

GW - 40

MONITORING REPORTS

DATE:

1988-1986

**DATA REPORT FOR
THE NORTHERN REFINERY AREA
GIANT BLOOMFIELD REFINERY**

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LOCATION: GBR-17

TEST: Halogenated/Aromatic Volatile Organic Compounds

ANALYTE	5/29/86 ug/l	6/05/86 ug/l	7/15/86 ug/l	11/21/86 ug/l	8/05/87 ug/l	10/07/87 ug/l	11/12/87 ug/l	4/20/88 ug/l	4/20/88 ug/l
BENZENE	ND	ND	ND	TR	ND	ND	ND	ND	ND
BROMODICHLOROMETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND
BROMOFORM	ND	ND	ND	ND	ND	ND	ND	ND	ND
BROMOMETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND
CARBON TETRACHLORIDE	ND	ND	ND	ND	ND	ND	ND	ND	ND
CHLORO BENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND
CHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-CHLOROETHYL VINYL ETHER	ND	ND	ND	ND	ND	ND	ND	ND	ND
CHLOROFORM	ND	ND	ND	ND	ND	ND	1.3	ND	ND
CHLOROMETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND
DIBROMOCHLOROMETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-DICHLORO BENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-DICHLORO BENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-DICHLORO BENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND
DICHLORODIFLUOROMETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-DICHLOROETHANE	ND	20	ND	6	TR	3.3	4	ND	TR
1,2-DICHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	TR
*CIS-1,2-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	ND	ND	ND
TRANS-1,2-DICHLOROETHENE	ND	1	ND	ND	ND	1.2	0.9	ND	ND
*DICHLOROMETHANE	ND	15	ND	TR	ND	ND	ND	ND	ND
1,2-DICHLOROPROPANE	ND	ND	ND	ND	ND	ND	ND	ND	ND
CIS-1,3-DICHLOROPROPENE	ND	ND	ND	ND	ND	ND	ND	ND	ND
TRANS-1,3-DICHLOROPROPENE	ND	ND	ND	ND	ND	ND	ND	ND	ND
ETHYL BENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND
METHYLENE CHLORIDE	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2,-TETRACHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND
TETRACHLOROETHENE	ND	1	ND	TR	TR	0.4	0.6	ND	TR
TOLUENE	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-TRICHLOROETHANE	ND	14	ND	7	4	4	2.1	4.4	TR
1,1,2-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND
TRICHLOROETHENE	ND	1	ND	TR	TR	0.4	0.5	ND	TR
TRICHLOROFLUOROMETHANE	ND	ND	ND	ND	ND	ND	ND	ND	TR
VINYL CHLORIDE	ND	ND	ND	ND	ND	ND	ND	ND	ND
META-XYLENE	ND	ND	ND	ND	ND	ND	ND	ND	ND
ORTHO-XYLENE	ND	ND	ND	ND	ND	ND	ND	ND	ND
PARA-XYLENE	ND	ND	ND	ND	ND	ND	ND	ND	DN
M,O-XYLENE	ND	ND	ND	ND	ND	ND	ND	ND	ND
O,P-XYLENE	ND	ND	ND	ND	ND	ND	ND	ND	ND
XYLENES	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND = NOT DETECTED

NA = NOT ANALYZED

N/A = NOT AVAILABLE

TR = TRACE QUANTITIES DETECTED BELOW DETECTION LIMIT

LOCATION: GBR-17

TEST: Halogenated/Aromatic Volatile Organic Compounds (Cont'd)

ANALYTE	6/02/88 ug/l	8/24/88 ug/l	8/24/88 ug/l	12/07/88 ug/l	3/14/89 ug/l
BENZENE	ND	ND	ND	ND	ND
BROMODICHLOROMETHANE	ND	ND	ND	ND	ND
BROMOFORM	ND	ND	ND	ND	ND
BROMOMETHANE	ND	ND	ND	ND	ND
CARBON TETRACHLORIDE	ND	ND	ND	ND	ND
CHLOROBENZENE	ND	ND	ND	ND	ND
CHLOROETHANE	ND	ND	ND	ND	ND
2-CHLOROETHYL VINYL ETHER	ND	ND	ND	ND	ND
CHLOROFORM	ND	ND	ND	ND	ND
CHLOROMETHANE	ND	ND	ND	ND	ND
DIBROMOCHLOROMETHANE	ND	ND	ND	ND	ND
1,2-DICHLOROBENZENE	ND	ND	ND	ND	ND
1,3-DICHLOROBENZENE	ND	ND	ND	ND	ND
1,4-DICHLOROBENZENE	ND	ND	ND	ND	ND
DICHLORODIFLUOROMETHANE	ND	ND	ND	ND	ND
1,1-DICHLOROETHANE	ND	TR	ND	0.8	ND
1,2-DICHLOROETHANE	ND	ND	ND	ND	ND
1,1-DICHLOROETHENE	ND	ND	ND	ND	ND
*CIS-1,2-DICHLOROETHENE	ND	ND	ND	ND	ND
TRANS-1,2-DICHLOROETHENE	ND	ND	ND	ND	ND
*DICHLOROMETHANE	ND	ND	ND	ND	ND
1,2-DICHLOROPROPANE	ND	ND	ND	ND	ND
CIS-1,3-DICHLOROPROPENE	ND	ND	ND	ND	ND
TRANS-1,3-DICHLOROPROPENE	ND	ND	ND	ND	ND
ETHYLBENZENE	ND	ND	ND	ND	ND
METHYLENE CHLORIDE	ND	ND	ND	ND	1.8
1,1,2,2,-TETRACHLOROETHANE	ND	ND	ND	ND	ND
TETRACHLOROETHENE	ND	TR	ND	0.7	ND
TOLUENE	ND	ND	ND	ND	ND
1,1,1-TRICHLOROETHANE	3.1	TR	2.40	2	0.85
1,1,2-TRICHLOROETHANE	ND	ND	ND	ND	ND
TRICHLOROETHENE	ND	TR	ND	ND	ND
TRICHLOROFLUOROMETHANE	ND	ND	ND	0.6	ND
VINYL CHLORIDE	ND	ND	ND	ND	ND
META-XYLENE	ND	ND	ND	ND	ND
ORTHO-XYLENE	ND	ND	ND	ND	ND
PARA-XYLENE	ND	ND	ND	ND	ND
M,O-XYLENE	ND	ND	ND	ND	ND
O,P-XYLENE	ND	ND	ND	ND	ND
XYLENES	ND	ND	ND	ND	ND

ND = NOT DETECTED

NA = NOT ANALYZED

N/A = NOT AVAILABLE

TR = TRACE QUANTITIES DETECTED BELOW DETECTION LIMIT

LOCATION: GBR-17

TEST: Aromatic Volatile Organic Compounds

ANALYTE	6/18/86
-----	ug/l
BENZENE	ND
CHLOROBENZENE	NA
1,2-DICHLOROBENZENE	NA
1,3-DICHLOROBENZENE	NA
1,4-DICHLOROBENZENE	NA
ETHYLBENZENE	NA
TOLUENE	ND
META-XYLENE	NA
ORTH-XYLENE	NA
PARA-XYLENE	NA
M,O-XYLENE	NA
O,P-XYLENE	NA
XYLENES	ND

ND = NOT DETECTED

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N/A = NOT AVAILABLE

TR = TRACE QUANTITIES DETECTED BELOW DETECTION LIMITS

LOCATION: GBR-17

TEST: 610 Polynuclear Aromatic Hydrocarbons

ANALYTE	6/02/88 ug/l	3/14/89 ug/l
ACENAPHTHENE	ND	ND
ACENAPHTHYLENE	ND	ND
ANTHRACENE	ND	ND
BENZO(A)ANTHRACENE	ND	ND
BENZO(A)PYRENE	ND	ND
BENZO(B)FLUORANTHENE	ND	ND
BENZO(J)FLUORANTHENE	ND	ND
BENZO(K)FLUORANTHENE	ND	2.6
BENZO(GHI)PERYLENE	ND	ND
CHRYSENE	ND	ND
DIBENZ(A,H)ACRIDENE	ND	ND
DIBENZ(A,J)ACRIDENE	ND	ND
DIBENZO(A,H)ANTHRACENE	ND	ND
L7H-DIBENZO(C,G)CARBAZOLE	ND	ND
DIBENZO(A,E)PYRENE	ND	ND
DIBENZO(A,H)PYRENE	ND	ND
DIBENZO(A,I)PYRENE	ND	ND
FLUORANTHENE	ND	1.4
FLUORENE	ND	1.8
INDENO(1,2,3-CD)PYRENE	ND	ND
L3-METHYLCHOLANTHRENE	ND	ND
NAPHTHALENE	ND	ND
PHENANTHRENE	ND	ND
PYRENE	ND	ND
ACENAPHTHENE	ND	ND
ACENAPHTHYLENE	ND	ND
ANTHRACENE	ND	ND

ND = NOT DETECTED

NA = NOT ANALYZED

N/A = NOT AVAILABLE

TR = TRACE QUANTITIES DETECTED BELOW DETECTION LIMIT

LOCATION: GBR-17

TEST: General Chemistry

ANALYTE	5/29/86 mg/l	06/10/86 mg/l	11/26/86 mg/l	08/07/87 mg/l	04/20/88 mg/l	06/02/88 mg/l	08/24/88 mg/l	12/07/88 mg/l
CALCIUM	NA	712	580	464	396	411	388	370
MAGNESIUM	NA	63.4	70.8	88	70.8	44	50.6	42
SODIUM	NA	616.4	358.8	380	299	281	323	290
POTASSIUM	NA	1.17	40.5	0.78	4	1.1	101	<5
AMMONIA-N	NA	NA	NA	NA	NA	NA	NA	NA
BICARBONATE	NA	376	312	805	214	124	268	NA
BROMIDE	NA	NA	649	1.57	<.3	NA	NA	NA
CARBONATE	NA	0	0	NA	NA	<20	NA	NA
CHLORIDE	NA	1005	649	337	141	370	166	170
FLUORIDE	NA	NA	NA	NA	NA	NA	NA	2.4
NITRATE-N+, NITRITE-N	NA	NA	NA	NA	NA	NA	NA	NA
SULFATE	NA	1202	1344	1340	960	2270	1340	1300
TFS	3024	4355	3434	2820	2598	3996	2528	2500
ACIDITY AS CaCO3	NA	NA	NA	NA	NA	NA	NA	NA
ALKALINITY AS CaCO3	NA	NA	NA	NA	NA	NA	NA	NA
HARDNESS AS CaCO3	NA	NA	NA	NA	NA	NA	NA	NA
CHARGE BALANCE (%)	NA	NA	NA	NA	NA	NA	102	NA
pH	NA	7	8.19	NA	NA	NA	7.2	NA
CONDUCTIVITY (umho)	NA	NA	4078	NA	NA	NA	3051	NA

TFS = TOTAL FILTERABLE SOLIDS (DISSOLVED)

ND = NOT DETECTED

NA = NOT ANALYZED

N/A = NOT AVAILABLE

TR = TRACE QUANTITIES DETECTED BELOW DETECTION LIMIT

LOCATION: GBR-17

TEST: General Chemistry (Cont'd)

ANALYTE	03/14/89 mg/l	03/14/89 mg/l
CALCIUM	415	422
MAGNESIUM	48	40
SODIUM	301	298
POTASSIUM	1	1
AMMONIA-N	NA	NA
BICARBONATE	282	283
BROMIDE	NA	NA
CARBONATE	0	0
CHLORIDE	162	161
FLUORIDE	NA	NA
NITRATE-N+, NITRITE-N	3.14	2.85
SULFATE	1341	1341
TFS	2496	2480
ACIDITY AS CaCO3	<1	<1
ALKALINITY AS CaCO3	232	282
HARDNESS AS CaCO3	1234	1216
CHARGE BALANCE (%)	99.12	99.77
pH	NA	NA
CONDUCTIVITY (umho)	NA	NA

TFS = TOTAL FILTERABLE SOLIDS (DISSOLVED)

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N/A = NOT AVAILABLE

TR = TRACE QUANTITIES DETECTED BELOW DETECTION LIMIT

LOCATION: GBR-17

TEST: Metals

ANALYTE	6/10/86 mg/l	11/21/86 mg/l	10/7/87 mg/l	11/12/87 mg/l
ALUMINUM	ND	ND	NA	0.42
ARSENIC	0.007	ND	ND	NA
BARIUM	ND	ND	ND	1.52
BERYLLIUM	ND	ND	NA	NA
BORON	0.3	0.2	NA	NA
CADMIUM	ND	ND	0.004	0.018
CALCIUM	730	660	NA	NA
HEXAVALENT CHROMIUM	NA	NA	ND	ND
TOTAL CHROMIUM	ND	ND	ND	2.91
COBALT	ND	ND	NA	NA
COPPER	ND	ND	NA	NA
IRON	ND	ND	NA	NA
LEAD	ND	ND	ND	0.06
MAGNESIUM	60	54	NA	NA
MANGANESE	ND	ND	NA	NA
MERCURY	ND	NA	ND	ND
MOLYBDENUM	ND	ND	NA	NA
NICKEL	0.1	0.1	NA	NA
SELENIUM	NA	NA	ND	ND
SILICON	5.9	6.2	NA	NA
SILVER	ND	ND	0.017	0.019
STRONTIUM	12	1	NA	NA
TIN	ND	ND	NA	NA
VANADIUM	ND	ND	NA	NA
ZINC	ND	ND	NA	NA

ND = NOT DETECTED

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TR = TRACE QUANTITIES DETECTED BELOW DETECTION LIMIT

LOCATION: GBR-18

TEST: Halogenated/Aromatic Volatile Organic Compounds

ANALYTE	06/05/86 ug/l	07/08/86 ug/l	11/21/86 ug/l	06/08/88 ug/l	08/24/88 ug/l	08/24/88 ug/l
BENZENE	50	ND	ND	TR	ND	ND
BROMODICHLOROMETHANE	ND	ND	ND	ND	ND	ND
BROMOFORM	ND	ND	ND	ND	ND	ND
BROMOMETHANE	ND	ND	ND	ND	ND	ND
CARBON TETRACHLORIDE	ND	ND	ND	ND	ND	ND
CHLORO BENZENE	ND	ND	ND	ND	ND	ND
CHLOROETHANE	ND	ND	ND	ND	ND	ND
1,2-CHLOROETHYL VINYL ETHER	ND	ND	ND	ND	ND	ND
CHLOROFORM	ND	ND	ND	ND	ND	ND
CHLOROMETHANE	ND	ND	ND	ND	ND	ND
DIBROMOCHLOROMETHANE	ND	ND	ND	ND	ND	ND
1,2-DICHLORO BENZENE	ND	ND	ND	ND	ND	ND
1,3-DICHLORO BENZENE	ND	ND	ND	ND	ND	ND
1,4-DICHLORO BENZENE	ND	ND	ND	ND	ND	ND
DICHLORODIFLUOROMETHANE	ND	ND	ND	ND	ND	ND
1,1-DICHLOROETHANE	ND	ND	ND	ND	ND	ND
1,2-DICHLOROETHANE	ND	ND	ND	ND	ND	ND
1,1-DICHLOROETHENE	ND	ND	ND	ND	ND	ND
TRANS-1,2-DICHLOROETHENE	ND	ND	ND	ND	ND	ND
1,2-DICHLOROPROPANE	ND	ND	ND	ND	ND	ND
CIS-1,3-DICHLOROPROPENE	ND	ND	ND	ND	ND	ND
TRANS-1,3-DICHLOROPROPENE	ND	ND	ND	ND	ND	ND
ETHYLBENZENE	ND	ND	ND	ND	ND	ND
METHYLENE CHLORIDE	ND	ND	ND	ND	ND	ND
1,1,2,2,-TETRACHLOROETHANE	ND	ND	ND	ND	ND	ND
TETRACHLOROETHENE	ND	ND	ND	ND	ND	ND
TOLUENE	11	1	ND	TR	ND	ND
1,1,1-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND
1,1,2-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND
TRICHLOROETHENE	ND	ND	ND	ND	ND	ND
TRICHLOROFLUOROMETHANE	ND	ND	ND	ND	ND	ND
VINYL CHLORIDE	ND	ND	ND	ND	ND	ND
META-XYLENE	4	ND	ND	ND	ND	ND
ORTHO-XYLENE	ND	1	ND	ND	ND	ND
PARA-XYLENE	ND	ND	ND	ND	ND	ND
M,O-XYLENE	ND	ND	ND	ND	ND	ND
O,P-XYLENE	ND	ND	ND	ND	ND	ND
P,M-XYLENE	ND	ND	ND	TR	ND	ND
XYLENES	ND	ND	ND	ND	ND	ND

ND = NOT DETECTED

NA = NOT ANALYZED

N/A = NOT AVAILABLE

TR = TRACE QUANTITIES DETECTED BELOW DETECTION LIMIT

LOCATION: GBR-18

TEST: Aromatic Volatile Organic Hydrocarbons

05/09/86

ug/l

BENZENE	ND
CHLOROBENZENE	ND
1,2-DICHLOROBENZENE	ND
1,3-DICHLOROBENZENE	ND
1,4-DICHLOROBENZENE	ND
ETHYLBENZENE	ND
TOLUENE	ND
META-XYLENE	ND
ORTH-XYLENE	ND
PARA-XYLENE	ND
M,O-XYLENE	ND
O,P-XYLENE	ND
XYLENES	ND

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TR = TRACE QUANTITIES DETECTED BELOW DETECTION LIMIT

LOCATION: GBR-18

TEST: General Chemistry

	06/05/86	11/21/86	06/08/88	08/24/88
	mg/l	mg/l	mg/l	mg/l
CALCIUM	420	460	488.00	488
IRON	NA	NA	0.00	NA
MAGNESIUM	293	14.6	90.30	60.4
MANGANESE	NA	NA	0.00	NA
SODIUM	432	990	1005.00	904
POTASSIUM	6.63	15.6	15.00	15.1
AMMONIA-N	NA	NA	0.00	NA
BICARBONATE	122	163	551.00	173
BROMIDE	NA	ND	1.30	NA
CARBONATE	0	0	0.00	NA
CHLORIDE	262	163	232.00	223
PHOSPHATE	NA	NA	0.00	NA
NITRATE-N+, NITRITE-N	NA	NA	0.00	NA
SULFATE	3141	2836	2975.00	2850
TFS	4935	4888	4802.00	4806
CHARGE BALANCE (%)	NA	NA	97.82	101
pH	7	7.79	7.00	7.8
CONDUCTIVITY (umho)	NA	4888	5495.00	5459

TFS = TOTAL FILTERABLE SOLIDS (DISSOLVED)

ND = NOT DETECTED

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N/A = NOT AVAILABLE

TR = TRACE QUANTITIES DETECTED BELOW DETECTION LIMIT

LOCATION: GBR-18

TEST: Metals

	06/05/86	11/21/86
	mg/l	mg/l
ALUMINUM	ND	6.9
ARSENIC	NA	ND
BARIUM	ND	ND
BERYLLIUM	ND	ND
BORON	0.2	0.3
CADMIUM	ND	ND
CALCIUM	440	460
HEXAVALENT CHROMIUM	ND	ND
TOTAL CHROMIUM	ND	ND
COBALT	ND	ND
COPPER	ND	ND
IRON	ND	7.5
LEAD	ND	0.2
MAGNESIUM	46	45
MANGANESE	ND	0.18
MERCURY	NA	NA
MOLYBDENUM	ND	ND
NICKEL	ND	ND
SELENIUM	NA	NA
SILICON	2.1	11
SILVER	ND	ND
STRONTIUM	11	11
TIN	ND	ND
VANADIUM	ND	ND
ZINC	0.5	17

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TR = TRACE QUANTITIES DETECTED BELOW DETECTION LIMIT

LOCATION: GBR-24D

TEST: Halogenated/Aromatic Volatile Organic Compounds

ANALYTE	11/21/86 ug/l	09/10/87 ug/l	10/07/87 ug/l	11/12/87 ug/l	06/01/88 ug/l	08/25/88 ug/l	08/25/88 ug/l	03/14/89 ug/l
BENZENE	230	100	100	1200	63	27	39.1	28.7
BROMODICHLOROMETHANE	NA	ND	ND	ND	ND	NA	ND	ND
BROMOFORM	NA	ND	ND	ND	ND	NA	ND	ND
BROMOMETHANE	NA	ND	ND	ND	ND	NA	ND	ND
CARBON TETRACHLORIDE	NA	ND	ND	ND	ND	NA	ND	ND
CHLOROBENZENE	NA	ND	ND	ND	ND	NA	ND	ND
CHLOROETHANE	NA	ND	ND	ND	ND	NA	ND	ND
2-CHLOROETHYL VINYL ETHER	NA	ND	ND	ND	ND	NA	ND	ND
CHLOROFORM	NA	ND	ND	23	ND	NA	ND	ND
CHLOROMETHANE	NA	ND	ND	ND	ND	NA	ND	ND
DIBROMOCHLOROMETHANE	NA	ND	ND	ND	ND	NA	ND	ND
1,2-DIBROMOMETHANE	TR	ND	ND	ND	ND	NA	ND	ND
1,2-DICHLOROBENZENE	TR	1.9	ND	ND	ND	NA	1.1	ND
1,3-DICHLOROBENZENE	NA	ND	ND	ND	1.3	NA	ND	ND
1,4-DICHLOROBENZENE	NA	ND	ND	ND	ND	NA	ND	ND
DICHLORODIFLUOROMETHANE	NA	ND	ND	ND	ND	NA	ND	ND
1,1-DICHLOROETHANE	NA	ND	ND	ND	ND	NA	ND	ND
1,2-DICHLOROETHANE	69	44.7	35	34	55	6	25.7	6.8
1,1-DICHLOROETHENE	NA	ND	ND	ND	ND	NA	ND	ND
TRANS-1,2-DICHLOROETHENE	NA	ND	ND	ND	ND	NA	ND	ND
1,2-DICHLOROPROPANE	NA	ND	ND	ND	ND	NA	ND	ND
CIS-1,3-DICHLOROPROPENE	NA	ND	ND	ND	ND	NA	ND	ND
TRANS-1,3-DICHLOROPROPENE	NA	ND	ND	ND	ND	NA	ND	ND
ETHYLBENZENE	180	211	181	1100	73	55	87.3	58.9
METHYLENE CHLORIDE	NA	ND	ND	ND	ND	NA	ND	ND
1,1,2,2,-TETRACHLOROETHANE	NA	ND	ND	ND	ND	NA	ND	ND
TETRACHLOROETHENE	TR	1.1	ND	2.9	0.69	NA	0.6	ND
TOLUENE	5	47.7	35	22	11	TR	6.5	8.9
1,1,1-TRICHLOROETHANE	NA	ND	ND	ND	ND	NA	ND	ND
1,1,2-TRICHLOROETHANE	NA	ND	ND	ND	ND	NA	ND	ND
TRICHLOROETHENE	NA	ND	ND	2	ND	NA	ND	ND
TRICHLOROFLUOROMETHANE	NA	ND	ND	ND	ND	NA	ND	ND
VINYL CHLORIDE	NA	ND	ND	ND	ND	NA	ND	ND
META-XYLENE	ND	71.1	40	12	ND	NA	ND	ND
ORTHO-XYLENE	7	ND	ND	ND	ND	NA	ND	2.2
PARA-XYLENE	140	ND	ND	ND	ND	NA	ND	ND
M,O-XYLENE	NA	ND	ND	ND	ND	NA	ND	ND
O,P-XYLENE	NA	175	125	43	ND	NA	30.4	ND
P,M-XYLENE	NA	ND	ND	ND	ND	10	ND	16.7
XYLENES	NA	ND	ND		40	NA	ND	ND

N D = NOT DETECTED

NA = NOT ANALYZED

N/A = NOT AVAILABLE

TR = TRACE QUANTITIES DETECTED BELOW DETECTION LIMITS

LOCATION: GBR-24D

TEST: Polynuclear Aromatic Hydrocarbons

	06/01/88	03/14/89
	ug/l	ug/l
ACENAPHTHENE	ND	ND
ACENAPHTHYLENE	ND	ND
ANTHRACENE	ND	ND
BENZO(A)ANTHRACENE	ND	ND
BENZO(A)PYRENE	ND	ND
BENZO(B)FLUORANTHENE	ND	ND
BENZO(J)FLUORANTHENE	ND	ND
BENZO(K)FLUORANTHENE	ND	ND
BENZO(GHI)PERYLENE	ND	ND
CHRYSENE	ND	ND
DIBENZ(A,H)ACRIDENE	ND	ND
DIBENZ(A,J)ACRIDENE	ND	ND
DIBENZO(A,H)ANTHRACENE	ND	ND
7H-DIBENZO(C,G)CARBAZOLE	ND	ND
DIBENZO(A,E)PYRENE	ND	ND
DIBENZO(A,H)PYRENE	ND	ND
DIBENZO(A,I)PYRENE	ND	ND
FLUORANTHENE	ND	ND
FLUORENE	ND	ND
INDENO(1,2,3-CD)PYRENE	ND	ND
3-METHYLCHOLANTHRENE	ND	ND
NAPHTHALENE	10	ND
PHENANTHRENE	ND	ND
PYRENE	ND	ND
ACENAPHTHENE	ND	ND
ACENAPHTHYLENE	ND	ND
ANTHRACENE	ND	ND

ND = NOT DETECTED

NA = NOT ANALYZED

N/A = NOT AVAILABLE

TR = TRACE QUANTITIES DETECTED BELOW DETECTION LIMITS

LOCATION: GBR-24D

TEST: General Chemistry

	11/21/86	06/01/88	08/25/88	03/14/89
	mg/l	mg/l	mg/l	mg/l
CALCIUM	320	500	524	543
MAGNESIUM	63.4	75	99.4	83
SODIUM	634	491	493	479
POTASSIUM	5.85	5.3	6	6
AMMONIA-N	NA	NA	NA	NA
BICARBONATE	489	130	229	292
BROMIDE	ND	NA	NA	NA
CARBONATE	0	ND	NA	0
CHLORIDE	618	630	624	630
NITRATE-N+, NITRITE-N	NA	NA	NA	0.08
SULFATE	943	1640	1800	1593
TFS	2826	3487	3642	3616
ACIDITY AS CaCO3	NA	NA	NA	<1
ALKALINITY AS CaCO3	NA	NA	NA	240
HARDNESS AS CaCO3	NA	NA	NA	1696
CHARGE BALANCE (%)	NA	NA	98	99.24
pH	7.86	NA	7.9	NA
CONDUCTIVITY (umho)	3807	NA	4397	NA

TFS = TOTAL FILTERABLE SOLIDS (DISSOLVED)

ND = NOT DETECTED

NA = NOT ANALYZED

N/A = NOT AVAILABLE

TR = TRACE QUANTITIES DETECTED BELOW DETECTION LIMITS

LOCATION: GBR-24D

TEST: Metals

	11/21/86 mg/l	9/10/87 mg/l	10/7/87 mg/l	11/12/87 mg/l
ALUMINUM	ND	NA	NA	NA
ARSENIC	ND	ND	ND	0.19
BARIUM	0.1	0.1	ND	0.21
BERYLLIUM	ND	NA	NA	NA
BORON	0.3	NA	NA	NA
CADMIUM	ND	0.019	0.006	0.011
CALCIUM	330	NA	NA	NA
HEXAVALENT CHROMIUM	ND	ND	ND	ND
TOTAL CHROMIUM	ND	0.09	ND	0.093
COBALT	ND	NA	NA	NA
COPPER	ND	NA	NA	NA
IRON	ND	NA	NA	NA
LEAD	ND	0.027	0.003	0.019
MAGNESIUM	43	NA	NA	NA
MANGANESE	0.6	NA	NA	NA
MERCURY	NA	ND	ND	ND
MOLYBDENUM	ND	NA	NA	NA
NICKEL	ND	NA	NA	NA
SELENIUM	NA	ND	ND	ND
SILICON	7.5	NA	NA	NA
SILVER	ND	0.017	0.021	0.013
STRONTIUM	7.1	NA	NA	NA
TIN	ND	NA	NA	NA
VANADIUM	ND	NA	NA	NA
ZINC	ND	NA	NA	NA

ND = NOT DETECTED

NA = NOT ANALYZED

N/A = NOT AVAILABLE

TR = TRACE QUANTITIES DETECTED BELOW DETECTION LIMITS

LOCATION: GBR-30

TEST: 601/602 Halogenated Aromatic Volatile Organic Compounds

ANALYTE	10/17/86 ug/l	11/21/86 ug/l	6/1/88 ug/l	12/7/88 ug/l	3/14/89 ug/l
BENZENE	ND	NA	ND	ND	1.9
BROMODICHLOROMETHANE	ND	NA	ND	ND	ND
BROMOFORM	ND	NA	ND	ND	ND
BROMOMETHANE	ND	NA	ND	ND	ND
CARBON TETRACHLORIDE	ND	NA	ND	ND	ND
CHLOROBENZENE	ND	NA	ND	ND	ND
CHLOROETHANE	ND	NA	ND	ND	ND
1,2-CHLOROETHYL VINYL ETHER	ND	NA	ND	ND	ND
CHLOROFORM	ND	NA	ND	ND	ND
CHLOROMETHANE	ND	NA	ND	ND	ND
DIBROMOCHLOROMETHANE	ND	NA	ND	ND	ND
1,2-DICHLOROBENZENE	ND	NA	ND	ND	ND
1,3-DICHLOROBENZENE	ND	NA	ND	ND	ND
1,4-DICHLOROBENZENE	ND	NA	ND	ND	ND
DICHLORODIFLUOROMETHANE	ND	NA	ND	ND	ND
1,1-DICHLOROETHANE	ND	NA	ND	0.5	0.08
1,2-DICHLOROETHANE	ND	NA	0.98	1.1	0.1
1,1-DICHLOROETHENE	ND	NA	ND	ND	ND
TRANS-1,2-DICHLOROETHENE	ND	NA	1	ND	ND
1,2-DICHLOROPROPANE	ND	NA	ND	ND	ND
CIS-1,3-DICHLOROPROPENE	ND	NA	ND	ND	ND
TRANS-1,3-DICHLOROPROPENE	ND	NA	ND	ND	ND
ETHYLBENZENE	ND	NA	ND	2.4	3.5
METHYLENE CHLORIDE	ND	NA	ND	ND	1
1,1,2,2,-TETRACHLOROETHANE	ND	NA	ND	ND	ND
TETRACHLOROETHENE	ND	TR	0.61	ND	ND
TOLUENE	ND	NA	ND	ND	5.3
1,1,1-TRICHLOROETHANE	ND	NA	ND	ND	ND
1,1,2-TRICHLOROETHANE	ND	NA	ND	ND	ND
TRICHLOROETHENE	ND	TR	0.52	ND	ND
TRICHLOROFLUOROMETHANE	ND	NA	ND	0.6	ND
VINYL CHLORIDE	ND	NA	ND	ND	ND
META-XYLENE	ND	28	ND	1.7	ND
ORTHO-XYLENE	ND	9	ND	ND	3.4
PARA-XYLENE	ND	52	ND	8.7	ND
M,O-XYLENE	ND	NA	ND	ND	ND
O,P-XYLENE	ND	NA	ND	ND	ND
P,M-XYLENE	ND	NA	ND	ND	8.2
XYLENES	ND	NA	20	ND	ND

ND = NOT DETECTED

NA = NOT ANALYZED

N/A = NOT AVAILABLE

TR = TRACE QUANTITIES

LOCATION: GBR-30

TEST: Polynuclear Aromatic Hydrocarbons

	6/1/88	3/14/89
	ug/l	ug/l
ACENAPHTHENE	ND	ND
ACENAPHTHYLENE	ND	ND
ANTHRACENE	ND	ND
BENZO(A)ANTHRACENE	ND	ND
BENZO(A)PYRENE	ND	ND
BENZO(B)FLUORANTHENE	ND	ND
BENZO(J)FLUORANTHENE	ND	ND
BENZO(K)FLUORANTHENE	ND	ND
BENZO(GHI)PERYLENE	ND	ND
CHRYSENE	ND	ND
DIBENZ(A,H)ACRIDENE	ND	ND
DIBENZ(A,J)ACRIDENE	ND	ND
DIBENZO(A,H)ANTHRACENE	ND	ND
7H-DIBENZO(C,G)CARBAZOLE	ND	ND
DIBENZO(A,E)PYRENE	ND	ND
DIBENZO(A,H)PYRENE	ND	ND
DIBENZO(A,I)PYRENE	ND	ND
FLUORANTHENE	ND	ND
FLUORENE	ND	ND
INDENO(1,2,3-CD)PYRENE	ND	ND
3-METHYLCHOLANTHRENE	ND	ND
NAPHTHALENE	ND	ND
PHENANTHRENE	ND	ND
PYRENE	ND	ND
ACENAPHTHENE	ND	ND
ACENAPHTHYLENE	ND	ND
ANTHRACENE	ND	ND

ND = NOT DETECTED

NA = NOT ANALYZED

N/A = NOT AVAILABLE

TR = TRACE QUANTITIES DETECTED BELOW DETECTION LIMIT

LOCATION: GBR-30

TEST: General Chemistry

	11/21/86 mg/l	6/1/88 mg/l	12/7/88 mg/l	3/14/89 mg/l
CALCIUM	180	586	460	530
MAGNESIUM	36.6	50	36	39
SODIUM	271	578	440	600
POTASSIUM	1.95	3.3	<5	3
AMMONIA-N	NA	NA	NA	NA
BICARBONATE	554	124	NA	533
BROMIDE	0.4	ND	NA	NA
CARBONATE	NA	NA	NA	0
CHLORIDE	133	370	620	583
FLUORIDE	NA	NA	3.6	NA
NITRATE-N+, NITRITE-N	NA	NA	NA	0.05
SULFATE	389	2270	1300	1501
TFS	1308	3996	3500	3604
ACIDITY AS CaCO3	NA	NA	NA	<1
ALKALINITY AS CaCO3	NA	NA	NA	437
HARDNESS AS CaCO3	NA	NA	NA	1484
CHARGE BALANCE (%)	NA	NA	NA	99.47
pH	7.85	NA	NA	NA
CONDUCTIVITY (umho)	1715	NA	NA	NA

TFS = TOTAL FILTERABLE SOLIDS (DISSOLVED)

ND = NOT DETECTED

NA = NOT ANALYZED

N/A = NOT AVAILABLE

TR = TRACE QUANTITIES DETECTED BELOW DETECTION LIMIT

LOCATION: GBR-30

TEST: METALS

	11/21/86 mg/l
ALUMINUM	ND
ARSENIC	ND
BARIUM	ND
BERYLLIUM	ND
BORON	0.3
CADMIUM	190
CALCIUM	ND
HEXAVALENT CHROMIUM	ND
TOTAL CHROMIUM	ND
COBALT	ND
COPPER	ND
IRON	ND
LEAD	ND
MAGNESIUM	15
MANGANESE	2.2
MERCURY	NA
MOLYBDENUM	ND
NICKEL	ND
SELENIUM	NA
SILICON	7.8
SILVER	ND
STRONTIUM	3.4
TIN	ND
VANADIUM	ND
ZINC	ND

ND = NOT DETECTED

NA = NOT ANALYZED

N/A = NOT AVAILABLE

TR = TRACE QUANTITIES DETECTED BELOW DETECTION LIMIT

LOCATION: GBR-32

TEST: Halogenated/Aromatic Volatile Organic Compounds

ANALYTE	8/5/87 ug/l	10/7/87 ug/l	11/12/87 ug/l	4/20/88 ug/l	4/20/88 ug/l	8/24/88 ug/l	8/24/88 ug/l	11/8/88 ug/l	3/14/89 ug/l
BENZENE	ND	ND	ND	ND	ND	ND	ND	ND	0.81
BROMODICHLOROMETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND
BROMOFORM	ND	ND	ND	ND	ND	ND	ND	ND	ND
BROMOMETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND
CARBON TETRACHLORIDE	ND	ND	ND	ND	ND	ND	ND	ND	ND
CHLOROBENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND
CHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-CHLOROETHYL VINYL ETHER	ND	ND	ND	ND	ND	ND	ND	ND	ND
CHLOROFORM	ND	ND	11	1.1	0.9	3.9	ND	8.20	0.4
CHLOROMETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND
DIBROMOCHLOROMETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-DICHLOROBENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND
DICHLORODIFLUOROMETHANE	ND	ND	ND	ND	ND	ND	6	ND	ND
1,1-DICHLOROETHANE	3	10.4	10.7	5.7	8.5	3.6	ND	5.80	ND
1,2-DICHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-DICHLOROETHENE	ND	ND	ND	ND	ND	ND	100	ND	3.1
*CIS-1,2-DICHLOROETHENE	79	ND	ND	ND	88	97	ND		ND
TRANS-1,2-DICHLOROETHENE	ND	35	106	160	ND	ND	ND	120.00	ND
*DICHLOROMETHANE	ND	ND	ND	ND	ND	TR	ND		ND
1,2-DICHLOROPROPANE	ND	0.5	ND	ND	ND	ND	ND	ND	ND
CIS-1,3-DICHLOROPROPENE	ND	ND	ND	ND	ND	ND	ND	N/A	ND
TRANS-1,3-DICHLOROPROPENE	ND	ND	ND	ND	ND	ND	ND	ND	ND
ETHYLBENZENE	ND	ND	ND	ND	ND	ND	ND	ND	ND
METHYLENE CHLORIDE	ND	ND	ND	ND	ND	ND	ND	ND	10.8
1,1,2,2,-TETRACHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND
TETRACHLOROETHENE	19	16.6	15.3	17	18	24	9	20.00	11.7
TOLUENE	ND	ND	ND	ND	ND	ND	ND	ND	1.1
1,1,1-TRICHLOROETHANE	3	3.3	2.3	1.9	1	4.5	ND	6.60	0.78
1,1,2-TRICHLOROETHANE	ND	ND	ND	ND	ND	ND	ND	ND	ND
TRICHLOROETHENE	17	13.4	11.4	16	14	16	8	13.00	8.1
TRICHLOROFLUOROMETHANE	ND	ND	ND	ND	2	0.8	ND	ND	ND
VINYL CHLORIDE	ND	ND	ND	ND	ND	ND	ND	ND	ND
META-XYLENE	ND	ND	ND	ND	ND	ND	ND	ND	ND
ORTHO-XYLENE	ND	ND	ND	ND	ND	ND	ND	ND	ND
PARA-XYLENE	ND	ND	ND	ND	ND	ND	ND	ND	ND
M,O-XYLENE	ND	ND	ND	ND	ND	ND	ND	ND	ND
O,P-XYLENE	ND	ND	ND	ND	ND	ND	ND	ND	ND
XYLENES	ND	ND	ND	ND	ND	ND	ND	ND	ND

ND = NOT DETECTED

NA = NOT ANALYZED

N/A = NOT AVAILABLE

TR = TRACE QUANTITIES DETECTED BELOW DETECTION LIMIT

LOCATION: GBR-32

TEST: General Chemistry

ANALYTE	8/5/87 mg/l	4/20/88 mg/l	8/24/88 mg/l	3/14/89 mg/l
CALCIUM	820	460	552	395
MAGNESIUM	98	11.59	50.6	36
SODIUM	669	848	792	780
POTASSIUM	1.95	2	2.7	3
AMMONIA-N	0.21	NA	NA	NA
BICARBONATE	270	221	845	468
BROMIDE	4.28	NA	0.26	NA
CARBONATE	NA	NA	NA	0
CHLORIDE	1260	848	588	541
NITRATE-N+, NITRITE-N	5.77	NA	NA	3.97
SULFATE	1770	148	1830	1588
TKN	0.58	NA	NA	NA
TFS	5056	4770	4400	3660
ACIDITY AS CaCO3	NA	NA	NA	<1
ALKALINITY AS CaCO3	NA	NA	NA	384
HARDNESS AS CaCO3	NA	NA	NA	1133
CHARGE BALANCE (%)	N/A	N/A	98	99.44
pH	N/A	N/A	7.12	NA
CONDUCTIVITY (umho)	5000	4840	4900	NA

TFS = TOTAL FILTERABLE SOLIDS (DISSOLVED)

ND = NOT DETECTED

NA = NOT ANALYZED

N/A = NOT AVAILABLE

TR = TRACE QUANTITIES DETECTED BELOW DETECTION LIMIT

LOCATION: GBR-32

TEST: Metals

ANALYTE	8/7/87 mg/l	10/7/87 mg/l	12/12/87 mg/l
ALUMINUM	7.7	NA	NA
ARSENIC	NA	ND	0.18
BARIUM	0.1	ND	1.15
BERYLLIUM	ND	NA	NA
BORON	0.3	NA	NA
CADMIUM	ND	0.012	0.018
CALCIUM	840	NA	NA
HEXAVALENT CHROMIUM	ND	ND	ND
TOTAL CHROMIUM	ND	0.032	0.591
COBALT	ND	NA	NA
COPPER	0.1	NA	NA
IRON	9.2	NA	NA
LEAD	ND	ND	0.03
MAGNESIUM	64	NA	NA
MANGANESE	1.1	NA	NA
MERCURY	NA	ND	ND
MOLYBDENUM	ND	NA	NA
NICKEL	0.3	NA	NA
SELENIUM	NA	0.165	0.038
SILICON	13	NA	NA
SILVER	ND	0.024	0.021
STRONTIUM	14	NA	NA
TIN	ND	NA	NA
VANADIUM	ND	NA	NA
ZINC	ND	NA	NA

TFS = TOTAL FILTERABLE SOLIDS (DISSOLVED)

ND = NOT DETECTED

NA = NOT ANALYZED

N/A = NOT AVAILABLE

TR = TRACE QUANTITIES DETECTED BELOW DETECTION LIMIT

LOCATION: GBR-48

TEST: Halogenated/Aromatic Volatile Organic Compounds

ANALYTE	11/08/88	3/14/89
	ug/l	ug/l
BENZENE	ND	0.24
BROMODICHLOROMETHANE	ND	ND
BROMOFORM	ND	ND
BROMOMETHANE	ND	ND
CARBON TETRACHLORIDE	ND	ND
CHLOROBENZENE	180	ND
CHLOROETHANE	ND	ND
1,2-CHLOROETHYL VINYL ETHER	ND	ND
CHLOROFORM	ND	0.5
CHLOROMETHANE	ND	ND
DIBROMOCHLOROMETHANE	ND	ND
1,2-DICHLOROBENZENE	ND	ND
1,3-DICHLOROBENZENE	ND	ND
1,4-DICHLOROBENZENE	ND	ND
DICHLORODIFLUOROMETHANE	ND	ND
1,1-DICHLOROETHANE	31	3
1,2-DICHLOROETHANE	ND	ND
1,1-DICHLOROETHENE	ND	ND
TRANS-1,2-DICHLOROETHENE	ND	ND
1,2-DICHLOROPROPANE	25	ND
CIS-1,3-DICHLOROPROPENE	ND	ND
TRANS-1,3-DICHLOROPROPENE	ND	ND
ETHYLBENZENE	ND	ND
METHYLENE CHLORIDE	ND	0.6
1,1,2,2,-TETRACHLOROETHANE	ND	ND
TETRACHLOROETHENE	ND	7.4
TOLUENE	ND	0.23
1,1,1-TRICHLOROETHANE	ND	0.69
1,1,2-TRICHLOROETHANE	ND	ND
TRICHLOROETHENE	ND	5.4
TRICHLOROFLUOROMETHANE	ND	ND
VINYL CHLORIDE	ND	ND
META-XYLENE	ND	ND
ORTHO-XYLENE	ND	ND
PARA-XYLENE	ND	ND
M,O-XYLENE	ND	ND
O,P-XYLENE	ND	ND
XYLENES	ND	ND

ND = NOT DETECTED

NA = NOT ANALYZED

N/A = NOT AVAILABLE

TR = TRACE QUANTITIES DETECTED BELOW DETECTION LIMITS

LOCATION: GBR-48

TEST: General Chemistry

	11/08/88	3/14/89
	mg/l	mg/l
CALCIUM	680	625
MAGNESIUM	70	42
SODIUM	960	770
POTASSIUM	NA	3
AMMONIA-N	NA	NA
BICARBONATE	434	483
BROMIDE	3	NA
CARBONATE	ND	0
CHLORIDE	1300	693
FLUORIDE	4.7	NA
POTASSIUM	5.4	NA
NITRATE-N+, NITRITE-N	8	6.2
SULFATE	1900	1960
ORTHOPHOSPHATE	ND	NA
TFS	5900	4496
ACIDITY AS CaCO3	NA	<1
ALKALINITY AS CaCO3	434	396
HARDNESS AS CaCO3	NA	1732
CHARGE BALANCE (%)	NA	99.92
pH	NA	NA
CONDUCTIVITY (umho)	NA	NA

TFS = TOTAL FILTERABLE SOLIDS (DISSOLVED)

ND = NOT DETECTED

NA = NOT ANALYZED

N/A = NOT AVAILABLE

TR = TRACE QUANTITIES DETECTED BELOW DETECTION LIMITS

LOCATION: GBR-49

TEST: Halogenated/Aromatic Volatile Organic Compound

ANALYTE	11/08/88 ug/l	3/14/89 ug/l
BENZENE	ND	0.63
BROMODICHLOROMETHANE	ND	ND
BROMOFORM	ND	ND
BROMOMETHANE	ND	ND
CARBON TETRACHLORIDE	ND	ND
CHLOROBENZENE	ND	ND
CHLOROETHANE	ND	ND
2-CHLOROETHYL VINYL ETHER	ND	ND
CHLOROFORM	6.9	1
CHLOROMETHANE	ND	ND
DIBROMOCHLOROMETHANE	ND	ND
1,2-DICHLOROBENZENE	ND	ND
1,3-DICHLOROBENZENE	ND	ND
1,4-DICHLOROBENZENE	ND	ND
DICHLORODIFLUOROMETHANE	ND	ND
1,1-DICHLOROETHANE	6.8	10.4
1,2-DICHLOROETHANE	ND	0.07
1,1-DICHLOROETHENE	ND	ND
TRANS-1,2-DICHLOROETHENE	88	0.3
1,2-DICHLOROPROPANE	ND	ND
CIS-1,3-DICHLOROPROPENE	ND	ND
TRANS-1,3-DICHLOROPROPENE	ND	ND
ETHYLBENZENE	ND	ND
METHYLENE CHLORIDE	ND	2.5
1,1,2,2,-TETRACHLOROETHANE	ND	ND
TETRACHLOROETHENE	15	25.3
TOLUENE	ND	ND
1,1,1-TRICHLOROETHANE	6.6	3.5
1,1,2-TRICHLOROETHANE	ND	ND
TRICHLOROETHENE	11	24.9
TRICHLOROFLUOROMETHANE	ND	ND
VINYL CHLORIDE	ND	ND
META-XYLENE	ND	ND
ORTHO-XYLENE	ND	ND
PARA-XYLENE	ND	ND
M,O-XYLENE	ND	ND
O,P-XYLENE	ND	ND
M,P-XYLENE	ND	0.28
XYLENES	ND	ND

ND = NOT DETECTED

NA = NOT ANALYZED

N/A = NOT AVAILABLE

TR = TRACE QUANTITIES DETECTED BELOW DETECTION LIMITS

LOCATION: GBR-49

TEST: General Chemistry

	11/08/88	3/14/89
	mg/l	mg/l
CALCIUM	680	733
MAGNESIUM	50	83
SODIUM	750	1199
POTASSIUM	NA	7
AMMONIA-N	NA	NA
BICARBONATE	360	587
BROMIDE	2	NA
CARBONATE	NA	0
CHLORIDE	790	1524
FLUORIDE	3.6	NA
POTASSIUM	<3	NA
NITRATE-N+, NITRITE-N	5.1	7.12
SULFATE	1800	2077
ORTHOPHOSPHATE	ND	NA
TFS	NA	6068
ACIDITY AS CaCO3	NA	<1
ALKALINITY AS CaCO3	ND	482
HARDNESS AS CaCO3	NA	2171
CHARGE BALANCE (%)	NA	99.93
pH	NA	NA
CONDUCTIVITY (umho)	NA	NA

TFS = TOTAL FILTERABLE SOLIDS (DISSOLVED)

ND = NOT DETECTED

NA = NOT ANALYZED

N/A = NOT AVAILABLE

TR = TRACE QUANTITIES DETECTED BELOW DETECTION LIMITS

LOCATION: GBR-50

TEST: Halogenated/Aromatic Volatile Organic Compounds

ANALYTE	11/8/89 ug/l	3/14/89 ug/l
BENZENE	0.8	ND
BROMODICHLOROMETHANE	ND	ND
BROMOFORM	ND	ND
BROMOMETHANE	ND	ND
CARBON TETRACHLORIDE	ND	ND
CHLOROBENZENE	ND	ND
CHLOROETHANE	ND	ND
2-CHLOROETHYL VINYL ETHER	ND	ND
CHLOROFORM	0.2	ND
CHLOROMETHANE	ND	ND
DIBROMOCHLOROMETHANE	ND	ND
1,2-DICHLOROBENZENE	ND	ND
1,3-DICHLOROBENZENE	ND	ND
1,4-DICHLOROBENZENE	ND	ND
DICHLORODIFLUOROMETHANE	ND	ND
1,1-DICHLOROETHANE	0.7	0.1
1,2-DICHLOROETHANE	ND	ND
1,1-DICHLOROETHENE	ND	ND
TRANS-1,2-DICHLOROETHENE	0.3	ND
1,2-DICHLOROPROPANE	ND	ND
CIS-1,3-DICHLOROPROPENE	ND	ND
TRANS-1,3-DICHLOROPROPENE	ND	ND
ETHYLBENZENE	ND	ND
METHYLENE CHLORIDE	0.3	1.2
1,1,2,2-TETRACHLOROETHANE	ND	ND
TETRACHLOROETHENE	0.7	0.19
TOLUENE	ND	ND
1,1,1-TRICHLOROETHANE	0.6	ND
1,1,2-TRICHLOROETHANE	ND	ND
TRICHLOROETHENE	0.2	ND
TRICHLOROFLUOROMETHANE	ND	ND
VINYL CHLORIDE	ND	ND
META-XYLENE	ND	ND
ORTHO-XYLENE	ND	ND
PARA-XYLENE	ND	ND
M,O-XYLENE	ND	ND
O,P-XYLENE	ND	ND
XYLENES	ND	ND

ND = NOT DETECTED

NA = NOT ANALYZED

N/A = NOT AVAILABLE

TR = TRACE QUANTITIES DETECTED BELOW DETECTION LIMITS

LOCATION: GBR-50

TEST: General Chemistry

	11/08/88 mg/l	3/14/89 mg/l
CALCIUM	280	338
MAGNESIUM	23	29
SODIUM	400	436
POTASSIUM	NA	3
AMMONIA-N	NA	NA
BICARBONATE	198	262
BROMIDE	<1	NA
CARBONATE	ND	0
CHLORIDE	110	173
FLUORIDE	2.3	NA
POTASSIUM	<3	NA
NITRATE-N+, NITRITE-N	1.8	2.9
ORTHOPHOSPHATE	ND	NA
SULFATE	1300	1396
TKN	NA	NA
TFS	NA	2564
ACIDITY AS CaCO3	NA	<1
ALKALINITY AS CaCO3	NA	215
HARDNESS AS CaCO3	NA	963
CHARGE BALANCE (%)	NA	99.91
pH	NA	NA
CONDUCTIVITY (umho)	NA	NA

ND = NOT DETECTED

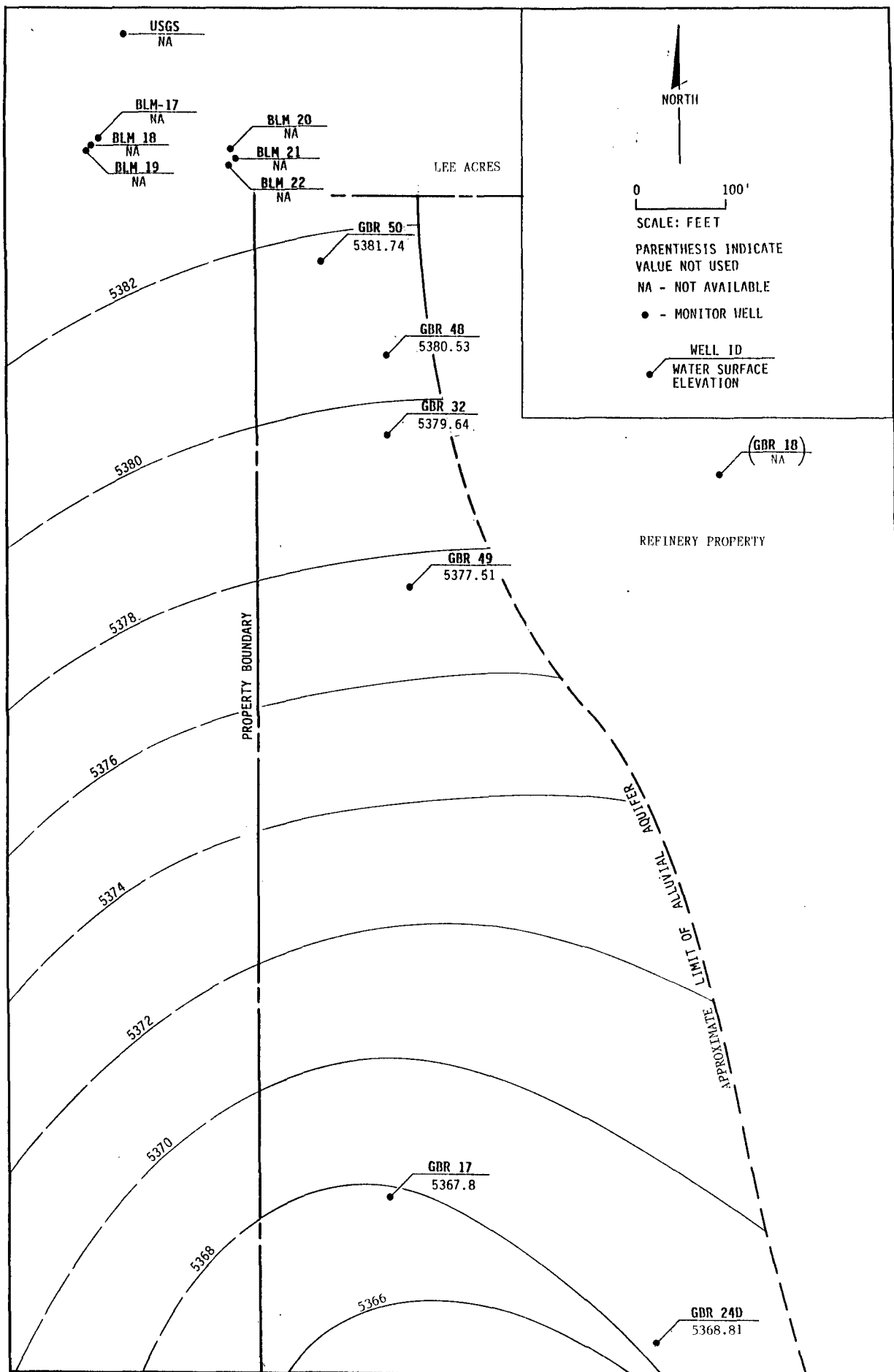
NA = NOT ANALYZED

N/A = NOT AVAILABLE

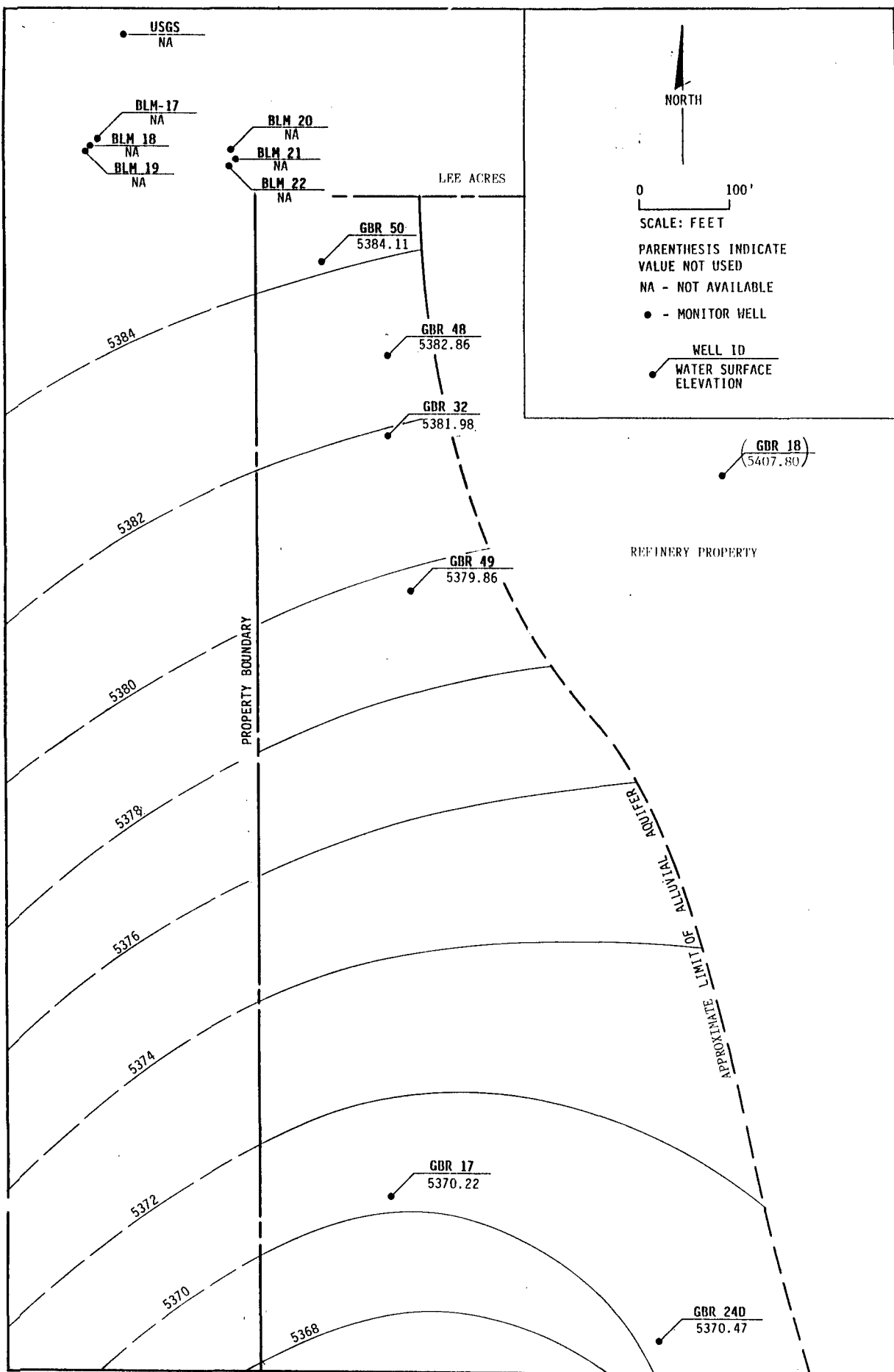
TR = TRACE QUANTITIES DETECTED BELOW DETECTION LIMIT

2.0 POTENTIOMETRIC SURFACE MAPS

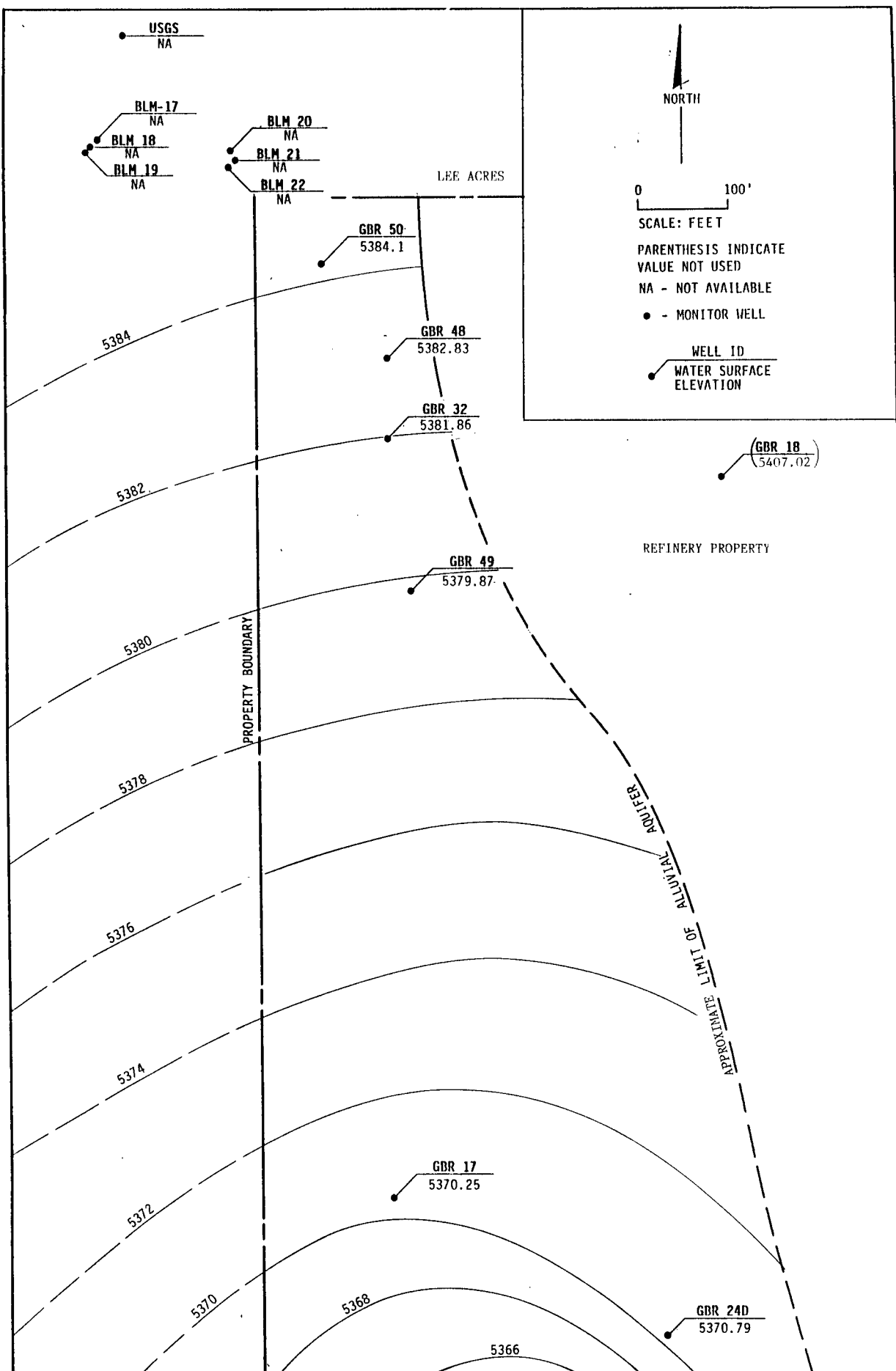
Potentiometric surface maps for the northern refinery area for November 1988 to March 1989 are included. Water level data prior to November 1989 is limited. Similar gradient for earlier dates is suggested by time series elevations observed in GBR 32, GBR 17 and GBR 24D.



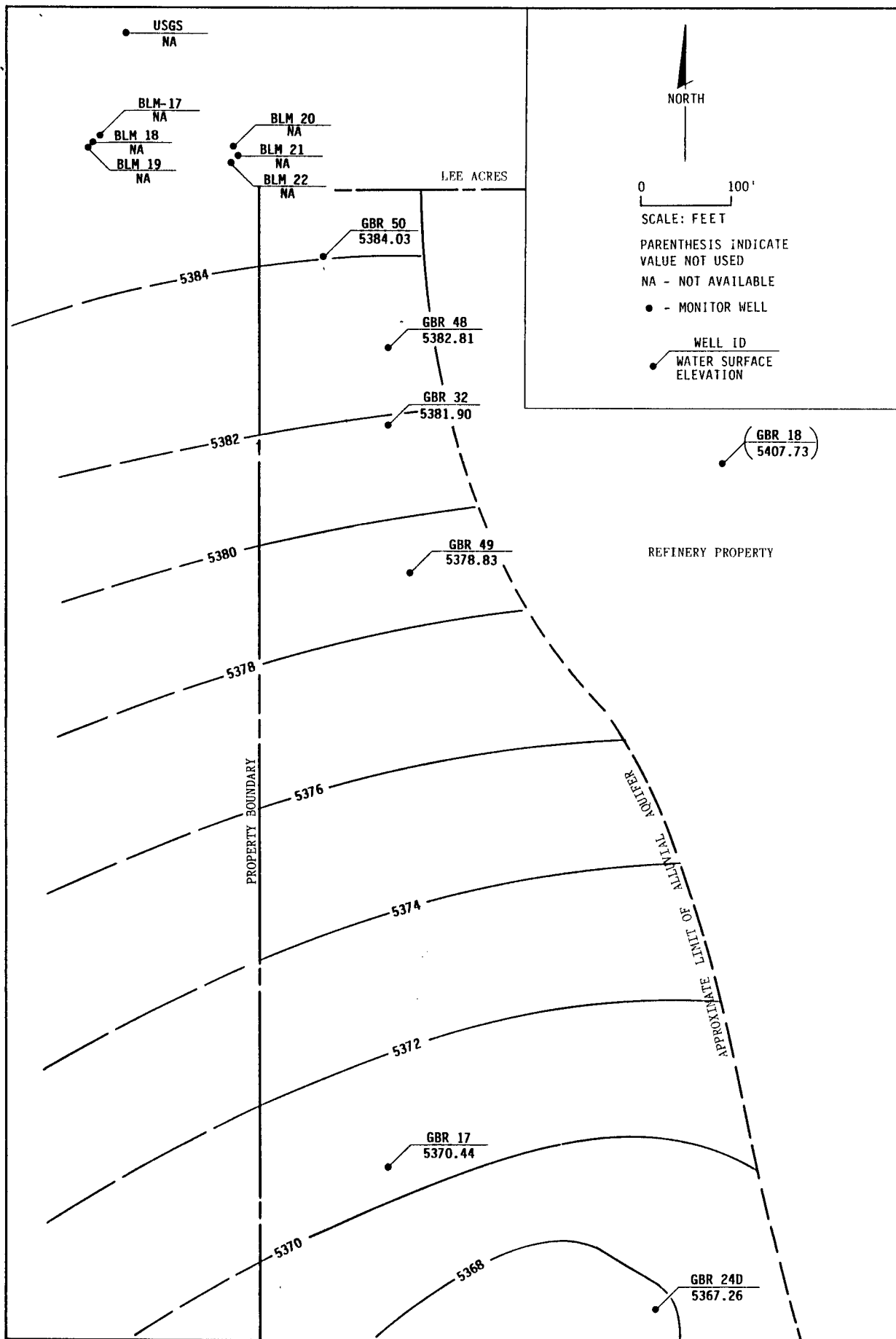
WATER SURFACE CONTOUR MAP GIANT-BLOOMFIELD REFINERY
MARCH, 1989



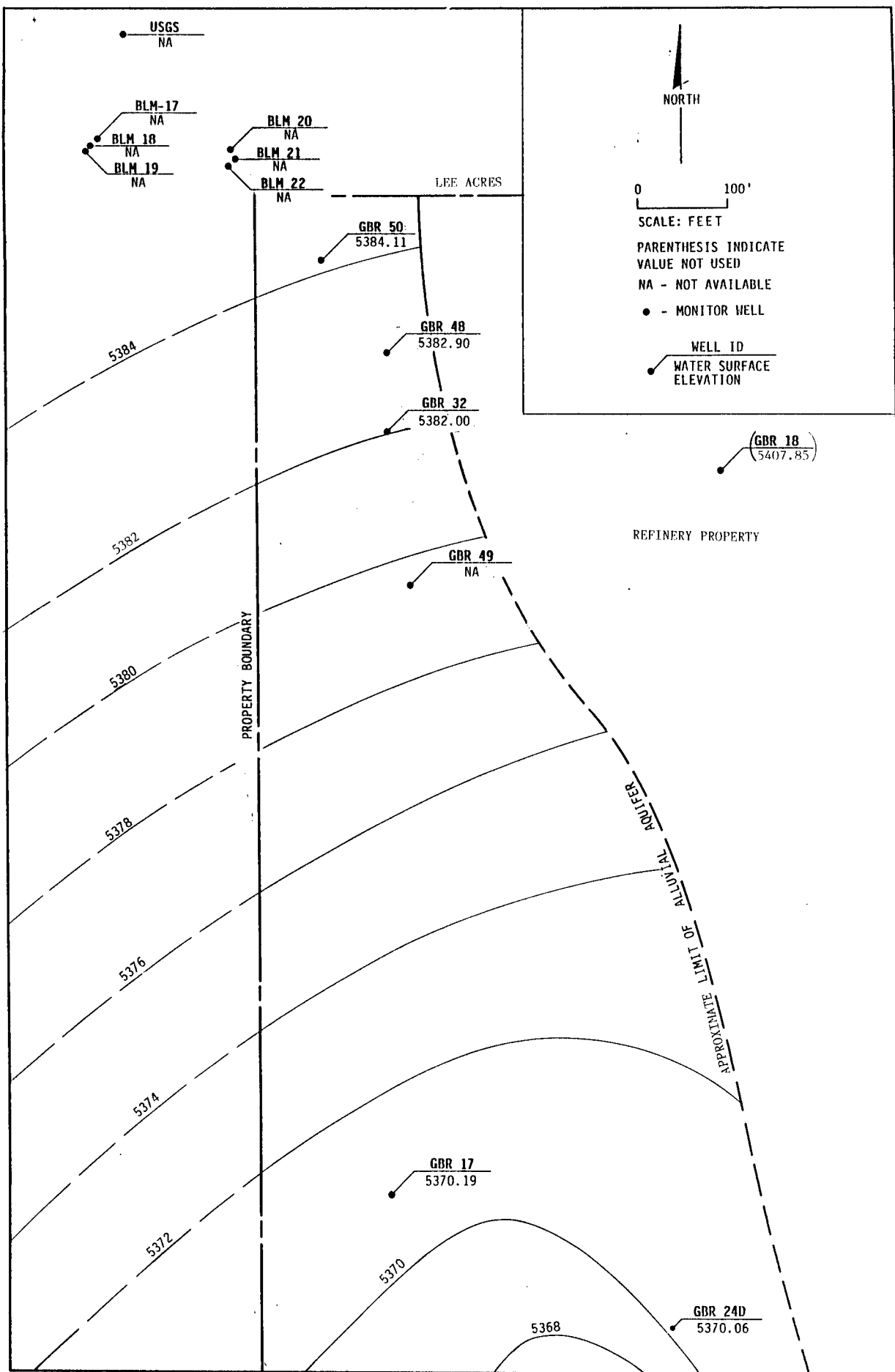
ALLUVIAL
WATER SURFACE CONTOUR MAP GIANT-BLOOMFIELD REFINERY
FEBRUARY, 1989



ALLUVIAL
WATER SURFACE CONTOUR MAP GIANT-BLOOMFIELD REFINERY
JANUARY, 1989



ALLUVIAL
WATER SURFACE CONTOUR MAP GIANT-BLOOMFIELD REFINERY
DECEMBER, 1988



ALLUVIAL
WATER SURFACE CONTOUR MAP GIANT-BLOOMFIELD REFINERY
NOVEMBER, 1989

3.0 LITHOLOGIC LOGS

Lithologic logs and well completion information for the following wells are included herein:

GBR-17

GBR-18

GBR-24D

GBR-30

GBR-32

GBR-48

GBR-49

GBR-50

Client Montgomery & Andrews Well Number GBR 171/2 1/2 1/2 1/2 S 27 T 29 R 12 State New MexicoCounty San Juan Contractor Beeman Bros. Drilling Co.Spud Date 5/28/86 Completion Date 5/28/86Logs Run Lith from cuttings Logged By NICHOLASElevation 5401.24 Spud In (Fm.) QALRemarks Drilled With Air Rotary, completed as a 2" flush jointPVC and SS Well N 11240.19 E 11141.69

Depth

Litho
CORV0-5' (5') sand, mod yellowish brn (10YR 5/4), very fine to coarse grained sand

5

5-10' (5') clayey sand, dk yellowish brn (10YR 4/2) fine to coarse grained sand

10

with clay stringers

15

10-20' (10') clayey sand, mod yellowish brn (10YR 5/4) fine to med grained sand

20

with clay stringers

25

20-45' (25') silty sand, mod yellowish brn, (10YR 5/4) fine to med grained sand

30

33'-6" 5-29-86

35

grades coarser at 45'45-60' (15') sand, mod yellowish brn (10YR 5/4) to lt olive grey (5Y 5/2), fine to

40

coarse grained sand with some cobbles

45

60-68' (8') silty sand, greenish grey (5GY 6/1), fine to coarse grained sand

50

w/some cobbles (1/2"-3"), 10-15%.

55

TD 68' to TOC, screened from 31'-51' ss screen, ss blanks on bottom,

60

PVC risers. Gravel packed to 28', 100 lb bag Bentonite @ 28', Backfill

65

to surface

Client Montgomery & Andrews Well Number GBR 18

1/2 1/2 1/2 1/2 S 1/2 T 1/2 R 1/2 State New Mexico

County San Juan Contractor Western Technologies

Spud Date _____ Completion Date _____

Logs Run Lith from cuttings and cores Logged By _____

Elevation ground 5420.28 Spud In (Fm.) QAL

Remarks drilled w/ HSA

Coordinates N 12021.64 E 11528.06

Depth

Litho
Recor

0

5

10

12'4"

15

20

25

30

35

40

45

50

0-10' (10') fill: very coarse cobbles, some sand and

gravel

10'-12.5' (2.5') sandy shale, yellowish brn

12.5-25' (12.5') sandstone: yellowish brn, med to fine grained

poorly sorted

25'-30' shale: brn gry to rd brn, fissile, clayey, damp

30-38' siltstone: gry brn to brn gry; clayey, same thin,

irregular sand stringers 1/4"-1/2"; moist

38-50' silty sandstone: yel brn to yel gry, very fine grained,

poorly sorted, locally clayey

Completed as 2.0" galv, steel piezometer,

screen 35'-45'.

Client Montgomery & Andrews Well Number GDR 24

NW 1/4 NW 1/4 NW 1/4 S 27 T 29N R 12 W State New Mexico

County San Juan Contractor Western Technologies

Spud Date 4/17/86 Completion Date 4/17/86

Logs Run Lithology from cuttings Logged By Nicholas

Elevation 5395' (top) Spud In (Fm.) Nacimienito

Remarks Drilled with HSA, continuous sampler used from 9'-49'

Depth

Litho
Acc

0'-9' (9') SAND: Moderate yellowish brown, (10yr 5/4), med to coarse grained, No HIC Odor

9'-14' (5') SILTY SANDSTONE: Moderate yellowish brown (10yr 5/4) to olive gray (5y4/1)
weathered, very fine to fine grained, No HIC Odor.

14'-49' (35') SANDSTONE: Lt olive grey (5y 6/1), fine grained, contains minor gravels;
28' (1"-1 1/2"), HIC Odor at 29'

Dual Completion as 2" PVC Piezometer

Stickup 3'3" 1041'3" and 46'3" from top of casing

Screened Intervals 23-33' and 33'-43'

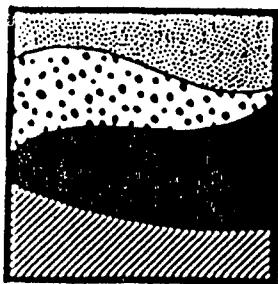
Caved to 33', sand to 22', Bentonite 2/3 Bag

@ 22', Backfill to 6', Bentonite 1/3 Bag @ 6'.

WL 24'4"

TD = 49'

GCL



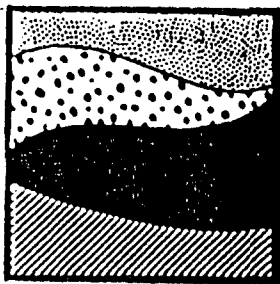
WELL LOGGING FORM

Page 1 of 2

Client Montgomery & Andrews Well Number (X-1) GBR 30
1/4 1/4 1/4 1/4 S 27 T 29 R 12 State New Mexico
 County San Juan Contractor Western Technologies
 Spud Date _____ Completion Date 9-24-86
 Logs Run Lithology Logged By Martin
 Elevation ground 5394.26 Spud In (Fm.) QAL

Remarks Drilled with Hollow Stem AugerCoordinates N 11014.84 E 11382.06

DEPTH	LITHO.	RECOV.	RUN	FROM	TO	SAMPLE DEPTH	REMARKS
0							
						0-5'	<u>SAND</u> , med gr mod yelsh brn 10YR5/4
5						5-10'	<u>SAND</u> , med-co gr mod yelsh brn 10YR5/4
10						10-15'	<u>SAND</u> , w/1-2% gravels; med-co gr mod yelsh brn 10YR5/4
15						15-20'	<u>SILTY SAND</u> , fn-med gr olive blk 5Y2/1; strong HC odor and stain
20						20-25'	<u>SILTY SAND</u> , med gr, dk grnsh bry 5GY4/1; strong HC odor and stain
25						25-30'	<u>CLAYEY SAND</u> , med-gr, olive blk 5Y2/1, strong HC odor and stain
30						30-33'	<u>SANDY CLAY</u> , fn-med gr, olive gry 5Y4/1; faint HC odor; wet
35						33-45'	<u>SANDY CLAY</u> , fn-med gr, lt olive gry 5Y5/2; faint HC odor; wet
40							
45							
							TD to 49'. Screened from 40' to 25', sand pack to 19'2"



WELL LOGGING FORM

Page 2 of 2Client Montgomery & Andrews Well Number (X-1) GBR 301/4 1/4 1/4 1/4 S 27 T 29 R 12 State New MexicoCounty San Juan Contractor Western TechnologiesSpud Date _____ Completion Date 9-24-86Logs Run Lithology Logged By MartinElevation ground 5394.26 Spud In (Fm.) QALRemarks Coordinates N 11014.84 E

DEPTH	LITHO.	RECOV.					REMARKS
			RUN	FROM	TO	SAMPLE DEPTH	
45	X						5' blank on bottom, bentonite plug to 13'11", cement grout w/5% bentonite to surface. Completed with 2" PVC.
50							
55							
60							
65							
70							
75							
80							
85							
90							

BOREHOLE LOG (WELL)

GCL

LOCATION MAP:

Page 1 of 2

+ GBR-48

+ GBR-32

+ GBR-18

+ GBR-49

1/4 1/4 1/4 SW 1/4 S22 T29N R12WSITE ID: MONT & AND LOCATION ID: (NW) GBR-32

SITE COORDINATES (ft.):

N 12061.95 E 11143.06GROUND ELEVATION (ft. MSL): 5412 (TOPO)STATE: NEW MEXICO COUNTY: SAN JUANDRILLING METHOD: HOLLOW STEM AUGER W/SPLIT SPOONS,DRILLING CONTR.: WESTERN TECH.DATE STARTED: 4/21/87 DATE COMPLETED: 4/22/87FIELD REP.: J.P. KASZUBA, S.J. COLARULLO, R.T. HICKSCOMMENTS: 7" BOREHOLE, SPOONS WET AT 33'-36'.BEDROCK @ 37.5' TD=45'

LOCATION DESCRIPTION:

DEPTH	LITH.	R E C	S A M	RUN			SAMPLE		USCS	VISUAL CLASSIFICATION
				#	FROM	TO	I.D.	TYPE		
0				1	4.5	6.0		*		4.5-4.7' <u>SAND</u> , fn- to cs-gr, poor sorting, tan color.
										4.7-5.2' <u>SAND</u> , fn- to med-gr, mod sorting, tan color.
5										5.2-6.0' <u>SAND</u> , med- to cs-gr, mod sorting, tan color.
10				2	9.5	11.0				9.5-11.0' <u>SAND</u> , as above.
15				3	14.5	16.0				4.5-16.0' <u>SAND</u> , as above.
20				4	19.5	21.0				9.5-21.0' <u>SAND</u> , as above.
25				5	24.5	26.0				24.5-25.2' <u>SILT</u> , lt brn, includes ~10% fn-gr sand and ~10% clay.
										25.2-26.0' <u>SAND</u> , med- to cs-gr, mod sorting, lt brn
30				6	29.5	31.0				29.5-31.0' <u>SAND</u> , as above, includes ~10% silt

GCL

LOCATION MAP:

* GBR-49

1/4 1/4 1/4 SW 1/4 S22 T29N R12W

BEDROCK @ 37.5'. TD=45'

LOCATION DESCRIPTION:

[illegible]

BOREHOLE LOG (SOIL)

Page 1 of 1

BLM-19 BLM-18 BLM-21
BLM-22

+ GBR-50

+ GBR-48

Giant Bloomfield
 SITE ID: Refinery LOCATION ID: GBR-48
 SITE COORDINATES (ft.):
 N 12159.02 E 11142.65
 GROUND ELEVATION (ft. MSL): 5416.14
 STATE: New Mexico COUNTY: San Juan
 DRILLING METHOD: Hollow Stem Auger/Continuous Sampler
 DRILLING CONTR.: Western Technologies
 DATE STARTED: 17 Oct 1988 DATE COMPLETED: 18 Oct 1988
 FIELD REP.: Martin Nee
 COMMENTS: _____

1/4 1/4 1/4 1/4 S T R

LOCATION DESCRIPTION:

DEPTH	LITH.	R E C	S A M	RUN			SAMPLE		USCS	VISUAL CLASSIFICATION
				#	FROM	TO	I.D.	TYPE		
0				1	0	3			SP	0'-23' <u>Sand</u> - Mod yelsh brn, 10 YR 5/4, v fn to crs sand, uncons, subangular to subrounded, well sorted moist from 13-14', v minor grv at 23'.
5				2	3	8				
10				3	8	13				
15				4	13	18				
20				5	18	23				
25				6	23	28			SM	23'-26.5' <u>Silty Sand</u> - Mod yelsh brn, 10 YR 5/4, 75% v fn to med sand, 20% silt, 5% clay, uncons, subangular to subrounded, mod well sorted.
30				7	28	33			SC	26.5'-27.5' <u>Clayey Sand</u> - Mod yelsh brn, 10 YR 5/4, 70% v fn to med grained sand, 20% clay, 10% silt, uncons, subangular to subround, mod well sorted.
35				8	33	38			CL	27.5'-31' <u>Silty Clay</u> - Mod yelsh brn, 10 YR 5/4, 80% clay, 15% silt, 5% v fn sand.
40				9	38	43			SP	31'-35' <u>Sand</u> - Mod yelsh brn, 10 YR 5/4, fn to coarse grained sand, uncons, mod well sorted, subangular to subrounded, minor gravel <3%.
45										35'-37' <u>Cobbles/Gravel Refusal</u> - No core.
50										37'-44' <u>Shale</u> - Light olive grey, 5 YR 2/2. TD = 44.0', 2" ss blank 43.6' to 38.4', ss 20 slot screen 38.4-28.4', 2" ss to 3' above surface, 10-20 sand to 23', bentonite to 17.5', grout w/5% bentonite to surface, 5"x6' cement filled steel guard pipe. 4'x4' concrete slab.

BOREHOLE LOG (SOIL)

Page 1 of 1

♦ GBR-32

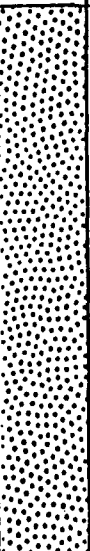
♦ GBR-18

♦ GBR-49

1/4 1/4 1/4 1/4 S T R

Giant Bloomfield
 SITE ID: Refinery LOCATION ID: GBR-49
 SITE COORDINATES (ft.):
 N 11908.13 E 11168.02
 GROUND ELEVATION (ft. MSL): 5410.76
 STATE: New Mexico COUNTY: San Juan
 DRILLING METHOD: Hollow Stem Auger/Continuous Sampler
 DRILLING CONTR.: Western Technologies
 DATE STARTED: 17 Oct 1988 DATE COMPLETED: 17 Oct 1988
 FIELD REP.: Martin Nee
 COMMENTS:

LOCATION DESCRIPTION:

DEPTH	LITH.	R E C	S A M	RUN			SAMPLE		USCS	VISUAL CLASSIFICATION
				#	FROM	TO	I.D.	TYPE		
0				1	0	3			SP	0'-22' Sand - Mod yelsh brn, 10 YR 5/4, v fn to coarse sand, uncons, sbang to sbrndd, minor silt.
5				2	3	8				
10				3	8	13				7'-9' As above w/cobblers or boulders.
15				4	13	18				
20				5	18	23				15'-16' Same as 0-22 with 5% fn to med pebble gravel.
25				6	23	28			SM	22'-25' Silty Sand - Mod yelsh brn, 10 YR 5/4, 70% sand, v fn to coarse, moderately well sorted, uncons, sbang to sbrndd, 20% silt, 10% clay, minor, v fn to med pebble gravel.
30				7	28	33			SC	25'-33' Clayey Silty Sand - Silty sand and stringers (6") of silty clay, mod yelsh brn, 10 YR 5/4, v fn to med grained sand, uncons, sbang to sbrndd.
35										28' Appears moist.
40									SM	33'-36.5' Silty Sand - Dk yelsh or, 10 YR 6/6, 80% sand, v fn to crs, uncons, sbang to sbrndd, well sorted, 20% silt, v minor clay.
45									SM	36.5'-40' Silty Sand - Lt olv brn, 5 YR 5/6, v fn to med grained sand, uncons, mod well sorted, sbang to sbrndd, 5% clay, 15% silt.
50									SC	40'-42.5' Clay - Lt blsh grey, 5B 7/11.
										TD = 42.5', 2" ss blank 38.5' to 36.3', ss 20 slot screen 36.3' to 25.9' 2" ss blank to 2.1' above surface, 10-20 sand to 21.0', bentonite to 16.45', grout with 5% bentonite to surface. 5"x6' cement filled steel guard pipe. 4'x4' concrete slab.

