Naphthalene	ND	1.7	ND	43	<u>5.8 *D</u>	1.7	<u>5.6 *D</u>	1.7
Phenanthrene	ND	0.60	<u>29 *</u>	15	<u>1.5 *</u>	1.2	<u>2.0 *</u>	0.60
Pyrene	ND	0.25	ND	6.5	ND	0.51	<u>0.25 *</u>	0.25
Surrogate Recovery(%)								
Terphenyl-d14	84		106		76		124	
Control Limits: 37 to 139								

 ND Not detected at specified detection limit
 D Sample diluted for this analyte

* 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: 89-12-112

Method: SW8310 PAH's by HPLC (1)

List: 8310 Method analytes

Sample ID: METHOD BLANK

Factor: 1

Results in: ug/L

19A

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	96							
Control Limits: 37 to 139								

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: 89-12-112

Method: SW8310 PAH's by HPLC (1)

List: Matrix Spike Analyte List

Sample ID:	RECOVERY CHECK	RECOVERY CHECK-
		K DUP
Factor:	1	1
Results in:	%	%
	20A	21A
Matrix:	water	water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
Acenaphthalene	64	2.3	65	2.3				
Acenaphthene	71	1.8	73	1.8				
Anthracene	94	0.66	100	0.66				
Benzo(k)fluoranthene	80	0.017	83	0.017				
Dibenzo(a,h)anthracene	131	0.030	137	0.030				
Fluorene	87	0.21	92	0.21				
Naphthalene	57	1.8	57	1.8				
Phenanthrene	94	0.64	102	0.64				
 <u>Surrogate Recovery(%)</u>								
Terphenyl-d14	64		68					
Control Limits: 37 to 139								

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

3.4 PURGEABLE HALOCARBONS EPA 601/8010

Geoscience Consultants, Ltd.
 Radian Work Order: 89-12-089

Method: Halogenated volatiles (1)

List: SW8010

Sample ID:	GBR-17	GBR-32	GBR-49	GBR-50	Trip Blank	Reagent Blank
Factor:	1	1	5	1	1	1
Results in:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
	01A	02A	03A	04A	05A	06A
Matrix:	water	water	water	water	water	water

Bromodichloromethane	<0.10	<0.10	<0.50	<0.10	<0.10	<0.10
Bromoform	<0.50	<0.50	<2.5	<0.50	<0.50	<0.50
Bromomethane	<1.2	<1.2	<5.9	<1.2	<1.2	<1.2
Carbon Tetrachloride	<0.12	<0.12	<0.60	<0.12	<0.12	<0.12
Chlorobenzene	<0.25	<0.25	<1.3	<0.25	<0.25	<0.25
Chloroethane	<0.52	<0.52	<2.6	<0.52	<0.52	<0.52
2-Chloroethylvinylether	<0.50	<0.50	<2.5	<0.50	<0.50	<0.50
Chloroform	<0.10	<0.10	<0.50	<0.10	<0.10	<0.10
Chloromethane	<0.30	<0.30	<1.5	<0.30	<0.30	<0.30
Dibromochloromethane-(2)	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20
1,2-Dichlorobenzene	<0.50	<0.50	<2.5	<0.50	<0.50	<0.50
1,3-Dichlorobenzene	<0.32	<0.32	<1.6	<0.32	<0.32	<0.32
1,4-Dichlorobenzene	<0.24	<0.24	<1.2	<0.24	<0.24	<0.24
1,1-Dichloroethane	<0.50	<u>3.0</u>	<u>2.8 *</u>	<0.50	<0.50	<0.50
1,2-Dichloroethane	<0.10	<0.10	<0.50	<0.10	<0.10	<0.10
1,1-Dichloroethene	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20
trans-1,2-Dichloroethene	<0.20	<u>140 D</u>	<u>150</u>	<u>0.27 *</u>	<0.20	<0.20
1,2-Dichloropropane	<0.10	<0.10	<0.50	<0.10	<0.10	<0.10
cis-1,3-Dichloropropene-(2)	N\A	N\A	N\A	N\A	N\A	N\A
trans-1,3-Dichloropropene	<0.30	<0.30	<1.5	<0.30	<0.30	<0.30
Methylene Chloride	<0.40	<u>1.2 *</u>	<2.0	<0.40	<u>7.2</u>	<0.40
1,1,2,2-Tetrachloroethane-(3)	<0.15	<0.15	<0.75	<0.15	<0.15	<0.15
Tetrachloroethene-(3)	<u>0.13 *</u>	<u>17</u>	<u>25</u>	<u>1.2</u>	<0.10	<0.10
1,1,2-Trichloroethane-(2)	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20
1,1,1-Trichloroethane	<u>1.0</u>	<u>1.3</u>	<u>1.0 *</u>	<u>0.26 *</u>	<0.20	<0.20
Trichloroethene	<0.20	<u>10</u>	<u>14</u>	<0.20	<0.20	<0.20
Trichlorofluoromethane	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20
Vinyl Chloride	<0.20	<0.20	<1.0	<0.20	<0.20	<0.20

N\A Not available

D Sample diluted for this analyte

* 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.

 (2) Dibromochloromethane, 1,1,2-Trichloroethane, and
 cis-1,3-Dichloropropene coelute. Quantitated as
 Dibromochloromethane unless otherwise noted.

 (3) Tetrachloroethene and 1,1,2,2-Tetrachloroethane
 coelute. Quantitated as Tetrachloroethene unless
 otherwise noted.

Geoscience Consultants, Ltd.
 Radian Work Order: 89-12-089

Method: Halogenated volatiles (1)

List: SW8010

Sample ID:	GBR-17	GBR-32	GBR-49	GBR-50	Trip Blank	Reagent Blank
Factor:	1	1	5	1	1	1
Results in:	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
	01A	02A	03A	04A	05A	06A
Matrix:	water	water	water	water	water	water

Surrogate Recovery(%)

1-Bromo-4-fluorobenzene

Control Limits: 76 to 140

95

104

88

110

127

N/A

N/A Not available

- (1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.
- (2) Dibromochloromethane, 1,1,2-Trichloroethane, and cis-1,3-Dichloropropene coelute. Quantitated as Dibromochloromethane unless otherwise noted.
- (3) Tetrachloroethene and 1,1,2,2-Tetrachloroethane coelute. Quantitated as Tetrachloroethene unless otherwise noted.

Geoscience Consultants, Ltd.
Radian Work Order: 89-12-112

ND Not detected at specified detection limit

N/A Not available

* 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.
- (2) Dibromochloromethane, 1,1,2-Trichloroethane, and cis-1,3-Dichloropropene coelute. Quantitated as Dibromochloromethane unless otherwise noted.
- (3) Tetrachloroethene and 1,1,2,2-Tetrachloroethane coelute. Quantitated as Tetrachloroethene unless otherwise noted.

Geoscience Consultants, Ltd.
 Radian Work Order: 89-12-112

Method: Halogenated volatiles (1)	SHS-1	Stripper Eff	Stripper Inf	GBR-24D
List: SW8010				
Sample ID:	8912121410	8912121145E	8912121145I	8912121130
Factor:	5	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	0.50	ND	0.10	ND	0.10	ND	0.10
Bromoform	ND	2.5	ND	0.50	ND	0.50	ND	0.50
Bromomethane	ND	5.9	ND	1.2	ND	1.2	ND	1.2
Carbon Tetrachloride	ND	0.60	ND	0.12	ND	0.12	ND	0.12
Chlorobenzene	ND	1.3	ND	0.25	ND	0.25	ND	0.25
Chloroethane	ND	2.6	ND	0.52	ND	0.52	ND	0.52
2-Chloroethylvinylether	ND	2.5	ND	0.50	ND	0.50	ND	0.50
Chloroform	5.7	0.50	ND	0.10	ND	0.10	ND	0.10
Chloromethane	ND	1.5	ND	0.30	ND	0.30	ND	0.30
Dibromochloromethane-(2)	ND	1.0	ND	0.20	ND	0.20	ND	0.20
1,2-Dichlorobenzene	ND	2.5	ND	0.50	ND	0.50	0.60 *	0.50
1,3-Dichlorobenzene	ND	1.6	ND	0.32	ND	0.32	ND	0.32
1,4-Dichlorobenzene	ND	1.2	ND	0.24	ND	0.24	ND	0.24
1,1-Dichloroethane	0.72 *	2.5	ND	0.50	1.9 *	0.50	ND	0.50
1,2-Dichloroethane	7.1	0.50	1.0	0.10	3.5	0.10	18	0.10
1,1-Dichloroethene	ND	1.0	ND	0.20	ND	0.20	ND	0.20
trans-1,2-Dichloroethene	21	1.0	0.97 *	0.20	9.3	0.20	ND	0.20
1,2-Dichloropropane	ND	0.50	ND	0.10	ND	0.10	ND	0.10
cis-1,3-Dichloropropene-(2)	N\A	N\A	N\A	N\A	N\A	N\A	N\A	N\A
trans-1,3-Dichloropropene	ND	1.5	ND	0.30	ND	0.30	ND	0.30
Methylene Chloride	ND	2.0	ND	0.40	1.0 *	0.40	ND	0.40
1,1,2,2-Tetrachloroethane-(3)	ND	0.75	ND	0.15	ND	0.15	ND	0.15
Tetrachloroethene-(3)	ND	0.50	ND	0.10	1.3	0.10	ND	0.10
1,1,2-Trichloroethane-(2)	ND	1.0	ND	0.20	ND	0.20	ND	0.20
1,1,1-Trichloroethane	ND	1.0	ND	0.20	0.80 *	0.20	ND	0.20
Trichloroethene	6.2	1.0	ND	0.20	2.0	0.20	ND	0.20
Trichlorofluoromethane	ND	1.0	ND	0.20	ND	0.20	ND	0.20
Vinyl Chloride	ND	1.0	ND	0.20	ND	0.20	ND	0.20

ND Not detected at specified detection limit

* Est. result less than 5 times detection limit

N\A Not available

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

 (2) Dibromochloromethane, 1,1,2-Trichloroethane, and
 cis-1,3-Dichloropropene coelute. Quantitated as
 Dibromochloromethane unless otherwise noted.

 (3) Tetrachloroethene and 1,1,2,2-Tetrachloroethane
 coelute. Quantitated as Tetrachloroethene unless
 otherwise noted.

Geoscience Consultants, Ltd.
 Radian Work Order: 89-12-112

Method: Halogenated volatiles (1)	SHS-1	Stripper Eff	Stripper Inf	GBR-24D
List: SW8010				
Sample ID:	8912121410	8912121145E	8912121145I	8912121130
Factor:	5	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
<u>Surrogate Recovery(%)</u>								
1-Bromo-4-fluorobenzene	117		117		107		104	
Control Limits: 76 to 140								

- (1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.
- (2) Dibromochloromethane, 1,1,2-Trichloroethane, and cis-1,3-Dichloropropene coelute. Quantitated as Dibromochloromethane unless otherwise noted.
- (3) Tetrachloroethene and 1,1,2,2-Tetrachloroethane coelute. Quantitated as Tetrachloroethene unless otherwise noted.

Geoscience Consultants, Ltd.
Radian Work Order: 89-12-112

Method: Halogenated volatiles (1)	GRW-13	GBR-13	GBR-8	GBR-15
List: SW8010				
Sample ID:	8912121200	8912121530	8912121600	8912131000
Factor:	1	1	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
	09A	10A	11A	13A
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	<u>1.3 *</u>	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-(2)	ND	0.20	ND	0.20	ND	0.20	ND	0.20
1,2-Dichlorobenzene	ND	0.50	ND	0.50	<u>0.84 *</u>	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	<u>4.9</u>	0.50	<u>5.3</u>	0.50	ND	0.50
1,2-Dichloroethane	<u>1.1</u>	0.10	<u>7.4</u>	0.10	<u>4.7</u>	0.10	<u>36</u>	0.10
1,1-Dichloroethene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
trans-1,2-Dichloroethene	ND	0.20	<u>25</u>	0.20	<u>20</u>	0.20	ND	0.20
1,2-Dichloropropane	ND	0.10	ND	0.10	ND	0.10	ND	0.10
cis-1,3-Dichloropropene-(2)	N\A	N\A	N\A	N\A	N\A	0.30	N\A	N\A
trans-1,3-Dichloropropene	ND	0.30	ND	0.30	ND	N\A	ND	0.30
Methylene Chloride	ND	0.40	<u>1.3 *</u>	0.40	ND	0.40	ND	0.40
1,1,2,2-Tetrachloroethane-(3)	ND	0.15	ND	0.15	ND	0.15	ND	0.15
Tetrachloroethene-(3)	ND	0.10	ND	0.10	ND	0.10	ND	0.10
1,1,2-Trichloroethane-(2)	ND	0.20	ND	0.20	ND	0.20	ND	0.20
1,1,1-Trichloroethane	ND	0.20	<u>0.90 *</u>	0.20	ND	0.20	ND	0.20
Trichloroethene	ND	0.20	<u>4.0</u>	0.20	<u>2.3</u>	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

N\A Not available

* 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.

(2) Dibromochloromethane, 1,1,2-Trichloroethane, and
cis-1,3-Dichloropropene coelute. Quantitated as
Dibromochloromethane unless otherwise noted.

(3) Tetrachloroethene and 1,1,2,2-Tetrachloroethane
coelute. Quantitated as Tetrachloroethene unless
otherwise noted.

Geoscience Consultants, Ltd.
 Radian Work Order: 89-12-112

Method: Halogenated volatiles (1)	GRW-13	GBR-13	GBR-8	GBR-15
List: SW8010				
Sample ID:	8912121200	8912121530	8912121600	8912131000
Factor:	1	1	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
	09A	10A	11A	13A
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	103	115	110	108
Control Limits: 76 to 140				

- (1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.
- (2) Dibromochloromethane, 1,1,2-Trichloroethane, and cis-1,3-Dichloropropene coelute. Quantitated as Dibromochloromethane unless otherwise noted.
- (3) Tetrachloroethene and 1,1,2,2-Tetrachloroethane coelute. Quantitated as Tetrachloroethene unless otherwise noted.

Geoscience Consultants, Ltd.
 Radian Work Order: 89-12-112

Method: Halogenated volatiles (1)	GBR-33	GBR-31	GBR-6	GBR-30
List: SW8010				
Sample ID:	8912131210	8912131300	8912131600	8912131030
Factor:	1	1	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
	14A	15A	16A	17A
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-(2)	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	<u>3.4</u>	0.50	ND	0.50	ND	0.50
1,2-Dichloroethane	<u>4.0</u>	0.10	<u>2.0</u>	0.10	<u>1.2</u>	0.10	<u>0.94</u>	0.10
1,1-Dichloroethene	ND	0.20	ND	0.20	ND	0.20	ND	0.20
trans-1,2-Dichloroethene	<u>1.1</u>	0.20	<u>44</u>	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-(2)	N\A	N\A	N\A	N\A	N\A	N\A	N\A	N\A
trans-1,3-Dichloropropene	ND	0.30	ND	0.30	ND	0.30	ND	0.30
Methylene Chloride	ND	0.40	<u>1.1 *</u>	0.40	ND	0.40	ND	0.40
1,1,2,2-Tetrachloroethane-(3)	ND	0.15	ND	0.15	ND	0.15	ND	0.15
Tetrachloroethene-(3)	ND	0.10	<u>12</u>	0.10	ND	0.10	ND	0.10
1,1,2-Trichloroethane-(2)	ND	0.20	ND	0.20	ND	0.20	ND	0.20
1,1,1-Trichloroethane	ND	0.20	<u>1.4</u>	0.20	ND	0.20	ND	0.20
Trichloroethene	ND	0.20	<u>7.9</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

N\A Not available

* 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.

 (2) Dibromochloromethane, 1,1,2-Trichloroethane, and
 cis-1,3-Dichloropropene coelute. Quantitated as
 Dibromochloromethane unless otherwise noted.

 (3) Tetrachloroethene and 1,1,2,2-Tetrachloroethane
 coelute. Quantitated as Tetrachloroethene unless
 otherwise noted.

Geoscience Consultants, Ltd.
 Radian Work Order: 89-12-112

Method: Halogenated volatiles (1)	GBR-33	GBR-31	GBR-6	GBR-30
List: SW8010				
Sample ID:	8912131210	8912131300	8912131600	8912131030
Factor:	1	1	1	1
Results in:	ug/L	ug/L	ug/L	ug/L
	14A	15A	16A	17A
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	112	115	117	117
Control Limits: 76 to 140				

- (1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.
- (2) Dibromochloromethane, 1,1,2-Trichloroethane, and cis-1,3-Dichloropropene coelute. Quantitated as Dibromochloromethane unless otherwise noted.
- (3) Tetrachloroethene and 1,1,2,2-Tetrachloroethane coelute. Quantitated as Tetrachloroethene unless otherwise noted.

Geoscience Consultants, Ltd.
 Radian Work Order: 89-12-112

Method: Halogenated volatiles (1)

List: SW8010

Sample ID:

Reagent blank

Factor:

1

Results in:

ug/L

22A

Matrix:

water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	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-(2)	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						
trans-1,2-Dichloroethene	ND	0.20						
1,2-Dichloropropane	ND	0.10						
cis-1,3-Dichloropropene-(2)	N\A	N\A						
trans-1,3-Dichloropropene	ND	0.30						
Methylene Chloride	ND	0.40						
1,1,2,2-Tetrachloroethane-(3)	ND	0.15						
Tetrachloroethene-(3)	ND	0.10						
1,1,2-Trichloroethane-(2)	ND	0.20						
1,1,1-Trichloroethane	ND	0.20						
Trichloroethene	ND	0.20						
Trichlorofluoromethane	ND	0.20						
Vinyl Chloride	ND	0.20						

ND Not detected at specified detection limit

N\A Not available

- (1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.
- (2) Dibromochloromethane, 1,1,2-Trichloroethane, and cis-1,3-Dichloropropene coelute. Quantitated as Dibromochloromethane unless otherwise noted.
- (3) Tetrachloroethene and 1,1,2,2-Tetrachloroethane coelute. Quantitated as Tetrachloroethene unless otherwise noted.

Geoscience Consultants, Ltd.
 Radian Work Order: 89-12-112

Method: Halogenated volatiles (1)

List: SW8010

Sample ID:

Reagent blank

Factor:

1

Results in:

ug/L

22A

Matrix:

water

	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit	Result	Det. Limit
<u>Surrogate Recovery(%)</u>								
1-Bromo-4-fluorobenzene	104							
Control Limits: 76 to 140								

- (1) For a detailed description of flags and technical terms in this report refer to Appendix A in this report.
- (2) Dibromochloromethane, 1,1,2-Trichloroethane, and cis-1,3-Dichloropropene coelute. Quantitated as Dibromochloromethane unless otherwise noted.
- (3) Tetrachloroethene and 1,1,2,2-Tetrachloroethane coelute. Quantitated as Tetrachloroethene unless otherwise noted.

3.5 KEY TO RADIAN COMMENTS, NOTES AND DEFINITIONS

Appendix A

Comments, Notes and Definitions

Geoscience Consultants, Ltd.
Radian Work Order: 89-12-112

General Comments

M-xylene and chlorobenzene coelute.

For analysis 8020, Fraction -08B was initially run 12/21/89;
a dilution was run on 1/02/90 and reported.

Geoscience Consultants, Ltd.
Radian Work Order: 89-12-112

- A This flag indicates that a spike is an analytical and/or post-digestion spike. These spikes have not been subjected to the extraction or digestion step.
- B This flag indicates that the analyte was detected in the reagent blank but the sample results are not corrected for the amount in the blank.
- 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.
- D This flag identifies all analytes identified in analysis at a secondary dilution factor. 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.
- E The reported value is estimated because of the presence of interference. The potential source of the interference is included in the report narrative.
- G This flag identifies a GC/MS result whose concentration exceeds the calibration range for that specific analysis. Usually if one or more compounds have a response greater than full scale, the sample or extract is diluted and re-analyzed.
- I 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 or supplemental case narrative with the report.
- J Indicates an estimated value for GC/MS data. This flag is used either when estimating a concentration for tentatively identified compounds where a response factor of 1 is assumed, or when the mass spectral data indicate the presence of a compound that meets the identification criteria but the result is less than the sample quantitation limit.
- NA This analyte was not analyzed.
- NC Applies to RPD and spike recovery results. 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. See * definition for further explanation of the unreliability of 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 considered insignificant.

Geoscience Consultants, Ltd.
Radian Work Order: 89-12-112

- 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.
- NR This analyte was not requested by the client.
- NS This analyte or surrogate was not added (spiked) to the sample for this analysis.
- N/A A result or value is not available for this parameter, usually a detection limit.
- P 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 P flag indicates that the analyte has been confirmed previously. This flag is applicable to analyses of samples arising from a regular sampling program as a specific sample source; for example, a quarterly well monitoring program.
- 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.
- R This flag indicates that the analyte was detected in the reagent blank and the sample results are corrected for the amount in the blank.
- S This flag indicates that a specific result from a metals analysis has been obtained using the Method of Standard Addition.
- U 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 U flag indicates that second column was not requested.
- X 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 X flag indicates a second column confirmation was performed but the analyte was not confirmed and is likely a false positive.
- * 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.

Geoscience Consultants, Ltd.
Radian Work Order: 89-12-112

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

4.0 WEEKLY MONITORING AND TANK VOLUMES

GIANTFarmington Refinery
606 Highway 64
Post Office Box 256
Farmington, NM 87401**WEEKLY
MONITORING**

DATE: 12/27/89

LOCATION	WATER DEPTH IN FEET	PRODUCT DEPTH IN INCHES	CAPACITY IN BBL/FT	WATER VOLUME IN GALLONS
TANK 102	7' 3"	.25"	33.54	10213
TANK 106	5' 9"	.5"	33.28	8037
TANK 21	0	0	435.96	0
TANK 22	20' 7"	0	438.18	378806
TANK 27	28' 2.5"	0	156.81	185780
TANK 32	24' 2"	1.75	156.80	159152
TANK 34	23' 6"	0	156.80	154762
TANK 35	0	0	156.79	0
TANK 37	33' 3"	0	252.34	352393

ARE ALL DIVERSION AND CONTAINMENT
BERMS IN PLACE AND IN GOOD
CONDITION?NO YES
☐ ☒ARE ALL PUMPS, BLOWERS, TANKS,
PIPELINES, AND EQUIPMENT IN GOOD
WORKING ORDER?☐ ☒

IS ALL EQUIPMENT FREE FROM LEAKS?

☐ ☒**COMMENTS:**

GIANT

Farmington Refinery
808 Highway 64
Post Office Box 256
Farmington, NM 87401

WEEKLY MONITORING

DATE: 12/18/89

LOCATION	WATER DEPTH IN FEET	PRODUCT DEPTH IN INCHES	CAPACITY IN BBL/FT	WATER VOLUME IN GALLONS
TANK 102	11' 6"	.25"	33.54	16199
TANK 106	5' 9"	.5"	33.28	8037
TANK 21	0	0	435.96	0
TANK 22	19' 5"	0	438.18	357336
TANK 27	28' 2.5"	0	156.81	185780
TANK 32	24' 2"	1.75	156.80	159152
TANK 34	23' 6"	0	156.80	154762
TANK 35	0	0	156.79	0
TANK 37	33' 3"	0	252.34	352393

ARE ALL DIVERSION AND CONTAINMENT
BERMS IN PLACE AND IN GOOD
CONDITION?

NO YES
☐ ☒

ARE ALL PUMPS, BLOWERS, TANKS,
PIPELINES, AND EQUIPMENT IN GOOD
WORKING ORDER?

☐ ☒

IS ALL EQUIPMENT FREE FROM LEAKS?

☐ ☒

COMMENTS:

GIANT

Farmington Refinery
808 Highway 64
Post Office Box 256
Farmington, NM 87401

WEEKLY MONITORING

DATE: 12/11/89

LOCATION	WATER DEPTH IN FEET	PRODUCT DEPTH IN INCHES	CAPACITY IN BBL/FT	WATER VOLUME IN GALLONS
TANK 102	4' 6"	.25"	33.54	6339
TANK 106	5' 9"	.5"	33.28	8037
TANK 21	0	0	435.96	0
TANK 22	18' 10"	0	438.18	346600
TANK 27	28' 2.5"	0	156.81	185780
TANK 32	24' 2"	1.75"	156.80	159152
TANK 34	23' 6"	0	156.80	154761
TANK 35	0	0	156.79	0
TANK 37	33' 3"	0	252.34	352393

ARE ALL DIVERSION AND CONTAINMENT
BERMS IN PLACE AND IN GOOD
CONDITION?

NO ☐ YES ☒

ARE ALL PUMPS, BLOWERS, TANKS,
PIPELINES, AND EQUIPMENT IN GOOD
WORKING ORDER?

☐ ☒

IS ALL EQUIPMENT FREE FROM LEAKS?

☐ ☒

COMMENTS:



Farmington Refinery
606 Highway 64
Post Office Box 256
Farmington, NM 87401

WEEKLY MONITORING

DATE: 12/04/89

LOCATION	WATER DEPTH IN FEET	PRODUCT DEPTH IN INCHES	CAPACITY IN BBL/FT	WATER VOLUME IN GALLONS
TANK 102	10' 7.5"	.25"	33.54	14967
TANK 106	5' 9"	.5"	33.28	8037
TANK 21	0	0	435.96	0
TANK 22	14' 1.5"	0	438.18	299950
TANK 27	28' 2.5"	0	156.81	185899
TANK 32	24' 2"	1.75"	156.80	159152
TANK 34	23' 6"	0	156.80	154761
TANK 35	0	0	156.79	0
TANK 37	33' 3"	0	252.34	352392

ARE ALL DIVERSION AND CONTAINMENT
BERMS IN PLACE AND IN GOOD
CONDITION?

NO ☐ YES ☒

ARE ALL PUMPS, BLOWERS, TANKS,
PIPELINES, AND EQUIPMENT IN GOOD
WORKING ORDER?

☐ ☒

IS ALL EQUIPMENT FREE FROM LEAKS?

☐ ☒

COMMENTS:

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Farmington Refinery
806 Highway 64
Post Office Box 256
Farmington, NM 87401

WEEKLY MONITORING

DATE: 11/27/89

LOCATION	WATER DEPTH IN FEET	PRODUCT DEPTH IN INCHES	CAPACITY IN BBL/FT	WATER VOLUME IN GALLONS
TANK 102	*	*	33.54	*
TANK 106	5' 9"	.5"	33.28	8037
TANK 21	0	0	435.96	0
TANK 22	7' 5"	0	438.18	136493
TANK 27	28' 2.5"	0	156.81	185780
TANK 32	24' 2"	1.75	156.80	159152
TANK 34	23' 6"	0	156.80	154762
TANK 35	0	0	156.79	0
TANK 37	33' 3"	0	252.34	352393

ARE ALL DIVERSION AND CONTAINMENT
BERMS IN PLACE AND IN GOOD
CONDITION?

NO YES
☐ ☒

ARE ALL PUMPS, BLOWERS, TANKS,
PIPELINES, AND EQUIPMENT IN GOOD
WORKING ORDER?

☐ ☒

IS ALL EQUIPMENT FREE FROM LEAKS?

☐ ☒

COMMENTS:

* No data recorded for this date



Farmington Refinery
806 Highway 54
Post Office Box 256
Farmington, NM 87401

WEEKLY MONITORING

DATE: 11/20/89

LOCATION	WATER DEPTH IN FEET	PRODUCT DEPTH IN INCHES	CAPACITY IN BBL/FT	WATER VOLUME IN GALLONS
TANK 102	11' 8"	.25"	33.54	16435
TANK 106	5' 9"	.5"	33.28	8037
TANK 21	0	0	435.96	0
TANK 22	7' 5"	0	438.18	136493
TANK 27	28' 2.5"	0	156.81	185780
TANK 32	24' 2"	1.75	156.80	159152
TANK 34	23' 6"	0	156.80	154762
TANK 35	0	0	156.79	0
TANK 37	33' 3"	0	252.34	352393

ARE ALL DIVERSION AND CONTAINMENT
BERMS IN PLACE AND IN GOOD
CONDITION?

NO ☐ YES ☒

ARE ALL PUMPS, BLOWERS, TANKS,
PIPELINES, AND EQUIPMENT IN GOOD
WORKING ORDER?

NO ☐ YES ☒

IS ALL EQUIPMENT FREE FROM LEAKS?

NO ☐ YES ☒

COMMENTS:

GIANT

Farmington Refinery
806 Highway 64
Post Office Box 256
Farmington, NM 87401

WEEKLY MONITORING

DATE: 11/13/89

LOCATION	WATER DEPTH IN FEET	PRODUCT DEPTH IN INCHES	CAPACITY IN BBL/FT	WATER VOLUME IN GALLONS
TANK 102	*	*	33.54	*
TANK 106	5' 9"	.5"	33.28	8037
TANK 21	0	0	435.96	0
TANK 22	7' 6.5"	0	438.18	138793
TANK 27	28' 2.5"	0	156.81	185780
TANK 32	24' 2"	1.75	156.80	159152
TANK 34	23' 6"	0	156.80	154762
TANK 35	0	0	156.79	0
TANK 37	33' 3"	0	252.34	352393

ARE ALL DIVERSION AND CONTAINMENT
BERMS IN PLACE AND IN GOOD
CONDITION?

NO ☐ YES ☒

ARE ALL PUMPS, BLOWERS, TANKS,
PIPELINES, AND EQUIPMENT IN GOOD
WORKING ORDER?

☐ ☒

IS ALL EQUIPMENT FREE FROM LEAKS?

☐ ☒

COMMENTS:

* No data recorded for this date

GIANT

Farmington Refinery
806 Highway 64
Post Office Box 256
Farmington, NM 87401

WEEKLY MONITORING

DATE: 10/23/89

LOCATION	WATER DEPTH IN FEET	PRODUCT DEPTH IN INCHES	CAPACITY IN BBL/FT	WATER VOLUME IN GALLONS
TANK 102	9' 7"	.25"	33.54	13500
TANK 106	5' 9"	.5"	33.28	8037
TANK 21	0	0	435.96	0
TANK 22	7' 5"	0	438.18	136493
TANK 27	28' 2.5"	0	156.81	185780
TANK 32	29' 0"	1.75	156.80	190982
TANK 34	23' 10"	0	156.80	156957
TANK 35	0	0	156.79	0
TANK 37	34' 7"	0	252.34	366524

ARE ALL DIVERSION AND CONTAINMENT
BERMS IN PLACE AND IN GOOD
CONDITION?

NO YES
☐ ☒

ARE ALL PUMPS, BLOWERS, TANKS,
PIPELINES, AND EQUIPMENT IN GOOD
WORKING ORDER?

☐ ☒

IS ALL EQUIPMENT FREE FROM LEAKS?

☐ ☒

COMMENTS:



Farmington Refinery
806 Highway 64
Post Office Box 256
Farmington, NM 87401

WEEKLY MONITORING

DATE: 10/16/89

LOCATION	WATER DEPTH IN FEET	PRODUCT DEPTH IN INCHES	CAPACITY IN BBL/FT	WATER VOLUME IN GALLONS
TANK 102	10' 6"	.25"	33.54	14791
TANK 106	5' 9"	.5"	33.28	8037
TANK 21	0	0	435.96	0
TANK 22	7' 5"	0	438.18	136493
TANK 27	28' 2.5"	0	156.81	185780
TANK 32	29' 0"	1.75	156.80	190982
TANK 34	23' 10"	0	156.80	156957
TANK 35	0	0	156.79	0
TANK 37	34' 7"	0	252.34	366524

ARE ALL DIVERSION AND CONTAINMENT
BERMS IN PLACE AND IN GOOD
CONDITION?

NO YES
☐ ☒

ARE ALL PUMPS, BLOWERS, TANKS,
PIPELINES, AND EQUIPMENT IN GOOD
WORKING ORDER?

☐ ☒

IS ALL EQUIPMENT FREE FROM LEAKS?

☐ ☒

COMMENTS:

GIANT

Farmington Refinery
806 Highway 64
Post Office Box 256
Farmington, NM 87401

WEEKLY MONITORING

DATE: 10/9/89

LOCATION	WATER DEPTH IN FEET	PRODUCT DEPTH IN INCHES	CAPACITY IN BBL/FT	WATER VOLUME IN GALLONS
TANK 102	11' 3"	.25"	33.54	15848
TANK 106	5' 9"	.5"	33.28	8037
TANK 21	0	0	435.96	0
TANK 22	7' 5"	0	438.18	136493
TANK 27	28' 2.5"	0	156.81	185780
TANK 32	25' 8"	1.75	156.80	169030
TANK 34	23' 5"	0	156.80	154213
TANK 35	0	0	156.79	0
TANK 37	34' 2"	0	252.34	362110

ARE ALL DIVERSION AND CONTAINMENT
BERMS IN PLACE AND IN GOOD
CONDITION?

NO YES
☐ ☒

ARE ALL PUMPS, BLOWERS, TANKS,
PIPELINES, AND EQUIPMENT IN GOOD
WORKING ORDER?

☐ ☒

IS ALL EQUIPMENT FREE FROM LEAKS?

☐ ☒

COMMENTS:

GIANTFarmington Refinery
806 Highway 64
Post Office Box 256
Farmington, NM 87401WEEKLY
MONITORING

DATE: 10/2/89

LOCATION	WATER DEPTH IN FEET	PRODUCT DEPTH IN INCHES	CAPACITY IN BBL/FT	WATER VOLUME IN GALLONS
TANK 102	8' 9"	.25"	33.54	12326
TANK 106	5' 9"	.5"	33.28	8037
TANK 21	0	0	435.96	0
TANK 22	7' 5"	0	438.18	136493
TANK 27	28' 2.5"	0	156.81	185780
TANK 32	27' 3.5"	1.75	156.80	179732
TANK 34	22' 10"	0	156.80	150371
TANK 35	0	0	156.79	0
TANK 37	34' 0"	0	252.34	360341

ARE ALL DIVERSION AND CONTAINMENT
BERMS IN PLACE AND IN GOOD
CONDITION?NO ☐ YES ☒ARE ALL PUMPS, BLOWERS, TANKS,
PIPELINES, AND EQUIPMENT IN GOOD
WORKING ORDER?NO ☐ YES ☒

IS ALL EQUIPMENT FREE FROM LEAKS?

NO ☐ YES ☒

COMMENTS:

5.0 METER READINGS

GIANTFarmington Refinery
806 Highway 64
Post Office Box 256
Farmington, NM 87401**METER READINGS
FOR THE WEEK OF**12/25/89 TO 12/29/89

LOCATION	MONDAY	WEDNESDAY	FRIDAY
GRW-1 SUBMERSIBLE	*	24090	24090
GRW-1 AIR LIFT			
GRW-2 SUBMERSIBLE	*	159430	160310
GRW-2 AIR LIFT			
GRW-3 SUBMERSIBLE	*	157140	159610
GRW-3 AIR LIFT			
GRW-4 SUBMERSIBLE	*	95760	98580
GRW-4 AIR LIFT			
GRW-5 SUBMERSIBLE	*	22070	22070
GRW-5 AIR LIFT			
GRW-6 SUBMERSIBLE	*	511830	514350
GRW-6 AIR LIFT			
GRW-10 SUBMERSIBLE	*	683420	687190
GRW-10 AIR LIFT			
GRW-11 AIR LIFT	*	196952	203680
GRW-12 AIR LIFT	**	**	**
GRW-13 AIR LIFT	**	**	**
TANK 102 INLET	*	158800	163840
STRIPPER INFLUENT	*	185800	192000

COMMENTS: * No data collected due to holiday

** Pumps frozen

Lack of air lift data indicates that no pumpable product was present

DWG# 1017

GIANTFarmington Refinery
808 Highway 64
Post Office Box 256
Farmington, NM 87401**METER READINGS
FOR THE WEEK OF**12/18/89 TO 12/22/89

LOCATION	MONDAY	WEDNESDAY	FRIDAY
GRW-1 SUBMERSIBLE	24090	24090	24090
GRW-1 AIR LIFT			
GRW-2 SUBMERSIBLE	155980	156710	157460
GRW-2 AIR LIFT			
GRW-3 SUBMERSIBLE	147560	151090	154510
GRW-3 AIR LIFT			
GRW-4 SUBMERSIBLE	83780	86050	88420
GRW-4 AIR LIFT			
GRW-5 SUBMERSIBLE	22070	22070	22070
GRW-5 AIR LIFT			
GRW-6 SUBMERSIBLE	501590	504150	506690
GRW-6 AIR LIFT			
GRW-10 SUBMERSIBLE	666780	671190	675650
GRW-10 AIR LIFT			
GRW-11 AIR LIFT	168459	175129	181389
GRW-12 AIR LIFT	*	*	*
GRW-13 AIR LIFT	*	*	*
TANK 102 INLET	123500	143900	154600
STRIPPER INFLUENT	144400	172600	179200
TANK 103 OUTLET			

COMMENTS: * Pumps frozen

Lack of air lift pump data indicates that no pumpable product is present

DWG# 1017

GIANTFarmington Refinery
808 Highway 64
Post Office Box 256
Farmington, NM 87401**METER READINGS
FOR THE WEEK OF**12/11/89 TO 12/15/89

LOCATION	MONDAY	WEDNESDAY	FRIDAY
GRW-1 SUBMERSIBLE	24080	*	20490
GRW-1 AIR LIFT			
GRW-2 SUBMERSIBLE	153300	*	154370
GRW-2 AIR LIFT			
GRW-3 SUBMERSIBLE	135180	*	140120
GRW-3 AIR LIFT			
GRW-4 SUBMERSIBLE	75140	*	78580
GRW-4 AIR LIFT			
GRW-5 SUBMERSIBLE	22070	*	22070
GRW-5 AIR LIFT			
GRW-6 SUBMERSIBLE	493080	*	496460
GRW-6 AIR LIFT			
GRW-10 SUBMERSIBLE	653470	*	658740
GRW-10 AIR LIFT			
GRW-11 AIR LIFT	145675	*	155259
GRW-12 AIR LIFT	46907	*	49225
GRW-13 AIR LIFT	77016	*	79805
TANK 102 INLET	104200	*	118600
STRIPPER INFLUENT	125900	*	144600

COMMENTS: * No data recorded

Lack of air lift data indicates that no pumpable product was present

DWG# 1017

GIANTFarmington Refinery
606 Highway 64
Post Office Box 256
Farmington, NM 87401**METER READINGS
FOR THE WEEK OF**12/4/89 TO 12/8/89

LOCATION	MONDAY	WEDNESDAY	FRIDAY
GRW-1 SUBMERSIBLE	24090	24090	24090
GRW-1 AIR LIFT			
GRW-2 SUBMERSIBLE	150600	151380	152140
GRW-2 AIR LIFT			
GRW-3 SUBMERSIBLE	122490	125850	129640
GRW-3 AIR LIFT			
GRW-4 SUBMERSIBLE	66790	69290	71670
GRW-4 AIR LIFT			
GRW-5 SUBMERSIBLE	22070	22070	22070
GRW-5 AIR LIFT			
GRW-6 SUBMERSIBLE	484180	486540	489170
GRW-6 AIR LIFT			
GRW-10 SUBMERSIBLE	635720	640240	645690
GRW-10 AIR LIFT	63940	63943	63943
GRW-11 AIR LIFT	124254	129866	136064
GRW-12 AIR LIFT	39064	41109	43465
GRW-13 AIR LIFT	67086	69696	72636
TANK 102 INLET	77700	87200	99600
STRIPPER INFLUENT	96400	105100	116000
TANK 103 OUTLET			

COMMENTS: Blank air lift pump readings indicate that no pumpable product is present.

DWG# 1017

GIANT

Farmington Refinery
806 Highway 64
Post Office Box 256
Farmington, NM 87401

METER READINGS FOR THE WEEK OF

11/27/89 TO 12/1/89

LOCATION	MONDAY	WEDNESDAY	FRIDAY
GRW-1 SUBMERSIBLE	24020	24080	*
GRW-1 AIR LIFT			
GRW-2 SUBMERSIBLE	147910	148620	*
GRW-2 AIR LIFT			
GRW-3 SUBMERSIBLE	110820	113960	*
GRW-3 AIR LIFT			
GRW-4 SUBMERSIBLE	57630	60010	*
GRW-4 AIR LIFT			
GRW-5 SUBMERSIBLE	22070	22070	*
GRW-5 AIR LIFT			
GRW-6 SUBMERSIBLE	475870	478140	*
GRW-6 AIR LIFT			
GRW-10 SUBMERSIBLE	622800	625320	*
GRW-10 AIR LIFT			
GRW-11 AIR LIFT	104856	109361	*
GRW-12 AIR LIFT	31176	33280	*
GRW-13 AIR LIFT	57043	59723	*
AIR STRIPPER INFLUENT	43200	59300	88000
TANK 102 INLET	33800	49500	70800

COMMENTS: * No data recorded
Lack of air lift data indicates lack of pumpable product

DWG# 1017

GIANT

Farmington Refinery
808 Highway 54
Post Office Box 256
Farmington, NM 87401

METER READINGS FOR THE WEEK OF

11/20/89 TO 11/24/89

LOCATION	MONDAY	WEDNESDAY	FRIDAY
GRW-1 SUBMERSIBLE	*	24020	*
GRW-1 AIR LIFT			
GRW-2 SUBMERSIBLE	*	145870	*
GRW-2 AIR LIFT			
GRW-3 SUBMERSIBLE	*	104110	*
GRW-3 AIR LIFT			
GRW-4 SUBMERSIBLE	*	49840	*
GRW-4 AIR LIFT			
GRW-5 SUBMERSIBLE	*	22070	*
GRW-5 AIR LIFT			
GRW-6 SUBMERSIBLE	*	469570	*
GRW-6 AIR LIFT			
GRW-10 SUBMERSIBLE	*	613960	*
GRW-10 AIR LIFT			
GRW-11 AIR LIFT	*	104127	*
GRW-12 AIR LIFT	*	25494	*
GRW-13 AIR LIFT	*	49800	*
AIR STRIPPER INFLUENT	*	2017870 3610 **	*
TANK 102 INLET	*	2960 **	*

COMMENTS: * No data recorded ** New meter installed
Lack of air lift data indicates lack of pumpable product

DWG# 1017

GIANTFarmington Refinery
806 Highway 64
Post Office Box 256
Farmington, NM 87401**METER READINGS
FOR THE WEEK OF**11/13/89 TO 11/17/89

LOCATION	MONDAY	WEDNESDAY	FRIDAY
GRW-1 SUBMERSIBLE	*	24020	24020
GRW-1 AIR LIFT			
GRW-2 SUBMERSIBLE	*	143330	143740
GRW-2 AIR LIFT			
GRW-3 SUBMERSIBLE	*	92530	94450
GRW-3 AIR LIFT			
GRW-4 SUBMERSIBLE	*	42870	44080
GRW-4 AIR LIFT			
GRW-5 SUBMERSIBLE	*	22070	22070
GRW-5 AIR LIFT			
GRW-6 SUBMERSIBLE	*	446390	463020
GRW-6 AIR LIFT			
GRW-10 SUBMERSIBLE	*	595660	600040
GRW-10 AIR LIFT			
GRW-11 AIR LIFT	**	**	**
GRW-12 AIR LIFT	**	**	**
GRW-13 AIR LIFT	**	**	**
AIR STRIPPER INFLUENT	**	**	**

COMMENTS: * No data recorded
Lack of air lift data indicates lack of pumpable product
** Shutdown while undergoing winterizing

DWG# 1017

GIANT

Farmington Refinery
806 Highway 54
Post Office Box 256
Farmington, NM 87401

METER READINGS FOR THE WEEK OF

11/6/89 TO 11/10/89

LOCATION	MONDAY	WEDNESDAY	FRIDAY
GRW-1 SUBMERSIBLE			
GRW-1 AIR LIFT			
GRW-2 SUBMERSIBLE			
GRW-2 AIR LIFT			
GRW-3 SUBMERSIBLE			
GRW-3 AIR LIFT			
GRW-4 SUBMERSIBLE			
GRW-4 AIR LIFT			
GRW-5 SUBMERSIBLE			
GRW-5 AIR LIFT			
GRW-6 SUBMERSIBLE			
GRW-6 AIR LIFT			
GRW-10 SUBMERSIBLE			
GRW-10 AIR LIFT			
GRW-11 AIR LIFT			
GRW-12 AIR LIFT			
GRW-13 AIR LIFT			
TANK 102 INLET			
STRIPPER INFLUENT			
TANK 103 OUTLET			

COMMENTS:

No readings were taken as the refinery was shutdown for repairs

DWG# 1017

GIANT

Farmington Refinery
808 Highway 54
Post Office Box 256
Farmington, NM 87401

METER READINGS FOR THE WEEK OF

10/30/89 TO 11/3/89

LOCATION	MONDAY	WEDNESDAY	FRIDAY
GRW-1 SUBMERSIBLE			
GRW-1 AIR LIFT			
GRW-2 SUBMERSIBLE			
GRW-2 AIR LIFT			
GRW-3 SUBMERSIBLE			
GRW-3 AIR LIFT			
GRW-4 SUBMERSIBLE			
GRW-4 AIR LIFT			
GRW-5 SUBMERSIBLE			
GRW-5 AIR LIFT			
GRW-6 SUBMERSIBLE			
GRW-6 AIR LIFT			
GRW-10 SUBMERSIBLE			
GRW-10 AIR LIFT			
GRW-11 AIR LIFT			
GRW-12 AIR LIFT			
GRW-13 AIR LIFT			
TANK 102 INLET			
STRIPPER INFLUENT			
TANK 103 OUTLET			

COMMENTS:

No readings were taken as the refinery was shutdown for repairs

DWG# 1017

GIANTFarmington Refinery
808 Highway 54
Post Office Box 256
Farmington, NM 87401**METER READINGS
FOR THE WEEK OF**10/23/89 TO 10/27/89

LOCATION	MONDAY	WEDNESDAY	FRIDAY
GRW-1 SUBMERSIBLE	24020		
GRW-1 AIR LIFT			
GRW-2 SUBMERSIBLE	137530		
GRW-2 AIR LIFT			
GRW-3 SUBMERSIBLE	66460		
GRW-3 AIR LIFT			
GRW-4 SUBMERSIBLE	26410		
GRW-4 AIR LIFT			
GRW-5 SUBMERSIBLE	22070		
GRW-5 AIR LIFT			
GRW-6 SUBMERSIBLE	443270		
GRW-6 AIR LIFT			
GRW-10 SUBMERSIBLE	538100		
GRW-10 AIR LIFT	20190		
GRW-11 AIR LIFT	81720		
GRW-12 AIR LIFT	14388		
GRW-13 AIR LIFT	42946		
AIR STRIPPER INFLUENT	1822170		

COMMENTS:Lack of air lift data indicates lack of pumpable product
The system was shutdown for repairs on the 24th

DWG# 1017

GIANTFarmington Refinery
606 Highway 64
Post Office Box 256
Farmington, NM 87401**METER READINGS
FOR THE WEEK OF**10/16/89 TO 10/20/89

LOCATION	MONDAY	WEDNESDAY	FRIDAY
GRW-1 SUBMERSIBLE	24010	24010	24010
GRW-1 AIR LIFT			
GRW-2 SUBMERSIBLE	134810	135650	136360
GRW-2 AIR LIFT			
GRW-3 SUBMERSIBLE	53580	57390	60790
GRW-3 AIR LIFT			
GRW-4 SUBMERSIBLE	18410	20770	22900
GRW-4 AIR LIFT			
GRW-5 SUBMERSIBLE	22070	22070	22070
GRW-5 AIR LIFT			
GRW-6 SUBMERSIBLE	433450	436340	438960
GRW-6 AIR LIFT			
GRW-10 SUBMERSIBLE	508990	517300	524820
GRW-10 AIR LIFT	20156	20172	20179
GRW-11 AIR LIFT	60859	66961	72460
GRW-12 AIR LIFT	6667	8955	10990
GRW-13 AIR LIFT	33001	35951	38578
AIR STRIPPER INFLUENT	*	*	1792730

COMMENTS: * No data recorded
Lack of air lift data indicates lack of pumpable product

DWG# 1017

GIANTFarmington Refinery
806 Highway 54
Post Office Box 256
Farmington, NM 87401**METER READINGS
FOR THE WEEK OF**10/9/89 TO 10/13/89

LOCATION	MONDAY	WEDNESDAY	FRIDAY
GRW-1 SUBMERSIBLE	24010	24010	24010
GRW-1 AIR LIFT			
GRW-2 SUBMERSIBLE	133110	134120	134810
GRW-2 AIR LIFT			
GRW-3 SUBMERSIBLE	40560	44430	48030
GRW-3 AIR LIFT			
GRW-4 SUBMERSIBLE	9630	12430	14710
GRW-4 AIR LIFT			
GRW-5 SUBMERSIBLE	22070	22070	22070
GRW-5 AIR LIFT			
GRW-6 SUBMERSIBLE	423170	426250	429010
GRW-6 AIR LIFT			
GRW-10 SUBMERSIBLE	493410	493410	495390
GRW-10 AIR LIFT			
GRW-11 AIR LIFT	42018	47774	52894
GRW-12 AIR LIFT	0	1208	3342
GRW-13 AIR LIFT	24431	27442	28732
AIR STRIPPER INFLUENT	1713460		

COMMENTS:

Lack of air lift data indicates lack of pumpable product

DWG# 1017

GIANTFarmington Refinery
808 Highway 64
Post Office Box 256
Farmington, NM 87401**METER READINGS
FOR THE WEEK OF**10/2/89 TO 10/6/89

LOCATION	MONDAY	WEDNESDAY	FRIDAY
GRW-1 SUBMERSIBLE	24010	24010	24010
GRW-1 AIR LIFT			
GRW-2 SUBMERSIBLE	129750	130670	131630
GRW-2 AIR LIFT			
GRW-3 SUBMERSIBLE	27180	30840	34700
GRW-3 AIR LIFT			
GRW-4 SUBMERSIBLE	160	2360	4670
GRW-4 AIR LIFT			
GRW-5 SUBMERSIBLE	22070	22070	22070
GRW-5 AIR LIFT			
GRW-6 SUBMERSIBLE	412980	415720	418570
GRW-6 AIR LIFT			
GRW-10 SUBMERSIBLE	493410	493410	493410
GRW-10 AIR LIFT			
GRW-11 AIR LIFT	24056	24056	24056
GRW-12 AIR LIFT	**	**	**
GRW-13 AIR LIFT	14403	16347	20037
AIR STRIPPER INFLUENT	*	*	*

COMMENTS: * No data recorded ** Pump under repair
Lack of air lift data indicates lack of pumpable product

DWG# 1017

6.0 QUARTERLY VOLUME TABULATIONS

Quarterly Recovery Well
Submersible Pump Discharge Volumes
Fourth Quarter 1989

Well	Beginning Reading	Ending Reading	Net Change
GRW-1	24010	24090	80
GRW-2	129750	159430	29680
GRW-3	27180	157140	129960
GRW-4	160	95760	95600
GRW-5	22070	22070	0
GRW-6	412980	511830	98850
GRW-10	493410	683420	190010
TOTAL PUMPED IN GALLONS			544180

Quarterly Recovery Well
Air Lift Pump Discharge Volumes
Fourth Quarter 1989

Well	Beginning Reading	Ending Reading	Net Change
GRW-10	20156	63943	43787
GRW-11	24056	203680	179624
GRW-12	1208	43465	42257
GRW-13	14403	72636	58233
TOTAL PUMPED IN CYCLES			323901
Gallons per cycle multiplier			x.45
TOTAL PUMPED IN GALLONS			145755

QUARTERLY NET TANK
VOLUME CHANGES
FOURTH QUARTER 1989

TANK NUMBER	BEGINNING VOLUME	ENDING VOLUME	NET CHANGE
102	12326	10213	(2113)
106	8037	8037	0
21	0	0	0
22	136493	378806	242313
27	185780	185780	0
32	179732	159152	(20580)
34	150371	154762	4391
35	0	0	0
37	360341	352393	(7948)
TOTAL NET VOLUME CHANGE IN GALLONS			216063

Total Volume Summary
Fourth Quarter 1989

	<u>Gallons</u>
Volume Pumped by Submersible Pumps	544180
Volume Pumped by Air Lift Pumps	145755
Total Volume Pumped by Recovery Wells	689935
Less Water Gain in Storage	(216063)
Total Water Delivered to the Air Stripper	473872
Total Volume Air Stripped as Indicated on the Stripper Influent Meter	492810
Difference	(18938)

Note: Meter inaccuracy and the approximate nature of estimating air lift pump volumes probably accounts for the volume discrepancy. Starting with the first quarter of 1990 additional metering has been added and some worn meters replaced to help improve the accuracy of volume reporting.

7.0 SPECIFIC CONDUCTANCE VALUES

SPECIFIC CONDUCTANCE VALUES
FOR GRW-13 IN umhos/cm
FOURTH QUARTER 1989

10/89

*

11/89

*

12/89

4325

* Inadvertently, no data was collected

8.0 ANNUAL REPRESENTATIVE TANK
AND STREAM ANALYSES

8.1 GENERAL WATER CHEMISTRY



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

CLIENT: GBR

DATE REPORTED: 01/19/90

SITE: TANK 22
LAB NO: 3754

DATE RECEIVED: 01/10/90
DATE COLLECTED: 01/10/90

Lab pH (s.u.).....	7.33
Lab Conductivity, umhos/cm.....	4944
Lab resistivity, ohm-m.....	2.0227
Total Dissolved Solids (180), mg/l..	3456
Total Dissolved Solids (calc), mg/l.	3408
Total Alkalinity as CaCO ₃ , mg/l.....	618.97
Total Hardness as CaCO ₃ , mg/l.....	1275.75
Sodium Absorption Ratio.....	8.37

	mg/l	meq/l
Bicarbonate as HCO ₃	755.14	12.38
Carbonate as CO ₃	0.00	0.00
Chloride.....	578.71	16.32
Sulfate.....	1283.06	26.73
Calcium.....	442.16	22.06
Magnesium.....	41.97	3.45
Potassium.....	3.92	0.10
Sodium.....	687.20	29.89
Major Cations.....		55.51
Major Anions.....		55.43
Cation/Anion Difference.....		0.06 %



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

CLIENT: GBR

DATE REPORTED: 01/19/90

SITE: TANK 22-LAB SPLIT
LAB NO: 3757

DATE RECEIVED: 01/10/90
DATE COLLECTED: 01/10/90

Lab pH (s.u.).....	7.37
Lab Conductivity, umhos/cm.....	4931
Lab resistivity, ohm-m.....	2.0280
Total Dissolved Solids (180), mg/l..	3456
Total Dissolved Solids (calc), mg/l.	3433
Total Alkalinity as CaCO ₃ , mg/l.....	620.84
Total Hardness as CaCO ₃ , mg/l.....	1282.07
Sodium Absorption Ratio.....	8.48

	mg/l	meq/l
Bicarbonate as HCO ₃	757.42	12.42
Carbonate as CO ₃	0.00	0.00
Chloride.....	578.71	16.32
Sulfate.....	1275.65	26.58
Calcium.....	488.48	24.38
Magnesium.....	15.40	1.27
Potassium.....	4.16	0.11
Sodium.....	698.00	30.36
Major Cations.....		56.11
Major Anions.....		55.32
Cation/Anion Difference.....		0.71 %



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

CLIENT: GBR

DATE REPORTED: 01/19/90

SITE: TANK 27
LAB NO: 3756

DATE RECEIVED: 01/10/90
DATE COLLECTED: 01/10/90

Lab pH (s.u.).....	7.68
Lab Conductivity, umhos/cm.....	5444
Lab resistivity, ohm-m.....	1.8369
Total Dissolved Solids (180), mg/l..	3760
Total Dissolved Solids (calc), mg/l.	3646
Total Alkalinity as CaCO ₃ , mg/l.....	403.92
Total Hardness as CaCO ₃ , mg/l.....	1397.85
Sodium Absorption Ratio.....	8.12

	mg/l	meq/l
Bicarbonate as HCO ₃	492.78	8.08
Carbonate as CO ₃	0.00	0.00
Chloride.....	781.77	22.05
Sulfate.....	1386.75	28.89
Calcium.....	490.58	24.48
Magnesium.....	42.28	3.48
Potassium.....	4.16	0.11
Sodium.....	698.00	30.36
Major Cations.....		58.42
Major Anions.....		59.02
Cation/Anion Difference.....		0.51 %



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

CLIENT: GBR

DATE REPORTED: 01/19/90

SITE: TANK 32
LAB NO: 3755

DATE RECEIVED: 01/10/90
DATE COLLECTED: 01/10/90

Lab pH (s.u.).....	7.30
Lab Conductivity, umhos/cm.....	4618
Lab resistivity, ohm-m.....	2.1654
Total Dissolved Solids (180), mg/l..	3086
Total Dissolved Solids (calc), mg/l.	3050
Total Alkalinity as CaCO ₃ , mg/l.....	482.46
Total Hardness as CaCO ₃ , mg/l.....	1117.86
Sodium Absorption Ratio.....	8.02

	mg/l	meq/l
Bicarbonate as HCO ₃	588.60	9.65
Carbonate as CO ₃	0.00	0.00
Chloride.....	619.33	17.47
Sulfate.....	1094.18	22.80
Calcium.....	391.62	19.54
Magnesium.....	34.23	2.82
Potassium.....	4.50	0.12
Sodium.....	616.20	26.80
Major Cations.....		49.28
Major Anions.....		49.91
Cation/Anion Difference.....		0.64 %



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

CLIENT: GBR

DATE REPORTED: 01/19/90

SITE: TANK 102
LAB NO: 3753

DATE RECEIVED: 01/10/90
DATE COLLECTED: 01/10/90

Lab pH (s.u.).....	7.40
Lab Conductivity, umhos/cm.....	4994
Lab resistivity, ohm-m.....	2.0024
Total Dissolved Solids (180), mg/l..	3578
Total Dissolved Solids (calc), mg/l.	3423
Total Alkalinity as CaCO ₃ , mg/l.....	615.23
Total Hardness as CaCO ₃ , mg/l.....	1271.54
Sodium Absorption Ratio.....	8.34

	mg/l	meq/l
Bicarbonate as HCO ₃	750.58	12.30
Carbonate as CO ₃	0.00	0.00
Chloride.....	588.87	16.61
Sulfate.....	1292.52	26.93
Calcium.....	446.37	22.27
Magnesium.....	38.39	3.16
Potassium.....	3.84	0.10
Sodium.....	683.60	29.73
Major Cations.....		55.26
Major Anions.....		55.84
Cation/Anion Difference.....		0.52 %

8.2 TRACE METALS



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

CLIENT: GBR

DATE REPORTED: 01/19/90

SITE: TANK 22
LAB NO: 3754

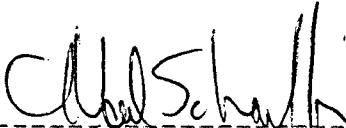
DATE RECEIVED: 01/10/90
DATE COLLECTED: 01/10/90

Trace metals by AA (Dissolved Concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As).....	0.0021	<0.0003
Lead (Pb).....	0.009	<0.004
Selenium (Se).....	ND	<0.0002

Trace metals by ICAP (Dissolved Concentration), mg/l

	Analytical Result:	Detection Limit:
Silver (Ag).....	ND	<0.05
Aluminum (Al).....	ND	<0.1
Boron (B).....	0.48	<0.01
Barium (Ba).....	ND	<0.5
Cobalt (Co).....	0.04	<0.02
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	ND	<0.01
Iron (Fe).....	6.24	<0.05
Manganese (Mn).....	1.66	<0.02
Molybdenum (Mo).....	ND	<0.02
Nickel (Ni).....	0.14	<0.01
Zinc (Zn).....	0.02	<0.01


C. Neal Schaeffer
Lab Director



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

CLIENT: GBR

DATE REPORTED: 01/19/90

SITE: TANK 22-LAB SPLIT
LAB NO: 3757

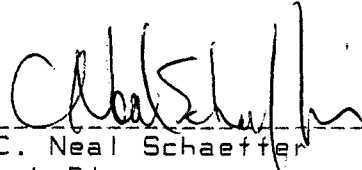
DATE RECEIVED: 01/10/90
DATE COLLECTED: 01/10/90

Trace metals by AA (Dissolved Concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As).....	0.0023	<0.0003
Lead (Pb).....	0.009	<0.004
Selenium (Se).....	ND	<0.0002

Trace metals by ICAP (Dissolved Concentration), mg/l

	Analytical Result:	Detection Limit:
Silver (Ag).....	ND	<0.05
Aluminum (Al).....	ND	<0.1
Boron (B).....	0.46	<0.01
Barium (Ba).....	ND	<0.5
Cobalt (Co).....	0.02	<0.02
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	ND	<0.01
Iron (Fe).....	2.87	<0.05
Manganese (Mn).....	0.94	<0.02
Molybdenum (Mo).....	ND	<0.02
Nickel (Ni).....	0.16	<0.01
Zinc (Zn).....	0.06	<0.01


C. Neal Schaeffer
Lab Director



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

CLIENT: GBR

DATE REPORTED: 01/19/90

SITE: TANK 27
LAB NO: 3756

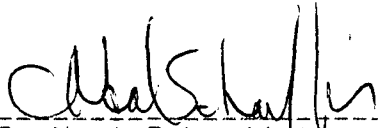
DATE RECEIVED: 01/10/90
DATE COLLECTED: 01/10/90

Trace metals by AA (Dissolved Concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As).....	0.0012	<0.0003
Lead (Pb).....	0.014	<0.004
Selenium (Se).....	ND	<0.0002

Trace metals by ICAP (Dissolved Concentration), mg/l

	Analytical Result:	Detection Limit:
Silver (Ag).....	ND	<0.05
Aluminum (Al).....	ND	<0.1
Boron (B).....	0.39	<0.01
Barium (Ba).....	ND	<0.5
Cobalt (Co).....	0.04	<0.02
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	0.01	<0.01
Iron (Fe).....	6.34	<0.05
Manganese (Mn).....	1.69	<0.02
Molybdenum (Mo).....	ND	<0.02
Nickel (Ni).....	0.14	<0.01
Zinc (Zn).....	0.02	<0.01


C. Neal Schaeffer
Lab Director



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

CLIENT: GBR

DATE REPORTED: 01/19/90

SITE: TANK 32
LAB NO: 3755

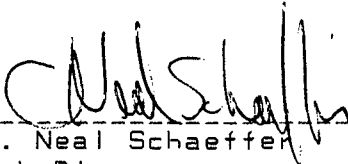
DATE RECEIVED: 01/10/90
DATE COLLECTED: 01/10/90

Trace metals by AA (Dissolved Concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As).....	0.0017	<0.0003
Lead (Pb).....	0.007	<0.004
Selenium (Se).....	ND	<0.0002

Trace metals by ICAP (Dissolved Concentration), mg/l

	Analytical Result:	Detection Limit:
Silver (Ag).....	ND	<0.05
Aluminum (Al).....	ND	<0.1
Boron (B).....	0.51	<0.01
Barium (Ba).....	ND	<0.5
Cobalt (Co).....	ND	<0.02
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	ND	<0.01
Iron (Fe).....	36.94	<0.05
Manganese (Mn).....	1.38	<0.02
Molybdenum (Mo).....	ND	<0.02
Nickel (Ni).....	0.12	<0.01
Zinc (Zn).....	0.02	<0.01


C. Neal Schaeffer
Lab Director



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

CLIENT: GBR

DATE REPORTED: 01/19/90

SITE: TANK 102
LAB NO: 3753

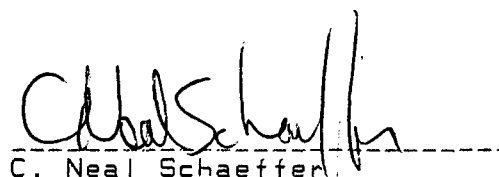
DATE RECEIVED: 01/10/90
DATE COLLECTED: 01/10/90

Trace metals by AA (Dissolved Concentration), mg/l

	Analytical Result:	Detection Limit:
Arsenic (As).....	0.0009	<0.0003
Lead (Pb).....	0.012	<0.004
Selenium (Se).....	0.0004	<0.0002

Trace metals by ICAP (Dissolved Concentration), mg/l

	Analytical Result:	Detection Limit:
Silver (Ag).....	ND	<0.05
Aluminum (Al).....	ND	<0.1
Boron (B).....	0.5	<0.01
Barium (Ba).....	ND	<0.5
Cobalt (Co).....	0.04	<0.02
Chromium (Cr).....	ND	<0.02
Copper (Cu).....	ND	<0.01
Iron (Fe).....	4.54	<0.05
Manganese (Mn).....	1.75	<0.02
Molybdenum (Mo).....	ND	<0.02
Nickel (Ni).....	0.13	<0.01
Zinc (Zn).....	0.04	<0.01


C. Neal Schaeffer
Lab Director

8.3 PURGEABLE HALOCARBONS EPA 601/8010



Inter-Mountain
Laboratories, Inc.

CLIENT: GBR

SITE: Tank 22

LAB NO: F3754

Analysis Requested: Purgeable halocarbons in water.

Parameter

DATE REPORTED: 02/21/90
DATE ANALYZED: 01/17/90
DATE RECEIVED: 01/10/90
DATE COLLECTED: 01/10/90

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

Concentration

Units

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.

* Chromatographic evidence of analyte below detection limits.

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: 01/17/90
DATE RECEIVED: 01/10/90
DATE COLLECTED: 01/10/90

SITE: Tank 27

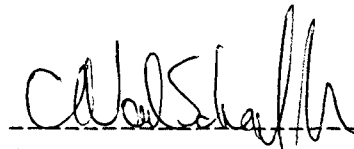
LAB NO: F3756

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



Inter-Mountain
Laboratories, Inc.

CLIENT: GBR

SITE: Tank 32

LAB NO: F3755

Analysis Requested: Purgeable halocarbons in water.

Parameter

DATE REPORTED: 02/21/90
DATE ANALYZED: 01/17/90
DATE RECEIVED: 01/10/90
DATE COLLECTED: 01/10/90

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

Concentration

Units

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



InterMountain
Laboratories, Inc.

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

CLIENT: GBR

DATE REPORTED: 02/21/90

DATE ANALYZED: 01/17/90

DATE RECEIVED: 01/10/90

DATE COLLECTED: 01/10/90

SITE: Tank 102

LAB NO: F3753

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.

* Chromatographic evidence of analyte below detection limits.

C. Neal Schaeffer
Senior Chemist

8.3.4

8.4 PURGEABLE AROMATICS EPA 602/8020



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

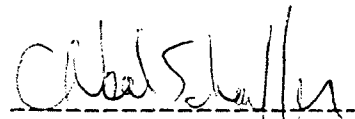
CLIENT: GBR
SITE: Tank 22
LAB NO: F3754
Analysis Requested: Purgeable aromatics in water.

DATE REPORTED: 01/23/90
DATE ANALYZED: 01/12/90
DATE RECEIVED: 01/10/90
DATE COLLECTED: 01/10/90

Parameter	Concentration	Units
-----	-----	-----
Benzene	267.75 (5.0)	ug/l
Toluene	ND (5.0)	ug/l
Ethylbenzene	67.25 (5.0)	ug/l
m/p-Xylene	7.75 (5.0)	ug/l
o-Xylene	13.5 (5.0)	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



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

CLIENT: GBR

SITE: Tank 27

LAB NO: F3756

Analysis Requested: Purgeable aromatics in water.

DATE REPORTED: 01/23/90

DATE ANALYZED: 01/12/90

DATE RECEIVED: 01/10/90

DATE COLLECTED: 01/10/90

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

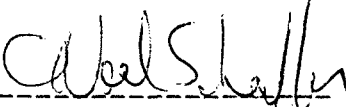
Method:

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



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

CLIENT: GBR

DATE REPORTED: 01/23/90

SITE: Tank 32

DATE ANALYZED: 01/12/90

LAB NO: F3755

DATE RECEIVED: 01/10/90

DATE COLLECTED: 01/10/90

Analysis Requested: Purgeable aromatics in water.

Parameter	Concentration	Units
Benzene	420 (5.0)	ug/l
Toluene	210 (5.0)	ug/l
Ethylbenzene	40 (5.0)	ug/l
m/p-Xylene	20 (5.0)	ug/l
o-Xylene	126 (5.0)	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



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

CLIENT: GBR

DATE REPORTED: 01/23/90

DATE ANALYZED: 01/12/90

DATE RECEIVED: 01/10/90

DATE COLLECTED: 01/10/90

SITE: Tank 102

LAB NO: F3753

Analysis Requested: Purgeable aromatics in water.

Parameter	Concentration	Units
Benzene	126.25 (1.0)	ug/l
Toluene	ND (1.0)	ug/l
Ethylbenzene	25.75 (1.0)	ug/l
m/p-Xylene	4.5 (1.0)	ug/l
o-Xylene	5.75 (1.0)	ug/l

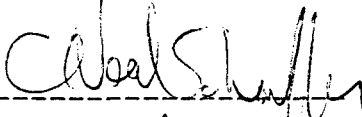
Method:

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

8.5 POLYNUCLEAR AROMATIC HYDRCARBONS EPA 610/8100



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

CLIENT: GBR
SITE: Tank 22
LAB NO: F3754

DATE REPORTED: 01/23/90
DATE RECEIVED: 01/10/90
DATE COLLECTED: 01/10/90

Analysis Requested: Polynuclear aromatic hydrocarbons in water.

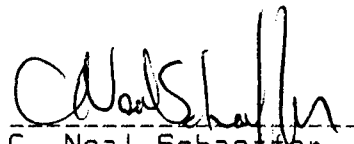
Parameter	Concentration	Units
Acenaphthene	ND (0.02)	mg/l
Acenaphthylene	ND (0.02)	mg/l
Anthracene	ND (0.02)	mg/l
Benzo(a)Anthracene	ND (0.02)	mg/l
Benzo(a)pyrene	ND (0.02)	mg/l
Benzo(k)fluoranthene	ND (0.02)	mg/l
Benzo(b)fluoranthene	ND (0.02)	mg/l
Benzo(g,h,i)perylene	0.090 (0.02)	mg/l
Dibenzo(a,h)anthracene	ND (0.02)	mg/l
Chrysene	ND (0.02)	mg/l
Fluoranthene	ND (0.02)	mg/l
Fluorene	0.012 (0.02)	mg/l
Indeno(1,2,3-cd)pyrene	ND (0.02)	mg/l
Naphthalene	0.041 (0.02)	mg/l
Phenanthrene	0.012 (0.02)	mg/l
Pyrene	0.010 (0.02)	mg/l
Benzo(b)fluoranthene	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
SITE: Tank 27
LAB NO: F3756

DATE REPORTED: 01/23/90
DATE RECEIVED: 01/10/90
DATE COLLECTED: 01/10/90

Analysis Requested: Polynuclear aromatic hydrocarbons in water.

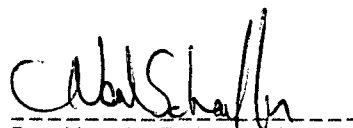
Parameter	Concentration	Units
Acenaphthene	ND (0.02)	mg/l
Acenaphthylene	ND (0.02)	mg/l
Anthracene	ND (0.02)	mg/l
Benzo(a)Anthracene	ND (0.02)	mg/l
Benzo(a)pyrene	ND (0.02)	mg/l
Benzo(k)fluoranthene	ND (0.02)	mg/l
Benzo(b)fluoranthene	0.180 (0.02)	mg/l
Benzo(g,h,i)perylene	ND (0.02)	mg/l
Dibenzo(a,h)anthracene	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
Benzo(b)fluoranthene	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
SITE: Tank 32
LAB NO: F3755

DATE REPORTED: 01/23/90
DATE RECEIVED: 01/10/90
DATE COLLECTED: 01/10/90

Analysis Requested: Polynuclear aromatic hydrocarbons in water.

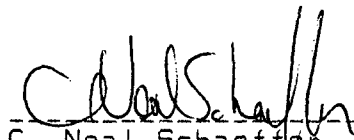
Parameter	Concentration	Units
Acenaphthene	ND (0.02)	mg/l
Acenaphthylene	ND (0.02)	mg/l
Anthracene	trace (0.02)	mg/l
Benzo(a)Anthracene	ND (0.02)	mg/l
Benzo(a)pyrene	0.09 (0.02)	mg/l
Benzo(k)fluoranthene	ND (0.02)	mg/l
Benzo(b)fluoranthene	ND (0.02)	mg/l
Benzo(g,h,i)perylene	0.180 (0.02)	mg/l
Dibenzo(a,h)anthracene	ND (0.02)	mg/l
Chrysene	ND (0.02)	mg/l
Fluoranthene	ND (0.02)	mg/l
Fluorene	trace (0.02)	mg/l
Indeno(1,2,3-cd)pyrene	ND (0.02)	mg/l
Naphthalene	0.11 (0.02)	mg/l
Phenanthrene	trace (0.02)	mg/l
Pyrene	ND (0.02)	mg/l
Benzo(b)fluoranthene	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
SITE: Tank 102
LAB NO: F3753

DATE REPORTED: 01/23/90
DATE RECEIVED: 01/10/90
DATE COLLECTED: 01/10/90

Analysis Requested: Polynuclear aromatic hydrocarbons in water.

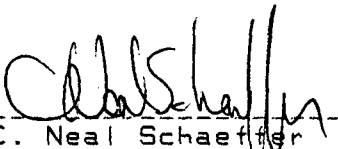
Parameter	Concentration	Units
Acenaphthene	ND (0.02)	mg/l
Acenaphthylene	ND (0.02)	mg/l
Anthracene	ND (0.02)	mg/l
Benzo(a)Anthracene	ND (0.02)	mg/l
Benzo(a)pyrene	ND (0.02)	mg/l
Benzo(k)fluoranthene	ND (0.02)	mg/l
Benzo(b)fluoranthene	ND (0.02)	mg/l
Benzo(g,h,i)perylene	0.185 (0.02)	mg/l
Dibenzo(a,h)anthracene	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	0.04 (0.02)	mg/l
Phenanthrene	ND (0.02)	mg/l
Pyrene	ND (0.02)	mg/l
Benzo(b)fluoranthene	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

**QUARTERLY DATA REPORT
FOR THE
GIANT BLOOMFIELD REFINERY**

July, Aug, Sept 89 12/22/89

December 22, 1989

Prepared for:

MONTGOMERY & ANDREWS, PA
325 Paseo de Peralta
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1.1 AIR STRIPPER ANALYSES FOR JULY, AUGUST, AND SEPTEMBER 1989

MONTHLY SAMPLING
ANALYTICAL RESULTS FOR AIR STRIPPER INFLUENT AND EFFLUENT
HALOGENATED VOLATILE ORGANIC COMPOUNDS
(ug/L unless otherwise noted)
(Sampling Event: 07/12/89)

	INFLUENT	EFFLUENT
Chloroethane	ND	ND
Bromomethane	ND	ND
Vinyl Chloride	ND	ND
Chloromethane	ND	ND
Methylene Chloride	ND	ND
Trichlorofluoromethane	ND	ND
1,1-Dichloroethene	ND	ND
1,1-Dichloroethane	ND	ND
trans-1,2-Dichloroethene	2.7	ND
Chloroform	ND	ND
1,2-Dichloroethane	ND	ND
1,1,1-Trichloroethane	3.4	ND
Carbon Tetrachloride	ND	ND
Bromodichloromethane	ND	ND
1,2-Dichloropropane	ND	ND
cis-1,3-Dichloropropene	ND	ND
Trichloroethene	0.9	ND
Dibromochloromethane	ND	ND
1,1,2-Trichloroethane	ND	ND
trans-1,3-Dichloropropene	ND	ND
2-Chloroethylvinyl Ether	ND	ND
Bromoform	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND
Tetrachloroethene	1.2	ND
Chlorobenzene	ND	ND
1,3-Dichlorobenzene	ND	ND
1,2-Dichlorobenzene	ND	ND
1,4-Dichlorobenzene	ND	ND
Dichlorodifluoromethane	ND	ND

() = Detection Limit
ND = Not Detected
T = Detected Below Quantifiable Levels
NA = Not Analyzed

MONTHLY SAMPLING
ANALYTICAL RESULTS FOR AIR STRIPPER INFLUENT AND EFFLUENT
AROMATIC VOLATILE ORGANIC COMPOUNDS
(ug/L unless otherwise noted)
(Sampling Event: 07/12/89)

	INFLUENT	EFFLUENT
Benzene	33.5	0.51
Toluene	ND	ND
Ethylbenzene	1.8	ND
Chlorobenzene	ND	ND
o-Xylene	7.3	ND
m,p-Xylene	11.2	ND
1,4-Dichlorobenzene	ND	ND
1,3-Dichlorobenzene	ND	ND
1,2-Dichlorobenzene	ND	ND

() = Detection Limit

ND = Not Detected

T = Detected Below Quantifiable Levels

NA = Not Analyzed

MONTHLY SAMPLING
ANALYTICAL RESULTS FOR AIR STRIPPER INFLUENT AND EFFLUENT
POLYNUCLEAR AROMATIC HYDROCARBONS
(ug/ml unless otherwise noted)
(Sampling Event: 07/12/89)

	INFLUENT	EFFLUENT
Acenaphthene	ND	ND (0.02)
Acenaphthylene	ND	ND (0.02)
Anthracene	ND	ND (0.02)
Benzo(a)Anthracene	ND	ND (0.02)
Benzo(a)pyrene	ND	ND (0.02)
Benzo(b)fluoranthene	ND	2.00 (0.02)
Benzo(j)fluoranthene	ND	ND (0.02)
Benzo(k)fluoranthene	ND	2.00 (0.02)
Benzo(g,h,i)perylene	ND	ND (0.02)
Chrysene	ND	ND (0.02)
Dibenz(a,h)acridine	ND	ND (0.02)
Dibenz(a,i)acridine	ND	ND (0.02)
Dibenzo(a,h)anthracene	ND	ND (0.02)
Dibenz(a,e)pyrene	ND	ND (0.02)
Dibenz(a,h)pyrene	ND	ND (0.02)
Dibenz(a,i)pyrene	ND	ND (0.02)
Fluoranthene	9.40	22.4 (0.02)
Fluorene	4.20	4.50 (0.02)
Indeno(1,2,3-cd)pyrene	ND	ND (0.02)
Naphthalene	ND	ND (0.02)
Phenanthrene	2.00	4.50 (0.02)
Pyrene	5.30	11.0 (0.02)
1-Methylnaphthalene	NA	NA (0.02)
3-Methylnaphthalene	ND	ND (0.02)

() = Detection Limit
ND = Not Detected
T = Detected Below Quantifiable Levels
NA = Not Analyzed

Revised?

MONTHLY SAMPLING
ANALYTICAL RESULTS FOR AIR STRIPPER INFLUENT AND EFFLUENT
GENERAL WATER CHEMISTRY
(mg/L unless otherwise noted)
(Sampling Event: 07/12/89)

	INFLUENT	EFFLUENT
Total dissolved solids (180)	3672.00	3570.00
Total alkalinity (as CaCO ₃)	485.17	381.64
Total hardness (as CaCO ₃)	1434.72	1307.64
pH	7.83	7.60
Conductivity (umhos/cm @ 25C)	4860	4760
Resistivity (ohm-m)	2.0576	2.1008
Acidity (as CaCO ₃)	<1.0	<1.0
Bicarbonate (as HCO ₃)	591.91	465.60
Carbonate (as CO ₃)	0.00	0.00
Chloride	680.64	691.28
Sulfate	1445.60	1448.07
Calcium	481.22	442.69
Magnesium	56.92	49.40
Potassium	3.44	3.44
Sodium	667.00	664.00
Major cations (meq/L)	57.79	55.12
Major anions (meq/L)	59.02	57.30
Anion/cation % difference (%)	1.05	1.94

ND = Not Detected
T = Detected Below Quantifiable Level
NA = Not Analyzed

MONTHLY SAMPLING
ANALYTICAL RESULTS FOR AIR STRIPPER INFLUENT AND EFFLUENT
HALOGENATED VOLATILE ORGANIC COMPOUNDS
(ug/L unless otherwise noted)
(Sampling Event: 08/17/89)

	INFLUENT	EFFLUENT
Chloromethane	ND	ND
Bromomethane	ND	ND
Vinyl Chloride	ND	ND
Chloroethane	ND	ND
Methylene Chloride	ND	ND
Trichlorofluoromethane	ND	ND
1,1-Dichloroethene	ND	ND
1,1-Dichloroethane	ND	ND
Total 1,2-Dichloroethene	17	7.1
Chloroform	ND	ND
1,2-Dichloroethane	3.9	ND
1,1,1-Trichloroethane	ND	ND
Carbon Tetrachloride	ND	ND
Bromodichloromethane	ND	ND
1,2-Dichloropropane	ND	ND
cis-1,3-Dichloropropene	ND	ND
Trichloroethene	ND	ND
Dibromochloromethane	ND	ND
1,1,2-Trichloroethane	ND	ND
trans-1,3-Dichloropropene	ND	ND
2-Chloroethylvinyl Ether	ND	ND
Bromoform	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND
Tetrachloroethene	ND	ND
Chlorobenzene	ND	ND
1,3-Dichlorobenzene	ND	ND
1,2-Dichlorobenzene	ND	ND
1,4-Dichlorobenzene	ND	ND

() = Detection Limit
ND = Not Detected

T = Detected Below Quantifiable Levels
NA = Not Analyzed

MONTHLY SAMPLING
ANALYTICAL RESULTS FOR AIR STRIPPER INFLUENT AND EFFLUENT
AROMATIC VOLATILE ORGANIC COMPOUNDS
(ug/L unless otherwise noted)
(Sampling Event: 08/17/89)

	INFLUENT	EFFLUENT
Benzene	140	(1.0)
Toluene	6.1	(3.0)
Ethylbenzene	ND	(1.0)
Chlorobenzene	ND	(1.0)
Total Xylenes	36	13
1,4-Dichlorobenzene	ND	ND
1,3-Dichlorobenzene	ND	ND
1,2-Dichlorobenzene	ND	ND

High

(58)

() = Detection Limit
ND = Not Detected
T = Detection Below Quantifiable Level
NA = Not Analyzed

MONTHLY SAMPLING
ANALYTICAL RESULTS FOR AIR STRIPPER INFLUENT AND EFFLUENT
POLYNUCLEAR AROMATIC HYDROCARBONS
(ug/L unless otherwise noted)
(Sampling Event: 08/17/89)

	INFLUENT	EFFLUENT
Acenaphthalene	<23	<23
Acenaphthene	<18	<18
Anthracene	<6.6	<6.6
Benzo(a)anthracene	<0.13	<0.13
Benzo(a)pyrene	<0.23	<0.23
Benzo(b)fluoranthene	<0.18	<0.18
Benzo(g,h,i)perylene	<0.76	<0.76
Benzo(k)fluoranthene	<0.17	<0.17
Chrysene	<0.13	<0.13
Dibenzo(a,h)anthracene	<0.30	<0.30
Fluoranthene	<2.1	<2.1
Fluorene	4	4
Indeno(1,2,3-cd)pyrene	<0.43	<0.43
Naphthalene	250	27
Phenanthrene	42	42
Pyrene	<2.7	<2.7

() = Detection Limit
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T = Detected Below Quantifiable Level
NA = Not Analyzed

MONTHLY SAMPLING
ANALYTICAL RESULTS FOR AIR STRIPPER INFLUENT AND EFFLUENT
GENERAL WATER CHEMISTRY
(mg/L unless otherwise noted)
(Sampling Event: 08/17/89)

	INFLUENT	EFFLUENT
Bicarbonate	499	479
Carbonate	<1.0	<1.0
Total alkalinity	499	479
Calcium	420	160
Chloride	620	670
Magnesium	43	26
Conductivity (umhos/cm @ 25C)	4800	4800
Sodium	600	160
Sulfate	1300	1300
Total Dissolved Solids	3500	3700

() = Detection Limit
 ND = Not Detected
 T = Detected Below Quantifiable Level
 NA = Not Analyzed

MONTHLY SAMPLING
ANALYTICAL RESULTS FOR AIR STRIPPER INFLUENT AND EFFLUENT
HALOGENATED VOLATILE ORGANIC COMPOUNDS
(ug/L unless otherwise noted)
(Sampling Event: 09/13/89)

	INFLUENT	EFFLUENT
Chloromethane	ND	ND
Bromomethane	ND	ND
Vinyl Chloride	ND	ND
Chloroethane	ND	ND
Methylene Chloride	ND	ND
Trichlorofluoromethane	ND	ND
1,1-Dichloroethene	ND	ND
1,1-Dichloroethane	ND	ND
Total 1,2-Dichloroethene	ND	ND
Chloroform	ND	ND
1,2-Dichloroethane	ND	ND
1,1,1-Trichloroethane	ND	ND
Carbon Tetrachloride	ND	ND
Bromodichloromethane	ND	ND
1,2-Dichloropropane	ND	ND
cis-1,3-Dichloropropene	ND	ND
Trichloroethene	ND	ND
Dibromochloromethane	ND	ND
1,1,2-Trichloroethane	ND	ND
trans-1,3-Dichloropropene	ND	ND
2-Chloroethylvinyl Ether	ND	ND
Bromoform	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND
Tetrachloroethene	ND	ND
Chlorobenzene	ND	ND
1,3-Dichlorobenzene	ND	ND
1,2-Dichlorobenzene	ND	ND
1,4-Dichlorobenzene	ND	ND

() = Detection Limit
ND = Not Detected

T = Detected Below Quantifiable Level
NA = Not Analyzed

MONTHLY SAMPLING
ANALYTICAL RESULTS FOR AIR STRIPPER INFLUENT AND EFFLUENT
AROMATIC VOLATILE ORGANIC COMPOUNDS
(ug/L unless otherwise noted)
(Sampling Event: 09/13/89)

	INFLUENT	EFFLUENT
Benzene	1800	1200
Chlorobenzene	ND	ND
Ethylbenzene	130	50
Toluene	260	190
Total Xylenes	210	110
1,2-Dichlorobenzene	ND	ND
1,3-Dichlorobenzene	ND	ND
1,4-Dichlorobenzene	ND	ND

() = Detection Limit
ND = Not Detected
T = Detected Below Quantifiable Level
NA = Not Analyzed

Immediately upon receipt of September's analytical results the air stripper operation was discontinued. An investigation of the air stripper was conducted and indicated a mechanical failure had occurred. Repairs were made and the air stripper was placed back in service on 9/29/89. See 9/29/89 sampling results (p. 14) for post repair performance.

MONTHLY SAMPLING
ANALYTICAL RESULTS FOR AIR STRIPPER INFLUENT AND EFFLUENT
POLYNUCLEAR AROMATIC HYDROCARBONS
(ug/L unless otherwise noted)
(Sampling Event: 09/13/89)

	INFLUENT		EFFLUENT	
Acenaphthalene	<55	(55)	<23	(23)
Acenaphthene	<43	(43)	<18	(18)
Anthracene	<16	(16)	<6.6	(6.6)
Benzo(a)anthracene	<0.31	(0.31)	<0.13	(0.13)
Benzo(a)pyrene	<0.55	(0.55)	<0.23	(0.23)
Benzo(b)fluoranthene	<0.43	(0.43)	<0.18	(0.18)
Benzo(g,h,i)perylene	<1.8	(1.8)	<0.76	(0.76)
Benzo(k)fluoranthene	<0.41	(0.41)	<0.17	(0.17)
Chrysene	<0.31	(0.31)	<0.13	(0.13)
Dibenzo(a,h)anthracene	<0.72	(0.72)	<0.30	(0.30)
Fluoranthene	<5.0	(5.04)	<2.1	(2.10)
Fluorene	9.4	(5.0)	9.5	(2.1)
Indeno(1,2,3-cd)pyrene	<1.0	(1.0)	<0.43	(0.43)
Naphthalene	<43	(43)	<18	(18)
Phenanthrene	<15	(15)	<6.4	(6.4)
Pyrene	<6.5	(6.5)	<2.7	(2.7)

() = Detection Limit
ND = Not Detected
T = Detected Below Quantifiable Level
NA = Not Analyzed

MONTHLY SAMPLING
ANALYTICAL RESULTS FOR AIR STRIPPER INFLUENT AND EFFLUENT
GENERAL WATER CHEMISTRY
(mg/L unless otherwise noted)
(Sampling Event: 09/13/89)

	INFLUENT	EFFLUENT
Total Dissolved Solids (180)	3138	3096
Total Alkalinity (as CaCO ₃)	414.58	567.32
Total Hardness (as CaCO ₃)	1079.97	1128.96
pH	8.11	8.19
Conductivity (umhos/cm @ 25C)	4544	4519
Resistivity (ohm-m)	2.2007	2.2129
Acidity (as CaCO ₃)	0.00	0.00
Bicarbonate as HCO ₃	505.79	692.13
Carbonate (as CO ₃)	0.00	0.00
Chloride	572.48	564.97
Sulfate	1060.85	1088.01
Calcium	385.31	372.67
Magnesium	28.85	48.43
Potassium	4.52	4.32
Sodium	586.00	658.00
Major Cations (meq/L)	47.20	49.95
Major Anions (meq/L)	46.54	51.31
Anion/cation % difference (%)	0.71	1.34

ND = Not Detected
T = Detected Below Quantifiable Limits
NA = Not Analyzed

MONTHLY SAMPLING
ANALYTICAL RESULTS FOR AIR STRIPPER INFLUENT AND EFFLUENT
AROMATIC VOLATILE ORGANIC COMPOUNDS
(ug/L unless otherwise noted)
(Sampling Event: 09/29/89)

	INFLUENT	EFFLUENT
Benzene	78.0 (1.0)	9.2 (1.0)
Chlorobenzene	ND (1.0)	ND (1.0)
Ethylbenzene	16.3 (1.0)	0.4 (1.0)
Toluene	22.6 (1.0)	0.6 (1.0)
m/p-Xylene	29.4 (1.0)	0.7 (1.0)
o-Xylene	13.7 (1.0)	0.5 (1.0)
1,2-Dichlorobenzene	ND (1.0)	ND (1.0)
1,3-Dichlorobenzene	ND (1.0)	ND (1.0)
1,4-Dichlorobenzene	ND (1.0)	ND (1.0)

() = Detection Limit
ND = Not Detected
T = Detected Below Quantifiable Level
NA = Not Analyzed

A

Why 20-fold decrease in Benzene Stream
9/13 sampling (A.11)?

0348/SAMP789.TAB

Present in 9/13 stream?
Alkanes and 1,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38,39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56,57,58,59,60,61,62,63,64,65,66,67,68,69,70,71,72,73,74,75,76,77,78,79,80,81,82,83,84,85,86,87,88,89,90,91,92,93,94,95,96,97,98,99,100,101,102,103,104,105,106,107,108,109,110,111,112,113,114,115,116,117,118,119,120,121,122,123,124,125,126,127,128,129,130,131,132,133,134,135,136,137,138,139,140,141,142,143,144,145,146,147,148,149,150,151,152,153,154,155,156,157,158,159,160,161,162,163,164,165,166,167,168,169,170,171,172,173,174,175,176,177,178,179,180,181,182,183,184,185,186,187,188,189,190,191,192,193,194,195,196,197,198,199,200,201,202,203,204,205,206,207,208,209,210,211,212,213,214,215,216,217,218,219,220,221,222,223,224,225,226,227,228,229,230,231,232,233,234,235,236,237,238,239,240,241,242,243,244,245,246,247,248,249,250,251,252,253,254,255,256,257,258,259,260,261,262,263,264,265,266,267,268,269,270,271,272,273,274,275,276,277,278,279,280,281,282,283,284,285,286,287,288,289,290,291,292,293,294,295,296,297,298,299,300,301,302,303,304,305,306,307,308,309,310,311,312,313,314,315,316,317,318,319,320,321,322,323,324,325,326,327,328,329,330,331,332,333,334,335,336,337,338,339,340,341,342,343,344,345,346,347,348,349,350,351,352,353,354,355,356,357,358,359,360,361,362,363,364,365,366,367,368,369,370,371,372,373,374,375,376,377,378,379,380,381,382,383,384,385,386,387,388,389,390,391,392,393,394,395,396,397,398,399,400,401,402,403,404,405,406,407,408,409,410,411,412,413,414,415,416,417,418,419,420,421,422,423,424,425,426,427,428,429,430,431,432,433,434,435,436,437,438,439,440,441,442,443,444,445,446,447,448,449,450,451,452,453,454,455,456,457,458,459,460,461,462,463,464,465,466,467,468,469,470,471,472,473,474,475,476,477,478,479,480,481,482,483,484,485,486,487,488,489,490,491,492,493,494,495,496,497,498,499,500,501,502,503,504,505,506,507,508,509,510,511,512,513,514,515,516,517,518,519,520,521,522,523,524,525,526,527,528,529,530,531,532,533,534,535,536,537,538,539,540,541,542,543,544,545,546,547,548,549,550,551,552,553,554,555,556,557,558,559,560,561,562,563,564,565,566,567,568,569,570,571,572,573,574,575,576,577,578,579,580,581,582,583,584,585,586,587,588,589,590,591,592,593,594,595,596,597,598,599,600,601,602,603,604,605,606,607,608,609,610,611,612,613,614,615,616,617,618,619,620,621,622,623,624,625,626,627,628,629,630,631,632,633,634,635,636,637,638,639,640,641,642,643,644,645,646,647,648,649,650,651,652,653,654,655,656,657,658,659,660,661,662,663,664,665,666,667,668,669,670,671,672,673,674,675,676,677,678,679,680,681,682,683,684,685,686,687,688,689,690,691,692,693,694,695,696,697,698,699,700,701,702,703,704,705,706,707,708,709,710,711,712,713,714,715,716,717,718,719,720,721,722,723,724,725,726,727,728,729,730,731,732,733,734,735,736,737,738,739,740,741,742,743,744,745,746,747,748,749,750,751,752,753,754,755,756,757,758,759,760,761,762,763,764,765,766,767,768,769,770,771,772,773,774,775,776,777,778,779,780,781,782,783,784,785,786,787,788,789,790,791,792,793,794,795,796,797,798,799,800,801,802,803,804,805,806,807,808,809,810,811,812,813,814,815,816,817,818,819,820,821,822,823,824,825,826,827,828,829,830,831,832,833,834,835,836,837,838,839,840,841,842,843,844,845,846,847,848,849,850,851,852,853,854,855,856,857,858,859,860,861,862,863,864,865,866,867,868,869,870,871,872,873,874,875,876,877,878,879,880,881,882,883,884,885,886,887,888,889,890,891,892,893,894,895,896,897,898,899,900,901,902,903,904,905,906,907,908,909,910,911,912,913,914,915,916,917,918,919,920,921,922,923,924,925,926,927,928,929,930,931,932,933,934,935,936,937,938,939,940,941,942,943,944,945,946,947,948,949,950,951,952,953,954,955,956,957,958,959,960,961,962,963,964,965,966,967,968,969,970,971,972,973,974,975,976,977,978,979,980,981,982,983,984,985,986,987,988,989,990,991,992,993,994,995,996,997,998,999,1000,1001,1002,1003,1004,1005,1006,1007,1008,1009,1010,1011,1012,1013,1014,1015,1016,1017,1018,1019,1020,1021,1022,1023,1024,1025,1026,1027,1028,1029,1030,1031,1032,1033,1034,1035,1036,1037,1038,1039,1040,1041,1042,1043,1044,1045,1046,1047,1048,1049,1050,1051,1052,1053,1054,1055,1056,1057,1058,1059,1060,1061,1062,1063,1064,1065,1066,1067,1068,1069,1070,1071,1072,1073,1074,1075,1076,1077,1078,1079,1080,1081,1082,1083,1084,1085,1086,1087,1088,1089,1090,1091,1092,1093,1094,1095,1096,1097,1098,1099,1100,1101,1102,1103,1104,1105,1106,1107,1108,1109,1110,1111,1112,1113,1114,1115,1116,1117,1118,1119,1120,1121,1122,1123,1124,1125,1126,1127,1128,1129,1130,1131,1132,1133,1134,1135,1136,1137,1138,1139,1140,1141,1142,1143,1144,1145,1146,1147,1148,1149,1150,1151,1152,1153,1154,1155,1156,1157,1158,1159,1160,1161,1162,1163,1164,1165,1166,1167,1168,1169,1170,1171,1172,1173,1174,1175,1176,1177,1178,1179,1180,1181,1182,1183,1184,1185,1186,1187,1188,1189,1190,1191,1192,1193,1194,1195,1196,1197,1198,1199,1200,1201,1202,1203,1204,1205,1206,1207,1208,1209,1210,1211,1212,1213,1214,1215,1216,1217,1218,1219,1220,1221,1222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,2223,2224,2225,2226,2227,2228,2229,2230,2231,2232,2233,2234,2235,2236,2237,2238,2239,2240,2241,2242,2243,2244,2245,2246,2247,2248,2249,2250,2251,2252,2253,2254,2255,2256,2257,2258,2259,2260,2261,2262,2263,2264,2265,2266,2267,2268,2269,2270,2271,2272,2273,2274,2275,2276,2277,2278,2279,2280,2281,2282,2283,2284,2285,2286,2287,2288,2289,2290,2291,2292,2293,2294,2295,2296,2297,2298,2299,2300,2301,2302,2303,2304,2305,2306,2307,2308,2309,2310,2311,2312,2313,2314,2315,2316,2317,2318,2319,2320,2321,2322,2323,2324,2325,2326,2327,2328,2329,2330,2331,2332,2333,2334,2335,2336,2337,2338,2339,2340,2341,2342,2343,2344,2345,2346,2347,2348,2349,2350,2351,2352,2353,2354,2355,2356,2357,2358,2359,2360,2361,2362,2363,2364,2365,2366,2367,2368,2369,2370,2371,2372,2373,2374,2375,2376,2377,2378,2379,2380,2381,2382,2383,2384,2385,2386,2387,2388,2389,2390,2391,2392,2393,2394,2395,2396,2397,2398,2399,2400,2401,2402,2403,2404,2405,2406,2407,2408,2409,2410,2411,2412,2413,2414,2415,2416,2417,2418,2419,2420,2421,2422,2423,2424,2425,2426,2427,2428,2429,2430,2431,2432,2433,2434,2435,2436,2437,2438,2439,2440,2441,2442,2443,2444,2445,2446,2447,2448,2449,2450,2451,2452,2453,2454,2455,2456,2457,2458,2459,2460,2461,2462,2463,2464,2465,2466,2467,2468,2469,2470,2471,2472,2473,2474,2475,2476,2477,2478,2479,2480,2481,2482,2483,2484,2485,2486,2487,2488,2489,2490,2491,2492,2493,2494,2495,2496,2497,2498,2499,2500,2501,2502,2503,2504,2505,2506,2507,2508,2509,2510,2511,2512,2513,2514,2515,2516,2517,2518,2519,2520,2521,2522,2523,2524,2525,2526,2527,2528,2529,2530,2531,2532,2533,2534,2535,2536,2537,

1.2 POTENTIOMETRIC SURFACE MAPS FOR JULY, AUGUST, AND SEPTEMBER 1989

GIANT INDUSTRIES BLOOMFIELD REFINERY
MONTHLY POTENTIOMETRIC SURFACE

MEASUREMENT DATE
7/12/89

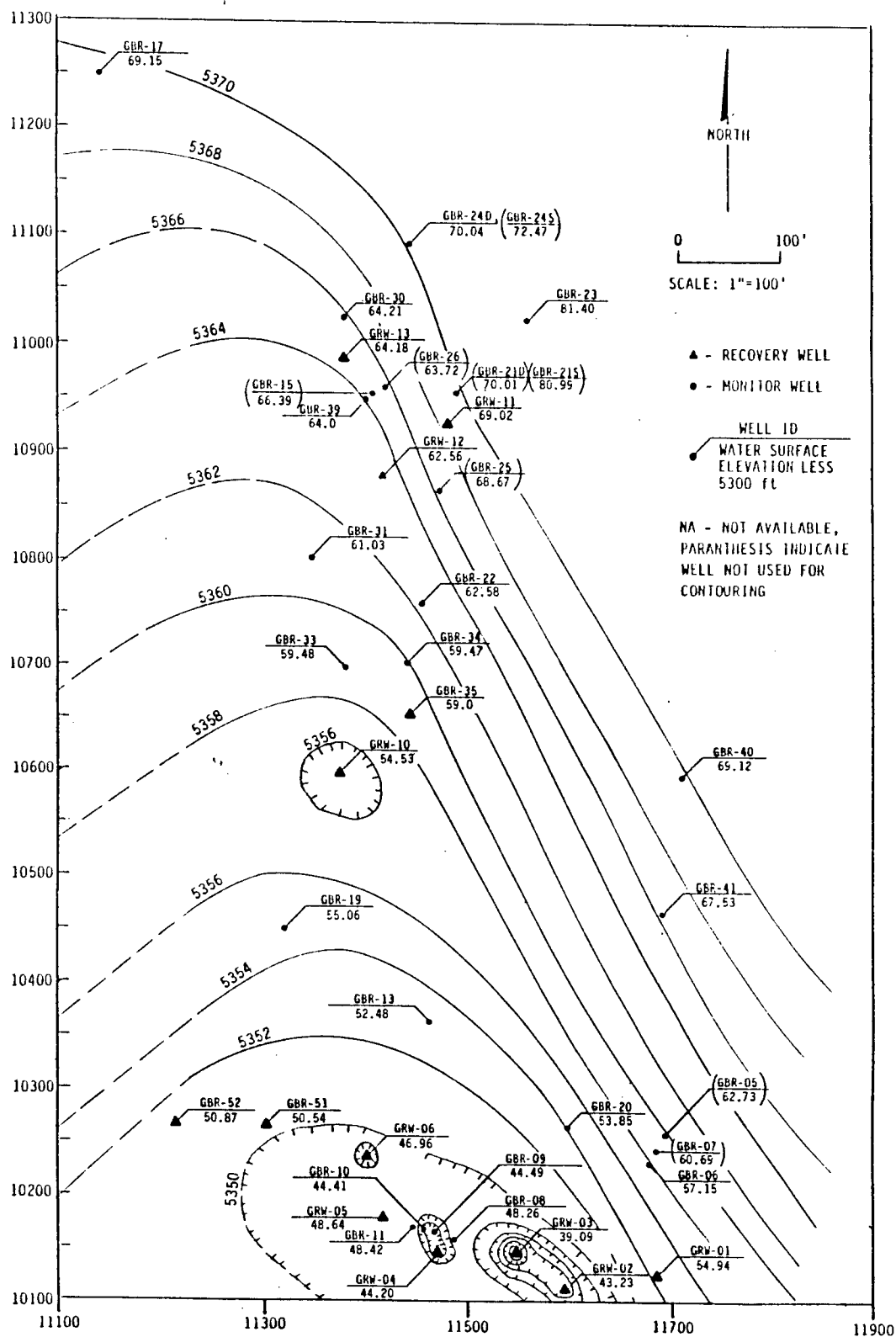
WELL ID	WELL HEAD ELEVATION	DEPTH TO WATER	DEPTH TO PRODUCT	PRODUCT THICKNESS	ADJUSTED WSEL
GBR-05	5395.07	32.34	32.34	0.00	5362.73
GBR-06	5395.70	38.55	38.55	0.00	5357.15
GBR-07	5395.85	40.98	33.70	7.28	5360.69
GBR-08	5390.50	42.44	42.19	0.25	5348.26
GBR-09	5389.92	45.43	45.43	0.00	5344.49
GBR-10	5390.57	46.31	46.12	0.19	5344.41
GBR-11	5389.43	43.35	40.43	2.92	5348.42
GBR-13	5393.04	41.81	40.25	1.56	5352.48
GBR-15	5397.99	31.60	31.60	0.00	5366.39
GBR-17	5402.69	33.54	33.54	0.00	5369.15
GBR-18	5421.68	15.45	15.45	0.00	5406.23
GBR-19	5393.83	38.77	38.77	0.00	5355.06
GBR-20	5393.47	39.85	39.56	0.29	5353.85
GBR-21D	5400.19	30.18	30.18	0.00	5370.01
GBR-21S	5400.65	19.72	19.65	0.07	5380.99
GBR-22	5395.91	33.33	33.33	0.00	5362.58
GBR-23	5403.72	22.32	22.32	0.00	5381.40
GBR-24D	5396.77	26.73	26.73	0.00	5370.04
GBR-24S	5396.08	23.61	23.61	0.00	5372.47
GBR-25	5396.72	28.05	28.05	0.00	5368.67
GBR-26	5395.59	31.87	31.87	0.00	5363.72
GBR-30	5396.58	32.40	32.36	0.04	5364.21
GBR-31	5394.86	33.83	33.83	0.00	5361.03
GBR-32	5416.77	35.67	35.67	0.00	5381.10
GBR-33	5396.28	36.80	36.80	0.00	5359.48
GBR-34	5394.00	34.35	34.24	0.11	5359.74
GBR-35	5393.66	35.42	34.47	0.95	5359.00
GBR-39	5397.55	33.55	33.55	0.00	5364.00
GBR-40	5400.76	31.64	31.64	0.00	5369.12
GBR-41	5396.35	28.82	28.82	0.00	5367.53
GBR-48	5419.09	37.07	37.07	0.00	5382.02
GBR-49	5412.45	33.55	33.55	0.00	5378.90
GBR-50	5416.59	33.33	33.33	0.00	5383.26
GBR-51	5389.68	39.14	39.14	0.00	5350.54
GBR-52	5387.74	36.87	36.87	0.00	5350.87
GRW-01	5394.30	39.28	39.28	0.00	5355.02
GRW-02	5391.28	48.20	48.20	0.00	5343.08
GRW-03	5388.77	50.13	49.64	0.49	5339.03

GIANT INDUSTRIES BLOOMFIELD REFINERY
MONTHLY POTENTIOMETRIC SURFACE

MEASUREMENT DATE
7/12/89 (Continued)

WELL ID	WELL HEAD ELEVATION	DEPTH TO WATER	DEPTH TO PRODUCT	PRODUCT THICKNESS	ADJUSTED WSEL
GRW-04	5390.02	50.14	50.14	0.00	5339.88
GRW-05	5390.56	41.82	41.82	0.00	5348.74
GRW-06	5390.81	44.79	44.79	0.00	5346.02
GRW-10	5395.02	44.25	39.55	4.70	5354.53
GRW-11	5397.85	28.33	28.33	0.00	5369.52
GRW-12	5397.24	34.68	34.68	0.00	5362.56
GRW-13	5396.90	32.72	32.72	0.00	5364.18

NA = Not Available
WSEL = Water Surface Elevation
All Units are in Feet



JULY 1989 WATER SURFACE CONTOUR MAP GIANT-BLOOMFIELD REFINERY

GIANT INDUSTRIES BLOOMFIELD REFINERY
MONTHLY POTENTIOMETRIC SURFACE

MEASUREMENT DATE
8/12/89

WELL ID	WELL HEAD ELEVATION	DEPTH TO WATER	DEPTH TO PRODUCT	PRODUCT THICKNESS	ADJUSTED WSEL
GBR-05	5395.07	32.56	32.34	0.22	5362.69
GBR-06	5395.70	38.56	38.42	0.14	5357.25
GBR-07	5395.85	40.92	33.74	7.18	5360.67
GBR-08	5390.50	42.22	42.05	0.17	5348.42
GBR-09	5389.92	44.84	44.84	0.00	5345.08
GBR-10	5390.57	42.15	41.95	0.20	5348.58
GBR-11	5389.43	42.66	40.28	2.38	5348.67
GBR-13	5393.04	33.19	33.19	0.00	5359.85
GBR-15	5397.99	31.43	31.43	0.00	5366.56
GBR-17	5402.69	33.54	33.54	0.00	5369.15
GBR-18	5421.68	15.45	15.45	0.00	5406.23
GBR-19	5393.83	38.77	38.77	0.00	5355.06
GBR-20	5393.47	39.85	39.56	0.29	5353.85
GBR-21D	5400.19	30.18	30.18	0.00	5370.01
GBR-21S	5400.65	19.72	19.65	0.07	5380.99
GBR-22	5395.91	33.18	33.18	0.00	5362.73
GBR-23	5403.72	22.32	22.32	0.00	5381.40
GBR-24D	5396.77	26.73	26.73	0.00	5370.04
GBR-24S	5396.08	23.61	23.61	0.00	5372.47
GBR-25	5396.72	28.05	28.05	0.00	5368.67
GBR-26	5395.59	31.87	31.87	0.00	5363.72
GBR-30	5396.58	32.40	32.36	0.04	5364.21
GBR-31	5394.86	33.83	33.83	0.00	5361.03
GBR-32	5416.77	35.67	35.67	0.00	5381.10
GBR-33	5396.28	36.80	36.80	0.00	5359.48
GBR-34	5394.00	34.15	34.15	0.00	5359.85
GBR-35	5393.66	35.42	34.47	0.95	5359.00
GBR-39	5397.55	33.55	33.55	0.00	5364.00
GBR-40	5400.76	31.55	31.55	0.00	5369.21
GBR-41	5396.35	28.82	28.82	0.00	5367.53
GBR-48	5419.09	37.07	37.07	0.00	5382.02
GBR-49	5412.45	33.55	33.55	0.00	5378.90
GBR-50	5416.59	33.33	33.33	0.00	5383.26
GBR-51	5389.68	39.14	39.14	0.00	5350.54
GBR-52	5387.74	36.87	36.87	0.00	5350.87
GRW-01	5394.30	39.28	39.28	0.00	5355.02
GRW-02	5391.28	48.20	48.20	0.00	5343.08
GRW-03	5388.77	50.13	49.64	0.49	5339.03

GIANT INDUSTRIES BLOOMFIELD REFINERY
MONTHLY POTENTIOMETRIC SURFACE

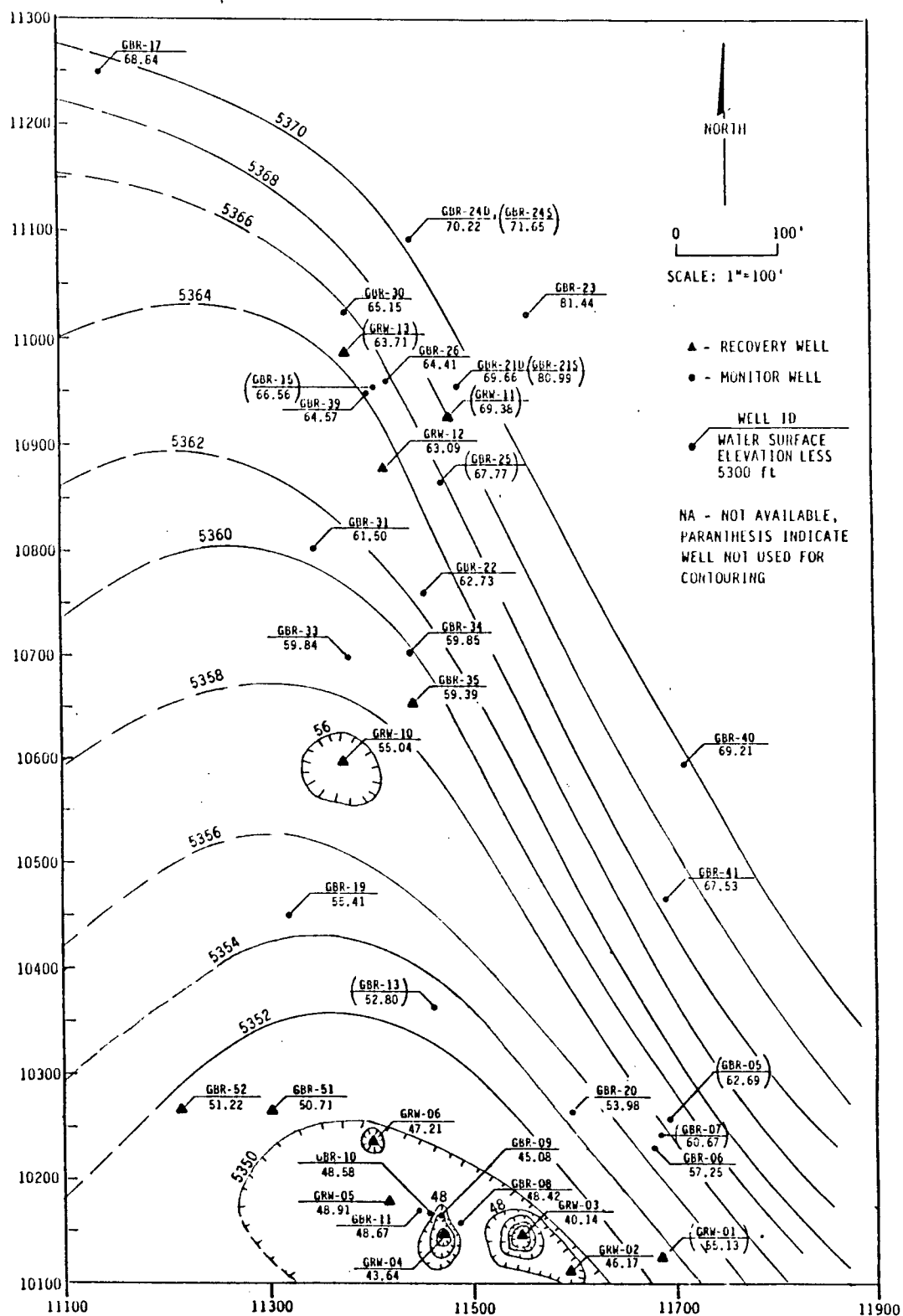
MEASUREMENT DATE
8/12/89 (Continued)

WELL ID	WELL HEAD ELEVATION	DEPTH TO WATER	DEPTH TO PRODUCT	PRODUCT THICKNESS	ADJUSTED WSEL
GRW-04	5390.02	50.14	50.14	0.00	5339.88
GRW-05	5390.56	41.82	41.82	0.00	5348.74
GRW-06	5390.81	44.79	44.79	0.00	5346
GRW-10	5395.02	44.25	39.55	4.70	5354.53
GRW-11	5397.85	28.33	28.33	0.00	5369.52
GRW-12	5397.24	34.68	34.68	0.00	5362.56
GRW-13	5396.90	32.72	32.72	0.00	5364.18

NA = Not Available

WSEL = Water Surface Elevation

All Units are in Feet



AUG 1989 WATER SURFACE CONTOUR MAP GIANT-BLOOMFIELD REFINERY

GIANT INDUSTRIES BLOOMFIELD REFINERY
MONTHLY POTENTIOMETRIC SURFACE

MEASUREMENT DATE

9/12/89

WELL ID	WELL HEAD ELEVATION	DEPTH TO WATER	DEPTH TO PRODUCT	PRODUCT THICKNESS	ADJUSTED WSEL
GBR-05	5395.07	32.52	32.36	0.16	5362.68
GBR-06	5395.70	38.22	38.06	0.16	5357.61
GBR-07	5395.85	37.48	33.78	3.70	5361.33
GBR-08	5390.50	41.75	41.75	0.00	5348.75
GBR-09	5389.92	44.74	44.74	0.00	5345.18
GBR-10	5390.57	41.73	41.73	0.00	5348.84
GBR-11	5389.43	41.97	40.15	1.82	5348.92
GBR-13	5393.04	40.36	39.84	0.52	5353.10
GBR-15	5397.99	30.51	30.51	0.00	5367.48
GBR-17	5402.69	32.89	32.89	0.00	5369.80
GBR-18	5421.68	15.88	15.88	0.00	5405.80
GBR-19	5393.83	38.14	38.14	0.00	5355.69
GBR-20	5393.47	39.35	39.07	0.28	5354.34
GBR-21D	5400.19	30.89	30.89	0.00	5369.30
GBR-21S	5400.65	19.45	19.44	0.01	5381.21
GBR-22	5395.91	32.81	32.81	0.00	5363.10
GBR-23	5403.72	21.86	21.86	0.00	5381.86
GBR-24D	5396.77	25.94	25.94	0.00	5370.83
GBR-24S	5396.08	22.88	22.88	0.00	5373.20
GBR-25	5396.72	27.55	27.55	0.00	5369.17
GBR-26	5395.59	30.49	30.49	0.00	5365.10
GBR-30	5396.58	30.83	30.83	0.00	5365.75
GBR-31	5394.86	32.95	32.95	0.00	5361.91
GBR-32	5416.77	35.07	35.07	0.00	5381.70
GBR-33	5396.28	36.97	36.97	0.00	5359.31
GBR-34	5394.00	33.68	33.68	0.00	5360.32
GBR-35	5393.66	33.84	33.84	0.00	5359.82
GBR-39	5397.55	32.46	32.46	0.00	5365.09
GBR-40	5400.76	31.62	31.62	0.00	5369.14
GBR-41	5396.35	28.78	28.78	0.00	5367.57
GBR-48	5419.09	NA	NA	0.00	5419.09
GBR-49	5412.45	33.02	33.02	0.00	5379.43
GBR-50	5416.59	32.64	32.64	0.00	5383.95
GBR-51	5389.68	38.55	38.55	0.00	5351.13
GBR-52	5387.74	36.22	36.22	0.00	5351.52
GRW-01	5394.30	39.44	39.44	0.00	5354.86
GRW-02	5391.28	48.59	48.59	0.00	5342.69
GRW-03	5388.77	41.35	41.35	0.00	5347.42

GIANT INDUSTRIES BLOOMFIELD REFINERY
MONTHLY POTENTIOMETRIC SURFACE

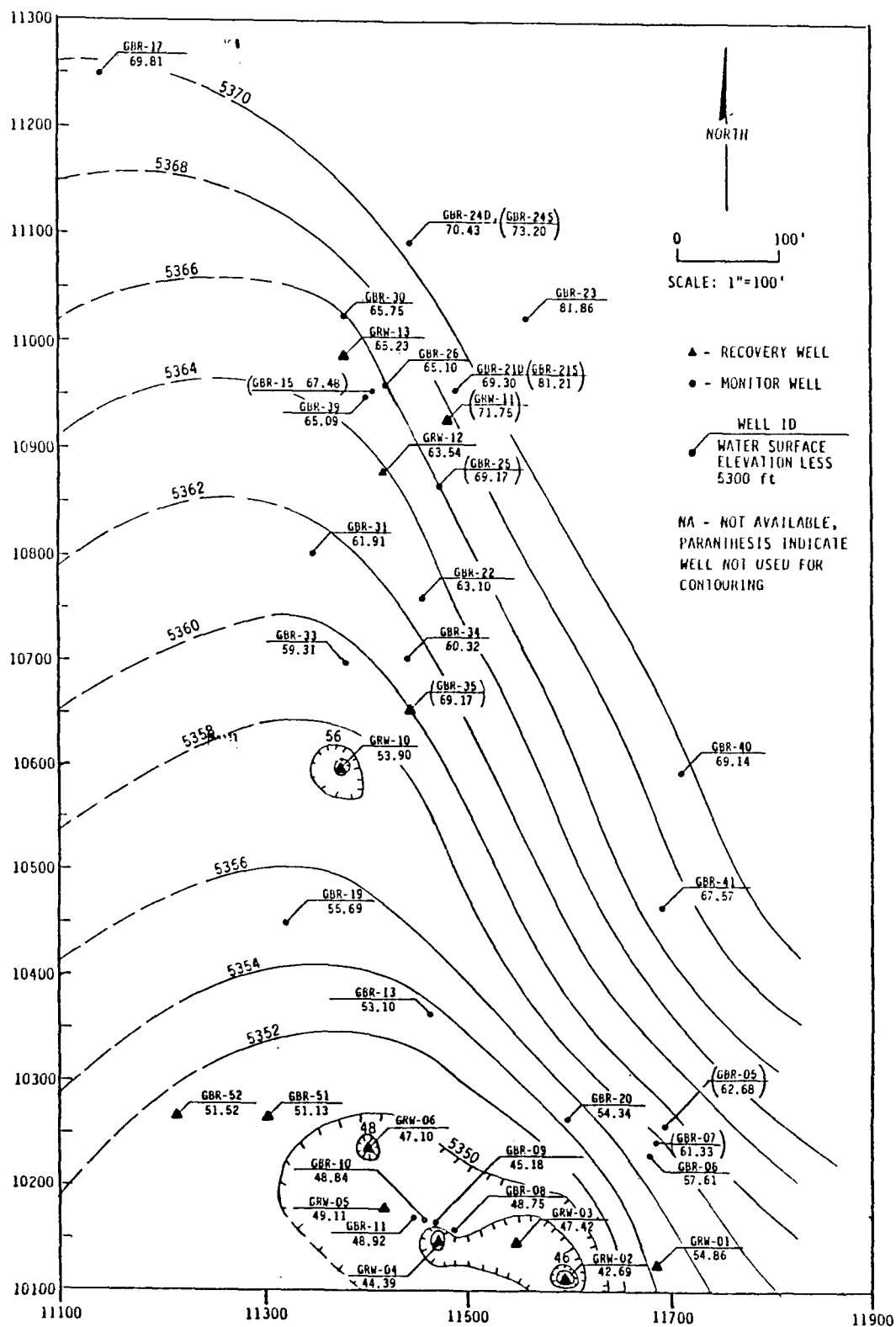
MEASUREMENT DATE

9/12/89 (Continued)

WELL ID	WELL HEAD ELEVATION	DEPTH TO WATER	DEPTH TO PRODUCT	PRODUCT THICKNESS	ADJUSTED WSEL
GRW-04	5390.02	45.63	45.63	0.00	5344.39
GRW-05	5390.56	41.45	41.45	0.00	5349.11
GRW-06	5390.81	43.71	43.71	0.00	5347.10
GRW-10	5395.02	41.57	41.01	0.56	5353.90
GRW-11	5397.85	26.10	26.10	0.00	5371.75
GRW-12	5397.24	33.70	33.70	0.00	5363.54
GRW-13	5396.90	31.67	31.67	0.00	5365.23

NA = Not Available
WSEL = Water Surface Elevation
All Units are in Feet

0348/QTR-789.TAB



SEPT 1989 WATER SURFACE CONTOUR MAP GIANT-BLOOMFIELD REFINERY

2.1 RESULTS OF QUARTERLY SAMPLING

QUARTERLY SAMPLING
ANALYTICAL RESULTS FOR GROUND WATER, HALOGENATED VOLATILE ORGANICS
(ug/L unless otherwise noted)
(Sampling Event: 09/13/89)

	GBR-6	GBR-8	GBR-13	GRW-13	GBR-15
Chloromethane	ND (130)	ND (130)	ND (25)	ND (0.50)	ND (2.5)
Bromomethane	ND (250)	ND (250)	ND (50)	ND (1.0)	ND (5.0)
Vinyl Chloride	ND (50)	ND (50)	ND (10)	ND (0.20)	ND (1.0)
Chloroethane	ND (130)	ND (130)	ND (25)	ND (0.50)	ND (2.5)
Methylene Chloride	ND (100)	ND (100)	ND (20)	ND (0.40)	6.7 (2.0)
Trichlorofluoromethane	ND (25)	ND (25)	ND (5.0)	2.0 (0.10)	ND (0.50)
1,1-Dichloroethene	ND (25)	ND (25)	ND (5.0)	ND (0.10)	ND (0.50)
1,1-Dichloroethane	ND (25)	ND (25)	ND (5.0)	ND (0.10)	ND (0.50)
Total 1,2-Dichloroethene	ND (25)	ND (25)	57 (5.0)	ND (0.10)	ND (0.50)
Chloroform	ND (25)	ND (25)	ND (5.0)	ND (0.10)	ND (0.50)
1,2-Dichloroethane	ND (25)	ND (25)	ND (5.0)	12 (0.10)	77 (0.50)
1,1,1-Trichloroethane	ND (50)	ND (50)	ND (10)	0.29 (0.20)	ND (1.0)
Carbon Tetrachloride	ND (50)	ND (50)	ND (10)	ND (0.20)	ND (1.0)
Bromodichloromethane	ND (25)	ND (25)	ND (5.0)	ND (0.10)	ND (0.50)
1,2-Dichloropropane	ND (25)	ND (25)	ND (5.0)	ND (0.10)	ND (0.50)
cis-1,3-Dichloropropene	ND (100)	ND (100)	ND (20)	ND (0.40)	ND (2.0)
Trichloroethene	ND (50)	ND (50)	13 (10)	ND (0.20)	ND (1.0)
Dibromochloromethane	ND (50)	ND (50)	ND (10)	ND (0.20)	ND (1.0)
1,1,2-Trichloroethane	ND (50)	ND (50)	ND (10)	ND (0.20)	ND (1.0)
trans-1,3-Dichloropropene	ND (100)	ND (100)	ND (20)	ND (0.40)	ND (2.0)
2-Chloroethylvinyl Ether	ND (500)	ND (500)	ND (100)	ND (2.0)	ND (10)
Bromoform	ND (500)	ND (500)	ND (100)	ND (2.0)	ND (10)
1,1,2,2-Tetrachloroethane	ND (50)	ND (50)	ND (10)	ND (0.20)	ND (1.0)
Tetrachloroethene	ND (25)	ND (25)	ND (5.0)	ND (0.10)	ND (0.50)
Chlorobenzene	ND (50)	ND (50)	ND (10)	ND (0.20)	ND (1.0)
1,3-Dichlorobenzene	ND (130)	ND (130)	ND (25)	ND (0.50)	ND (2.5)
1,2-Dichlorobenzene	ND (50)	ND (50)	ND (10)	ND (0.20)	ND (1.0)
1,4-Dichlorobenzene	ND (50)	ND (50)	ND (10)	ND (0.20)	ND (1.0)

() = Detection Limit
ND = Not Detected
T = Detected Below Quantifiable Level
NA = Not Analyzed

QUARTERLY SAMPLING
ANALYTICAL RESULTS FOR GROUND WATER, HALOGENATED VOLATILE ORGANICS
(ug/L unless otherwise noted)
(Sampling Event: 09/13/89)

	GBR-17	GBR-24D	GBR-30	GBR-31	GBR-33
Chloromethane	ND (0.50)	ND (0.50)	ND (1.0)	ND (0.50)	ND (2.5)
Bromomethane	ND (1.0)	ND (1.0)	ND (2.0)	ND (1.0)	ND (5.0)
Vinyl Chloride	ND (0.20)	ND (0.20)	ND (0.40)	ND (0.20)	ND (1.0)
Chloroethane	ND (0.50)	ND (0.50)	ND (1.0)	ND (0.50)	ND (2.5)
Methylene Chloride	ND (0.40)	0.50 (0.40)	ND (0.80)	0.71 (0.40)	ND (2.0)
Trichlorofluoromethane	3.0 (0.10)	2.5 (0.10)	0.91 (0.20)	3.6 (0.10)	ND (0.50)
1,1-Dichloroethene	ND (0.10)	ND (0.10)	ND (0.20)	ND (0.10)	ND (0.50)
1,1-Dichloroethane	0.89 (0.10)	ND (0.10)	0.88 (0.20)	2.8 (0.10)	ND (0.50)
Total 1,2-Dichloroethene	ND (0.10)	ND (0.10)	ND (0.20)	23 (0.10)	2.5 (0.50)
Chloroform	ND (0.10)	ND (0.10)	ND (0.20)	ND (0.10)	ND (0.50)
1,2-Dichloroethane	ND (0.10)	18 (0.10)	9.6 (0.20)	1.8 (0.10)	0.97 (0.50)
1,1,1-Trichloroethane	0.96 (0.20)	ND (0.20)	ND (0.40)	0.65 (0.20)	ND (1.0)
Carbon Tetrachloride	ND (0.20)	ND (0.20)	ND (0.40)	ND (0.20)	ND (1.0)
Bromodichloromethane	ND (0.10)	ND (0.10)	ND (0.20)	ND (0.10)	ND (0.50)
1,2-Dichloropropane	ND (0.10)	ND (0.10)	ND (0.20)	ND (0.10)	ND (0.50)
cis-1,3-Dichloropropene	ND (0.40)	ND (0.40)	ND (0.80)	ND (0.40)	ND (2.0)
Trichloroethene	ND (0.20)	ND (0.20)	ND (0.40)	ND (0.20)	ND (1.0)
Dibromochloromethane	ND (0.20)	ND (0.20)	ND (0.40)	ND (0.20)	ND (1.0)
1,1,2-Trichloroethane	ND (0.20)	ND (0.20)	ND (0.40)	ND (0.20)	ND (1.0)
trans-1,3-Dichloropropene	ND (0.40)	ND (0.40)	ND (0.80)	ND (0.40)	ND (2.0)
2-Chloroethylvinyl Ether	ND (2.0)	ND (2.0)	ND (4.0)	ND (2.0)	ND (10)
Bromoform	ND (2.0)	ND (2.0)	ND (4.0)	ND (2.0)	ND (10)
1,1,2,2-Tetrachloroethane	ND (0.20)	ND (0.20)	ND (0.40)	ND (0.20)	ND (1.0)
Tetrachloroethene	0.21 (0.10)	ND (0.10)	ND (0.20)	4.7 (0.10)	ND (0.50)
Chlorobenzene	ND (0.20)	ND (0.20)	ND (0.40)	ND (0.20)	ND (1.0)
1,3-Dichlorobenzene	ND (0.50)	ND (0.50)	ND (1.0)	ND (0.50)	ND (2.5)
1,2-Dichlorobenzene	ND (0.20)	ND (0.20)	ND (0.40)	ND (0.20)	ND (1.0)
1,4-Dichlorobenzene	ND (0.20)	ND (0.20)	ND (0.40)	ND (0.20)	ND (1.0)

() = Detection Limit
ND = Not Detected
T = Detected Below Quantifiable Level
NA = Not Analyzed

QUARTERLY SAMPLING
ANALYTICAL RESULTS FOR GROUND WATER, AROMATIC VOLATILE ORGANIC COMPOUNDS
(ug/L unless otherwise noted)
(Sampling Event: 09/13/89)

	GBR-6	GBR-8	GBR-13	GRW-13	GBR-15	GBR-17
Benzene	200 (25)	2200 (25)	1700 (5.0)	ND (0.10)	33 (0.50)	ND (0.10)
Toluene	ND (75)	180 (75)	200 (15)	ND (0.30)	ND (1.5)	ND (0.30)
Ethylbenzene	860 (25)	1400 (25)	540 (5.0)	ND (0.10)	ND (0.50)	ND (0.10)
Chlorobenzene	ND (25)	ND (25)	ND (5.0)	ND (0.10)	ND (0.50)	ND (0.10)
Total Xylenes	4100 (50)	4400 (50)	1900 (10)	4.7 (0.20)	ND (1.0)	ND (0.20)
1,4-Dichlorobenzene	ND (50)	ND (50)	ND (10)	ND (0.20)	ND (1.0)	ND (0.20)
1,3-Dichlorobenzene	ND (100)	ND (100)	ND (20)	ND (0.40)	ND (2.0)	ND (0.40)
1,2-Dichlorobenzene	ND (50)	ND (50)	ND (10)	ND (0.20)	ND (1.0)	ND (0.20)

() = Detection Limit
 ND = Not Detected
 T = Detected Below Quantifiable Limit
 NA = Not Analyzed

QUARTERLY SAMPLING
ANALYTICAL RESULTS FOR GROUND WATER, AROMATIC VOLATILE ORGANIC COMPOUNDS
(ug/L unless otherwise noted)
(Sampling Event: 09/13/89)

	GBR-24D	GBR-30	GBR-31	GBR-33	Field Blank
Benzene	12 (0.10)	0.96 (0.50)	0.38 (0.10)	ND (0.50)	ND (0.10)
Toluene	2.8 (0.30)	4.3 (1.5)	ND (0.30)	ND (1.5)	ND (0.30)
Ethylbenzene	18 (0.10)	11 (0.50)	ND (0.10)	7.9 (0.50)	ND (0.10)
Chlorobenzene	0.47 (0.10)	2.7 (0.50)	ND (0.10)	ND (0.50)	ND (0.10)
Total Xylenes	19 (0.20)	44 (1.0)	ND (0.20)	17 (1.0)	ND (0.20)
1,4-Dichlorobenzene	ND (0.20)	40 (1.0)	ND (0.20)	ND (1.0)	ND (0.20)
1,3-Dichlorobenzene	ND (0.40)	17 (2.0)	ND (0.40)	ND (2.0)	ND (0.40)
1,2-Dichlorobenzene	ND (0.20)	35 (1.0)	ND (0.20)	ND (1.0)	ND (0.20)

() = Detection Limit
 ND = Not Detected
 T = Detected Below Quantifiable Limit
 NA = Not Analyzed

QUARTERLY SAMPLING
ANALYTICAL RESULTS FOR GROUND WATER
POLYNUCLEAR AROMATIC HYDROCARBONS
(ug/L unless otherwise noted)
(Sampling Event: 09/13/89)

	GBR-6	GBR-8	GBR-13	GRW-13	GBR-15
Acenaphthalene	<55 (55)	<220 (220)	<220 (220)	<2.3 (2.3)	<2.3 (2.3)
Acenaphthene	580 (43)	<170 (170)	<170 (170)	<1.8 (1.8)	<1.8 (1.8)
Anthracene	<16 (16)	<63 (63)	<62 (62)	<0.66 (0.66)	<0.66 (0.66)
Benzo(a)anthracene	<0.31 (0.31)	<1.2 (1.2)	<1.2 (1.2)	<0.013 (0.013)	<0.013 (0.013)
Benzo(a)pyrene	<0.55 (0.55)	<2.2 (2.2)	<2.2 (2.2)	<0.023 (0.023)	<0.023 (0.023)
Benzo(b)fluoranthene	<0.43 (0.43)	<1.7 (1.7)	<1.7 (1.7)	<0.018 (0.018)	<0.018 (0.018)
Benzo(g,h,i)perylene	<1.8 (1.8)	<7.2 (7.2)	<7.1 (7.1)	<0.076 (0.076)	<0.076 (0.076)
Benzo(k)fluoranthene	<0.41 (0.41)	<1.6 (1.6)	<1.6 (1.6)	<0.017 (0.017)	<0.017 (0.017)
Chrysene	<0.31 (0.31)	<1.2 (1.2)	<1.2 (1.2)	<0.013 (0.013)	<0.013 (0.013)
Dibenzo(a,h)anthracene	<0.72 (0.72)	<2.9 (2.9)	<2.8 (2.8)	<0.030 (0.030)	<0.030 (0.030)
Fluoranthene	<5.0 (5.0)	<20 (20)	830 (20)	<0.21 (0.21)	<0.21 (0.21)
Fluorene	57 (5.0)	<20 (20)	<20 (20)	<0.21 (0.21)	<0.21 (0.21)
Indeno(1,2,3-cd)pyrene	<1.0 (1.0)	<4.1 (4.1)	<4.0 (4.0)	<0.043 (0.043)	<0.043 (0.043)
Naphthalene	120 (43)	420 (170)	330 (170)	<1.8 (1.8)	<1.8 (1.8)
Phenanthrene	25 (15)	320 (61)	<60 (60)	<0.64 (0.64)	<0.64 (0.64)
Pyrene	<6.5 (6.5)	59 (26)	<25 (25)	<0.27 (0.27)	<0.27 (0.27)

() = Detection Limit
ND = Not Detected
T = Detected Below Quantifiable Level
NA = Not Analyzed

QUARTERLY SAMPLING
ANALYTICAL RESULTS FOR GROUND WATER
POLYNUCLEAR AROMATIC HYDROCARBONS
(ug/L unless otherwise noted)
(Sampling Event: 09/13/89)

	GBR-17	GBR-24D	GBR-30	GBR-31	GBR-33
Acenaphthalene	<2.3 (2.3)	<2.3 (2.3)	<55 (55)	<2.3 (2.3)	<21 (21)
Acenaphthene	<1.8 (1.8)	<1.8 (1.8)	<43 (43)	<1.8 (1.8)	<16 (16)
Anthracene	<0.66 (0.66)	<0.66 (0.66)	<16 (16)	<0.66 (0.66)	<5.9 (5.9)
Benzo(a)anthracene	<0.013 (0.013)	<0.013 (0.013)	<0.31 (0.31)	<0.013 (0.013)	<0.12 (0.12)
Benzo(a)pyrene	<0.023 (0.023)	<0.023 (0.023)	<0.55 (0.55)	<0.023 (0.023)	<0.21 (0.21)
Benzo(b)fluoranthene	<0.018 (0.018)	<0.018 (0.018)	<0.43 (0.43)	<0.018 (0.018)	<0.16 (0.16)
Benzo(g,h,i)perylene	<0.076 (0.076)	<0.076 (0.076)	<1.8 (1.8)	<0.076 (0.076)	<0.68 (0.68)
Benzo(k)fluoranthene	<0.017 (0.017)	<0.017 (0.017)	<0.41 (0.41)	<0.017 (0.017)	<0.15 (0.15)
Chrysene	<0.013 (0.013)	<0.013 (0.013)	<0.31 (0.31)	<0.013 (0.013)	<0.12 (0.12)
Dibenzo(a,h)anthracene	<0.030 (0.030)	<0.030 (0.030)	<0.72 (0.72)	<0.030 (0.030)	<0.27 (0.27)
Fluoranthene	<0.21 (0.21)	<0.21 (0.21)	<5.0 (5.0)	<0.21 (0.21)	<1.9 (1.9)
Fluorene	<0.21 (0.21)	4.6 (0.21)	11 (5.0)	<0.21 (0.21)	6 (1.9)
Indeno(1,2,3-cd)pyrene	<0.043 (0.043)	<0.043 (0.043)	<1.0 (1.0)	<0.043 (0.043)	0.39 (0.39)
Naphthalene	<1.8 (1.8)	<1.8 (1.8)	<43 (43)	<1.8 (1.8)	16 (16)
Phenanthrene	<0.64 (0.64)	7.4 (0.64)	<15 (15)	<0.64 (0.64)	<5.8 (5.8)
Pyrene	<0.27 (0.27)	<0.27 (0.27)	<6.5 (6.5)	<0.27 (0.27)	<2.4 (2.4)

() = Detection Limit
ND = Not Detected
T = Detected Below Quantifiable Level
NA = Not Analyzed

QUARTERLY SAMPLING
ANALYTICAL RESULTS FOR GROUND WATER
GENERAL WATER CHEMISTRY
(mg/L unless otherwise noted)
(Sampling Event: 09/13/89)

	GBR-6	GBR-8	GBR-13	GRW-13	GBR-15	GBR-17	GBR-24D	GBR-30	GBR-31	GBR-33
Bicarbonate as HCO ₃	1543.98	1583.91	825.23	439.24	226.27	266.20	279.51	625.58	452.55	658.85
Calcium	383.20	210.55	551.64	444.26	452.68	357.93	585.33	326.35	526.38	391.62
Carbonate as CO ₃	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cation/Anion Difference %	0.85	0.10	1.46	0.24	0.05	1.87	0.58	1.38	0.06	0.65
Chloride	287.44	485.68	604.62	644.27	267.62	99.12	545.15	386.56	584.80	505.50
Conductivity (umhos/cm @ 25C)	4068	4422	5384	4506	4641	2984	4629	3557	4958	4105
Magnesium	98.43	42.62	14.60	24.60	7.24	8.34	54.22	4.22	26.26	24.67
Major Anions (meq/l)	50.98	48.41	64.17	50.44	54.40	34.97	55.21	38.24	56.80	46.90
Major Cations (meq/l)	50.11	48.31	62.32	50.20	54.34	33.68	55.86	37.20	56.74	47.51
pH	7.53	7.46	7.53	8.10	7.19	8.05	8.21	7.78	7.31	7.18
Potassium	3.44	1.64	2.64	5.84	6.72	1.36	5.16	1.96	2.20	1.40
Resistivity (ohm-m)	2.4582	2.2614	1.8574	2.2193	2.1547	3.3512	2.1603	2.8114	2.0169	2.4361
Sodium	524.40	787.60	770.80	594.40	712.40	347.20	507.20	471.60	649.60	595.60
Sodium Absorption Ratio	6.18	12.94	8.85	7.43	9.10	4.96	5.38	7.11	7.49	7.89
Sulfate	842.75	419.73	1612.26	1203.23	2070.67	1334.91	1692.09	819.71	1578.51	1048.50
Total Acidity as CaCO ₃	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Alkalinity as CaCO ₃	1265.56	1298.29	676.42	360.03	185.47	218.20	229.11	512.77	370.94	540.05
Total Dissolved Solids (180)	2794	2586	4084	3154	3678	2300	3666	2314	3654	2856
Total Dissolved Solids (calc)	2899	2727	3962	3133	3629	2280	3527	2318	3590	2891
Total Hardness as CaCO ₃	1360.80	700.56	1436.40	1209.60	1159.20	927.36	1683.36	831.60	1421.28	1078.56

ND = Not Detected
T = Detected Below Quantifiable Limits
NA = Not Analyzed

0348/QTRSAMP9.TAB

3.1 QUARTERLY TANK VOLUMES

	DATE	6/30/89	
TANK	READING (FEET)	VOLUME (GALLONS)	CHANGE (GALLONS)
102	7.2	10,161	NA
106	5.8	8,107	NA
24	37.0	781,118	NA
27	14.3	94,180	NA
32	24.3	160,040	NA
34	3.9	25,685	NA
35	0.1	659	NA
37	0.1	1,060	NA
TOTAL		1,081,010	NA

	DATE	7/03/89	
TANK	READING (FEET)	VOLUME (GALLONS)	CHANGE (GALLONS)
102	6.3	8,891	(1,270)
106	5.8	8,107	0
24	37.0	781,118	0
27	14.3	94,180	0
32	27.2	179,140	19,100
34	0.0	0	(25,685)
35	0.0	0	(659)
37	0.0	0	(1,060)
TOTAL		1,071,435	(9,575)

	DATE	7/10/89	
TANK	READING (FEET)	VOLUME (GALLONS)	CHANGE (GALLONS)
102	5.7	8,044	(847)
106	5.8	8,107	0
24	37.3	787,451	6,333
27	24.5	161,357	67,177
32	24.6	162,016	(17,124)
34	0.0	0	0
35	0.0	0	0
37	0.0	0	0
TOTAL		1,126,976	55,540

	DATE	7/17/89	
TANK	READING (FEET)	VOLUME (GALLONS)	CHANGE (GALLONS)
102	5.7	8,044	0
106	5.8	8,107	0
24	37.0	781,118	(6,333)
27	26.7	175,847	14,490
32	26.8	176,505	14,489
34	0.0	0	0
35	0.0	0	0
37	0.0	0	0
TOTAL		1,149,621	22,645

	DATE		
	7/24/89		
TANK	READING (FEET)	VOLUME (GALLONS)	CHANGE (GALLONS)
102	5.7	8,044	0
106	5.8	8,107	0
24	37.3	787,451	6,333
27	27.3	179,798	3,951
32	27.3	179,798	3,293
34	0.0	0	0
35	0.0	0	0
37	0.0	0	0
TOTAL		1,163,199	13,578

	DATE		
	7/31/89		
TANK	READING (FEET)	VOLUME (GALLONS)	CHANGE (GALLONS)
102	11.7	16,511	8,467
106	5.8	8,107	0
24	36.9	779,007	(8,444)
27	28.1	185,067	5,269
32	28.2	185,726	5,928
34	0.0	0	0
35	0.0	0	0
37	0.0	0	0
TOTAL		1,174,418	11,219

	DATE		
		8/07/89	
TANK	READING (FEET)	VOLUME (GALLONS)	CHANGE (GALLONS)
102	9.7	13,689	(2,822)
106	5.8	8,107	0
24	37.2	785,340	6,333
27	27.0	177,823	(7,244)
32	27.1	178,481	(7,245)
34	0.0	0	0
35	0.0	0	0
37	0.0	0	0
TOTAL		1,163,440	(10,978)

	DATE		
		8/14/89	
TANK	READING (FEET)	VOLUME (GALLONS)	CHANGE (GALLONS)
102	10.6	14,959	1,270
106	5.8	8,107	0
24	37.4	789,563	4,223
27	28.1	185,067	7,244
32	28.1	185,067	6,586
34	0.0	0	0
35	0.0	0	0
37	0.0	0	0
TOTAL		1,182,763	19,323

	DATE		
		8/21/89	
TANK	READING (FEET)	VOLUME (GALLONS)	CHANGE (GALLONS)
102	8.7	12,277	(2,682)
106	5.8	8,107	0
24	36.9	779,007	(10,556)
27	27.3	179,798	(5,269)
32	27.3	179,798	(5,269)
34	0.0	0	0
35	0.0	0	0
37	0.0	0	0
TOTAL		1,158,988	(23,775)

	DATE		
		8/28/89	
TANK	READING (FEET)	VOLUME (GALLONS)	CHANGE (GALLONS)
102	9.5	13,406	1,129
106	5.8	8,107	0
24	35.4	747,340	(31,667)
27	25.2	165,968	(13,830)
32	25.2	165,968	(13,830)
34	0.0	0	0
35	0.0	0	0
37	0.0	0	0
TOTAL		1,100,789	(58,199)

	DATE		
	9/05/89		
TANK	READING (FEET)	VOLUME (GALLONS)	CHANGE (GALLONS)
102	9.5	13,406	0
106	5.8	8,107	0
24	35.5	749,451	2,111
27	25.3	166,626	658
32	35.3	232,487	66,519
34	0.0	0	0
35	0.0	0	0
37	0.0	0	0
TOTAL		1,170,077	69,289

	DATE		
	9/11/89		
TANK	READING (FEET)	VOLUME (GALLONS)	CHANGE (GALLONS)
102	11.7	16,511	16,511
106	5.8	8,107	(5,299)
24	36.7	774,785	766,678
27	25.6	168,602	(580,849)
32	25.6	168,602	1,976
34	0.0	0	(232,487)
35	0.0	0	0
37	0.0	0	0
TOTAL		1,136,607	(33,470)

	DATE		
	9/18/89		
TANK	READING (FEET)	VOLUME (GALLONS)	CHANGE (GALLONS)
102	12.7	17,922	1,411
106	5.8	8,107	0
24	21.9	462,337	(312,448)
27	28.1	185,067	16,465
32	28.2	185,726	17,124
34	0.0	0	0
35	0.0	0	0
37	0.0	0	0
TOTAL		859,160	(277,447)

	DATE		
	9/25/89		
TANK	READING (FEET)	VOLUME (GALLONS)	CHANGE (GALLONS)
102	8.9	12,560	(5,362)
106	5.8	8,107	0
24	12.0	253,336	(209,001)
27	28.1	185,067	0
32	28.2	185,726	0
34	0.0	0	0
35	0.0	0	0
37	20.3	215,139	215,139
TOTAL		859,935	775

NET CHANGE (221,075)

GALLONS IN () = DECREASED VOLUME.

0348/TANK3A.TAB

4.1 PUMP DISCHARGE RATES

**PUMP DISCHARGE
(GALLONS)**

DATE	GRW-1	GRW-2	GRW-3	GRW-4	GRW-5	GRW-6	GRW-10	AIR STRIPPER
6/30/89	23,990	91,600	114,420	121,320	22,070	277,620	295,200	775,540
7/07/89	23,990	95,150	118,320	132,340	22,070	286,760	318,540	787,030
7/14/89	24,000	98,110	122,100	140,520	22,070	296,030	343,110	806,890
7/21/89	24,000	100,000	126,340	140,520	22,070	305,350	365,230	NA
7/28/89	24,000	101,910	130,880	140,520	22,070	314,700	383,550	861,830
8/04/89	24,000	103,710	135,000	150,910	22,070	323,950	400,750	906,300
8/11/89	24,010	105,490	136,240	160,290	22,070	333,890	420,180	950,850
8/18/89	24,010	107,420	136,240	169,540	22,070	345,000	437,900	1,022,090
8/25/89	24,010	109,870	136,240	177,650	22,070	355,910	449,990	1,073,560
9/01/89	24,010	112,710	NA	186,320	22,070	366,860	449,990	1,122,470
9/08/89	24,010	116,560	136,270	196,810	22,070	377,090	449,990	1,263,030
9/15/89	24,010	121,100	138,130	205,050	22,070	NA	465,450	1,442,720
9/22/89	24,010	124,820	146,160	211,070	22,070	397,710	482,370	1,571,000
9/25/89	24,010	126,300	160,020	216,180	22,070	402,270	482,520	1,571,000

Net Change	20	34,700	45,600	94,860	0	124,650	187,320	795,460
Gallons								

TOTAL PUMPED

477,150

TOTAL STRIPPED

795,460

NA = Not Available

New meters will be installed to measure water volumes from pumped wells and storage tanks. Possibilities for discrepancies exist from air lift pump metering and submersible pump meter calibration.

0348/PUMP3.TAB

5.1 MONTHLY SPECIFIC CONDUCTANCE VALUES

MONTHLY SAMPLING RESULTS
GIANT BLOOMFIELD REFINERY
SPECIFIC CONDUCTANCE
UNITS ARE umhos/cm

WELL NUMBER	JULY 1989	AUGUST 1989	SEPTEMBER 1989
GRW-13	5820	6020	4506

0348/MO-RESULT.TAB

**QUARTERLY DATA REPORT
FOR THE
GIANT BLOOMFIELD REFINERY**

April, May, June 9/14/89

September 14, 1989

Prepared for:

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1.1 AIR STRIPPER ANALYSES FOR APRIL, MAY, AND JUNE 1989

MONTHLY SAMPLING
ANALYTICAL RESULTS FOR AIR STRIPPER INFLUENT AND EFFLUENT
AROMATIC VOLATILE ORGANIC COMPOUNDS
(ug/L unless otherwise noted)
(Sampling Event: 04/25/89)

ANALYTE	INFLUENT	EFFLUENT
BENZENE	363 (2.0)	10.1 (0.2)
ETHYL BENZENE	97.3 (2.0)	8.3 (0.2)
TOLUENE	121 (2.0)	4.6 (0.2)
m,p-XYLENE	247 (2.0)	19.7 (0.2)
o-XYLENE	95.8 (2.0)	10.2 (0.2)

() = Detection limit
ND = Not detected
T = Detected below quantifiable level
NA = Not analyzed

MONTHLY SAMPLING
ANALYTICAL RESULTS FOR AIR STRIPPER INFLUENT AND EFFLUENT
AROMATIC VOLATILE ORGANIC COMPOUNDS
(ug/L unless otherwise noted)
(Sampling Event: 05/12/89)

ANALYTE	INFLUENT	EFFLUENT
BENZENE	390 (2.0)	9.8 (0.2)
ETHYL BENZENE	41 (2.0)	2.6 (0.2)
TOLUENE	140 (2.0)	4.5 (0.2)
m,p-XYLENE	210 (2.0)	9.4 (0.2)
o-XYLENE	100 (2.0)	8.3 (0.2)

() = Detection limit
ND = Not detected
T = Detected below quantifiable level
NA = Not analyzed

MONTHLY SAMPLING
ANALYTICAL RESULTS FOR AIR STRIPPER INFLUENT AND EFFLUENT
HALOGENATED VOLATILE ORGANIC COMPOUNDS
(ug/L unless otherwise noted)
(Sampling Event: 05/12/89)

ANALYTE	INFLUENT	EFFLUENT
BROMODICHLOROMETHANE	ND (0.1)	ND (0.1)
BROMOFORM	ND (0.1)	ND (0.5)
BROMOMETHANE	ND (1.0)	ND (1.0)
CARBON TETRACHLORIDE	ND (0.1)	ND (0.1)
CHLOROBENZENE	ND (0.1)	ND (0.1)
CHLOROETHANE	ND (1.0)	ND (1.0)
CHLOROFORM	ND (0.1)	ND (0.1)
2-CHLOROETHYL VINYL ETHER	ND (0.1)	ND (0.1)
CHLOROMETHANE	ND (1.0)	ND (1.0)
DIBROMOCHLOROMETHANE	1.2 (0.1)	ND (0.1)
1,2-DICHLOROBENZENE	ND (0.1)	ND (0.1)
1,3-DICHLOROBENZENE	ND (0.1)	ND (0.1)
1,4-DICHLOROBENZENE	ND (0.1)	ND (0.1)
DICHLORODIFLUOROMETHANE	ND (1.0)	ND (1.0)
1,2-DICHLOROETHANE	7.3 (0.1)	0.9 (0.1)
1,2-DICHLOROPROPANE	ND (0.1)	ND (0.1)
1,1,2,2-TETRACHLOROETHANE	ND (0.1)	ND (0.1)
1,1,1-TRICHLOROETHANE	ND (0.1)	ND (0.1)
1,1,2-TRICHLOROETHANE	ND (0.1)	ND (0.1)
TRICHLOROFLUOROMETHANE	ND (1.0)	ND (1.0)
VINYL CHLORIDE	ND (1.0)	ND (1.0)
METHYLENE CHLORIDE	1.2 (0.1)	0.3 (0.1)
1,1-DICHLOROETHENE	ND (0.1)	ND (0.1)
TRANS-1,2-DICHLOROETHENE	ND (0.1)	ND (0.1)
TETRACHLOROETHANE	DT (0.1)	ND (0.1)
1,1-DICHLOROETHENE	3.1 (0.1)	ND (0.1)
TRICHLOROETHENE	ND (0.1)	ND (0.1)
TRANS-1,3-DICHLOROPROPENE	ND (0.1)	ND (0.1)
CIS-1,3-DICHLOROPROPENE	ND (0.1)	ND (0.1)

() = Detection limit
ND = Not detected
T = Detected below quantifiable levels
NA = Not analyzed

MONTHLY SAMPLING
ANALYTICAL RESULTS FOR AIR STRIPPER INFLUENT AND EFFLUENT
POLYNUCLEAR AROMATIC HYDROCARBONS
(ug/m³) unless otherwise noted)
(Sampling Event: 05/12/89)

ANALYTE	INFLUENT	EFFLUENT
Acenaphthylene	ND (0.2)	ND (0.6)
Anthracene	ND (0.2)	ND (0.6)
Benzo(a)anthracene	ND (0.2)	ND (0.6)
Benzo(a)pyrene	ND (0.2)	ND (0.6)
Benzo(b)fluoranthene	ND (0.2)	ND (0.6)
Benzo(k)fluoranthene	ND (0.2)	ND (0.6)
Benzo(g,h,i)perylene	ND (0.2)	ND (0.6)
Chrysene	ND (0.2)	ND (0.6)
Dibenzo(a,h)anthracene	ND (0.2)	ND (0.6)
Fluoranthene	ND (0.2)	ND (0.6)
Fluorene	ND (0.2)	ND (0.6)
Indeno(1,2,3-cd)pyrene	ND (0.2)	ND (0.6)
Naphthalene	ND (0.2)	ND (0.6)
Phenanthrene	ND (0.2)	ND (0.6)
Pyrene	ND (0.2)	ND (0.6)
Acetnaphthene	ND (0.2)	ND (0.6)
1-Methylnaphthalene	ND (0.2)	ND (0.6)

() = Detection limit

ND = Not detected

T = Detected below quantifiable level

NA = Not analyzed

MONTHLY SAMPLING
ANALYTICAL RESULTS FOR AIR STRIPPER INFLUENT AND EFFLUENT
AROMATIC VOLATILE ORGANIC COMPOUNDS
(ug/L unless otherwise noted)
(Sampling Event: 06/13/89)

ANALYTE	INFLUENT	EFFLUENT
BENZENE	82.3 (0.2)	5.5 (0.2)
CHLOROBENZENE	ND (0.2)	ND (0.2)
1,4-DICHLOROBENZENE	ND (0.2)	ND (0.2)
1,3-DICHLOROBENZENE	ND (0.2)	ND (0.2)
1,2-DICHLOROBENZENE	ND (0.2)	ND (0.2)
ETHYL BENZENE	11.4 (0.2)	ND (0.2)
TOLUENE	17.8 (0.2)	ND (0.2)
o-XYLENE	18.8 (0.2)	ND (0.2)
m,p-XYLENE	24.2 (0.2)	ND (0.2)

() = Detection limit
ND = Not detected
T = Detected below quantifiable level
NA = Not analyzed

MONTHLY SAMPLING
ANALYTICAL RESULTS FOR AIR STRIPPER INFLUENT AND EFFLUENT
HALOGENATED VOLATILE ORGANIC COMPOUNDS
(ug/L unless otherwise noted)
(Sampling Event: 06/13/89)

ANALYTE	INFLUENT	EFFLUENT
BROMODICHLOROMETHANE	ND (1.0)	ND (1.0)
BROMOFORM	ND (1.0)	ND (1.0)
BROMOMETHANE	ND (1.0)	ND (1.0)
CARBON TETRACHLORIDE	ND (1.0)	ND (1.0)
CHLOROBENZENE	ND (1.0)	ND (1.0)
CHLOROETHANE	ND (1.0)	ND (1.0)
CHLOROFORM	1.2 (1.0)	ND (1.0)
2-CHLOROETHYL VINYL ETHER	ND (1.0)	ND (1.0)
CHLOROMETHANE	ND (1.0)	ND (1.0)
DIBROMOCHLOROMETHANE	ND (1.0)	ND (1.0)
1,2-DICHLOROBENZENE	ND (1.0)	ND (1.0)
1,3-DICHLOROBENZENE	ND (1.0)	ND (1.0)
1,4-DICHLOROBENZENE	ND (1.0)	ND (1.0)
DICHLORODIFLUOROMETHANE	ND (1.0)	ND (1.0)
1,1-DICHLOROETHANE	4.6 (1.0)	ND (1.0)
1,2-DICHLOROETHANE	3.3 (1.0)	ND (1.0)
1,1,2,2-TETRACHLOROETHANE	ND (1.0)	ND (1.0)
1,1,1-TRICHLOROETHANE	ND (1.0)	ND (1.0)
1,1,2-TRICHLOROETHANE	ND (1.0)	ND (1.0)
TRICHLOROETHENE	1.9 (1.0)	ND (1.0)
TRICHLOROFLUOROMETHANE	ND (1.0)	ND (1.0)
VINYL CHLORIDE	ND (1.0)	ND (1.0)
1,2-DICHLOROPROPANE	ND (1.0)	ND (1.0)
CIS-1,3-DICHLOROPROPENE	ND (1.0)	ND (1.0)
METHYLENE CHLORIDE	ND (1.0)	ND (1.0)
TRANS-1,3-DICHLOROPROPENE	ND (1.0)	ND (1.0)
1,1-DICHLOROETHENE	ND (1.0)	ND (1.0)
TETRACHLOROETHENE	1.6 (1.0)	ND (1.0)
TRANS-1,2-DICHLOROETHENE	ND (1.0)	ND (1.0)

() = Detection limit
ND = Not detected
T = Detected below quantifiable levels
NA = Not analyzed

MONTHLY SAMPLING
ANALYTICAL RESULTS FOR AIR STRIPPER INFLUENT AND EFFLUENT
POLYNUCLEAR AROMATIC HYDROCARBONS
(ug/ml unless otherwise noted)
(Sampling Event: 06/13/89)

ANALYTE	INFLUENT	EFFLUENT
Acenaphthene	ND (0.025)	0.007 (0.003)
Acenaphthylene	0.050 (0.025)	ND (0.003)
Anthracene	0.038 (0.025)	0.011 (0.003)
Benzo(a)anthracene	0.062 (0.025)	ND (0.003)
Benzo(a)pyrene	ND (0.025)	0.009 (0.003)
Benzo(b)fluoranthene	0.066 (0.025)	0.024 (0.003)
Benzo(j)fluoranthene	ND (0.025)	ND (0.003)
Benzo(k)fluoranthene	ND (0.025)	ND (0.003)
Benzo(g,h,i)perylene	ND (0.025)	ND (0.003)
Chrysene	ND (0.025)	ND (0.003)
Dibenz(a,h)acridine	ND (0.025)	ND (0.003)
Dibenz(a,j)acridine	ND (0.025)	ND (0.003)
Dibenzo(a,h)anthracene	ND (0.025)	ND (0.003)
Dibenz(a,e)pyrene	ND (0.025)	ND (0.003)
Dibenz(a,h)pyrene	ND (0.025)	ND (0.003)
Fluoranthene	0.040 (0.025)	ND (0.003)
Fluorene	ND (0.025)	0.005 (0.003)
Indeno(1,2,3-cd)pyrene	ND (0.025)	ND (0.003)
Naphthalene	0.052 (0.025)	ND (0.003)
Phenanthrene	0.054 (0.025)	ND (0.003)
Pyrene	ND (0.025)	0.003 (0.003)
1-Methylnaphthalene	NA (0.025)	NA (0.003)
3-Methylnaphthalene	ND (0.025)	ND (0.003)

() = Detection limit

ND = Not detected

T = Detected below quantifiable level

NA = Not analyzed

1.2 POTENTIOMETRIC SURFACE MAPS FOR APRIL, MAY, AND JUNE 1989

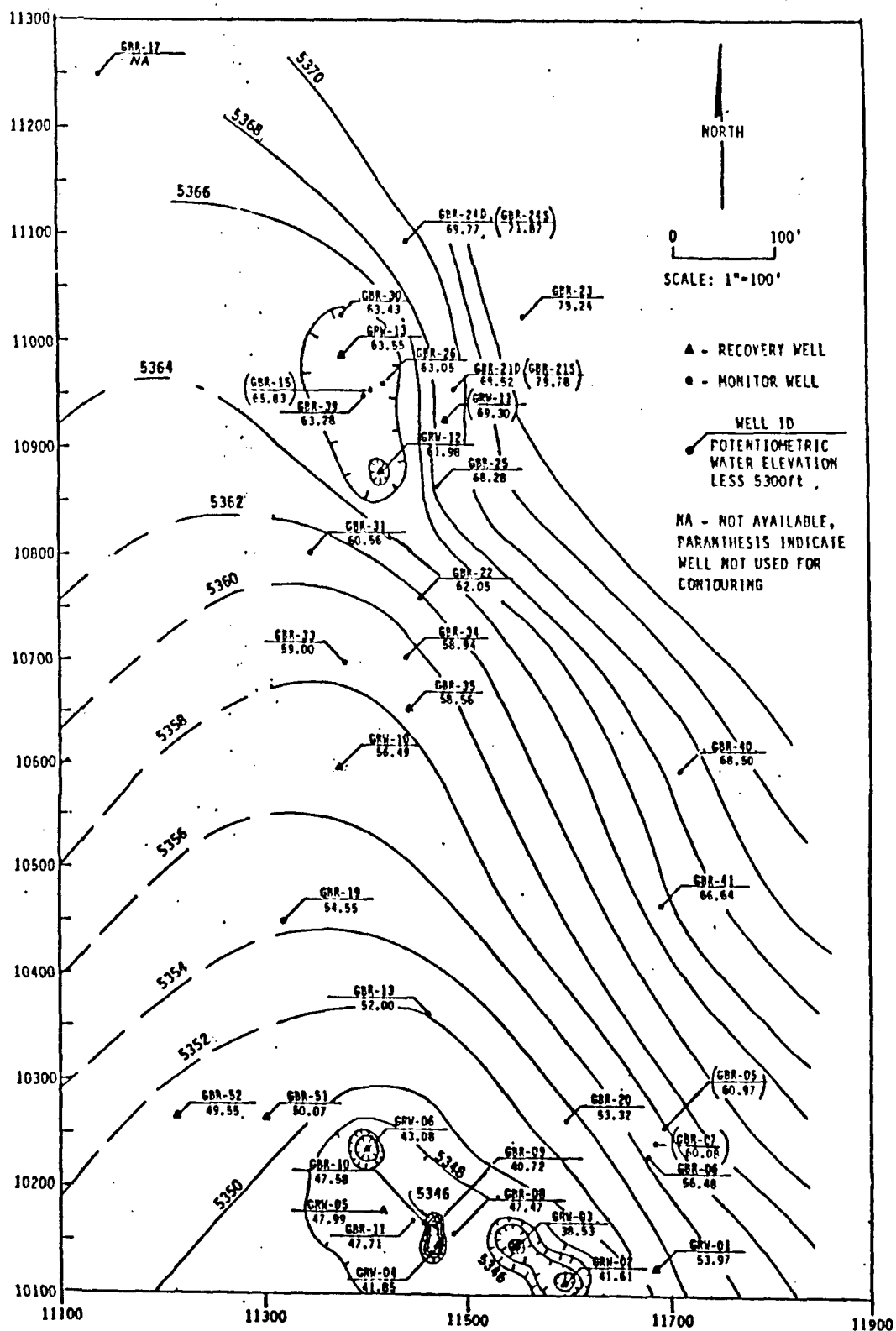
GIANT INDUSTRIES BLOOMFIELD REFINERY
MONTHLY POTENTIOMETRIC SURFACE
MEASUREMENT DATE
4/11/89

WELL ID	WELL HEAD ELEVATION	DEPTH TO WATER	DEPTH TO PRODUCT	PRODUCT THICKNESS	ADJUSTED WSEL
GBR-05	5395.07	38.08	33.11	4.98	5360.97
GBR-06	5395.70	39.27	39.21	0.06	5356.48
GBR-07	5395.85	39.71	34.79	4.92	5360.08
GBR-08	5390.50	43.16	43.00	0.16	5347.47
GBR-09	5389.92	49.20	49.20	0.00	5340.72
GBR-10	5390.57	44.97	42.50	2.47	5347.58
GBR-11	5389.43	43.71	41.23	2.48	5347.71
GBR-13	5393.04	41.04	41.04	0.00	5352.00
GBR-15	5397.99	32.16	32.16	0.00	5365.83
GBR-17	5402.69	38.57	38.33	0.24	5364.31
GBR-18	5421.68	15.41	15.41	0.00	5406.27
GBR-19	5393.83	39.28	39.28	0.00	5354.55
GBR-20	5393.47	40.88	39.97	0.91	5353.32
GBR-21D	5400.19	30.67	30.67	0.00	5369.52
GBR-21S	5400.65	21.35	20.75	0.60	5379.78
GBR-22	5395.91	34.52	33.69	0.83	5362.05
GBR-23	5403.72	24.48	24.48	0.00	5379.24
GBR-24D	5396.77	27.00	27.00	0.00	5369.77
GBR-24S	5396.08	24.21	24.21	0.00	5371.87
GBR-25	5396.72	28.44	28.44	0.00	5368.28
GBR-26	5395.59	32.54	32.54	0.00	5363.05
GBR-30	5396.58	33.15	33.15	0.00	5363.43
GBR-31	5394.86	34.30	34.30	0.00	5360.56
GBR-32	5416.77	36.25	36.25	0.00	5380.52
GBR-33	5396.28	37.28	37.28	0.00	5359.00
GBR-34	5394.00	35.48	34.96	0.52	5358.94
GBR-35	5393.66	35.16	35.08	0.08	5358.56
GBR-39	5397.55	34.27	34.27	0.00	5363.28
GBR-40	5400.76	32.26	32.26	0.00	5368.50
GBR-41	5396.35	29.71	29.71	0.00	5366.64
GBR-48	5419.09	37.72	37.72	0.00	5381.37
GBR-49	5412.45	34.14	34.14	0.00	5378.31
GBR-50	5416.59	34.30	34.30	0.00	5382.29
GBR-51	5389.68	39.61	39.61	0.00	5350.07
GBR-52	5387.74	38.19	38.19	0.00	5349.55
GRW-01	5394.30	40.33	40.33	0.00	5353.97
GRW-02	5391.28	49.67	49.67	0.00	5341.61
GRW-03	5388.77	50.78	50.10	0.68	5338.53
GRW-04	5390.02	48.17	48.17	0.00	5341.85
GRW-05	5390.56	42.57	42.57	0.00	5347.99
GRW-06	5390.81	47.73	47.73	0.00	5343.08

GIANT INDUSTRIES BLOOMFIELD REFINERY
MONTHLY POTENTIOMETRIC SURFACE
MEASUREMENT DATE
4/11/89 (Continued)

WELL ID	WELL HEAD ELEVATION	DEPTH TO WATER	DEPTH TO PRODUCT	PRODUCT THICKNESS	ADJUSTED WSEL
GRW-10	5395.02	38.53	38.53	0.00	5356.49
GRW-11	5397.85	28.55	28.55	0.00	5369.30
GRW-12	5397.24	35.30	35.25	0.05	5361.98
GRW-13	5396.90	33.35	33.35	0.00	5363.55

NA = NOT AVAILABLE
WSEL = WATER SURFACE ELEVATION
ALL UNITS ARE IN FEET



APRIL 1989. POTENTIOMETRIC SURFACE MAP GIANT BROOMFIELD REFINERY

GIANT INDUSTRIES BLOOMFIELD REFINERY
MONTHLY POTENTIOMETRIC SURFACE
MEASUREMENT DATE
5/12/89

WELL ID	WELL HEAD ELEVATION	DEPTH TO WATER	DEPTH TO PRODUCT	PRODUCT THICKNESS	ADJUSTED WSEL
GBR-05	5395.07	33.50	32.02	1.48	5362.75
GBR-06	5395.70	38.31	38.26	0.05	5357.43
GBR-07	5395.85	41.42	33.69	7.73	5360.61
GBR-08	5390.50	42.30	42.00	0.30	5348.44
GBR-09	5389.92	38.13	38.13	0.00	5351.79
GBR-10	5390.57	43.45	41.42	2.03	5348.74
GBR-11	5389.43	42.81	40.30	2.51	5348.63
GBR-13	5393.04	40.25	40.25	0.00	5352.79
GBR-15	5397.99	31.64	31.64	0.00	5366.35
GBR-17	5402.69	33.45	33.45	0.00	5369.24
GBR-18	5421.68	14.75	14.75	0.00	5406.93
GBR-19	5393.83	38.55	38.55	0.00	5355.28
GBR-20	5393.47	39.95	39.00	0.95	5354.28
GBR-21D	5400.19	27.40	27.40	0.00	5372.79
GBR-21S	5400.65	20.07	20.07	0.00	5380.58
GBR-22	5395.91	32.93	32.93	0.00	5362.98
GBR-23	5403.72	22.89	22.89	0.00	5380.83
GBR-24D	5396.77	26.62	26.62	0.00	5370.15
GBR-24S	5396.08	23.66	23.66	0.00	5372.42
GBR-25	5396.72	27.90	27.90	0.00	5368.82
GBR-26	5395.59	32.02	32.02	0.00	5363.57
GBR-30	5396.58	32.51	32.51	0.00	5364.07
GBR-31	5394.86	33.75	33.75	0.00	5361.11
GBR-32	5416.77	35.42	35.42	0.00	5381.35
GBR-33	5396.28	36.64	36.64	0.00	5359.64
GBR-34	5394.00	34.17	34.17	0.00	5359.83
GBR-35	5393.66	34.30	34.30	0.00	5359.36
GBR-39	5397.55	33.67	33.67	0.00	5363.88
GBR-40	5400.76	31.38	31.38	0.00	5369.38
GBR-41	5396.35	28.76	28.76	0.00	5367.59
GBR-48	5419.09	36.82	36.82	0.00	5382.27
GBR-49	5412.45	33.31	33.31	0.00	5379.14
GBR-50	5416.59	33.08	33.08	0.00	5383.51
GBR-51	5389.68	38.87	38.87	0.00	5350.81
GBR-52	5387.74	36.55	36.55	0.00	5351.19
GRW-01	5394.30	39.21	39.21	0.00	5355.09
GRW-02	5391.28	47.50	47.50	0.00	5343.78
GRW-03	5388.77	50.13	49.64	0.49	5339.03
GRW-04	5390.02	49.02	49.02	0.00	5341.00
GRW-05	5390.56	41.68	41.68	0.00	5348.88
GRW-06	5390.81	45.91	45.91	0.00	5344.90

GIANT INDUSTRIES BLOOMFIELD REFINERY
MONTHLY POTENTIOMETRIC SURFACE
MEASUREMENT DATE
5/12/89 (Continued)

WELL ID	WELL HEAD ELEVATION	DEPTH TO WATER	DEPTH TO PRODUCT	PRODUCT THICKNESS	ADJUSTED WSEL
GRW-10	5395.02	36.96	36.96	0.00	5358.06
GRW-11	5397.85	28.71	28.71	0.00	5369.14
GRW-12	5397.24	34.71	34.71	0.00	5362.53
GRW-13	5396.90	32.80	32.80	0.00	5364.10

NA = NOT AVAILABLE
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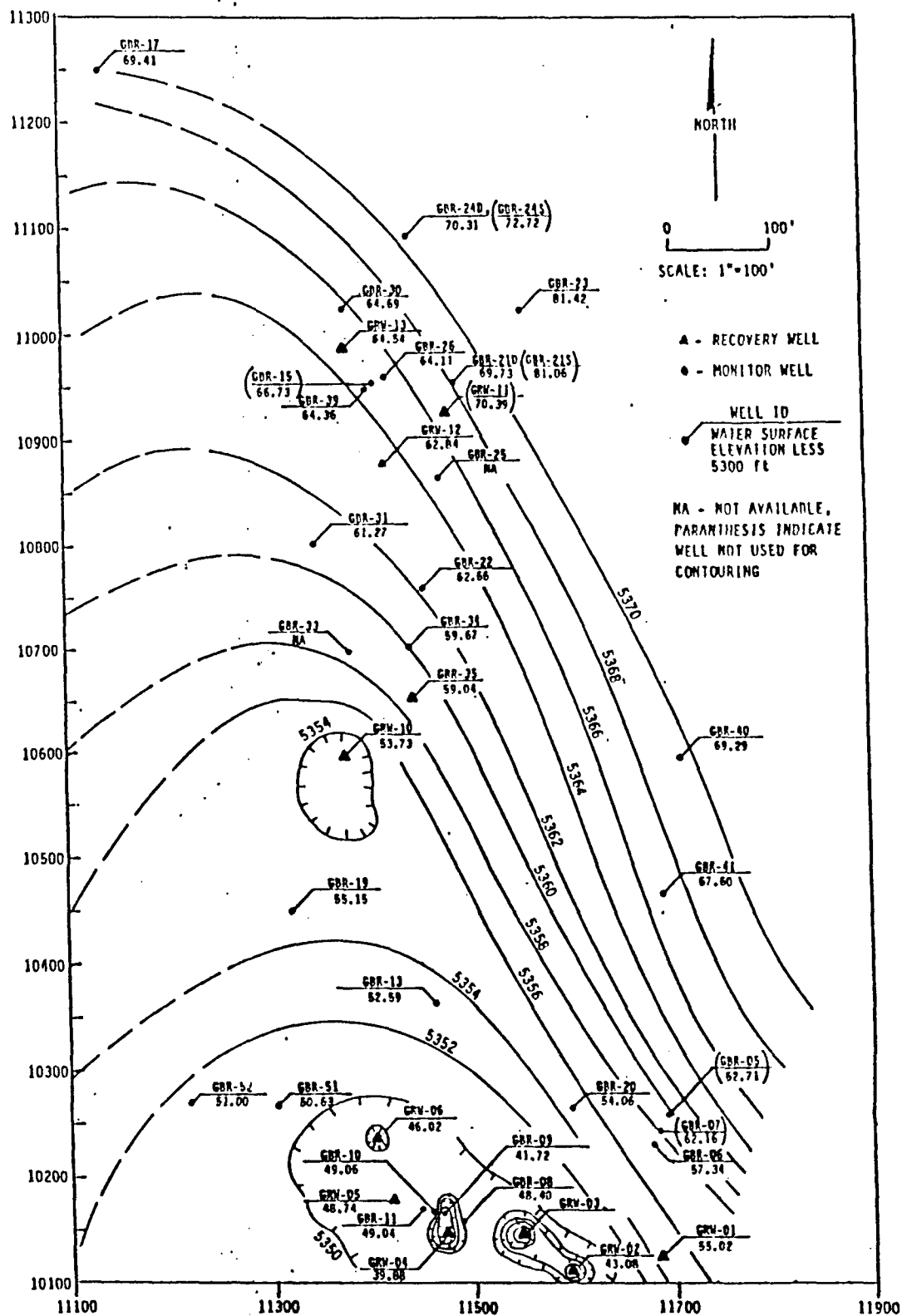
GIANT INDUSTRIES BLOOMFIELD REFINERY
MONTHLY POTENTIOMETRIC SURFACE
MEASUREMENT DATE
6/12/89

WELL ID	WELL HEAD ELEVATION	DEPTH TO WATER	DEPTH TO PRODUCT	PRODUCT THICKNESS	ADJUSTED WSEL
GBR-05	5395.07	34.01	31.95	2.06	5362.71
GBR-06	5395.70	38.36	38.36	0.00	5357.34
GBR-07	5395.85	33.76	33.67	0.09	5362.16
GBR-08	5390.50	42.10	42.10	0.00	5348.40
GBR-09	5389.92	48.20	48.20	0.00	5341.72
GBR-10	5390.57	41.51	41.51	0.00	5349.06
GBR-11	5389.43	40.39	40.39	0.00	5349.04
GBR-13	5393.04	41.62	40.16	1.46	5352.59
GBR-15	5397.99	31.26	31.26	0.00	5366.73
GBR-17	5402.69	33.28	33.28	0.00	5369.41
GBR-18	5421.68	15.07	15.07	0.00	5406.61
GBR-19	5393.83	38.69	38.68	0.01	5355.15
GBR-20	5393.47	40.27	39.20	1.07	5354.06
GBR-21D	5400.19	30.46	30.46	0.00	5369.73
GBR-21S	5400.65	19.65	19.58	0.07	5381.06
GBR-22	5395.91	33.87	33.09	0.78	5362.66
GBR-23	5403.72	22.30	22.30	0.00	5381.42
GBR-24D	5396.77	26.46	26.46	0.00	5370.31
GBR-24S	5396.08	23.36	23.36	0.00	5372.72
GBR-25	5396.72	NA	NA	NA	NA
GBR-26	5395.59	31.48	31.48	0.00	5364.11
GBR-30	5396.58	31.90	31.90	0.00	5364.69
GBR-31	5394.86	33.59	33.59	0.00	5361.27
GBR-32	5416.77	35.55	35.55	0.00	5381.22
GBR-33	5396.28	NA	NA	NA	NA
GBR-34	5394.00	34.85	34.20	0.65	5359.67
GBR-35	5393.66	35.29	34.45	0.84	5359.04
GBR-39	5397.55	33.19	33.19	0.00	5364.36
GBR-40	5400.76	31.47	31.47	0.00	5369.29
GBR-41	5396.35	28.76	28.76	0.00	5367.60
GBR-48	5419.09	36.94	36.94	0.00	5382.15
GBR-49	5412.45	33.41	33.41	0.00	5379.04
GBR-50	5416.59	33.20	33.20	0.00	5383.39
GBR-51	5389.68	39.05	39.05	0.00	5350.63
GBR-52	5387.74	36.74	36.74	0.00	5351.00
GRW-01	5394.30	39.28	39.28	0.00	5355.02
GRW-02	5391.28	48.20	48.20	0.00	5343.08
GRW-03	5388.77	50.13	49.64	0.49	5339.03
GRW-04	5390.02	50.14	50.14	0.00	5339.88
GRW-05	5390.56	41.82	41.82	0.00	5348.74
GRW-06	5390.81	44.79	44.79	0.00	5346.02

GIANT INDUSTRIES BLOOMFIELD REFINERY
MONTHLY POTENTIOMETRIC SURFACE
MEASUREMENT DATE
6/12/89 (Continued)

WELL ID	WELL HEAD ELEVATION	DEPTH TO WATER	DEPTH TO PRODUCT	PRODUCT THICKNESS	ADJUSTED WSEL
GRW-10	5395.02	44.65	40.45	4.20	5353.73
GRW-11	5397.85	27.46	27.46	0.00	5370.39
GRW-12	5397.24	34.40	34.40	0.00	5362.84
GRW-13	5396.90	32.36	32.36	0.00	5364.54

NA = NOT AVAILABLE
WSEL = WATER SURFACE ELEVATION
ALL UNITS ARE IN FEET



JUNE, 1989 POTENTIOMETRIC SURFACE CONTOUR MAP GIANT-BLOOMFIELD REFINERY

2.1 RESULTS OF QUARTERLY SAMPLING

QUARTERLY SAMPLING
ANALYTICAL RESULTS FOR GROUNDWATER HALOGENATED VOLATILE ORGANICS
(ug/L unless otherwise noted)
(Sampling Event: 06/13/89)

ANALYTE	GBR-06	GBR-08	GBR-13	GBR-13	GBR-15
BROMODICHLOROMETHANE	ND (10.0)	ND (50.0)	ND (100.0)	ND (1.0)	ND (1.0)
BROMOFORM	ND (10.0)	ND (50.0)	ND (100.0)	ND (1.0)	ND (1.0)
BROMOMETHANE	ND (10.0)	ND (50.0)	ND (100.0)	ND (1.0)	ND (1.0)
CARBON TETRACHLORIDE	ND (10.0)	ND (50.0)	ND (100.0)	ND (1.0)	ND (1.0)
CHLOROBENZENE	ND (10.0)	ND (50.0)	ND (100.0)	ND (1.0)	ND (1.0)
CHLOROETHANE	ND (10.0)	ND (50.0)	ND (100.0)	ND (1.0)	ND (1.0)
CHLOROFORM	ND (10.0)	ND (50.0)	ND (100.0)	ND (1.0)	ND (1.0)
2-CHLOROETHYL VINYL ETHER	ND (10.0)	ND (50.0)	ND (100.0)	ND (1.0)	ND (1.0)
CHLOROMETHANE	ND (10.0)	ND (50.0)	ND (100.0)	ND (1.0)	ND (1.0)
DIBROMOCHLOROMETHANE	ND (10.0)	ND (50.0)	ND (100.0)	ND (1.0)	ND (1.0)
1,2-DICHLOROBENZENE	ND (10.0)	ND (50.0)	ND (100.0)	ND (1.0)	ND (1.0)
1,3-DICHLOROBENZENE	ND (10.0)	ND (50.0)	ND (100.0)	ND (1.0)	ND (1.0)
1,4-DICHLOROBENZENE	ND (10.0)	ND (50.0)	ND (100.0)	ND (1.0)	ND (1.0)
DICHLORODIFLUOROMETHANE	ND (10.0)	ND (50.0)	ND (100.0)	ND (1.0)	ND (1.0)
1,1-DICHLOROETHANE	ND (10.0)	ND (50.0)	ND (100.0)	ND (1.0)	ND (1.0)
1,2-DICHLOROETHANE	ND (10.0)	ND (50.0)	ND (100.0)	ND (1.0)	ND (1.0)
1,1,2,2-TETRACHLOROETHANE	ND (10.0)	ND (50.0)	ND (100.0)	ND (1.0)	ND (1.0)
1,1,1-TRICHLOROETHANE	ND (10.0)	ND (50.0)	ND (100.0)	ND (1.0)	ND (1.0)
1,1,2-TRICHLOROETHANE	ND (10.0)	ND (50.0)	ND (100.0)	ND (1.0)	ND (1.0)
TRICHLOROETHENE	ND (10.0)	ND (50.0)	ND (100.0)	ND (1.0)	ND (1.0)
TRICHLOROFLUOROMETHANE	ND (10.0)	ND (50.0)	ND (100.0)	ND (1.0)	ND (1.0)
VINYL CHLORIDE	ND (10.0)	ND (50.0)	ND (100.0)	ND (1.0)	ND (1.0)
METHYLENE CHLORIDE	ND (10.0)	ND (50.0)	ND (100.0)	ND (1.0)	ND (1.0)
1,2-DICHLOROPROPANE	ND (10.0)	ND (50.0)	ND (100.0)	ND (1.0)	ND (1.0)
CIS-1,3-DICHLOROPROPENE	ND (10.0)	ND (50.0)	ND (100.0)	ND (1.0)	ND (1.0)
TRANS-1,2-DICHLOROETHENE	ND (10.0)	ND (50.0)	ND (100.0)	ND (1.0)	ND (1.0)
TETRACHLOROETHENE	ND (10.0)	ND (50.0)	ND (100.0)	ND (1.0)	ND (1.0)
1,1-DICHLOROETHENE	ND (10.0)	ND (50.0)	ND (100.0)	ND (1.0)	ND (1.0)
TRANS-1,3-DICHLOROPROPENE	ND (10.0)	ND (50.0)	ND (100.0)	ND (1.0)	ND (1.0)

() = Detection Limit

ND = Not detected

T = Detected below quantifiable limit

NA = Not analyzed

QUARTERLY SAMPLING
ANALYTICAL RESULTS FOR GROUNDWATER HALOGENATED VOLATILE ORGANICS
(ug/L unless otherwise noted)
(Sampling Event: 06/13/89)

ANALYTE	GBR-17	GBR-24D	GBR-30	GBR-31	GBR-33
BROMODICHLOROMETHANE	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
BROMOFORM	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
BROMOMETHANE	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
CARBON TETRACHLORIDE	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
CHLOROBENZENE	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
CHLOROETHANE	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
CHLOROFORM	ND (1.0)	ND (1.0)	ND (1.0)	1.9 (1.0)	ND (1.0)
2-CHLOROETHYL VINYL ETHER	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
CHLOROMETHANE	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
DIBROMOCHLOROMETHANE	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,2-DICHLOROBENZENE	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,3-DICHLOROBENZENE	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,4-DICHLOROBENZENE	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
DICHLORODIFLUOROMETHANE	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1-DICHLOROETHANE	ND (1.0)	ND (1.0)	ND (1.0)	5.7 (1.0)	ND (1.0)
1,2-DICHLOROETHANE (EDC)	ND (1.0)	13.1 (1.0)	ND (1.0)	ND (1.0)	1.8 (1.0)
1,1,2,2-TETRACHLOROETHANE	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,1,1-TRICHLOROETHANE	1.4 (1.0)	ND (1.0)	ND (1.0)	1.6 (1.0)	ND (1.0)
1,1,2-TRICHLOROETHANE	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
TRICHLOROETHENE	ND (1.0)	ND (1.0)	ND (1.0)	10.8 (1.0)	ND (1.0)
TRICHLOROFLUOROMETHANE	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
VINYL CHLORIDE	ND (1.0)	4.3 (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
METHYLENE CHLORIDE	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
1,2-DICHLOROPROPANE	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
CIS-1,3-DICHLOROPROPENE	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
TRANS-1,2-DICHLOROETHENE	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
TETRACHLOROETHENE	ND (1.0)	ND (1.0)	ND (1.0)	17.2 (1.0)	ND (1.0)
1,1-DICHLOROETHENE	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
TRANS-1,3-DICHLOROPROPENE	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)

() = Detection Limit

ND = Not detected

T = Detected below quantifiable limit

NA = Not analyzed

QUARTERLY SAMPLING
ANALYTICAL RESULTS FOR GROUNDWATER
POLYNUCLEAR AROMATIC HYDROCARBONS
(ug/ml unless otherwise noted)
(Sampling Event: 06/13/89)

ANALYTE	GBR-06	GBR-08	GBR-13	GRW-13	GBR-15
Acenaphthene	ND (0.003)	36 (4.4)	31 (14)	ND (0.003)	0.008 (0.005)
Acenaphthylene	ND (0.003)	22 (14)	18 (14)	ND (0.003)	T (0.005)
Anthracene	0.004 (0.003)	T (14)	4.7 (4.4)	0.005 (0.003)	0.006 (0.005)
Benzo(a)anthracene	ND (0.003)	ND (14)	ND (14)	ND (0.003)	ND (0.005)
Benzo(a)pyrene	ND (0.003)	ND (14)	ND (14)	0.005 (0.003)	ND (0.005)
Benzo(b)fluoranthene	0.020 (0.003)	ND (14)	ND (14)	0.009 (0.003)	0.019 (0.005)
Benzo(j)fluoranthene	ND (0.003)	ND (14)	ND (14)	ND (0.003)	ND (0.005)
Benzo(k)fluoranthene	ND (0.003)	ND (14)	ND (14)	ND (0.003)	ND (0.005)
Benzo(g,h,i)perylene	ND (0.003)	ND (14)	ND (14)	ND (0.003)	ND (0.005)
Chrysene	0.010 (0.003)	ND (14)	ND (14)	0.004 (0.003)	0.031 (0.005)
Dibenz(a,h)acridine	ND (0.003)	ND (14)	ND (14)	ND (0.003)	ND (0.005)
Dibenz(a,j)acridine	ND (0.003)	ND (14)	ND (14)	ND (0.003)	ND (0.005)
Dibenzo(a,h)anthracene	ND (0.003)	ND (14)	ND (14)	ND (0.003)	ND (0.005)
Dibenz(a,e)pyrene	ND (0.003)	ND (14)	ND (14)	ND (0.003)	ND (0.005)
Dibenz(a,h)pyrene	ND (0.003)	ND (14)	ND (14)	ND (0.003)	ND (0.005)
Fluoranthene	T (0.003)	ND (14)	ND (14)	ND (0.003)	0.009 (0.005)
Fluorene	0.004 (0.003)	23 (4.4)	29 (14)	0.004 (0.003)	0.010 (0.005)
Indeno(1,2,3-cd)pyrene	ND (0.003)	ND (14)	ND (14)	ND (0.003)	ND (0.005)
Naphthalene	ND (0.003)	15 (4.4)	11 (14)	ND (0.003)	ND (0.005)
Phenanthrene	0.003 (0.003)	ND (14)	ND (14)	0.006 (0.003)	0.014 (0.005)
Pyrene	0.003 (0.003)	ND (14)	ND (14)	0.004 (0.003)	0.009 (0.005)
1-Methylnaphthalene	NA (0.003)	NA (14)	NA (14)	NA (0.003)	NA (0.005)
3-Methylnaphthalene	ND (0.003)	ND (14)	ND (14)	ND (0.003)	ND (0.005)

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ND = Not detected

T = Detected below quantifiable level

NA = Not analyzed

QUARTERLY SAMPLING
ANALYTICAL RESULTS FOR GROUNDWATER
POLYNUCLEAR AROMATIC HYDROCARBONS
(ug/ml unless otherwise noted)
(Sampling Event: 06/13/89)

ANALYTE	GBR-17	GBR-240	GBR-30	GBR-31	GBR-33
Acenaphthene	NA	0.010 (0.005)	2.3 (0.6)	ND (0.003)	0.34 (0.25)
Acenaphthylene	NA	0.008 (0.005)	ND (0.6)	ND (0.003)	0.44 (0.25)
Anthracene	NA	0.006 (0.005)	ND (0.6)	ND (0.003)	ND (0.25)
Benzo(a)anthracene	NA	ND (0.005)	ND (0.6)	ND (0.003)	0.59 (0.25)
Benzo(a)pyrene	NA	ND (0.005)	ND (0.6)	ND (0.003)	ND (0.25)
Benzo(b)fluoranthene	NA	0.007 (0.005)	ND (0.6)	0.014 (0.003)	1.58 (0.25)
Benzo(j)fluoranthene	NA	ND (0.005)	ND (0.6)	ND (0.003)	ND (0.25)
Benzo(k)fluoranthene	NA	ND (0.005)	ND (0.6)	ND (0.003)	ND (0.25)
Benzo(g,h,i)perylene	NA	ND (0.005)	ND (0.6)	ND (0.003)	ND (0.25)
Chrysene	NA	ND (0.005)	ND (0.6)	0.008 (0.003)	0.67 (0.25)
Dibenz(a,h)acridine	NA	ND (0.005)	ND (0.6)	ND (0.003)	ND (0.25)
Dibenz(a,j)acridine	NA	ND (0.005)	ND (0.6)	ND (0.003)	ND (0.25)
Dibenzo(a,h)anthracene	NA	ND (0.005)	ND (0.6)	ND (0.003)	ND (0.25)
Dibenz(a,e)pyrene	NA	ND (0.005)	ND (0.6)	ND (0.003)	ND (0.25)
Dibenz(a,h)pyrene	NA	ND (0.005)	ND (0.6)	ND (0.003)	ND (0.25)
Fluoranthene	NA	ND (0.005)	ND (0.6)	ND (0.003)	ND (0.25)
Fluorene	NA	0.009 (0.005)	ND (0.6)	0.005 (0.003)	ND (0.25)
Indeno(1,2,3-cd)pyrene	NA	ND (0.005)	ND (0.6)	ND (0.003)	ND (0.25)
Naphthalene	NA	ND (0.005)	ND (0.6)	ND (0.003)	ND (0.25)
Phenanthrene	NA	0.013 (0.005)	2.0 (0.6)	0.006 (0.003)	0.53 (0.25)
Pyrene	NA	ND (0.005)	ND (0.6)	0.004 (0.003)	ND (0.25)
1-Methylnaphthalene	NA	NA (0.005)	NA (0.6)	NA (0.003)	NA (0.25)
3-Methylnaphthalene	NA	ND (0.005)	ND (0.6)	ND (0.003)	ND (0.25)

() = Detection limit

ND = Not detected

T = Detected below quantifiable level

NA = Not analyzed

QUARTERLY SAMPLING
ANALYTICAL RESULTS FOR GROUNDWATER
AROMATIC VOLATILE ORGANIC COMPOUNDS
(ug/L unless otherwise noted)
(Sampling Event: 06/13/89)

ANALYTE	GBR-06	GBR-08	GBR-13	GRW-13	GBR-15
BENZENE	136	4400	1600	ND	23.7
CHLOROBENZENE	ND	ND	ND	ND	ND
1,4-DICHLOROBENZENE	ND	ND	ND	ND	ND
1,3-DICHLOROBENZENE	ND	ND	ND	ND	ND
1,2-DICHLOROBENZENE	ND	ND	ND	ND	ND
ETHYL BENZENE	149	2130	620	ND	ND
TOLUENE	ND	560	840	ND	ND
o-XYLENE	39	1510	660	ND	ND
m,p-XYLENE	167	5500	1400	ND	ND

() = Detection Limit

ND = Not detected

T = Detected below quantifiable limits

NA = Not analyzed

QUARTERLY SAMPLING
ANALYTICAL RESULTS FOR GROUNDWATER
AROMATIC VOLATILE ORGANIC COMPOUNDS
(ug/L unless otherwise noted)
(Sampling Event: 06/13/89)

ANALYTE	GBR-17	GBR-24D	GBR-30	GBR-31	GBR-33
BENZENE	ND (0.2)	19.4 (0.2)	ND (0.2)	ND (0.2)	32.6 (0.2)
CHLOROBENZENE	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)
1,4-DICHLOROBENZENE	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)
1,3-DICHLOROBENZENE	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)
1,2-DICHLOROBENZENE	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)
ETHYL BENZENE	ND (0.2)	34.0 (0.2)	ND (0.2)	ND (0.2)	76.0 (0.2)
TOLUENE	ND (0.2)	6.9 (0.2)	ND (0.2)	ND (0.2)	11.3 (0.2)
o-XYLENE	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	19.0 (0.2)
m,p-XYLENE	ND (0.2)	10.6 (0.2)	4.3 (0.2)	ND (0.2)	55.1 (0.2)

25 () = Detection limit

ND = Not detected

T = Detected below quantifiable level

NA = Not analyzed

QUARTERLY SAMPLING
ANALYTICAL RESULTS FOR GROUNDWATER
GENERAL WATER CHEMISTRY
(mg/L unless otherwise noted)
(Sampling Event: 06/13/89)

ANALYTE	GBR-06	GBR-08	GBR-13	GRW-13	GBR-15	GBR-17	GBR-240	GBR-30	GBR-31	GBR-33
Total dissolved solids (180)	2780.00	3380.00	4220.00	4318.00	3754.00	2466.00	3722.00	3544.00	4414.00	3576.00
Total alkalinity (as CaCO3)	1124.86	960.15	736.30	246.67	188.70	222.00	246.67	376.17	342.25	354.58
Total hardness (as CaCO3)	1204.43	1204.43	1781.77	1602.59	1294.02	1134.76	1736.97	1353.74	1682.23	1311.74
pH	7.33	7.27	7.30	7.27	7.60	7.40	8.02	7.39	7.66	7.17
Conductivity (umhos/cm @ 25C)	3910	4650	5340	5750	4500	2970	4690	4800	5520	4490
Resistivity (ohm-m)	2.5575	2.1505	1.8727	1.7391	2.2222	3.3670	2.1322	2.0833	1.8116	2.2272
Acidity (as CaCO3)	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bicarbonate (as HCO3)	1372.33	1171.38	898.29	300.93	230.21	270.84	300.93	458.92	417.55	432.59
Carbonate (as CO3)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Chloride	315.91	550.82	599.42	899.14	307.81	145.81	591.32	664.23	575.12	364.51
Sulfate	773.21	964.97	1698.26	1686.33	2103.59	1332.85	1644.77	1320.50	2032.40	1768.22
Calcium	500.08	377.11	278.73	577.96	209.05	389.41	545.17	430.40	569.76	434.49
Magnesium	<1.0	64.09	264.19	39.05	187.86	39.69	91.63	68.07	63.39	55.37
Potassium	2.64	2.16	2.32	4.96	5.44	0.72	5.08	1.84	1.96	1.36
Sodium	522.40	751.60	734.40	738.40	689.20	292.00	480.40	606.40	735.20	608.80
Major cations (meq/L)	46.88	56.84	67.64	64.30	56.00	35.41	55.77	53.50	65.67	52.75
Major anions (meq/L)	47.52	54.84	67.02	65.43	56.28	36.32	55.88	53.77	65.41	54.21
Anion/cation % difference (%)	0.68	1.78	0.46	0.87	0.25	1.26	0.10	0.25	0.20	1.37

ND = Not detected

T = Detected below quantifiable limits

NA = Not analyzed

0348/QRTR0UT.DAT

3.1 QUARTERLY TANK VOLUMES

	DATE	4/12/89	
TANK	READING (FEET)	VOLUME (GALLONS)	CHANGE (GALLONS)
102	8.8	14,858	NA
106	6.2	8,157	NA
24	26.7	564,890	NA
27	14.3	93,056	NA
32	14.3	92,796	NA
34	13.8	89,800	NA
35	22.0	143,524	NA
37	20.1	34,045	NA
TOTAL		1,041,126	NA

	DATE	4/17/89	
TANK	READING (FEET)	VOLUME (GALLONS)	CHANGE (GALLONS)
102	6.3	10,613	(4,245)
106	6.7	8,818	661
24	26.7	564,890	0
27	15.1	98,461	5,405
32	15.2	98,787	5,991
34	13.8	89,800	0
35	22.0	143,524	0
37	20.1	34,045	0
TOTAL		1,048,938	7,812

	DATE	4/24/89	
TANK	READING (FEET)	VOLUME (GALLONS)	CHANGE (GALLONS)
102	9.7	16,420	5,807
106	10.3	13,656	4,839
24	27.3	576,310	11,420
27	15.1	98,461	0
32	23.8	155,181	56,394
34	13.8	89,800	0
35	22.0	143,524	0
37	20.1	34,045	0
TOTAL		1,127,398	78,460

	DATE	5/1/89	
TANK	READING (FEET)	VOLUME (GALLONS)	CHANGE (GALLONS)
102	8.8	14,858	(1,562)
106	6.2	8,157	(5,500)
24	32.1	678,460	102,150
27	14.3	93,056	(5,405)
32	12.6	81,921	(73,260)
34	13.8	89,800	0
35	22.0	143,524	0
37	15.8	26,744	(7,301)
TOTAL		1,136,520	9,122

	DATE	5/8/89	
TANK	READING (FEET)	VOLUME (GALLONS)	CHANGE (GALLONS)
102	6.3	10,613	(4,245)
106	6.2	8,157	0
24	34.7	733,236	54,776
27	14.3	93,056	0
32	17.2	111,811	29,890
34	13.8	89,800	0
35	22.0	143,524	0
37	15.8	26,744	0
TOTAL		1,216,941	80,421

	DATE	5/15/89	
TANK	READING (FEET)	VOLUME (GALLONS)	CHANGE (GALLONS)
102	10.3	17,405	6,792
106	6.2	8,157	0
24	35.7	755,231	21,995
27	14.3	93,056	0
32	24.3	158,176	46,365
34	13.8	89,800	0
35	22.4	145,934	2,409
37	7.5	12,803	(13,941)
TOTAL		1,280,562	63,621

	DATE	5/22/89	
TANK	READING (FEET)	VOLUME (GALLONS)	CHANGE (GALLONS)
102	8.2	13,873	(3,532)
106	9.1	12,004	3,847
24	37.2	786,108	30,878
27	14.3	93,056	0
32	24.8	161,172	2,996
34	13.8	89,800	0
35	22.0	143,524	(2,409)
37	0.3	560	(12,243)
TOTAL		1,300,099	19,536

	DATE	6/5/89	
TANK	READING (FEET)	VOLUME (GALLONS)	CHANGE (GALLONS)
102	9.8	16,640	2,768
106	9.1	12,004	0
24	37.2	786,108	0
27	14.3	93,056	0
32	18.3	119,170	(42,002)
34	13.8	89,800	0
35	18.0	117,216	(26,308)
37	0.3	560	0
TOTAL		1,234,555	(65,543)

	DATE	6/12/89	
TANK	READING (FEET)	VOLUME (GALLONS)	CHANGE (GALLONS)
102	8.8	14,942	(1,698)
106	5.8	7,668	(4,336)
24	37.0	782,513	(3,595)
27	14.3	93,056	0
32	24.8	161,498	42,328
34	13.8	89,800	0
35	12.3	80,098	(37,118)
37	0.3	560	0
TOTAL		1,230,136	(4,420)

	DATE	6/19/89	
TANK	READING (FEET)	VOLUME (GALLONS)	CHANGE (GALLONS)
102	8.3	14,093	(849)
106	5.8	7,668	0
24	37.0	782,513	0
27	14.3	93,056	0
32	12.0	78,144	(83,354)
34	13.8	89,800	0
35	12.3	80,098	0
37	0.3	560	0
TOTAL		1,145,933	(84,203)

	DATE	6/26/89	
TANK	READING (FEET)	VOLUME (GALLONS)	CHANGE (GALLONS)
102	9.6	16,301	2,207
106	5.8	7,668	0
24	37.0	782,513	0
27	14.3	93,056	0
32	16.9	110,053	31,909
34	13.8	89,800	0
35	0.3	1,954	(78,144)
37	0.3	560	0
TOTAL		1,101,905	(44,028)
NET CHANGE			60,779

GALLONS IN () = DECREASED VOLUME.

4.1 PUMP DISCHARGE RATES

DATE	GRW-1	GRW-2	GRW-3	GRW-4	GRW-5	GRW-6	GRW-10	AIR STRIPPER
4/12/89	23,990	51,840	73,590	2,030	22,070	156,910	75,730	200,070
4/14/89	23,990	52,840	73,590	5,790	22,070	160,070	84,370	206,720
4/21/89	23,990	56,610	73,590	19,460	22,070	160,070	84,370	206,720
4/28/89	23,990	60,300	78,410	29,150	22,070	183,330	116,320	219,790
5/05/89	23,990	62,810	80,860	35,640	22,070	190,830	126,420	NA
5/19/89	23,990	70,330	90,100	61,020	22,070	213,860	153,530	308,480
5/27/89	23,990	73,990	94,360	64,920	22,070	225,070	168,390	375,720
6/09/89	23,990	81,230	103,050	89,320	22,070	247,360	212,970	552,350
6/16/89	23,990	84,290	106,410	98,030	22,070	253,980	234,410	617,380
6/23/89	23,990	88,000	110,510	110,080	22,070	267,170	266,820	696,590
6/30/89	23,990	91,600	114,420	121,320	22,070	277,620	295,200	775,540

NET CHANGE
GALLONS

TOTAL PUMPED

TOTAL STRIPPED

NA=NOT AVAILABLE

*The volume of water treated by the air stripper, added to the volume of water placed in storage does not equal the volume of water pumped. We will be paying close attention to this in the future.

0348/PUMP2.PRN

5.1 MONTHLY SPECIFIC CONDUCTANCE VALUES

MONTHLY SAMPLING RESULTS
GIANT BLOOMFIELD REFINERY
SPECIFIC CONDUCTANCE
UNITS ARE umhos

WELL NUMBER	APRIL 1989	MAY 1989	JUNE 1989
GRW-13	6840	5050	5750

**QUARTERLY DATA REPORT
FOR THE
GIANT BLOOMFIELD REFINERY**

Jan, Feb, Mar 89 4/26/89

April 26, 1989

Prepared for:

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**OIL CONSERVATION DIV.
SANTA FE**

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1.1 AIR STRIPPER ANALYSES FOR JANUARY, FEBRUARY
AND MARCH 1989

MONTHLY SAMPLING
ANALYTICAL RESULTS FOR AIR STRIPPER INFLUENT AND EFFLUENT
HALOGENATED VOLATILE ORGANIC COMPOUNDS

ANALYTE	AIR STRIPPER	
	INFLUENT (01/16/89)	EFFLUENT (01/16/89)
CHLOROMETHANE	ND (.3)	ND (.3)
BROMOMETHANE	ND (1.2)	ND (1.2)
VINYL CHLORIDE	ND (.2)	ND (.2)
CHLOROETHANE	ND (.5)	ND (.5)
METHYLENE CHLORIDE	1.0 (.3)	ND (.3)
TRICHLOROFLUOROMETHANE	0.5 (.1)	1.0 (.1)
1,1-DICHLOROETHENE	ND (.1)	ND (.1)
1,1-DICHLOROETHANE	4.2 (.09)	0.8 (.09)
TRANS-1,2-DICHLOROETHENE	11 (.2)	1.3 (.2)
CHLOROFORM	ND (.05)	ND (.05)
1,2-DICHLOROETHANE	6.7 (.03)	2.9 (.03)
1,1,1-TRICHLOROETHANE	2.1 (.09)	0.6 (.09)
CARBON TETRACHLORIDE	ND (.1)	ND (.1)
BROMODICHLOROMETHANE	ND (.1)	ND (.1)
1,2-DICHLOROPROPANE	ND (.3)	ND (.3)
TRANS-1,3-DICHLOROPROPENE	3.0 (.2)	0.5 (.2)
TRICHLOROETHENE	ND (.2)	ND (.2)
DIBROMOCHLOROMETHANE-A	ND (.07)	ND (.07)
1,1,2-TRICHLOROETHANE-A	ND (N\R)	ND (N\R)
CIS-1,3-DICHLOROPROPENE-A	ND (.2)	ND (.2)
CHLOROETHYL VINYL ETHER	ND (.3)	ND (.3)
BROMOFORM	ND (.12)	ND (.12)
1,1,2,2-TETRACHLOROETHANE-B	1.9 (.03)	0.6 (.03)
TETRACHLOROETHENE-B	ND (.3)	ND (.3)
CHLOROBENZENE	ND (.3)	ND (.3)
1,3-DICHLOROBENZENE	ND (.5)	ND (.5)
1,2-DICHLOROBENZENE	ND (.4)	ND (.4)

UNITS ARE ug/L

() = detection limit

ND = not detected at detection limit

NA = not analyzed N\R = not reported

MONTHLY SAMPLING
ANALYTICAL RESULTS FOR AIR STRIPPER INFLUENT AND EFFLUENT
AROMATIC VOLATILE ORGANIC COMPOUNDS
(01/16/89)

ANALYTE	AIR	
	STRIPPER INFLUENT	STRIPPER EFFLUENT
BENZENE	440 (10.0)	42 (1.0)
TOLUENE	ND (5.0)	ND (1.0)
ETHYLBENZENE	80 (7.5)	10 (1.5)
CHLOROBENZENE-A	ND (7.5)	ND (1.5)
1,4-DICHLOROBENZENE	ND (7.5)	ND (1.5)
1,3-DICHLOROBENZENE	ND (10.0)	ND (2.0)
1,2-DICHLOROBENZENE	ND (10.0)	ND (2.0)
p-XYLENE-A	150 (5.0)	18 (1.0)
m-XYLENE	120 (5.0)	15 (1.0)
o-XYLENE	49 (2.5)	8.6 (0.5)

Units are ug/L

() = detection limit

ND = not detected at detection limit

NA = not analyzed

N/R = not reported

MONTHLY SAMPLING
ANALYTICAL RESULTS FOR AIR STRIPPER INFLUENT AND EFFLUENT
SELECTED MAJOR CATIONS, ANIONS, NITRATE, AND TOTAL DISSOLVED SOLIDS
(01/16/89)

ANALYTE	AIR STRIPPER INFLUENT	AIR STRIPPER EFFLUENT
CALCIUM	390 (N\R)	400 (N\R)
CARBONATE	ND (1.0)	ND (1.0)
CHLORIDE	630 (N\R)	630 (N\R)
FLUORIDE	3.7 (N\R)	3.6 (N\R)
MAGNESIUM	36 (N\R)	37 (N\R)
POTASSIUM	ND (3.0)	ND (3.0)
SODIUM	560 (N\R)	610 (N\R)
SULFATE	1400 (N\R)	1400 (N\R)
NITRATE AS N	NA	NA
TOTAL DISSOLVED SOLIDS	3700 (10)	3700 (10)

UNITS FOR ANALYSES ARE: mg/L
() = detection limit
ND = not detected at detection limit
NA = not analyzed
N\R = not reported

MONTHLY SAMPLING
AIR STRIPPER ANALYSES
POLYNUCLEAR AROMATIC HYDROCARBONS
UNITS FOR ANALYSES ARE ug/L
(01/16/89)

ANALYTE:	AIR	
	STRIPPER <u>INFLUENT</u>	STRIPPER <u>EFFLUENT</u>
PYRENE	ND (0.35)	ND (0.35)
DIBENZO(A,H)ANTHRACENE	ND (0.15)	ND (0.15)
BENZO(K)FLUORANTHENE	ND (0.05)	ND (0.1)
ACENAPHTHYLENE	ND (15)	ND (15)
ACENAPHTHENE	ND (1.7)	ND (1.7)
FLUORANTHENE	ND (0.3)	ND (0.3)
FLUORENE	7.1 (N/R)	7.1 (N/R)
CHRYSENE	ND (0.05)	ND (0.05)
NAPTHELENE	37 (N/R)	36 (N/R)
ANTHRACENE	ND (1.2)	ND (1.2)
BENZ(A)ANTHRACENE	ND (0.2)	ND (0.2)
INDENO(1,2,3-CD)PYRENE	ND (0.89)	ND (0.9)
BENZO(B)FLUORANTHENE	ND (0.05)	ND (0.05)
PHENANTHRENE	16 (N/R)	17 (N/R)
BENZO(A)PYRENE	ND (0.099)	ND (0.1)
BENZO(GH)PERYLENE	ND (0.15)	ND (0.15)

UNITS ARE ug/L
() INDICATES DETECTION LIMITS
ND = NOT DETECTED
NA = NOT ANALYSED
N/R = NOT REPORTED

MONTHLY SAMPLING
ANALYTICAL RESULTS FOR AIR STRIPPER INFLUENT AND EFFLUENT
HALOGENATED VOLATILE ORGANIC COMPOUNDS

ANALYTE	AIR STRIPPER INFLUENT (02/02/89)	AIR STRIPPER EFFLUENT (02/02/89)
CHLOROMETHANE	ND (.3)	ND (.3)
BROMOMETHANE	ND (1.2)	ND (1.2)
VINYL CHLORIDE	ND (.2)	ND (.2)
CHLOROETHANE	ND (.5)	ND (.5)
METHYLENE CHLORIDE	1.4 (.3)	ND (.3)
TRICHLOROFLUOROMETHANE	ND (.1)	ND (.1)
1,1-DICHLOROETHENE	ND (.1)	ND (.1)
1,1-DICHLOROETHANE	5.0 (.09)	ND (.09)
TRANS-1,2-DICHLOROETHENE	11 (.2)	ND (.2)
CHLOROFORM	0.9 (.05)	ND (.05)
1,2-DICHLOROETHANE	6.0 (.03)	0.7 (.03)
1,1,1-TRICHLOROETHANE	2.1 (.09)	ND (.09)
CARBON TETRACHLORIDE	ND (.1)	ND (.1)
BROMODICHLOROMETHANE	ND (.1)	ND (.1)
1,2-DICHLOROPROPANE	ND (.3)	ND (.3)
TRANS-1,3-DICHLOROPROPENE	3.4 (.2)	ND (.2)
TRICHLOROETHENE	ND (.2)	ND (.2)
DIBROMOCHLOROMETHANE-A	ND (.07)	ND (.07)
1,1,2-TRICHLOROETHANE-A	ND (N/R)	ND (N/R)
CIS-1,3-DICHLOROPROPENE-A	ND (.2)	ND (.2)
CHLOROETHYL VINYL ETHER	ND (.3)	ND (.3)
BROMOFORM	ND (.12)	ND (.12)
1,1,2,2-TETRACHLOROETHANE-B	2.2 (.03)	ND (.03)
TETRACHLOROETHENE-B	ND (.3)	ND (.3)
CHLOROBENZENE	ND (.3)	ND (.3)
1,3-DICHLOROBENZENE	ND (.5)	ND (.5)
1,2-DICHLOROBENZENE	ND (.4)	ND (.4)
1,4-DICHLOROBENZENE		

UNITS ARE ug/L

() = detection limit

ND = not detected at detection limit

NA = not analyzed N/R = not reported

MONTHLY SAMPLING
ANALYTICAL RESULTS FOR AIR STRIPPER INFLUENT AND EFFLUENT
AROMATIC VOLATILE ORGANIC COMPOUNDS
(02/02/89)

ANALYTE	AIR	
	STRIPPER INFLUENT	STRIPPER EFFLUENT
BENZENE	280 (10.0)	ND (0.2)
TOLUENE	ND (10.0)	ND (0.2)
ETHYLBENZENE	ND (15.0)	ND (0.3)
CHLOROBENZENE-A	ND (15.0)	ND (0.3)
1,4-DICHLOROBENZENE	ND (15.0)	ND (0.3)
1,3-DICHLOROBENZENE	ND (20.0)	ND (0.4)
1,2-DICHLOROBENZENE	ND (20.0)	ND (0.4)
p-XYLENE-A	ND (10.0)	ND (0.2)
m-XYLENE	ND (10.0)	ND (0.2)
o-XYLENE	38 (5.0)	ND (0.1)

Units are ug/L

() = detection limit

ND = not detected at detection limit

NA = not analyzed

N/R = not reported

MONTHLY SAMPLING
ANALYTICAL RESULTS FOR AIR STRIPPER INFLUENT AND EFFLUENT
SELECTED MAJOR CATIONS, ANIONS, NITRATE, AND TOTAL DISSOLVED SOLIDS
(02/02/89)

<u>ANALYTE</u>	<u>AIR STRIPPER INFLUENT</u>	<u>AIR STRIPPER EFFLUENT</u>
CALCIUM	450 (N\R)	450 (N\R)
CARBONATE	ND (1.0)	ND (1.0)
CHLORIDE	630 (N\R)	620 (N\R)
FLUORIDE	3.6 (N\R)	3.4 (N\R)
MAGNESIUM	38 (N\R)	40 (N\R)
SODIUM	470 (N\R)	490 (N\R)
SULFATE	1600 (N\R)	1600 (N\R)
NITRATE AS N	NA	NA
TOTAL DISSOLVED SOLIDS	NA	NA

UNITS FOR ANALYSES ARE: mg/L
() = detection limit
ND = not detected at detection limit
NA = not analyzed
N\R = not reported

MONTHLY SAMPLING
AIR STRIPPER ANALYSES
POLYNUCLEAR AROMATIC HYDROCARBONS
UNITS FOR ANALYSES ARE ug/L
(02/01/89)

ANALYTE:	AIR	
	STRIPPER INFLUENT	STRIPPER EFFLUENT
PYRENE	ND (0.33)	ND (0.33)
DIBENZO(A,H)ANTHRACENE	ND (0.14)	ND (0.14)
BENZO(K)FLUORANTHENE	ND (0.047)	ND (0.047)
ACENAPHTHYLENE	ND (14)	ND (14)
ACENAPHTHENE	ND (1.6)	ND (1.6)
FLUORANTHENE	ND (0.28)	ND (0.28)
FLUORENE	5.4 (N\R)	4.2 (N\R)
CHRYSENE	ND (0.047)	ND (0.047)
NAPTHELENE	16 (N\R)	9.5 (N\R)
ANTHRACENE	ND (1.1)	ND (1.1)
BENZ(A)ANTHRACENE	ND (0.19)	ND (0.19)
INDENO(1,2,3-CD)PYRENE	ND (0.85)	ND (0.85)
BENZO(B)FLUORANTHENE	ND (0.047)	ND (0.047)
PHENANTHRENE	8.2 (N\R)	5.5 (N\R)
BENZO(A)PYRENE	ND (0.094)	ND (0.094)
BENZO(GHI)PERYLENE	ND (0.14)	ND (0.14)
1-METHYLNAPHTHALENE	36 (N\R)	15 (N\R)
2-METHYLNAPHTHALENE	28 (N\R)	8.2(N\R)

UNITS ARE ug/L
() INDICATES DETECTION LIMITS
ND = NOT DETECTED
NA = NOT ANALYSED
N\R = NOT REPORTED

MONTHLY SAMPLING
ANALYTICAL RESULTS FOR AIR STRIPPER INFLUENT AND EFFLUENT
HALOGENATED VOLATILE ORGANIC COMPOUNDS

ANALYTE	AIR STRIPPER INFLUENT (03/14/89)	AIR STRIPPER EFFLUENT (03/14/89)
CHLOROMETHANE	ND (1.0)	ND (1.0)
BROMOMETHANE	ND (1.0)	ND (1.0)
VINYL CHLORIDE	ND (1.0)	ND (1.0)
CHLOROETHANE	ND (1.0)	ND (1.0)
METHYLENE CHLORIDE	2.5 (0.1)	7.2 (0.1)
TRICHLOROFLUOROMETHANE	ND (0.1)	ND (0.1)
1,1-DICHLOROETHENE	ND (0.1)	ND (0.1)
1,1-DICHLOROETHANE	ND (.05)	ND (.05)
TRANS-1,2-DICHLOROETHENE	ND (0.2)	ND (0.2)
CHLOROFORM	ND (0.1)	ND (0.1)
1,2-DICHLOROETHANE	13.4 (.03)	11.1 (.03)
1,1,1-TRICHLOROETHANE	ND (.03)	ND (.03)
CARBON TETRACHLORIDE	ND (0.1)	ND (0.1)
BROMODICHLOROMETHANE	ND (0.1)	ND (0.1)
1,2-DICHLOROPROPANE	ND (0.1)	ND (0.1)
TRANS-1,3-DICHLOROPROPENE	ND (0.1)	ND (0.1)
TRICHLOROETHENE	ND (0.1)	ND (0.1)
DIBROMOCHLOROMETHANE-A	ND (0.1)	ND (0.1)
1,1,2-TRICHLOROETHANE-A	ND (.02)	ND (.02)
CIS-1,3-DICHLOROPROPENE-A	ND (0.1)	ND (0.1)
CHLOROETHYL VINYL ETHER	ND (0.1)	ND (0.1)
BROMOFORM	ND (0.2)	ND (0.2)
1,1,2,2-TETRACHLOROETHANE-B	ND (.03)	ND (.03)
TETRACHLOROETHENE-B	ND (.03)	ND (.03)
CHLOROBENZENE	ND (0.1)	ND (0.1)
1,3-DICHLOROBENZENE	ND (0.1)	ND (0.1)
1,2-DICHLOROBENZENE	ND (0.1)	ND (0.1)
1,4-DICHLOROBENZENE	ND (0.1)	ND (0.1)

UNITS ARE ug/L

() = detection limit

ND = not detected at detection limit

NA = not analyzed N/A = not reported

MONTHLY SAMPLING
ANALYTICAL RESULTS FOR AIR STRIPPER INFLUENT AND EFFLUENT
AROMATIC VOLATILE ORGANIC COMPOUNDS
(03/14/89)

ANALYTE	AIR STRIPPER INFLUENT	AIR STRIPPER EFFLUENT
BENZENE	2314 (0.2)	219 (0.2)
TOLUENE	2630 (0.2)	319 (0.2)
ETHYLBENZENE	191 (0.2)	12.5 (0.2)
CHLOROBENZENE	ND (0.1)	ND (0.1)
1,4-DICHLOROBENZENE	NA (0.0)	NA (0.0)
1,3-DICHLOROBENZENE	NA (0.0)	NA (0.0)
1,2-DICHLOROBENZENE	NA (0.0)	NA (0.0)
m,p-XYLENE	860 (0.2)	94.7 (0.2)
o-XYLENE	301 (0.2)	42.5 (0.2)

Units are ug/L

() = detection limit

ND = not detected at detection limit

NA = not analyzed

N/R = not reported

MONTHLY SAMPLING
ANALYTICAL RESULTS FOR AIR STRIPPER INFLUENT AND EFFLUENT
SELECTED MAJOR CATIONS, ANIONS, NITRATE, AND TOTAL DISSOLVED SOLIDS
(03/14/89)

ANALYTE	AIR STRIPPER INFLUENT	AIR STRIPPER EFFLUENT
CALCIUM	428 (N\R)	408 (N\R)
CARBONATE	NA (N\R)	NA (N\R)
CHLORIDE	356 (N\R)	357 (N\R)
FLUORIDE	NA (N\R)	NA (N\R)
MAGNESIUM	48 (N\R)	47 (N\R)
POTASSIUM	5 (N\R)	5 (N\R)
SODIUM	373 (N\R)	374 (N\R)
SULFATE	1042 (N\R)	1032 (N\R)
NITRATE AS N	NA (N\R)	NA (N\R)
TOTAL DISSOLVED SOLIDS	2628 (10)	2592 (N\R)

UNITS FOR ANALYSES ARE: mg/L
() = detection limit
ND = not detected at detection limit
NA = not analyzed
N\R = not reported

MONTHLY SAMPLING
AIR STRIPPER ANALYSES
POLYNUCLEAR AROMATIC HYDROCARBONS
UNITS FOR ANALYSES ARE ug/L
(03/14/89)

ANALYTE:	AIR	
	STRIPPER INFLUENT	STRIPPER EFFLUENT
PYRENE	ND (0.35)	ND (0.35)
DIBENZO(A,H)ANTHRACENE	ND (0.15)	ND (0.15)
BENZO(K)FLUORANTHENE	ND (0.05)	ND (0.1)
ACENAPHTHYLENE	ND (15)	ND (15)
ACENAPHTHENE	ND (1.7)	ND (1.7)
FLUORANTHENE	ND (0.3)	ND (0.3)
FLUORENE	7.1 (N\R)	7.1 (N\R)
CHRYSENE	ND (0.05)	ND (0.05)
NAPTHELENE	37 (N\R)	36 (N\R)
ANTHRACENE	ND (1.2)	ND (1.2)
BENZ(A)ANTHRACENE	ND (0.2)	ND (0.2)
INDENO(1,2,3-CD)PYRENE	ND (0.89)	ND (0.9)
BENZO(B)FLUORANTHENE	ND (0.05)	ND (0.05)
PHENANTHRENE	16 (N\R)	17 (N\R)
BENZO(A)PYRENE	ND (0.099)	ND (0.1)
BENZO(GHI)PERYLENE	ND (0.15)	ND (0.15)

UNITS ARE ug/L
() INDICATES DETECTION LIMITS
ND = NOT DETECTED
NA = NOT ANALYSED
N\R = NOT REPORTED

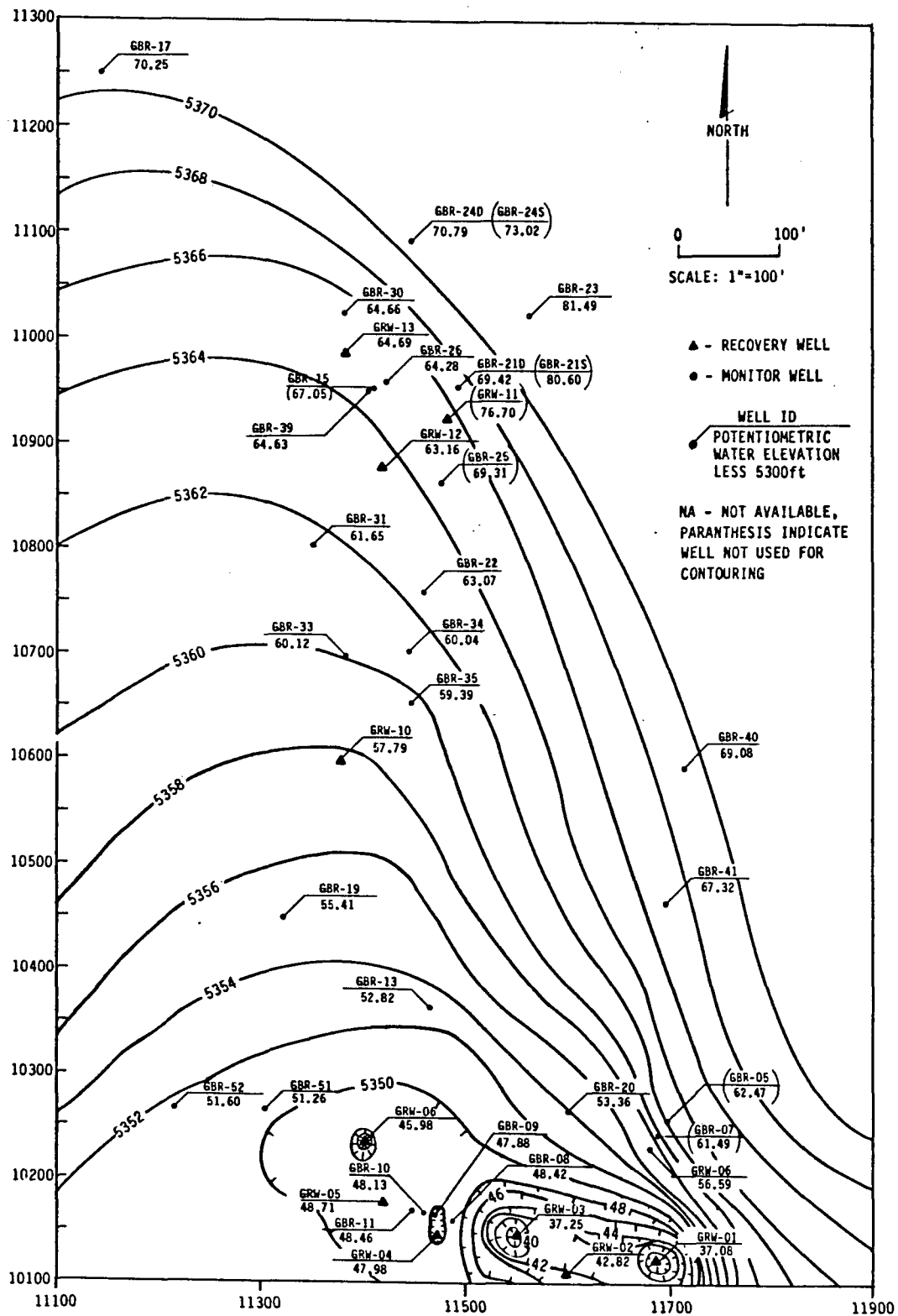
1.2 POTENTIOMETRIC SURFACE MAPS FOR
JANUARY, FEBRUARY, AND MARCH 1989

GIANT INDUSTRIES BLOOMFIELD REFINERY
MONTHLY POTENTIOMETRIC SURFACE

MEASUREMENT DATE
01/16/89

WELL NUMBER	WATER ELEVATION	HYDROCARBON THICKNESS	CORRECTED WATER ELEVATION
GBR-05	5360.74	2.160	5362.47
GBR-06	5356.58	0.010	5356.59
GBR-07	5359.75	2.170	5361.49
GBR-08	5348.42	0.000	5348.42
GBR-09	5347.88	0.000	5347.88
GBR-10	5346.00	2.660	5348.13
GBR-11	5346.75	2.140	5348.46
GBR-13	5352.82	0.000	5352.82
GBR-15	5367.05	0.000	5367.05
GBR-17	5370.25	0.000	5370.25
GBR-18	5407.02	0.000	5407.02
GBR-19	5355.41	0.000	5355.41
GBR-20	5349.58	4.730	5353.36
GBR-21D	5369.42	0.000	5369.42
GBR-21S	5380.56	0.050	5380.60
GBR-22	5362.87	0.250	5363.07
GBR-23	5381.49	0.000	5381.49
GBR-24D	5370.79	0.000	5370.79
GBR-24S	5373.02	0.000	5373.02
GBR-25	5369.31	0.000	5369.31
GBR-26	5364.28	0.000	5364.28
GBR-30	5364.56	0.130	5364.66
GBR-31	5361.65	0.000	5361.65
GBR-32	5381.86	0.000	5381.86
GBR-32	5381.86	0.000	5381.86
GBR-33	5360.12	0.000	5360.12
GBR-34	5359.86	0.220	5360.04
GBR-35	5359.39	0.000	5359.39
GBR-39	5364.63	0.000	5364.63
GBR-40	5369.08	0.000	5369.08
GBR-41	5367.32	0.000	5367.32
GBR-48	5382.83	0.000	5382.83
GBR-49	5379.87	0.000	5379.87
GBR-50	5384.10	0.000	5384.10
GBR-51	5351.26	0.000	5351.26
GBR-52	5351.60	0.000	5351.60
GRW-01	5337.08	0.000	5337.08
GRW-02	5342.82	0.000	5342.82
GRW-03	5335.71	1.920	5337.25
GRW-04	5347.98	0.000	5347.98
GRW-05	5348.71	0.000	5348.71
GRW-06	5345.98	0.000	5345.98
GRW-10	5354.19	4.500	5357.79
GRW-11	5376.70	0.000	5376.70
GRW-12	5363.16	0.000	5363.16
GRW-13	5364.69	0.000	5364.69

Units for hydrocarbon thickness are (FEET)



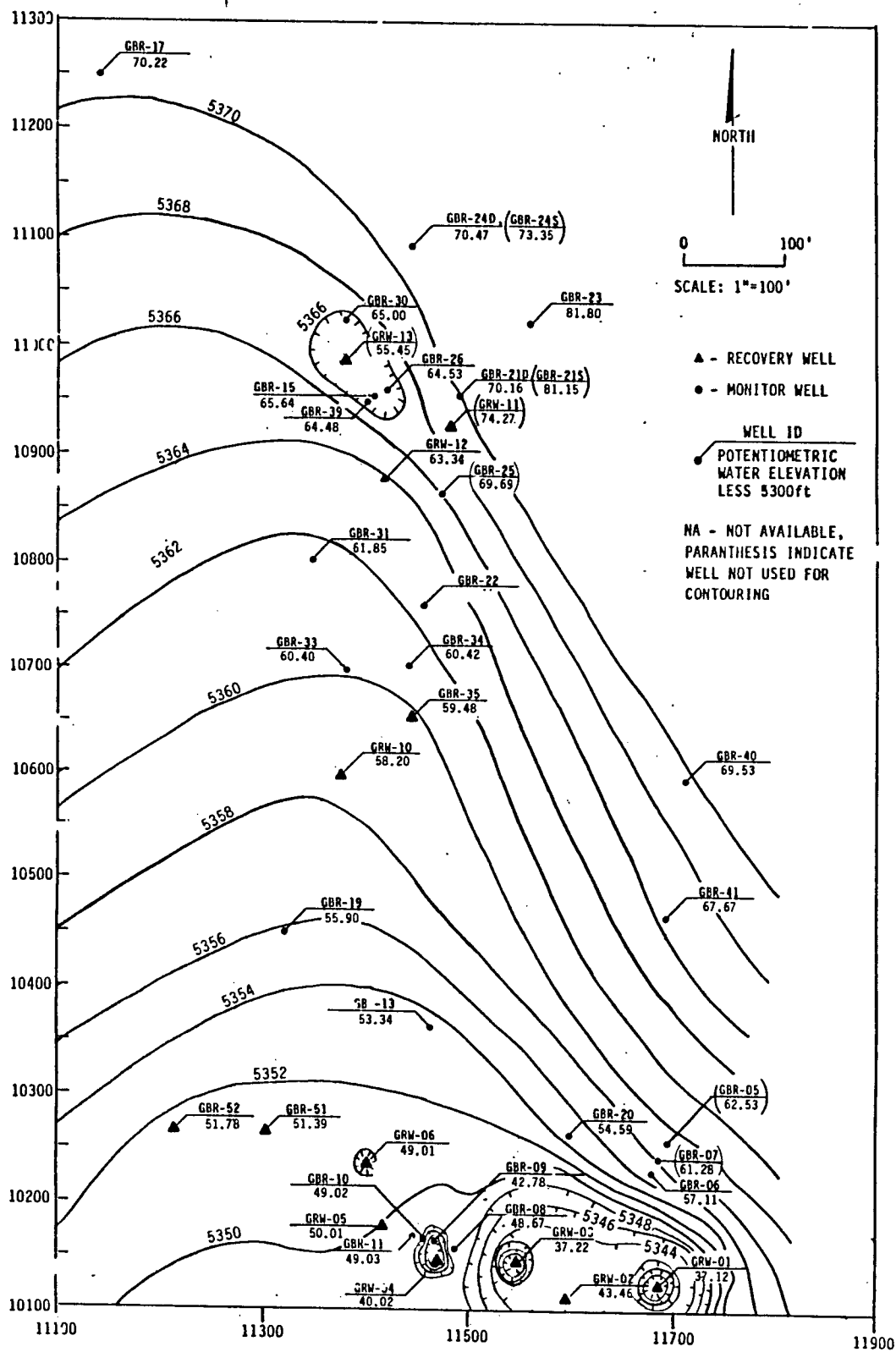
JANUARY 1989, POTENTIOMETRIC SURFACE MAP GIANT BLOOMFIELD REFINERY

GIANT INDUSTRIES BLOOMFIELD REFINERY
MONTHLY POTENTIOMETRIC SURFACE

MEASUREMENT DATE
02/02/89

WELL NUMBER	WATER ELEVATION	HYDROCARBON THICKNESS	CORRECTED WATER ELEVATION
GER-05	5360.90	2.040	5362.53
GER-06	5357.04	0.090	5357.11
GER-07	5358.55	3.410	5361.28
GER-08	5348.50	0.210	5348.67
GER-09	5342.78	0.000	5342.78
GER-10	5346.99	2.540	5349.02
GER-11	5347.45	1.980	5349.03
GER-13	5353.34	0.000	5353.34
GER-15	5365.64	0.000	5365.64
GER-17	5370.22	0.000	5370.22
GER-18	5407.80	0.000	5407.80
GER-19	5355.90	0.000	5355.90
GER-20	5353.89	0.880	5354.59
GER-21D	5370.16	0.000	5370.16
GER-21S	5380.96	0.240	5381.15
GER-22	5363.04	0.560	5363.49
GER-23	5381.80	0.000	5381.80
GER-24D	5370.47	0.000	5370.47
GER-24S	5373.35	0.000	5373.35
GER-25	5369.69	0.000	5369.69
GER-26	5364.53	0.000	5364.53
GER-30	5364.79	0.260	5365.00
GER-31	5361.85	0.000	5361.85
GER-32	5381.98	0.000	5381.98
GER-33	5360.40	0.000	5360.40
GER-34	5360.00	0.530	5360.42
GER-35	5359.48	0.000	5359.48
GER-39	5364.48	0.000	5364.48
GER-40	5369.53	0.000	5369.53
GER-41	5367.67	0.000	5367.67
GER-48	5382.86	0.000	5382.86
GER-49	5379.86	0.000	5379.86
GER-50	5384.11	0.000	5384.11
GER-51	5351.39	0.000	5351.39
GER-52	5351.78	0.000	5351.78
GRW-01	5337.12	0.000	5337.12
GRW-02	5343.46	0.000	5343.46
GRW-03	5335.96	1.580	5337.22
GRW-05	5340.56	0.000	5340.56
GRW-05	5350.01	0.000	5350.01
GRW-06	5349.01	0.000	5349.01
GRW-10	5344.80	16.750	5358.20
GRW-11	5374.27	0.000	5374.27
GRW-12	5363.11	0.290	5363.34
GRW-13	5355.45	0.000	5355.45

Units for hydrocarbon thickness are (FEET)



FEBRUARY 1989, POTENTIOMETRIC SURFACE MAP GIANT BLOOMFIELD REFINERY

GIANT INDUSTRIES BLOOMFIELD REFINERY
MONTHLY POTENTIOMETRIC SURFACE

MEASUREMENT DATE
03/13/89

WELL NUMBER	WATER ELEVATION	HYDROCARBON THICKNESS	CORRECTED WATER ELEVATION
GER-05	5358.92	1.770	5360.34
GER-06	5354.48	0.200	5354.64
GER-07	5355.83	3.950	5358.99
GER-08	5346.72	0.000	5346.72
GER-09	5343.74	0.000	5343.74
GER-10	5344.77	2.460	5346.74
GER-11	5345.25	2.100	5346.93
GER-13	5352.83	0.000	5352.83
GER-15	5365.08	0.000	5365.08
GER-17	5367.80	0.000	5367.80
GER-19	5353.73	0.000	5353.73
GER-20	5351.59	0.820	5352.25
GER-21D	5367.36	0.000	5367.36
GER-21S	5378.84	0.210	5379.01
GER-22	5360.59	0.840	5361.26
GER-23	5379.48	0.000	5379.48
GER-24D	5368.81	0.000	5368.81
GER-24S	5371.23	0.000	5371.23
GER-25	5367.54	0.000	5367.54
GER-26	5362.32	0.000	5362.32
GER-30	5362.70	0.050	5362.74
GER-31	5359.78	0.000	5359.78
GER-32	5379.64	0.000	5379.64
GER-33	5358.28	0.000	5358.28
GER-34	5357.85	0.000	5357.85
GER-35	5357.78	0.000	5357.78
GER-39	5362.58	0.000	5362.58
GER-40	5367.45	0.000	5367.45
GER-41	5364.47	0.000	5364.47
GER-48	5380.53	0.000	5380.53
GER-49	5377.51	0.000	5377.51
GER-50	5381.74	0.000	5381.74
GER-51	5349.18	0.000	5349.18
GER-52	5349.55	0.000	5349.55
GRW-01	5337.34	0.000	5337.34
GRW-02	5341.15	0.000	5341.15
GRW-03	5344.37	0.280	5344.59
GRW-04	5341.86	1.200	5342.82
GRW-05	5347.16	0.030	5347.18
GRW-06	5342.93	0.000	5342.93
GRW-10	5353.52	3.290	5356.15
GRW-11	5369.93	0.040	5369.96
GRW-12	5361.20	0.050	5361.24
GRW-13	5362.62	0.030	5362.64

Units for hydrocarbon thickness are (FEET)

2.1 RESULTS OF QUARTERLY SAMPLING

QUARTERLY ANALYSIS RESULTS
 HALOGENATED VOLATILE ORGANICS
 ALL ANALYSES REPORTED IN ug/L
 (03/15/89)

SAMPLE LOCATION

ANALYTE	GBR-06	GBR-08	GBR-13	GRV-13	GBR-15
CHLOROMETHANE	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
BROMOMETHANE	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
VINYL CHLORIDE	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
CHLOROETHANE	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
METHYLENE CHLORIDE	2 (0.1)	10.7 (0.1)	30.8 (0.1)	2.0 (0.1)	1.2 (0.1)
TRICHLOROFLUOROMETHANE	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
1,1-DICHLOROETHENE	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
1,1-DICHLOROETHANE	ND (.05)	3.2 (.05)	4.3 (.05)	ND (.05)	0.1 (.05)
TRANS-1,2-DICHLOROETHENE	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
CHLOROFORM	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
1,2-DICHLOROETHANE	ND (.03)	5.7 (.03)	4.4 (.03)	2.1 (.03)	16.9 (.03)
1,1,1-TRICHLOROETHANE	ND (.03)	ND (.03)	ND (.03)	ND (.03)	ND (.03)
CARBON TETRACHLORIDE	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
BROMODICHLOROMETHANE	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
1,2-DICHLOROPROPANE	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
TRANS-1,3-DICHLOROPROPENE	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
TRICHLOROETHENE	ND (0.1)	1.4 (0.1)	3.6 (0.1)	ND (0.1)	ND (0.1)
DIBROMOCHLOROMETHANE-A	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
1,1,2-TRICHLOROETHANE-A	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
CIS-1,3-DICHLOROPROPENE-A	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
2-CHLOROETHYL VINYL ETHER	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
BROMOFORM	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)
1,1,2,2-TETRACHLOROETHANE-B	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)
TETRACHLOROETHENE-B	ND (.03)	ND (.03)	ND (.03)	ND (.03)	ND (.03)
CHLOROBENZENE	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
1,3-DICHLOROBENZENE	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
1,2-DICHLOROBENZENE	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
1,4-DICHLOROBENZENE	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)

QUARTERLY ANALYSIS RESULTS

HALOGENATED VOLATILE ORGANICS

ALL ANALYSES REPORTED IN ug/L

(03/15/89)

SAMPLE LOCATION

ANALYTE	GBR-17	GBR-24D	GBR-30	GBR-31	GBR-33
CHLOROMETHANE	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
BROMOMETHANE	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
VINYL CHLORIDE	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
CHLOROETHANE	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)
METHYLENE CHLORIDE	1.8 (0.1)	ND (0.1)	1 (0.1)	5.8 (0.1)	3.2 (0.1)
TRICHLOROFLUOROMETHANE	ND (0.1)	ND (0.1)	ND (0.1)	1.4 (0.1)	ND (0.1)
1,1-DICHLOROETHENE	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	0.18 (0.1)
1,1-DICHLOROETHANE	ND (.05)	ND (.05)	0.08 (.05)	ND (.05)	ND (.05)
TRANS-1,2-DICHLOROETHENE	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
CHLOROFORM	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
1,2-DICHLOROETHANE	ND (.03)	6.8 (.03)	0.1 (.03)	0.33 (.03)	0.84 (.03)
1,1,1-TRICHLOROETHANE	0.85 (.03)	ND (.03)	ND (.03)	0.32 (.03)	ND (.03)
CARBON TETRACHLORIDE	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
BROMODICHLOROMETHANE	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
1,2-DICHLOROPROPANE	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
TRANS-1,3-DICHLOROPROPENE	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
TRICHLOROETHENE	ND (0.1)	ND (0.1)	ND (0.1)	1.1 (0.1)	ND (0.1)
DIBROMOCHLOROMETHANE-A	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
1,1,2-TRICHLOROETHANE-A	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)	ND (0.02)
CIS-1,3-DICHLOROPROPENE-A	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
2-CHLOROETHYL VINYL ETHER	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
BROMOFORM	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)	ND (0.2)
1,1,2,2-TETRACHLOROETHANE-B	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)	ND (0.03)
TETRACHLOROETHENE-B	ND (.03)	ND (.03)	ND (.03)	1.4 (.03)	0.17 (.03)
CHLOROBENZENE	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
1,3-DICHLOROBENZENE	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
1,2-DICHLOROBENZENE	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)
1,4-DICHLOROBENZENE	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)	ND (0.1)

QUARTERLY SAMPLING
ANALYTICAL RESULTS FOR GROUNDWATER
POLYNUCLEAR AROMATIC HYDROCARBONS
(03/14/89)

SAMPLE LOCATION

<u>ANALYTE</u>	<u>GBR-06</u>	<u>GBR-08</u>	<u>GBR-13</u>	<u>GRU-13</u>	<u>GBR-15</u>
ACENAPHTHENE	ND (50)	86.3 (50)	ND (5)	ND (.5)	.9 (1)
ACENAPHTHYLENE	ND (50)	66.5 (50)	ND (5)	ND (.5)	ND (1)
ANTHRACENE	ND (50)	ND (50)	ND (5)	ND (.5)	ND (1)
BENZO(A)ANTHRACENE	ND (50)	ND (50)	ND (1)	ND (.5)	ND (1)
BENZO(A)PYRENE	ND (50)	ND (50)	ND (1)	ND (.5)	ND (.5)
BENZO(B)FLUORANTHENE	ND (50)	ND (50)	ND (1)	ND (.5)	ND (.5)
BENZO(G,H,I)PERYLENE	ND (50)	ND (50)	ND (1)	ND (.5)	ND (.5)
BENZO(K)FLUORANTHENE	ND (50)	ND (50)	ND (1)	ND (.5)	3.0 (.5)
CHRYSENE	ND (50)	ND (50)	ND (1)	ND (.5)	7.6 (.5)
DIBENZO(A,H)ANTHRACENE	ND (50)	ND (50)	ND (1)	ND (.5)	ND (.5)
FLUORANTHENE	ND (50)	ND (50)	ND (5)	ND (.5)	2.5 (.5)
FLUORENE	ND (50)	93.9 (50)	ND (5)	ND (.5)	3.4 (1)
INDENO(1,2,3-CD)PYRENE	ND (50)	ND (50)	ND (1)	ND (.5)	ND (1)
NAPHTHELENE	ND (50)	70.3 (50)	ND (5)	ND (.5)	ND (.5)
PHENANTHRENE	ND (50)	ND (50)	ND (5)	ND (.5)	ND (1)
PYRENE	ND (50)	ND (50)	ND (5)	ND (.5)	1.5 (1)
1-METHYLNAPHTHALENE	ND (50)	71.8 (50)	ND (5)	ND (.5)	ND (1)

Units are ug/L
() = detection limit
ND = not detected at detection limit
NA = not analyzed
N\A = not reported

QUARTERLY SAMPLING
ANALYTICAL RESULTS FOR GROUNDWATER
POLYNUCLEAR AROMATIC HYDROCARBONS
(03/14/89)

SAMPLE LOCATION

<u>ANALYTE</u>	<u>GBR-17</u>	<u>GBR-24D</u>	<u>GBR-30</u>	<u>GBR-31</u>	<u>GBR-33</u>
ACENAPHTHENE	ND (.5)	ND (1)	ND (10)	ND (5)	ND (1)
ACENAPHTHYLENE	ND (.5)	ND (1)	ND (10)	ND (5)	ND (1)
ANTHRACENE	ND (.5)	ND (1)	ND (10)	ND (5)	ND (1)
BENZO(A)ANTHRACENE	ND (.5)	ND (.5)	ND (10)	ND (2)	ND (.5)
BENZO(A)PYRENE	ND (.5)	ND (.5)	ND (10)	ND (2)	ND (.5)
BENZO(B)FLUORANTHENE	ND (.5)	ND (.5)	ND (10)	ND (2)	ND (.5)
BENZO(G,H,I)PERYLENE	ND (.5)	ND (.5)	ND (10)	ND (2)	ND (.5)
BENZO(K)FLUORANTHENE	2.6 (.5)	ND (.5)	ND (10)	ND (2)	ND (.5)
CHRYSENE	ND (.5)	ND (.5)	ND (10)	ND (2)	ND (.5)
DIBENZO(A,H)ANTHRACENE	ND (.5)	ND (.5)	ND (10)	ND (2)	ND (.5)
FLUORANTHENE	1.4 (.5)	ND (1)	ND (10)	8.3 (5)	ND (1)
FLUORENE	1.8 (.5)	ND (1)	ND (10)	20 (5)	ND (1)
INDENO(1,2,3-CD)PYRENE	ND (.5)	ND (.5)	ND (10)	ND (2)	ND (.5)
NAPHTHELENE	ND (.5)	ND (1)	ND (10)	7.4 (5)	ND (1)
PHENANTHRENE	ND (.5)	ND (1)	ND (10)	15.8 (5)	ND (1)
PYRENE	ND (.5)	ND (1)	ND (10)	2.9 (5)	ND (1)
1-METHYLNAPHTHALENE	ND (.5)	ND (1)	ND (10)	ND (5)	ND (1)

Units are ug/L

() = detection limit

ND = not detected at detection limit

NA = not analyzed

N/R = not reported

QUARTERLY SAMPLING
ANALYTICAL RESULTS FOR GROUNDWATER
AROMATIC VOLATILE ORGANIC COMPOUNDS
(03/14/89)

<u>ANALYTE</u>	<u>GBR-06</u>	<u>GBR-08</u>	<u>GBR-13</u>	<u>GRV-13</u>	<u>GBR-15</u>
BENZENE	222 (0.2)	5184 (0.2)	309 (0.2)	ND (0.2)	32.6 (0.2)
TOLUENE	37 (0.2)	172 (0.2)	24.3 (0.2)	ND (0.2)	2.1 (0.2)
ETHYLBENZENE	323 (0.2)	1341 (0.2)	166 (0.2)	ND (0.2)	2.9 (0.2)
CHLOROBENZENE-A	NA	NA	NA	NA	NA
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA
m,p-XYLENE	265 (0.2)	2080 (0.2)	102 (0.2)	ND (0.2)	ND (0.2)
o-XYLENE	167 (0.2)	584 (0.2)	30.9 (0.2)	ND (0.2)	ND (0.2)

Units are ug/L

() = detection limit

ND = not detected at detection limit

NA = not analyzed

N/R = not reported

QUARTERLY SAMPLING
ANALYTICAL RESULTS FOR GROUNDWATER
AROMATIC VOLATILE ORGANIC COMPOUNDS
(03/14/89)

<u>ANALYTE</u>	<u>GBR-17</u>	<u>GBR-24D</u>	<u>GBR-30</u>	<u>GBR-31</u>	<u>GBR-33</u>
BENZENE	ND (0.2)	28.7 (0.2)	1.9 (0.2)	.3 (0.2)	12.6 (0.2)
TOLUENE	ND (0.2)	8.9 (0.2)	5.3 (0.2)	ND (0.2)	3.3 (0.2)
ETHYLBENZENE	ND (0.2)	58.9 (0.2)	3.5 (0.2)	ND (0.2)	16.3 (0.2)
CHLOROBENZENE-A	NA	NA	NA	NA	NA
1,4-DICHLOROBENZENE	NA	NA	NA	NA	NA
1,3-DICHLOROBENZENE	NA	NA	NA	NA	NA
1,2-DICHLOROBENZENE	NA	NA	NA	NA	NA
m,p-XYLENE	ND (0.2)	16.7 (0.2)	8.2 (0.2)	ND (0.2)	13.5 (0.2)
o-XYLENE	ND (0.2)	2.2 (0.2)	3.4 (0.2)	ND (0.2)	4.8 (0.2)

Units are ug/L

() = detection limit

ND = not detected at detection limit

NA = not analyzed

N/R = not reported

QUARTERLY SAMPLING
ANALYTICAL RESULTS FOR GROUNDWATER
SELECTED MAJOR CATIONS, ANIONS, AND TOTAL DISSOLVED SOLIDS
(03/14/89)

ANALYTE	<u>GBR-06</u>	<u>GBR-08</u>	<u>GBR-13</u>	<u>GRW-13</u>	<u>GBR-15</u>	<u>GBR-17</u>	<u>GBR-24D</u>	<u>GBR-30</u>	<u>GBR-31</u>	<u>GBR-33</u>
CALCIUM	321	351	603	588	449	415	543	530	589	543
CHLORIDE	351	638	667	830	282	162	630	583	449	642
FLUORIDE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MAGNESIUM	75	43	50	29	17	48	83	39	33	26
POTASSIUM	4	3	3	7	7	1	6	3	2	3
SODIUM	522	780	761	738	693	301	479	600	615	633
SULFATE	525	653	1639	1796	2110	1341	1593	1501	1983	1490
TOTAL DISSOLVED SOLIDS	2576	3240	4212	4232	3724	2496	3616	3604	3904	3688
SPECIFIC CONDUCTANCE	NA	NA	NA	4780	NA	NA	NA	NA	NA	NA

UNITS ARE mg/L
ND = NOT DETECTED
NA = NOT ANALYSED
N/R = NOT REPORTED

3.1 RESULTS OF ANNUAL TANK/STREAM SAMPLING

ANNUAL SAMPLING
ANALYTICAL RESULTS FOR WATER STORED IN TANKS
VOLATILE ORGANIC COMPOUNDS
(11/08/88)

ANALYTE:	<u>TANK 22</u>	<u>TANK 27</u>	<u>TANK 34</u>	<u>TANK 35</u>	<u>TANK 106</u>
ACETONE	ND (25)	ND (25)	ND (25)	ND (25)	ND (25)
ACROLEIN	ND (75)	ND (75)	ND (75)	ND (75)	ND (75)
ACRYLONITRILE	ND (30)	ND (30)	ND (30)	ND (30)	ND (30)
BENZENE	690 (N/R)	72 (N/R)	570 (N/R)	33 (N/R)	180 (N/R)
BROMOFORM	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
BROMOMETHANE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
CHLORODIBROMOMETHANE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
CHLOROETHANE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
CHLOROBENZENE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
CARBON DISULFIDE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
CARBON TETRACHLORIDE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
CHLOROFORM	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
CHLOROMETHANE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
2-CHLOROETHYL VINYL ETHER	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
DIBROMOMETHANE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
DICHLORODIFLUOROMETHANE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
1,1-DICHLOROETHANE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
1,2-DICHLOROETHANE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
TRANS-1,2-DICHLOROETHENE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
1,1-DICHLOROETHENE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
DICHLOROBROMOMETHANE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
1,2-DICHLOROPROPANE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)

UNITS ARE ug/L

() INDICATES DETECTION LIMITS

ND = NOT DETECTED

NA = NOT ANALYSED

N/R = NOT REPORTED

ANNUAL SAMPLING
ANALYTICAL RESULTS FOR WATER STORED IN TANKS
VOLATILE ORGANIC COMPOUNDS
(11/08/88)

ANALYTE:	<u>TANK 22</u>	<u>TANK 27</u>	<u>TANK 34</u>	<u>TANK 35</u>	<u>TANK 106</u>
CIS-1,3-DICHLOROPROPENE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
TRANS-1,2-DICHLOROPROPENE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
ETHYL METHACRYLATE	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)
ETHYLBENZENE	120 (N/R)	ND (2)	55 (N/R)	2.1 (N/R)	ND (2)
2-HEXANONE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
IODOMETHANE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
METHYLENE CHLORIDE	ND (10)	ND (2)	ND (2)	ND (2)	ND (2)
METHYL ETHYL KETONE	ND (10)	ND (2)	ND (2)	ND (2)	ND (2)
4-METHYL-2-PENTANONE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
STYRENE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
1,1,2,2-TETRACHLOROETHANE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
TETRACHLOROETHYLENE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
TOLUENE	4.7 (N/R)	3.9 (N/R)	9.2 (N/R)	2.1 (N/R)	ND (2)
TRICHLOROETHENE	3.4 (N/R)	2.6 (N/R)	ND (2)	ND (2)	ND (2)
1,1,1-TRICHLOROETHANE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
1,1,2-TRICHLOROETHANE	ND (2)	3.4 (N/R)	ND (2)	ND (2)	ND (2)
TRICHLOROFLUOROMETHANE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
1,2,3-TRICHLOROPROPANE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
VINYL CHLORIDE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
VINYL ACETATE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
TRANS1,4DICHLORO-2-BUTENE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)
XYLENES	140 (N/R)	11 (N/R)	168 (N/R)	12 (N/R)	190 (N/R)
1,2-DIBROMOETHANE	ND (2)	ND (2)	ND (2)	ND (2)	ND (2)

UNITS ARE ug/L

() INDICATES DETECTION LIMITS

ND = NOT DETECTED

NA = NOT ANALYSED

N/R = NOT REPORTED

ANNUAL SAMPLING
ANALYTICAL RESULTS FOR WATER STORED IN TANKS
POLYNUCLEAR AROMATIC HYDROCARBONS
(11/08/88)

ANALYTE:	TANK 22	TANK 27	TANK 34	TANK 35	TANK 106
PYRENE	NA	ND (0.71)	NA	NA	ND (0.71)
DIBENZO(A,H)ANTHRACENE	NA	ND (0.3)	NA	NA	ND (0.3)
BENZO(K)FLUORANTHENE	NA	ND (0.1)	NA	NA	ND (0.1)
ACENAPHTHYLENE	NA	ND (31)	NA	NA	ND (31)
ACENAPHTHENE	NA	ND (3.4)	NA	NA	ND (3.4)
FLUORANTHENE	NA	ND (0.61)	NA	NA	ND (0.61)
FLUORENE	NA	3.7 (N\R)	NA	NA	7.3 (N\R)
CHRYSENE	NA	ND (0.1)	NA	NA	ND (0.1)
NAPTHELENE	NA	6.5 (N\R)	NA	NA	9.6 (N\R)
ANTHRACENE	NA	ND (2.4)	NA	NA	ND (2.4)
BENZ(A)ANTHRACENE	NA	ND (0.4)	NA	NA	ND (0.4)
INDENO(1,2,3-CD)PYRENE	NA	ND (1.8)	NA	NA	ND (1.8)
BENZO(B)FLUORANTHENE	NA	ND (0.1)	NA	NA	ND (0.1)
PHENANTHRENE	NA	8.3 (N\R)	NA	NA	12 (N\R)
BENZO(A)PYRENE	NA	ND (0.2)	NA	NA	ND (0.2)
BENZO(GH)PERYLENE	NA	ND (0.3)	NA	NA	ND (0.3)
1-METHYLNAPHTHALENE	NA	55 (N\R)	25 (N\R)	NA	83 (N\R)
2-METHYLNAPHTHALENE	NA	56 (N\R)	9.3 (N\R)	NA	45 (N\R)

UNITS ARE ug/L

() INDICATES DETECTION LIMITS

ND = NOT DETECTED

NA = NOT ANALYSED

N\R = NOT REPORTED

ANNUAL SAMPLING
ANALYTICAL RESULTS FOR WATER STORED IN TANKS
SELECTED MAJOR CATIONS, ANIONS, NITRATE AND TOTAL DISSOLVED SOLIDS
(11/08/88)

ANALYTE	TANK 22	TANK 27	TANK 34	TANK 35	TANK 106
CALCIUM	NA	390 (N\R)	460 (N\R)	NA	400 (N\R)
CHLORIDE	NA	940 (N\R)	720 (N\R)	410	580 (N\R)
FLUORIDE	NA	3.5 (N\R)	3.7 (N\R)	NA	3.8 (N\R)
POTASSIUM	NA	3.9 (N\R)	3.7 (N\R)	NA	5.2 (N\R)
MAGNESIUM	NA	51 (N\R)	48 (N\R)	NA	43 (N\R)
SODIUM	NA	520 (N\R)	600 (N\R)	NA	470 (N\R)
SULFATE	NA	940 (N\R)	1400 (N\R)	640	1400 (N\R)
NITRATE AS N	NA	NA	0.32 (N\R)	NA	NA
TOTAL DISSOLVED SOLIDS	3800 (6)	3800 (6)	3900 (6)	3800 (6)	3700 (6)

UNITS FOR ANALYSES ARE mg/L
() INDICATES DETECTION LIMIT
ND = NOT DETECTED
NA = NOT ANALYSED
N/A = NOT REPORTED

ANNUAL SAMPLING
ANALYTICAL RESULTS FOR WATER STORED IN TANKS
WQCC METALS
(11/08/88)

ANALYTE:	TANK 22	TANK 27	TANK 34	TANK 35	TANK 106
SILVER	NA	NA (0.03)	NA	NA	ND (0.03)
ALUMINUM	NA	0.3 (0.20)	NA	NA	ND (0.20)
ARSENIC	NA	0.3 (0.3)	NA	NA	ND (0.30)
BORON	NA	0.71 (0.60)	NA	NA	0.64 (0.60)
BARIUM	NA	0.042 (0.01)	NA	NA	0.052 (0.01)
CALCIUM	NA	390 (1.00)	NA	NA	410 (1.00)
COBALT	NA	ND (0.01)	NA	NA	0.035 (0.01)
CHROMIUM	NA	ND (0.03)	NA	NA	ND (0.03)
COPPER	NA	ND (0.02)	NA	NA	0.052 (0.02)
IRON	NA	5.0 (0.04)	NA	NA	7.6 (0.04)
POTASSIUM	NA	ND (3.00)	NA	NA	ND (3.0)
MAGNESIUM	NA	49 (1.00)	NA	NA	41 (1.00)
MANGANESE	NA	2.6 (0.01)	NA	NA	2.6 (0.01)
MOLYBDENUM	NA	ND (0.05)	NA	NA	ND (0.05)
SODIUM	NA	560 (1.00)	NA	NA	540 (1.00)
NICKEL	NA	0.18 (0.02)	NA	NA	0.12 (0.02)
LEAD	NA	ND (0.05)	NA	NA	ND (0.05)
SELENIUM	NA	ND (0.03)	NA	NA	ND (0.30)
ZINC	NA	ND (0.02)	NA	NA	0.26 (0.02)

Units are mg/L

ND = not detected at detection limit

NA = not analyzed

N\R = not reported

4.1 PUMP DISCHARGE RATES

Pump discharge Rates:

Monitoring requirements pursuant to the Giant Bloomfield Refinery Discharge Plan state that the number of gallons pumped by each submersible pump be recorded as well as the volume of influent and effluent at the air stripper and the source of the influent.

Flow monitoring from the submersible pumps and the air stripper experienced difficulty during the first quarter of the discharge plan. Accurate flow measurements from individual pumps and the air stripper are not available. New flow meters have been installed, are being checked for accuracy and should remedy this situation for the next quarter.

Submersible and air lift pumps at the Giant Bloomfield Refinery are designed and operated to produce an approximate total of 10 gallons per minute (gpm) ground water. Water from the pumps is directed to either the storage tanks or to the air stripper. At 10 gallons per minute, remediation at the Giant Bloomfield Refinery would produce 1.31 million gallons of water per quarter.

The air stripper was not operated continuously during the quarter due to effluent not meeting the WQCC standard for benzene on two occasions. The problem was first caused by a reduced operating efficiency during cold weather and later by a change in the source of influent from pumped ground water to stored ground water. While the air stripper was not operating, ground water recovered during the quarter was placed in storage.

5.1 MONTHLY SPECIFIC CONDUCTANCE VALUES

MONTHLY SAMPLING RESULTS
 GIANT BLOOMFIELD REFINERY
 SPECIFIC CONDUCTANCE
 UNITS ARE umhos

WELL NUMBER	JANUARY 1989	FEBRUARY 1989	MARCH 1989
GRW-13	4700	4670	4780