GROUNDWATER MONITORING AND SAMPLING REPORT

BP Oil Company Service Station No. 11102
100 MacArthur Boulevard
Oakland, California

Project No. 10-076

1108

Prepared for:

BP Oil Company
Environmental Resource Management
16400 Southcenter Parkway, Suite 301
Tukwila, Washington

Prepared by:

Alisto Engineering Group
1000 Burnett Avenue, Suite 420
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January 6, 1993

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Project Manager

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Principal

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Exp. Date 3/31/94
CIVIL
STATE OF CALIFORNIA

GROUNDWATER MONITORING AND SAMPLING REPORT

BP Oil Company Service Station No. 11102
100 MacArthur Boulevard
Oakland, California

Project No. 10-076

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INTRODUCTION

This report presents the results and findings of the November 11, 1992 groundwater monitoring and sampling conducted by Alisto Engineering Group at BP Oil Company Service Station No. 11102, 100 MacArthur Boulevard, Oakland, California. A site vicinity map is shown in Figure 1.

FIELD PROCEDURES

Field activities were performed in accordance with the procedures and guidelines of the Alameda County Health Care Services Agency and the Regional Water Quality Control Board, San Francisco Bay Region.

Before purging and sampling, the groundwater level in each well was measured from a permanent mark on the top of the casing to the nearest 0.01 foot using an electronic sounder. The depth to groundwater and top of casing elevation data were used to calculate the groundwater elevation in each well in reference to mean sea level. The survey data and groundwater elevation measurements collected to date are presented in Table 1.

Before sample collection, each well was purged of 3 casing volumes, while recording field readings of pH, temperature, and electrical conductivity, unless the monitoring well would not produce sufficient groundwater. Groundwater samples were collected for laboratory analysis by lowering a bottom-fill, disposable bailer to just below the water level in the well. The samples were carefully transferred from the bailer into the appropriate clean glass containers. The water sampling field survey forms are presented in Appendix A.

SAMPLING AND ANALYTICAL RESULTS

The results of monitoring and laboratory analysis of the groundwater samples for this and previous quarters are summarized in Table 1. The potentiometric groundwater elevations as interpreted from the results of this monitoring event are shown in Figure 2. The results of groundwater analysis are shown in Figure 3. The laboratory report and chain of custody record are presented in Appendix B.

SUMMARY OF FINDINGS

The findings of the November 11, 1992 groundwater monitoring and sampling event are summarized as follows:

- No free product was observed in any of the groundwater monitoring wells.
- Groundwater elevation data indicate a gradient of approximately 0.06 foot per foot in a general southwesterly direction across the site.
- Dissolved-phase total petroleum hydrocarbons as gasoline (TPH-G) and benzene, toluene, ethylbenzene, and total xylenes (BTEX) constituents were detected in the samples collected from MW-1 and MW-2 at concentrations of up to 260 parts per billion (ppb) TPH-G and 30 ppb benzene. The groundwater sample from MW-3 did not contain concentrations of TPH-G and BTEX constituents above reported detection limits with the exception of 0.7 ppb toluene and 1.3 ppb total xylenes.
- Analysis of the groundwater sample from Monitoring Well MW-1 detected 92 ppb dissolved-phase total petroleum hydrocarbons as diesel.

TABLE 1 - SUMMARY OF RESULTS OF GROUNDWATER SAMPLING
BP OIL COMPANY SERVICE STATION NO.11102
100 MACARTHUR BOULEVARD, OAKLAND, CALIFORNIA

ALISTO PROJECT NO. 10-076

WELL ID	DATE OF SAMPLING/ MONITORING	CASING ELEVATION (a)	DEPTH TO WATER	GROUNDWATER ELEVATION (b)	TPH-G (ppb)	TPH-D (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	1,2-DCA (ppb)	TOG (ppb)	LAB
MW-1	11/04/89	90.20	13.21	76.99	ND<500	ND<50	3.4	0.6	ND<0.3	ND<0.3	0.9	ND<5000	SAL
MW-1	11/11/89	90.20	13.32	76.88	—	—	—	—	—	—	—	—	—
MW-1	04/03/90	90.20	12.46	77.74	820	—	64	1.9	23	34	—	—	ANA
MW-1	07/30/90	90.20	12.92	77.28	190	ND<50	11	ND<5.0	ND<5.0	ND<5.0	ND	ND<5000	ANA
MW-1	11/20/90	90.20	14.08	76.12	50	79	2.4	ND<0.3	ND<0.3	ND<0.3	4.0	ND<5000	SAL
MW-1	03/01/91	90.20	13.61	76.59	ND<100	ND<1000	0.9	ND<0.3	ND<0.3	0.3	ND	14000	SAL
MW-1	08/19/91	90.20	15.74	74.46	370	ND<50	35	0.73	6.4	5.6	1.4	ND<5000	SEQ
MW-1	11/13/91	90.20	14.08	76.12	60	ND<50	0.68	ND<0.3	ND<0.3	ND<0.3	1.0	ND<5000	SEQ
MW-1	02/24/92	90.20	12.52	77.68	140	100	3.9	0.66	1.2	3.8	1.7	ND<5000	SEQ
MW-1	05/19/92	90.20	11.80	78.40	4200	910	440	21	250	37	ND	ND<5000	SEQ
MW-1	06/17/92	90.20	12.01	78.19	4000	560	350	14	150	17	ND	ND<5000	SEQ
MW-1	07/22/92	90.20	12.42	77.78	4000	—	ND<5.0	19	210	61	—	—	ANA
MW-1	08/14/92	90.20	12.75	77.45	2400	1700	330	20	150	47	ND<2.5	ND<5000	SEQ
MW-1	11/11/92	90.20	13.69	76.51	260	92	30	3.4	7.6	6.8	ND<2.5	ND<5000	ANA
MW-2	11/04/89	87.91	15.84	72.07	ND<500	—	6.5	ND<0.3	ND<0.3	ND<0.3	—	—	SAL
MW-2	11/11/89	87.91	14.75	73.16	—	—	—	—	—	—	—	—	—
MW-2	04/03/90	87.91	15.25	72.66	ND<500	—	ND<0.5	ND<0.5	ND<0.5	ND<0.5	—	—	ANA
MW-2	07/30/90	87.91	15.59	72.32	61	—	6.5	ND<0.5	ND<0.5	ND<0.5	—	—	ANA
MW-2	11/20/90	87.91	17.81	70.10	ND<50	—	0.3	ND<0.3	ND<0.3	ND<0.3	—	—	SAL
MW-2	03/01/91	87.91	17.11	70.80	ND<100	—	0.4	ND<0.3	ND<0.3	ND<0.3	4.0	—	SAL
MW-2	08/19/91	87.91	17.97	69.94	ND<30	—	ND<0.3	ND<0.3	ND<0.3	ND<0.3	—	—	SEQ
MW-2	11/13/91	87.91	16.76	71.15	38	—	0.32	ND<0.3	ND<0.3	ND<0.3	—	—	SEQ
MW-2	02/24/92	87.91	15.07	72.84	ND<50	—	ND<0.50	ND<0.50	ND<0.50	0.58	16	—	SEQ
MW-2	05/19/92	87.91	14.70	73.21	ND<50	—	0.55	ND<0.50	ND<0.50	ND<0.50	—	—	SEQ
MW-2	07/22/92	87.91	15.60	72.31	90	—	1.3	0.6	0.9	1.9	—	—	ANA
MW-2	08/14/92	87.91	15.88	72.03	—	—	—	—	—	—	—	—	—
MW-2	11/11/92	87.91	16.19	71.72	52	—	2.8	ND<0.5	ND<0.5	0.9	—	—	ANA
QC-1	11/11/92 (c)	—	—	—	65	—	3.2	ND<0.5	ND<0.5	1.0	—	—	ANA

TABLE 1 - SUMMARY OF RESULTS OF GROUNDWATER SAMPLING
BP OIL COMPANY SERVICE STATION NO.11102
100 MACARTHUR BOULEVARD, OAKLAND, CALIFORNIA

ALISTO PROJECT NO. 10-076

WELL ID	DATE OF SAMPLING/ MONITORING	CASING ELEVATION (a)	DEPTH TO WATER	GROUNDWATER ELEVATION (b)	TPH-G (ppb)	TPH-D (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	1,2-DCA (ppb)	TOG (ppb)	LAB
MW-3	11/04/89	87.02	15.40	71.62	ND<500	---	ND<0.3	ND<0.3	ND<0.3	ND<0.3	---	---	SAL
MW-3	11/11/89	87.02	14.10	72.92	---	---	---	---	---	---	---	---	---
MW-3	04/03/90	87.02	13.90	73.12	ND<100	---	ND<0.5	ND<0.5	ND<0.5	ND<0.5	---	---	ANA
MW-3	07/30/90	87.02	13.77	73.25	ND<50	---	ND<0.5	ND<0.5	ND<0.5	ND<0.5	---	ND<5000	ANA
MW-3	11/20/90	87.02	14.67	72.35	ND<50	---	0.3	0.8	0.4	1.5	---	---	SAL
MW-3	03/01/91	87.02	15.22	71.80	ND<100	---	0.4	ND<0.3	ND<0.3	ND<0.3	ND	---	SAL
MW-3	08/19/91	87.02	13.15	73.87	ND<30	---	ND<0.3	ND<0.3	ND<0.3	ND<0.3	---	---	SEQ
MW-3	11/13/91	87.02	15.66	71.36	ND<30	---	ND<0.3	ND<0.3	ND<0.3	ND<0.3	---	---	SEQ
MW-3	02/24/92	87.02	15.01	72.01	ND<50	---	0.65	1.4	0.66	4.4	ND	---	SEQ
MW-3	05/19/92	87.02	15.52	71.50	ND<50	---	ND<0.50	ND<0.50	ND<0.50	ND<0.50	---	---	SEQ
MW-3	07/22/92	87.02	15.63	71.39	ND<50	ND<50	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.50	ND<5000	ANA
MW-3	08/14/92	87.02	13.57	73.45	---	---	---	---	---	---	---	---	---
MW-3	11/11/92	87.02	14.13	72.89	ND<50	---	ND<0.5	0.7	ND<0.5	1.3	---	---	ANA
QC-2	11/11/92 (d)	----	----	----	ND<50	---	ND<0.5	ND<0.5	ND<0.5	ND<0.5	---	---	ANA

ABBREVIATIONS:

TPH-G	Total Petroleum Hydrocarbons as Gasoline
TPH-D	Total Petroleum Hydrocarbons as Diesel
B	Benzene
T	Toluene
E	Ethylbenzene
X	Xylenes
1,2-DCA	1,2-Dichloroethane
TOG	Total oil and grease
ND	Not detected above reported detection limits
SAL	Superior Analytical Laboratory
SEQ	Sequoia Analytical Laboratory
ANA	Anametrix, Inc.
(ppb)	Parts per Billion
---	Not analyzed / not available

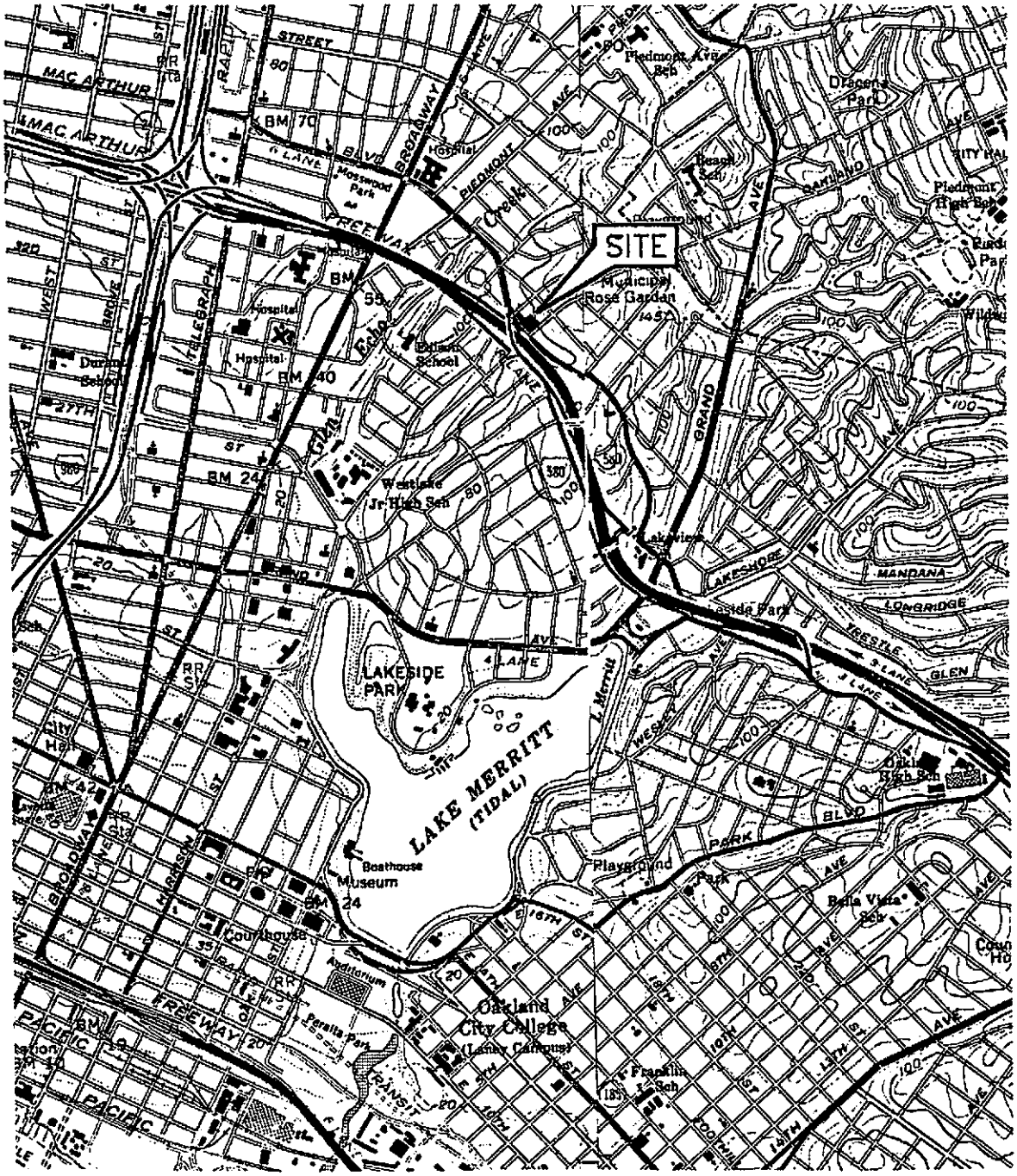
NOTES:

(a) Top of casing elevations surveyed to the nearest 0.01 foot above mean sea level.

(b) Groundwater elevations in feet above mean sea level.

(c) Blind duplicate of MW-2

(d) Travel blank



SOURCE:
USGS MAP, OAKLAND EAST & WEST QUADRANGLES, CALIFORNIA. 7.5 MINUTE SERIES. 1959. PHOTOREVISED 1980.

FIGURE 1

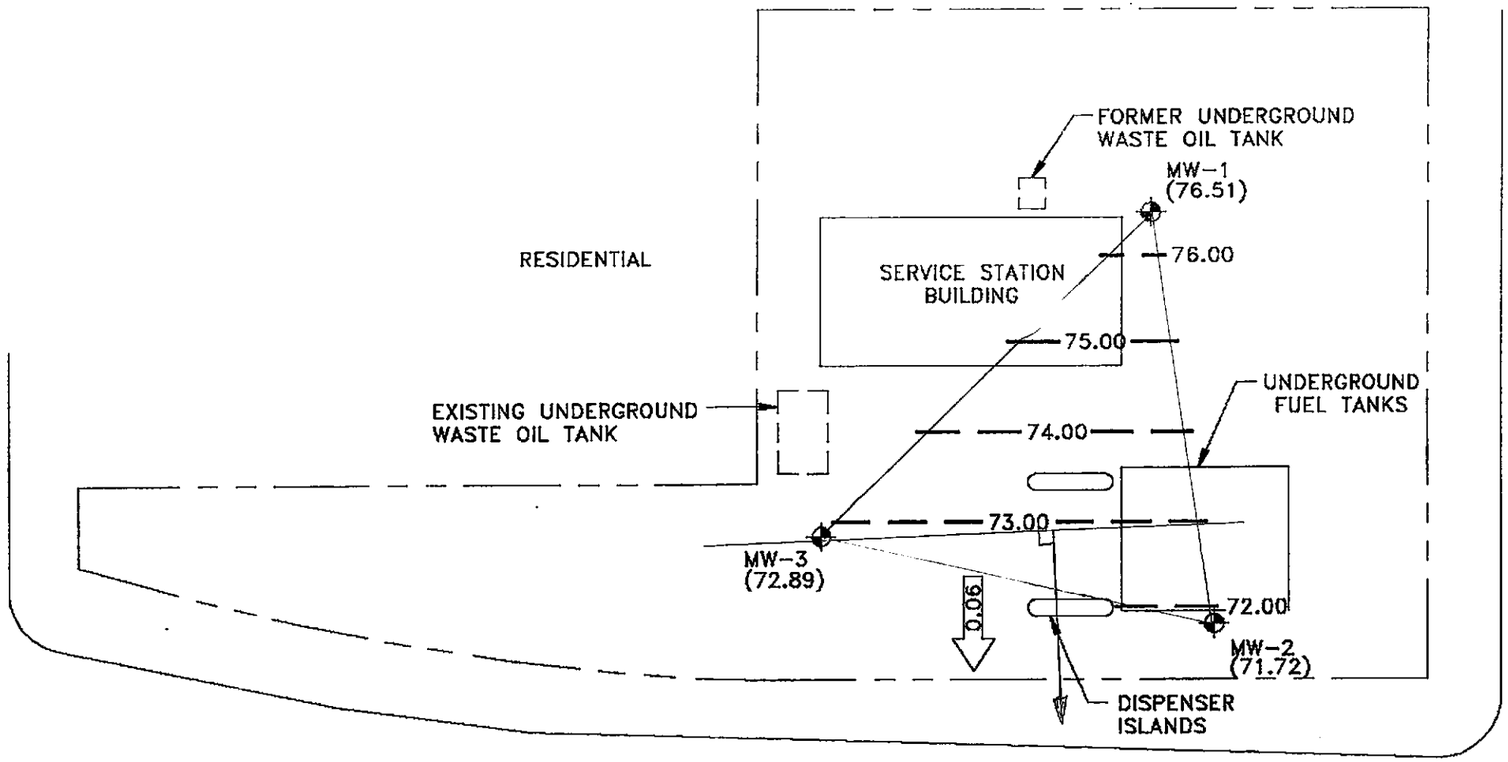
SITE VICINITY MAP

BP OIL SERVICE STATION NO. 11102
100 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

ALISTO PROJECT NO. 10-076

ALISTO ENGINEERING GROUP
CONCORD, CALIFORNIA

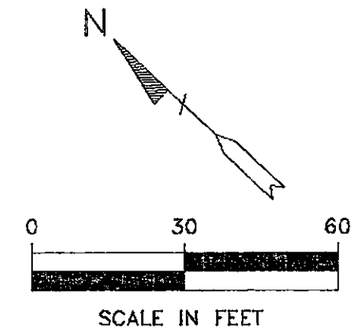
10076017.DWG 12-2-02 JNB 1=1



$\frac{H-M}{H-L} = \frac{X}{H \to L}$

$\left(\frac{3.67}{4.79}\right) 82 = X$

$62' = X$



LEGEND:

- ⌖ GROUNDWATER MONITORING WELL
- (76.51) GROUNDWATER ELEVATION IN FEET ABOVE MEAN SEA LEVEL
- 76.00 GROUNDWATER ELEVATION CONTOUR IN FEET ABOVE MEAN SEA LEVEL (CONTOUR INTERVAL – 1.00 FOOT)
- 0.06 CALCULATED GROUNDWATER GRADIENT DIRECTION AND MAGNITUDE

FIGURE 2

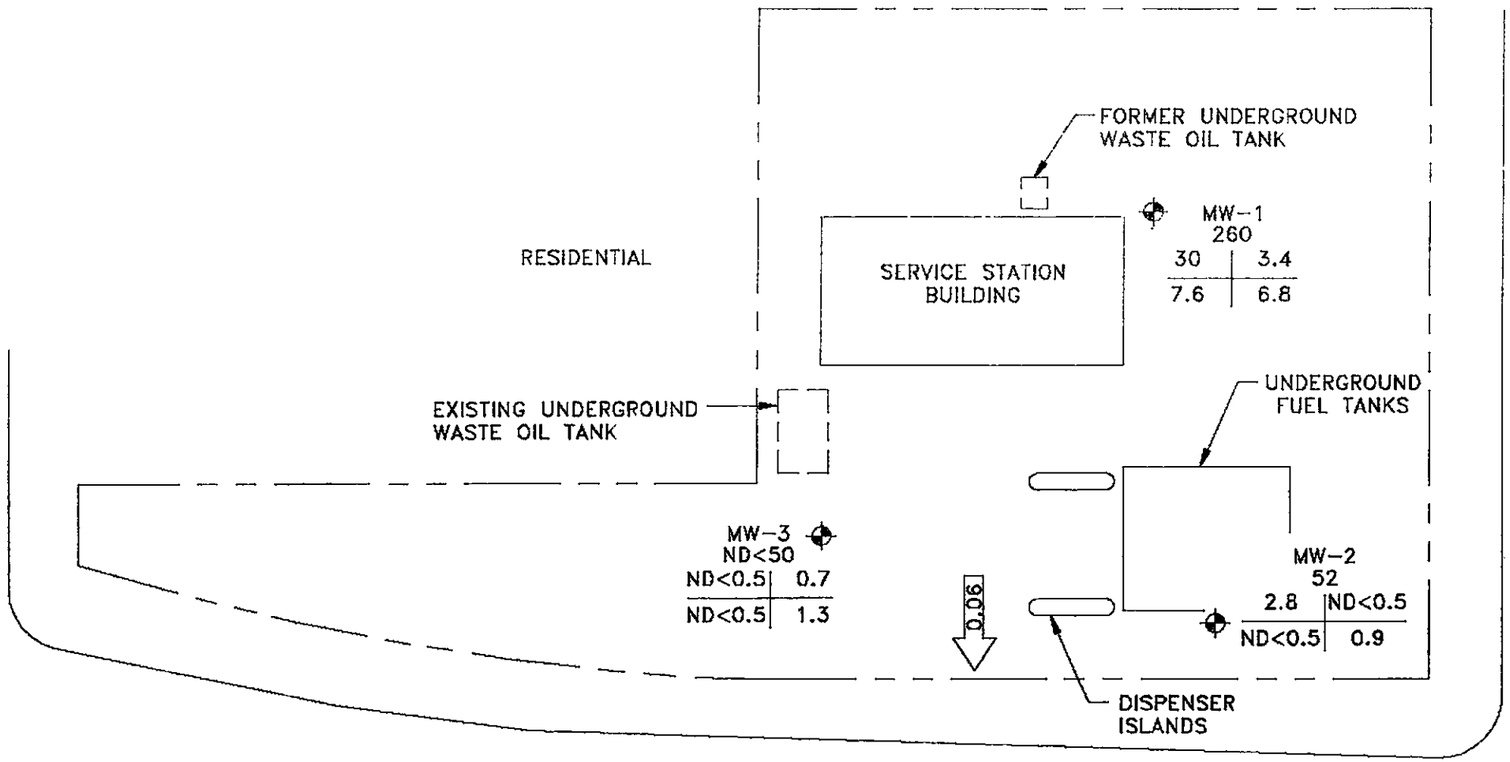
POTENTIOMETRIC GROUNDWATER ELEVATION CONTOUR MAP (NOVEMBER 11, 1992)

BP OIL SERVICE STATION NO. 11102
100 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

PROJECT NO. 10-076

ALISTO ENGINEERING GROUP
CONCORD, CALIFORNIA

10076011.DWG 12-2-92 JWB 1=60



N

0 30 60

SCALE IN FEET

LEGEND:

- GROUNDWATER MONITORING WELL
- TPH-G / B | T / E | X — CONCENTRATION OF CONSTITUENTS IN PARTS PER BILLION (PPB)
- TPH-G — TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
- B — BENZENE
- T — TOLUENE
- E — ETHYLBENZENE
- X — TOTAL XYLENES
- ND — NOT DETECTED ABOVE REPORTED DETECTION LIMIT
- 0.06 → CALCULATED GROUNDWATER GRADIENT DIRECTION AND MAGNITUDE

FIGURE 3

CONCENTRATIONS OF PETROLEUM HYDROCARBONS IN GROUNDWATER (NOVEMBER 11, 1992)

BP OIL SERVICE STATION NO. 11102
100 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

PROJECT NO. 10-076

ALISTO ENGINEERING GROUP
CONCORD, CALIFORNIA

10076017.DWG 12-2-92 JWB 1=60

APPENDIX A

WATER SAMPLING FIELD SURVEY FORMS

ALISTO ENGINEERING GROUP
FIELD FORM

Client: BP
Alisto Project No: 10-076-01
Service Station No: 11102

Date: 11/11/92
Field Personnel: LCB
Site Address: Oakland, Ca

Field Activity: ___ Groundwater Monitoring X Groundwater Sampling ___ Well Development

Well ID	Order Measured	Total Depth	Depth to Water	Depth to Product	Product Thickness	Comments
MW-1	3	32.40	13.69	Ø	Ø	
MW-2	2	32.60	16.19	↓	↓	
MW-3	1	32.05	14.13	↓	↓	
MW-3						Water Runoff inside Monument Around Casing. Water mixed with anti Freeze and a visible Sheen Removed water, antifreeze, & Sheen

QUALITY CONTROL SAMPLES:

MW-2 QC-1 Sample Duplicate (Well ID)
X QC-2 Trip Blank
___ QC-3 Rinsate Blank

Notes:

ALISTO ENGINEERING GROUP

Groundwater Monitoring Well Development/Sampling Field Survey Form

Client: BP
Alisto Project No: 10-076-01
Service Station No: 11102

Date: 11/11/92
Field Personnel: LcB
Address: Oakland, Ca

Well ID: MW-1 Field Activity: ___Well Development X Well Sampling ___Product Bailing

Casing Diameter:
___2 Inch (0.16 Gal/foot)
___3 Inch (0.37 Gal/foot)
X 4 Inch (0.65 Gal/Foot)
___4.5 Inch (0.83 Gal/foot)
___6 Inch (1.47 Gal/foot)

Purge Method:
___Pump (dispos. Poly Tubing)
___Disposable Bailers
___Other
___1.66 PVC Standard Bailer
X 3.50 PVC Standard Bailer

Well Data:
Ø Depth to Product
Ø Product Thickness
13.69 Depth to Water

Sampling Method:
X Dispos. Bailer
___Pump

Decontamination Method: X Triple Rinse (Liquinox) ___ Steam Cleaned

Calculated Purge Volume

32.40	- 13.69	= 16.71 ft X	.65 Gal/Ft	= 8.36 (10.86) Gal X	3	= 25.08 (32.58)
Total Depth of Well	Depth to Water	Water Column	Conversion Factor	Casing Vol	Vols to Purge	Calculated Purge Volume

Well Development/Sampling Parameters

Time	Surged (Min)	Temp °F	pH	Cond. (umhos /cm)	Purge Vol (Gal)	Comments		Analysis Required	Container Type	Preserv.
				X1000						
1545		67.8	7.87	11.36	6.50	Lt Brown Suspended silt/Sediment	X	TPH-G/BTEX	VOA	HCL
1548		67.3	7.47	9.13	13.00	" "	X	TPH-Diesel	Amber Liter	
1552		66.3	7.45	8.98	19.50	" "	X	EPA 601	VOA	
1556		65.1	7.47	9.01	26.00	" "	X	TOG 5520BF	Amber Liter	H_2NO_3
1600		65.2	7.48	8.84	32.75	" "				

Comments:
Begin Purge: 1540 Stop: 1600 Sampled: 1615
Well produces good

ALISTO ENGINEERING GROUP

Groundwater Monitoring Well Development/Sampling Field Survey Form

Client: BP
Alisto Project No: 10-076-01
Service Station No: 11102

Date: 11/11/92
Field Personnel: LCB
Address: Oakland, Ca

Well ID: MW-2 Field Activity: ___Well Development X Well Sampling ___Product Bailing

Casing Diameter:
___2 Inch (0.16 Gal/foot)
___3 Inch (0.37 Gal/foot)
X 4 Inch (0.65 Gal/Foot)
___4.5 Inch (0.83 Gal/foot)
___6 Inch (1.47 Gal/foot)

Purge Method:
___Pump (dispos. Poly Tubing)
___Disposable Bailers
___Other
___1.66 PVC Standard Bailer
X 3.50 PVC Standard Bailer

Well Data:
0 Depth to Product
0 Product Thickness
16.19 Depth to Water

Sampling Method:
X Dispos. Bailer
___Pump

Decontamination Method: X Triple Rinse (Liquinox) ___ Steam Cleaned

Calculated Purge Volume

32.60 (Total Depth of Well) − 16.19 (Depth to Water) = 16.41 ft (Water Column) × .65 Gal/Ft (Conversion Factor) = 10.67 Gal (Casing Vol) × 3 (Vols to Purge) = 32.01 (Calculated Purge Volume)

Well Development/Sampling Parameters

Time	Surged (Min)	Temp °F	pH	Cond. (umhos /cm)	Purge Vol (Gal)	Comments		Analysis Required	Container Type	Preserv.
1508		67.1	7.88	X100 8.24	6.50	Lt Brown suspended silt/sediment	X	TPH-G/BTEX	VOA	HCL
1512		67.1	7.42	15.75	13.00	" "		TPH-Diesel	Amber Liter	
1516		65.9	7.14	X1000 3.08	18.50	Brown silt/Sediment		EPA 601	VOA	
1621		64.2	7.60	3.03	25.00	" "		TOG 5520BF	Amber Liter	H_2NO_3
1624		65.5	7.82	2.83	32.25	" "				

Comments:

Begin Purge 1504 Stop: 1624 Sampled 1638
Well went dry after purging ~20.50 gal. @ 1519
Returned @ 1618 Purged remaining Volume
QC-1 Duplicate taken from this well

ALISTO ENGINEERING GROUP

Groundwater Monitoring Well Development/Sampling Field Survey Form

Client: BP
Alisto Project No: 10-076-01
Service Station No: 11102

Date: 11/11/92
Field Personnel: LCB
Address: Oakland, Ca

Well ID: MW-3 Field Activity: ___Well Development X Well Sampling ___Product Bailing

Casing Diameter:
___2 Inch (0.16 Gal/foot)
___3 Inch (0.37 Gal/foot)
X 4 Inch (0.65 Gal/Foot)
___4.5 Inch (0.83 Gal/foot)
___6 Inch (1.47 Gal/foot)

Purge Method:
___Pump (dispos. Poly Tubing)
___Disposable Bailers
___Other
___1.66 PVC Standard Bailer
X 3.50 PVC Standard Bailer

Well Data:
Ø Depth to Product
Ø Product Thickness
14.13 Depth to Water

Sampling Method:
X Dispos. Bailer
___Pump

Decontamination Method: X Triple Rinse (Liquinox) ___ Steam Cleaned

Calculated Purge Volume

32.05 (Total Depth of Well) - 14.13 (Depth to Water) = 17.92 ft (Water Column) X .65 Gal/Ft (Conversion Factor) = 11.65 Gal (Casing Vol) X 3 (Vols to Purge) = 34.95 (Calculated Purge Volume)

Well Development/Sampling Parameters

Time	Surged (Min)	Temp °C	pH	Cond. (umhos /cm)	Purge Vol (Gal)	Comments	Analysis Required		Container Type	Preserv
1433		72.7	8.68	6.89 X100	7	clear	X	TPH-G/BTEX	VOA	HCL
1440		69.1	8.17	6.53	14	Lt Brown Suspended silt/sediment		TPH-Diesel	Amber Liter	
1443		67.5	7.69	6.78	21	" "		EPA 601	VOA	
1448		66.6	7.52	7.15	28	" "		TOG 5520BF	Amber Liter	H_2NO_3
1456		66.3	7.46	7.09	35	" "				

Comments:
Begin Purge: 1428 Stop: 1456
Sampled: 1536

APPENDIX B

LABORATORY REPORT AND CHAIN OF CUSTODY RECORD

ANAMETRIX INC
Environmental & Analytical Chemistry

Part of INCHCAPE ENVIRONMENTAL

REPORT

MR. BRADY NAGLE
ALISTO ENGINEERING GROUP
1000 BURNETT AVENUE, SUITE 150
CONCORD, CA 94520

Workorder # : 9211205
Date Received : 11/12/92
Project ID : 10-076-01
Purchase Order: N/A

The following samples were received at Anametrix, Inc. for analysis :

ANAMETRIX ID	CLIENT SAMPLE ID
9211205- 1	QC-2
9211205- 2	MW-3
9211205- 3	MW-2
9211205- 4	QC-1
9211205- 5	MW-1

This report consists of 19 pages not including the cover letter, and is organized in sections according to the specific Anametrix laboratory group or section which performed the analysis(es) and generated the data. The Report Summary that precedes each section will help you determine which Anametrix group is responsible for those test results, and will bear the signatures of the department supervisor and the chemist who have reviewed the analytical data. Please refer all questions to the department supervisor who signed the form.

Anametrix is certified by the California Department of Health Services (DHS) to perform environmental testing under Certificate Number 1234. A detailed list of the approved fields of testing can be obtained by calling our office, or the DHS Environmental Laboratory Accreditation Program at (415)540-2800.

If you have any further questions or comments on this report, please give us a call as soon as possible. Thank you for using Anametrix.

Sarah Schoen, Ph.D.
Laboratory Director

11-24-92
Date

ANAMETRIX REPORT DESCRIPTION
GC

Organic Analysis Data Sheets (OADS)

OADS forms contain tabulated results for target compounds. The OADS are grouped by method and, within each method, organized sequentially in order of increasing Anametrix ID number.

Surrogate Recovery Summary (SRS)

SRS forms contain quality assurance data. An SRS form will be printed for each method, if the method requires surrogate compounds. They will list surrogate percent recoveries for all samples and any method blanks. Any surrogate recovery outside the established limits will be flagged with an "*", and the total number of surrogates outside the limits will be listed in the column labelled "Total Out".

Matrix Spike Recovery Form (MSR)

MSR forms contain quality assurance data. They summarize percent recovery and relative percent difference information for matrix spikes and matrix spike duplicates. This information is a statement of both accuracy and precision. Any percent recovery or relative percent difference outside established limits will be flagged with an "*", and the total number outside the limits will be listed at the bottom of the page. Not all reports will contain an MSR form.

Qualifiers

Anametrix uses several data qualifiers (Q) in it's report forms. These qualifiers give additional information on the compounds reported. They should help a data reviewer to verify the integrity of the analytical results. The following is a list of qualifiers and their meanings:

- U - Indicates that the compound was analyzed for, but was not detected at or above the specified reporting limit.
- B - Indicates that the compound was detected in the associated method blank.
- J - Indicates that the compound was detected at an amount below the specified reporting limit. Consequently, the amount should be considered an approximate value. Tentatively identified compounds will always have a "J" qualifier because they are not included in the instrument calibration.
- E - Indicates that the amount reported exceeded the linear range of the instrument calibration.
- D - Indicates that the compound was detected in an analysis performed at a secondary dilution.

Absence of a qualifier indicates that the compound was detected at a concentration at or above the specified reporting limit.

REPORTING CONVENTIONS

- Due to a size limitation in our data processing step, only the first eight (8) characters of your project ID and sample ID will be printed on the report forms. However, the report cover letter and report summary pages display up to twenty (20) characters of your project and sample IDs.
- Amounts reported are gross values, i.e., not corrected for method blank contamination.

REPORT SUMMARY
ANAMETRIX, INC. (408)432-8192

MR. BRADY NAGLE
ALISTO ENGINEERING GROUP
1000 BURNETT AVENUE, SUITE 150
CONCORD, CA 94520

Workorder # : 9211205
Date Received : 11/12/92
Project ID : 10-076-01
Purchase Order: N/A
Department : GC
Sub-Department: VOA

SAMPLE INFORMATION:

ANAMETRIX SAMPLE ID	CLIENT SAMPLE ID	MATRIX	DATE SAMPLED	METHOD
9211205- 5	MW-1	WATER	11/11/92	8010

REPORT SUMMARY
ANAMETRIX, INC. (408)432-8192

MR. BRADY NAGLE
ALISTO ENGINEERING GROUP
1000 BURNETT AVENUE, SUITE 150
CONCORD, CA 94520

Workorder # : 9211205
Date Received : 11/12/92
Project ID : 10-076-01
Purchase Order: N/A
Department : GC
Sub-Department: VOA

QA/QC SUMMARY :

- Sample MW-1 was analyzed at a dilution due to foaminess.

Department Supervisor — Date: 11/20/92

Chemist: Michelle Young — Date: 11/20/92

DESCRIPTIONS FOR SPECIFIC COMPOUNDS ANALYZED
EPA METHOD 601/8010

CAS #	COMPOUND NAME	ABBREVIATED NAME
74-87-3	Chloromethane	Chloromethane
74-83-9	Bromomethane	Bromoethane
75-71-8	Dichlorodifluoromethane	Freon 12
75-01-4	Vinyl Chloride	Vinyl Chloride
75-00-3	Chloroethane	Chloroethane
75-09-2	Methylene Chloride	Methylene Chlor
75-69-4	Trichlrofluoromethane	Freon 11
75-35-4	1,1-Dichloroethene	1,1-DCE
75-34-3	1,1-Dichloroethane	1,1-DCA
156-59-2	Cis-1,2-Dichloroethene	Cis-1,2-DCE
156-60-5	Trans-1,2-Dichloroethene	Trans-1,2-DCE
67-66-3	Chloroform	Chloroform
76-13-1	Trichlorotrifluoroethane	Freon 113
107-06-2	1,2-Dichloroethane	1,2-DCA
71-55-6	1,1,1-Trichloroethane	1,1,1-TCA
56-23-5	Carbon Tetrachloride	Carbon Tet
75-27-4	Bromodichloromethane	BromodichloroMe
78-87-5	1,2-Dichloropropane	1,2-DCPA
10061-02-6	Trans-1,3-Dichloropropene	Trans-1,3-DCPE
79-01-6	Trichloroethene	TCE
124-48-1	Dibromochloromethane	DibromochloroMe
79-00-5	1,1,2-Trichloroethane	1,1,2-TCA
10061-01-5	Cis-1,3-Dichloropropene	Cis-1,3-DCPE
110-75-8	2-Chloroethylvinylether	Chloroethylvinl
75-25-2	Bromoform	Bromoform
127-18-4	Tetrachloroethene	PCE
79-34-5	1,1,2,2-Tetrachloroethane	PCA
108-90-7	Chlorobenzene	Chlorobenzene
95-50-1	1,2-Dichlorobenzene	1,2-DCB
541-73-1	1,3-Dichlorobenzene	1,3-DCB
106-46-7	1,4-Dichlorobenzene	1,4-DCB
352-33-0	p-Chlorofluorobenzene	Chlorofluoroben

mh/3426 - 10MH

ORGANIC ANALYSIS DATA SHEET -- EPA METHOD 8010
ANAMETRIX, INC. (408)432-8192

Project ID : 10-076-0
Sample ID : MW-1
Matrix : WATER
Date Sampled :11/11/92
Date Analyzed :11/18/92
Instrument ID : HP14

Anametrix ID : 9211205-05
Analyst : mf
Supervisor : CP

Dilution Factor : 5.0
Conc. Units : ug/L

CAS No.	COMPOUND NAME	REPORTING LIMIT	AMOUNT DETECTED	Q
75-71-8	Freon 12	5.0	ND	U
74-87-3	Chloromethane	5.0	ND	U
75-01-4	Vinyl Chloride	2.5	ND	U
74-83-9	Bromomethane	2.5	ND	U
75-00-3	Chloroethane	2.5	ND	U
75-69-4	Freon 11	2.5	ND	U
76-13-1	Freon 113	2.5	ND	U
75-35-4	1,1-DCE	2.5	ND	U
75-09-2	Methylene Chlor	5.0	ND	U
156-60-5	Trans-1,2-DCE	2.5	ND	U
75-34-3	1,1-DCA	2.5	ND	U
156-59-2	Cis-1,2-DCE	2.5	ND	U
67-66-3	Chloroform	2.5	ND	U
71-55-6	1,1,1-TCA	2.5	ND	U
56-23-5	Carbon Tet	2.5	ND	U
107-06-2	1,2-DCA	2.5	ND	U
79-01-6	Trichloroethene	2.5	ND	U
78-87-5	1,2-DCPA	2.5	ND	U
75-27-4	Bromodichlorome	2.5	ND	U
110-75-8	Chloroethylvinl	5.0	ND	U
10061-01-5	Cis-1,3-DCPE	2.5	ND	U
10061-02-6	Trans-1,3-DCPE	2.5	ND	U
79-00-5	1,1,2-TCA	2.5	ND	U
127-18-4	PCE	2.5	ND	U
124-48-1	Dibromochlorome	2.5	ND	U
108-90-7	Chlorobenzene	2.5	ND	U
75-25-2	Bromoform	2.5	ND	U
79-34-5	1,1,2,2-PCA	2.5	ND	U
541-73-1	1,3-DCB	5.0	ND	U
106-46-7	1,4-DCB	5.0	ND	U
95-50-1	1,2-DCB	5.0	ND	U

ORGANIC ANALYSIS DATA SHEET -- EPA METHOD 8010
ANAMETRIX, INC. (408)432-8192

Project ID	: 10-076	Anametrix ID	: 14B1118H01
Sample ID	: VBLANK	Analyst	: KK
Matrix	: WATER	Supervisor	: CP
Date Sampled	: 0/ 0/ 0		
Date Analyzed	:11/18/92	Dilution Factor	: 1.0
Instrument ID	: HP14	Conc. Units	: ug/L

CAS No.	COMPOUND NAME	REPORTING LIMIT	AMOUNT DETECTED	Q
75-71-8	Freon 12	1.0	ND	U
74-87-3	Chloromethane	1.0	ND	U
75-01-4	Vinyl Chloride	.50	ND	U
74-83-9	Bromomethane	.50	ND	U
75-00-3	Chloroethane	.50	ND	U
75-69-4	Freon 11	.50	ND	U
76-13-1	Freon 113	.50	ND	U
75-35-4	1,1-DCE	.50	ND	U
75-09-2	Methylene Chlor	1.0	ND	U
156-60-5	Trans-1,2-DCE	.50	ND	U
75-34-3	1,1-DCA	.50	ND	U
156-59-2	Cis-1,2-DCE	.50	ND	U
67-66-3	Chloroform	.50	ND	U
71-55-6	1,1,1-TCA	.50	ND	U
56-23-5	Carbon Tet	.50	ND	U
107-06-2	1,2-DCA	.50	ND	U
79-01-6	Trichloroethene	.50	ND	U
78-87-5	1,2-DCPA	.50	ND	U
75-27-4	Bromodichlorome	.50	ND	U
110-75-8	Chloroethylvinl	1.0	ND	U
10061-01-5	Cis-1,3-DCPE	.50	ND	U
10061-02-6	Trans-1,3-DCPE	.50	ND	U
79-00-5	1,1,2-TCA	.50	ND	U
127-18-4	PCE	.50	ND	U
124-48-1	Dibromochlorome	.50	ND	U
108-90-7	Chlorobenzene	.50	ND	U
75-25-2	Bromoform	.50	ND	U
79-34-5	1,1,2,2-PCA	.50	ND	U
541-73-1	1,3-DCB	1.0	ND	U
106-46-7	1,4-DCB	1.0	ND	U
95-50-1	1,2-DCB	1.0	ND	U

SURROGATE RECOVERY SUMMARY -- EPA METHOD 8010
ANAMETRIX, INC. (408)432-8192

Project ID : 10-076-0
Matrix : LIQUID

Anametrix ID : 9211205
Analyst : MF
Supervisor : CP

	SAMPLE ID	SU1	SU2	SU3
1	VBLANK	103		
2	MW-1	92		
3				
4				
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29				
30				

	QC LIMITS
SU1 = CHLOROFLUOROBEN	(51-136)

* Values outside of Anametrix QC limits

LABORATORY CONTROL SAMPLE
EPA METHOD 601/8010
ANAMETRIX, INC. (408)432-8192

Project/Case	: LABORATORY CONTROL SAMPLE	Anametrix I.D.	: WO11892
Matrix	: WATER	Analyst	: KK
SDG/Batch	: N/A	Supervisor	: CP
Date analyzed	: 11/18/92	Instrument I.D.	: HP14

COMPOUND	SPIKE AMOUNT (ug/L)	AMOUNT RECOVERED (ug/L)	PERCENT RECOVERY	%RECOVERY LIMITS
FREON 113	10	7.1	71%	34 - 128
1,1-DICHLOROETHENE	10	9.7	97%	63 - 133
trans-1,2-DICHLOROETHENE	10	12.7	127%	55 - 145
1,1-DICHLOROETHANE	10	11.6	116%	49 - 121
cis-1,2-DICHLOROETHENE	10	11.7	117%	66 - 168
1,1,1-TRICHLOROETHANE	10	11.7	117%	72 - 143
TRICHLOROETHENE	10	14.0	140%	63 - 147
TETRACHLOROETHENE	10	13.0	130%	60 - 133
CHLOROBENZENE	10	11.8	118%	70 - 148
1,3-DICHLOROBENZENE	10	13.1	131%	49 - 139
1,4-DICHLOROBENZENE	10	12.7	127%	70 - 133
1,2-DICHLOROBENZENE	10	13.0	130%	69 - 140

* Limits based on data generated by Anametrix, Inc., August, 1992.

REPORT SUMMARY
ANAMETRIX, INC. (408)432-8192

MR. BRADY NAGLE
ALISTO ENGINEERING GROUP
1000 BURNETT AVENUE, SUITE 150
CONCORD, CA 94520

Workorder # : 9211205
Date Received : 11/12/92
Project ID : 10-076-01
Purchase Order: N/A
Department : GC
Sub-Department: TPH

SAMPLE INFORMATION:

ANAMETRIX SAMPLE ID	CLIENT SAMPLE ID	MATRIX	DATE SAMPLED	METHOD
9211205- 5	MW-1	WATER	11/11/92	TPHd
9211205- 1	QC-2	WATER	11/11/92	TPHg/BTEX
9211205- 2	MW-3	WATER	11/11/92	TPHg/BTEX
9211205- 3	MW-2	WATER	11/11/92	TPHg/BTEX
9211205- 4	QC-1	WATER	11/11/92	TPHg/BTEX
9211205- 5	MW-1	WATER	11/11/92	TPHg/BTEX

REPORT SUMMARY
ANAMETRIX, INC. (408)432-8192

MR. BRADY NAGLE
ALISTO ENGINEERING GROUP
1000 BURNETT AVENUE, SUITE 150
CONCORD, CA 94520

Workorder # : 9211205
Date Received : 11/12/92
Project ID : 10-076-01
Purchase Order: N/A
Department : GC
Sub-Department: TPH

QA/QC SUMMARY :

- No QA/QC problems encountered for these samples.

Department Supervisor — Date: 11/24/92

Chemist — Date: 11.24.92

ANALYSIS DATA SHEET - TOTAL PETROLEUM HYDROCARBONS
(GASOLINE WITH BTEX)
ANAMETRIX, INC. - (408) 432-8192

Anametrix W.O.: 9211205
Matrix : WATER
Date Sampled : 11/11/92

Project Number : 10-076-01
Date Released : 11/24/92

COMPOUNDS	Reporting Limit (ug/L)	Sample I.D.# QC-2 -01	Sample I.D.# MW-3 -02	Sample I.D.# MW-2 -03	Sample I.D.# QC-1 -04	Sample I.D.# MW-1 -05
Benzene	0.5	ND	ND	2.8	3.2	30
Toluene	0.5	ND	0.7	ND	ND	3.4
Ethylbenzene	0.5	ND	ND	ND	ND	7.6
Total Xylenes	0.5	ND	1.3	0.9	1.0	6.8
TPH as Gasoline	50	ND	ND	52	65	260
% Surrogate Recovery		107%	102%	99%	98%	97%
Instrument I.D.		HP4	HP4	HP4	HP4	HP4
Date Analyzed		11/18/92	11/18/92	11/18/92	11/19/92	11/19/92
RLMF		1	1	1	1	1

ND - Not detected at or above the practical quantitation limit for the method.
TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using modified EPA Method 8015 following sample purge and trap by EPA Method 5030.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA Method 8020 following sample purge and trap by EPA Method 5030.
RLMF - Reporting Limit Multiplication Factor.

Anametrix control limits for surrogate p-Bromofluorobenzene recovery are 53-147%.

All testing procedures follow California Department of Health Services (Cal-DHS) approved methods.

Charleston Burch 11.24.92
Analyst Date

Cheryl Balmer 11/24/92
Supervisor Date

ANALYSIS DATA SHEET - TOTAL PETROLEUM HYDROCARBONS
(GASOLINE WITH BTEX)
ANAMETRIX, INC. - (408) 432-8192

Anametrix W.O.: 9211205
Matrix : WATER
Date Sampled : N/A

Project Number : 10-076-01
Date Released : 11/24/92

COMPOUNDS	Reporting Limit (ug/L)	Sample I.D.# BN1801E2 BLANK	Sample I.D.# BN1901E2 BLANK
Benzene	0.5	ND	ND
Toluene	0.5	ND	ND
Ethylbenzene	0.5	ND	ND
Total Xylenes	0.5	ND	ND
TPH as Gasoline	50	ND	ND
% Surrogate Recovery		82%	109%
Instrument I.D.		HP4	HP4
Date Analyzed		11/18/92	11/19/92
RLMF		1	1

ND - Not detected at or above the practical quantitation limit for the method.
TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using modified EPA Method 8015 following sample purge and trap by EPA Method 5030.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA Method 8020 following sample purge and trap by EPA Method 5030.
RLMF - Reporting Limit Multiplication Factor.

Anametrix control limits for surrogate p-Bromofluorobenzene recovery are 53-147%.

All testing procedures follow California Department of Health Services (Cal-DHS) approved methods.

Charlotte Burch 11.24.92
Analyst Date

Cheryl Balmer 11/24/92
Supervisor Date

ANALYSIS DATA SHEET - TOTAL PETROLEUM HYDROCARBONS AS DIESEL
ANAMETRIX, INC. (408) 432-8192

Anametrix W.O.: 9211205
Matrix : WATER
Date Sampled : 11/11/92
Date Extracted: 11/17/92

Project Number : 10-076-01
Date Released : 11/24/92
Instrument I.D.: HP23

Anametrix I.D.	Client I.D.	Date Analyzed	Reporting Limit (ug/L)	Amount Found (ug/L)
9211205-05	MW-1	11/18/92	50	92
DWBL111792	METHOD BLANK	11/17/92	50	ND

Note : Reporting limit is obtained by multiplying the dilution factor times 50 ug/L.
ND - Not detected at or above the practical quantitation limit for the method.
TPHd - Total Petroleum Hydrocarbons as diesel is determined by GCFID following sample extraction by EPA Method 3510.

All testing procedures follow California Department of Health Services (Cal-DHS) approved methods.

Charleston Bunch 11.24.92
Analyst Date

Cheryl Balmer 11/24/92
Supervisor Date

BTEX LABORATORY CONTROL SAMPLE REPORT
EPA METHOD 5030 WITH GC/PID
ANAMETRIX, INC. (408) 432-8192

Sample I.D.	: LAB CONTROL SAMPLE	Anametrix I.D.	: LCSW1118
Matrix	: WATER	Analyst	: CMB
Date Sampled	: N/A	Supervisor	: CB
Date Analyzed	: 11/18/92	Date Released	: 11/24/92
		Instrument ID	: HP4

COMPOUND	SPIKE AMT. (ug/L)	LCS (ug/L)	REC LCS	%REC LIMITS
Benzene	20.0	17.4	87%	49-159
Toluene	20.0	18.4	92%	53-156
Ethylbenzene	20.0	18.0	90%	54-151
TOTAL-Xylenes	20.0	18.3	92%	56-157
P-BFB			85%	53-147

* Limits established by Anametrix, Inc.

TOTAL EXTRACTABLE HYDROCARBON LABORATORY CONTROL SAMPLE REPORT
EPA METHOD 3510 WITH GC/FID
ANAMETRIX, INC. (408) 432-8192

Sample I.D.	: LAB CONTROL SAMPLE	Anametrix I.D.	: LCSW1117
Matrix	: WATER	Analyst	: CMB
Date Sampled	: N/A	Supervisor	: CB
Date Extracted	: 11/17/92	Date Released	: 11/24/92
Date Analyzed	: 11/17/92	Instrument I.D.	: HP23

COMPOUND	SPIKE AMT (ug/L)	LCS REC (ug/L)	% REC LCS	LCSD REC (ug/L)	% REC LCSD	RPD	% REC LIMITS
DIESEL	1250	1200	96%	1200	96%	0%	63-130

*Quality control established by Anametrix, Inc.

REPORT SUMMARY
ANAMETRIX, INC. (408)432-8192

MR. BRADY NAGLE
ALISTO ENGINEERING GROUP
1000 BURNETT AVENUE, SUITE 150
CONCORD, CA 94520

Workorder # : 9211205
Date Received : 11/12/92
Project ID : 10-076-01
Purchase Order: N/A
Department : PREP
Sub-Department: PREP

SAMPLE INFORMATION:

ANAMETRIX SAMPLE ID	CLIENT SAMPLE ID	MATRIX	DATE SAMPLED	METHOD
9211205- 5	MW-1	WATER	11/11/92	5520BF

REPORT SUMMARY
ANAMETRIX, INC. (408)432-8192

MR. BRADY NAGLE
ALISTO ENGINEERING GROUP
1000 BURNETT AVENUE, SUITE 150
CONCORD, CA 94520

Workorder # : 9211205
Date Received : 11/12/92
Project ID : 10-076-01
Purchase Order: N/A
Department : PREP
Sub-Department: PREP

QA/QC SUMMARY :

- No QA/QC problems encountered for sample.

Department Supervisor 11/24/92 Date

Chemist 11-24-92 Date

ANALYSIS DATA SHEET - TOTAL OIL AND GREASE
ANAMETRIX, INC. (408) 432-8192

Project I.D.	: 10-076-01	Anametrix I.D.	: 9211205
Matrix	: WATER	Analyst	: AP
Date sampled	: 11/11/92	Supervisor	: CM
Date ext. TOG	: 11/17/92	Date released	: 11/24/92
Date anl. TOG	: 11/17/92		

Workorder #	Sample I.D.	Reporting Limit (mg/L)	Amount Found (mg/L)
9211205-05	MW-1	5	ND
GWBL111792	METHOD BLANK	5	ND

ND - Not detected at or above the practical quantitation limit for the method.
TOG - Total Oil & Grease is determined by Standard Method 5520BF.

All testing procedures follow California Department of Health Services (Cal-DHS) approved methods.

TOTAL OIL AND GREASE LAB CONTROL SAMPLE REPORT
STANDARD METHOD 5520BF
ANAMETRIX, INC. (408) 432-8192

Sample I.D.	: LAB CONTROL SAMPLE	Anametrix I.D.	: LCSW1117
Matrix	: WATER	Analyst	: RR.
Date sampled	: N/A	Supervisor	: CM
Date extracted	: 11/17/92	Date Released	: 11/24/92
Date analyzed	: 11/17/92		

COMPOUND	SPIKE AMT. (mg/L)	LCS (mg/L)	%REC LCS	LCSD (mg/L)	%REC LCSD	%RPD	%REC LIMITS
Motor Oil	50	41	82%	43	86%	5%	54-106%

* Quality control limits established by Anametrix, Inc.

ANAMETRIX INC
Environmental & Analytical Chemistry
1961 Concourse Drive, Suite E, San Jose, CA 95131
(408) 432-8192 • Fax (408) 432-8198

22:10 9211205 (18) (16) (10/27)

CHAIN-OF-CUSTODY RECORD

PROJECT NUMBER: 10-076-01
PROJECT NAME: BP
Send Report Attention of: Brady Wagle
Report Due: STAT / /
Verbal Due: STAT / /

Sample Number	Date	Time	Comp	Matrix	Station Location	Number of Cntnrs	Type of Containers	TPH-G/BTXE	601 HVOC	TOG	TPH-D	Condition of Samples	Initial
(1) QC-2	11/11/92	1534 ~~14~~		W	Oakland	2	HCL pres. VOAs	X				OK all	
(2) MW-3	↓	1536 ~~1456~~		↓	↓	3	↓	↓				containers for TPH-d & TOG received	
(3) MW-2	↓	1638		↓	↓	3	↓	↓				unpreserved.	
(4) QC-1	↓	1640		↓	↓	3	↓	↓				↓	
(5) MW-1	↓	1615		↓	↓	10	HCL pres VOAs Amber Liters	↓	X	X	X	↓	MB

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
Jerry Buendia	11/12/92 1510	Bonny S. Carrasco	11-12-92 1510
Bonny S. Carrasco	11-12-92 1615	Maria Borg	11/12/92 16:15
Relinquished by: (Signature)	Date/Time	Received by Lab:	Date/Time

Remarks:

COMPANY: Alisto Engineering Group
ADDRESS: 1000 Burnett Ave., Concord, Ca 94520
PHONE: (510) 798-4070 FAX: 798-4099