5/8/89

ENSCO ENVIRONMENTAL SERVICES, INC.

APRIL QUARTERLY REPORT
GROUNDWATER SAMPLING
AND ANALYSES

FOR

SHELL OIL COMPANY
230 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

Project No. 1847G
April 1989

Corporate Offices 41674 Christy Street, Fremont, CA 94538-3114 (415) 659-0404 Fax: (415) 651-4677 Contr. Lic. No. 550205

ensco environmental services, inc.
a subsidiary of environmental system company

April 5, 1989

Shell Oil Company
1390 Willow Pass Road
Suite 900
Concord, CA 94520

Attn: Ms. Diane Lundquist

Re: April Quarterly Report
Groundwater Sampling and Analyses
Shell Gas Station, 230 MacArthur Boulevard, Oakland, California
EES Project No. 1847G

Dear Ms. Lundquist:

This report presents the results of groundwater sampling and analyses performed at the above referenced site since January 1989. It includes all current and past analytical data acquired during the course of this ongoing investigation.

If you have any questions, please call.

Sincerely,
Ensco Environmental Services, Inc.

Stephen Costello
Project Geologist

David J. Blunt R.G. 4516
Manager, Geotechnical Services

SC/DJB/sd
Enclosure

APRIL QUARTERLY REPORT
GROUNDWATER SAMPLING AND ANALYSES

FOR

SHELL OIL COMPANY
230 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

INTRODUCTION

This report presents the results of groundwater monitoring by Ensco Environmental Services, Inc. (EES) at the Shell Gas Station located at 230 MacArthur Boulevard in the City of Oakland, Alameda County, California (see Figure 1). Groundwater sampling has been performed monthly since October, 1988. This report presents the data for the period from January through March, 1989. The program objectives are listed below.

- Plot the groundwater contour surface and inferred flow direction.
- Investigate for the presence of a petroleum hydrocarbon plume and its concentrations.
- Compare current and past data.

The existence and degree of hydrocarbon contamination is determined by 1) checking free-floating product thickness and 2) performing laboratory analyses on groundwater samples to determine concentrations of total petroleum hydrocarbons as gasoline (TPHG), benzene, toluene, ethyl benzene, and total xylenes (BTEX). At the request of Shell, EES has also collected groundwater samples from one well on the property for total dissolved solids (TDS) analysis.

BACKGROUND

The station currently utilizes two dispensing islands and three recently replaced underground gasoline storage tanks (installed in November, 1987). The background information that follows was compiled from information provided to EES by Shell.

Emcon Associates performed an investigation on the property on April 14, 1986 which involved the drilling of four exploratory borings within the tank complex area. These borings were advanced to final depths of 20.5 feet. Groundwater was initially encountered at an approximate depth of 13 feet in each boring. Emcon reported that the soils underlying the tank complex consisted of fine to medium grained silty sand and clayey silt to the total depth explored. The soil samples collected were analyzed for the presence of total petroleum hydrocarbons (TPH) and benzene, toluene, and xylene (BTX) compounds. One soil sample was analyzed for total lead. Laboratory results indicated that TPH concentrations in the soils analyzed ranged from 1,200 to 5,700 parts-per-million (ppm) at depths between 8 and 15 feet.

An additional site assessment was performed by W.W. Irwin, Inc. on December 2 and 3, 1986 which consisted of analyzing soil gas vapors from 38 probe holes located within the tank complex and throughout the rest of the site. They concluded that very high concentrations of hydrocarbons were primarily confined to the area of the tank complex and the vicinity of the pump island (southwest portion of site) nearest MacArthur Boulevard.

On March 12, 1987, Wayne Perry Construction, Inc. installed three vapor recovery wells within the tank complex for the purpose of venting the soil. Each well was installed to a depth of 13 feet and was constructed of solid and machine-slotted 4-inch diameter PVC pipe. The slotted interval (slot size 0.02-inch) extended from three feet below ground surface to the bottom of the borings. A soil venting system, utilizing an activated carbon scrubber, was operated on the site between April and November, 1987. Gas vapors were analyzed using a Foxboro 128 OVA system with a portable chart recorder. Wayne Perry Construction concluded that the well gas contained light hydrocarbon compounds and that prolonged venting reduced their concentrations. Once the venting operation stopped, however, the hydrocarbon

concentrations began increasing. On August 27, 1987 Wayne Perry drilled and sampled two additional borings within the tank complex for the purpose of analyzing concentrations of residual hydrocarbons remaining in the soils beneath the tanks after the first phase of soil venting was completed. Analyses of the samples collected indicated that the highest remaining concentrations of TPH (1,870 ppm) occurred at a depth of eight feet.

On November 2, 1987 the underground storage tanks were removed from the site and soil samples were collected from the excavation and soil stockpile. Analytical results indicated that TPH contamination was detected in the soil samples from the excavation at concentrations ranging from 8.6 to 480 ppm at a depth of 15 feet. Five composite samples were collected from the soil stockpile and the TPH concentrations detected in them ranged from 8.4 to 250 ppm.

In June of 1988, Shell contracted EES to perform a supplemental site assessment for the purpose of further delineating the subsurface hydrocarbon contamination at the subject property. The scope of work for this project included drilling three exploratory borings, collecting soil samples from the borings, converting each boring to a groundwater monitoring well, developing and sampling the wells, providing laboratory analyses of the samples, surveying the well heads, and technical report preparation. The field work was performed in July, 1988. Beginning in October 1988, EES initiated a monthly sampling program to monitor depth, flow direction, gradient, and quality of the groundwater beneath the site.

The soil and groundwater samples collected during the course of this supplemental investigation were analyzed for TPHG with BTEX distinction. The soil sample collected at a depth of 10 feet from the boring for MW-3 in the area of the former underground fuel tanks was found by the laboratory analyses to contain TPHG at a concentration of 278 ppm. No petroleum contamination was detected in any of the other soil samples submitted for analysis. This information was presented in an EES report issued in November, 1988.

GROUNDWATER SAMPLING

Sampling of the monitoring wells was performed in accordance with the attached EES protocol (Appendix A). Prior to sampling, all wells were field checked for the presence of floating product. No floating product was observed in the wells. All water purged from each well was placed in drums and properly labeled. The water was transferred by Crosby and Overton, a licensed hauler, to the Shell refinery for recycling.

SITE CONDITIONS

The results of the monthly monitoring program are summarized in Table 1. Only minor quantities of dissolved hydrocarbons have been detected in the groundwater over the past quarter. Groundwater samples collected from MW-3 contained TPHG concentrations of 0.07 ppm (February 6, 1989) and 0.15 ppm (March 10, 1989). No hydrocarbon contamination was detected in the groundwater samples collected from MW-1 or MW-2 during this quarter. TDS concentrations range between 400 ppm and 456 ppm. The laboratory analytical reports are attached in Appendix B.

Groundwater surface contour maps were prepared based on the data collected from the on-site groundwater monitoring wells. These maps are presented as Figures 2, 3, and 4. The apparent groundwater surface was inclined to the northwest throughout the quarter. The calculated gradient has increased over the past quarter from 0.0025 feet-per-foot in January to 0.0028 feet-per-foot in February to 0.008 feet-per-foot in March.

LONG-TERM MONITORING

EES will continue to monitor the wells on the property. The monitoring will include monthly depth-to-water measurements and quarterly sample collection for laboratory analysis. The next quarterly report summarizing the results of this monitoring program will be issued in July, 1989.

CONCLUSIONS AND RECOMMENDATIONS

1. Groundwater at the subject site was measured at elevations ranging between 60.3 and 61.3 feet above mean sea level during the last quarter. Gradient determinations have shown that the groundwater flow has been to the northwest over the past quarter.

2. Very low concentrations of dissolved hydrocarbons have been sporadically detected in the groundwater beneath the subject property. No free product was observed in the groundwater monitoring wells at the site.

3. EES will continue to monitor the wells on the site. The next quarterly groundwater monitoring report will be submitted in July 1989, and will include analytical results of samples collected in June as wells as monthly depth data. This schedule will continue until reviewed by the San Francisco Bay Regional Water Quality Control Board (SFBRWQCB). In general, the SFBRWQCB requires a minimum of one year of monitoring with "clean" results to discontinue site groundwater monitoring.

REPORTING REQUIREMENTS

A copy of this report should be forwarded to the following agencies:

Alameda County Flood Control and
Water Conservation District
5997 Parkside Drive
Pleasanton, California 94566
Attn: Mr. Craig Mayfield

Regional Water Quality Control Board
San Francisco Bay Region
1111 Jackson Street
Oakland, California 94607
Attn: Ms. Lisa McCann

Alameda County Health Department
Department of Environmental Health
80 Swan Way, Room 200
Oakland, California 94621
Attn: Mr. Lowell Miller

DISCLAIMER

This report has been prepared solely for the use of Shell and any reliance on this report by third parties shall be as such party's sole risk.

LIMITATIONS

The discussions and recommendations presented in this report are based on the following:

1. The exploratory test borings drilled at the site.
2. The observations of field personnel.
3. The results of laboratory analyses performed by a state-certified laboratory.
4. Referenced documents.
5. Our understanding of the regulations of the State of California and Alameda County and/or the City of Oakland.

It is possible that variations in the soil or groundwater conditions could exist beyond the points explored in this investigation. Also, changes in the groundwater conditions could occur at sometime in the future due to variations in rainfall, temperature, regional water usage or other factors.

The service performed by EES has been conducted in a manner consistent with the level of care and skill ordinarily exercised by members of our profession currently practicing under similar conditions in the San Francisco Bay Area. Please note that contamination of soil and groundwater must be reported to the appropriate agencies in a timely manner. No other warranty, expressed or implied, is made.

The chemical analytical data included in this report have been obtained from a state-certified laboratory. The analytical methods employed by the laboratory were in accordance with procedures suggested by the U.S. EPA and the State of California. EES is not responsible for laboratory errors in procedure or result reporting.

TABLE 1
GROUNDWATER ANALYSES DATA

WELL	DATE	TPHG (ppm)	BENZENE (ppm)	TOLUENE (ppm)	ETHYL BENZENE (ppm)	TOTAL XYLENES (ppm)	TDS (ppm)	WELL ELEV. (ft.)	DEPTH TO WATER (ft.)
MW-1	7/14/88	ND	ND	ND	ND	ND	NA	73.89	13.30
	10/4/88	BRL	0.008	0.0043	BRL	0.009	NA		13.65
	11/10/88	BRL	BRL	BRL	BRL	BRL	NA		13.55
	12/9/88	ND	ND	ND	ND	ND	NA		13.22
	1/10/89	ND	ND	ND	ND	ND	NA		12.86
	1/20/89	NA	NA	NA	NA	NA	NA		12.91
	2/6/89	ND	ND	ND	ND	ND	NA		12.94
	3/10/89	ND	ND	ND	ND	ND	NA		12.59
MW-2	7/14/88	ND	0.0079	0.0026	0.0011	0.004	NA	75.24	15.18
	10/4/88	0.09	BRL	0.0013	0.0025	0.012	NA		15.30
	11/10/88	BRL	BRL	BRL	BRL	0.002	NA		15.17
	12/9/88	ND	ND	0.0006	ND	0.003	NA		14.82
	1/20/89	ND	ND	ND	ND	ND	456		14.54
	2/6/89	ND	ND	ND	ND	ND	400		14.59
	3/10/89	ND	ND	ND	ND	ND	407		14.88
MW-3	7/14/88	ND	ND	ND	ND	ND	NA	74.68	14.05
	10/4/88	BRL	BRL	BRL	BRL	0.005	NA		14.60
	11/10/88	BRL	BRL	BRL	BRL	BRL	NA		14.35
	12/9/88	ND	ND	ND	ND	ND	NA		14.04
	1/10/89	ND	ND	ND	ND	ND	NA		13.70
	1/20/89	NA	NA	NA	NA	NA	NA		13.72
	2/6/89	0.07	ND	ND	ND	ND	NA		13.75
	3/10/89	0.15	ND	ND	ND	ND	NA		13.42

TPHG = Total Petroleum Hydrocarbons as Gasoline
ppm = parts per million
ND= Not Detected
BRL = Below Reporting Limit
NA = Not Analyzed
TDS = Total Dissolved Solids
Note: See lab reports for detection limits and reporting limit

BASE: USGS 7.5 MINUTE TOPOGRAPHIC SHEET

ensco environmental services, Inc.

SITE LOCATION MAP

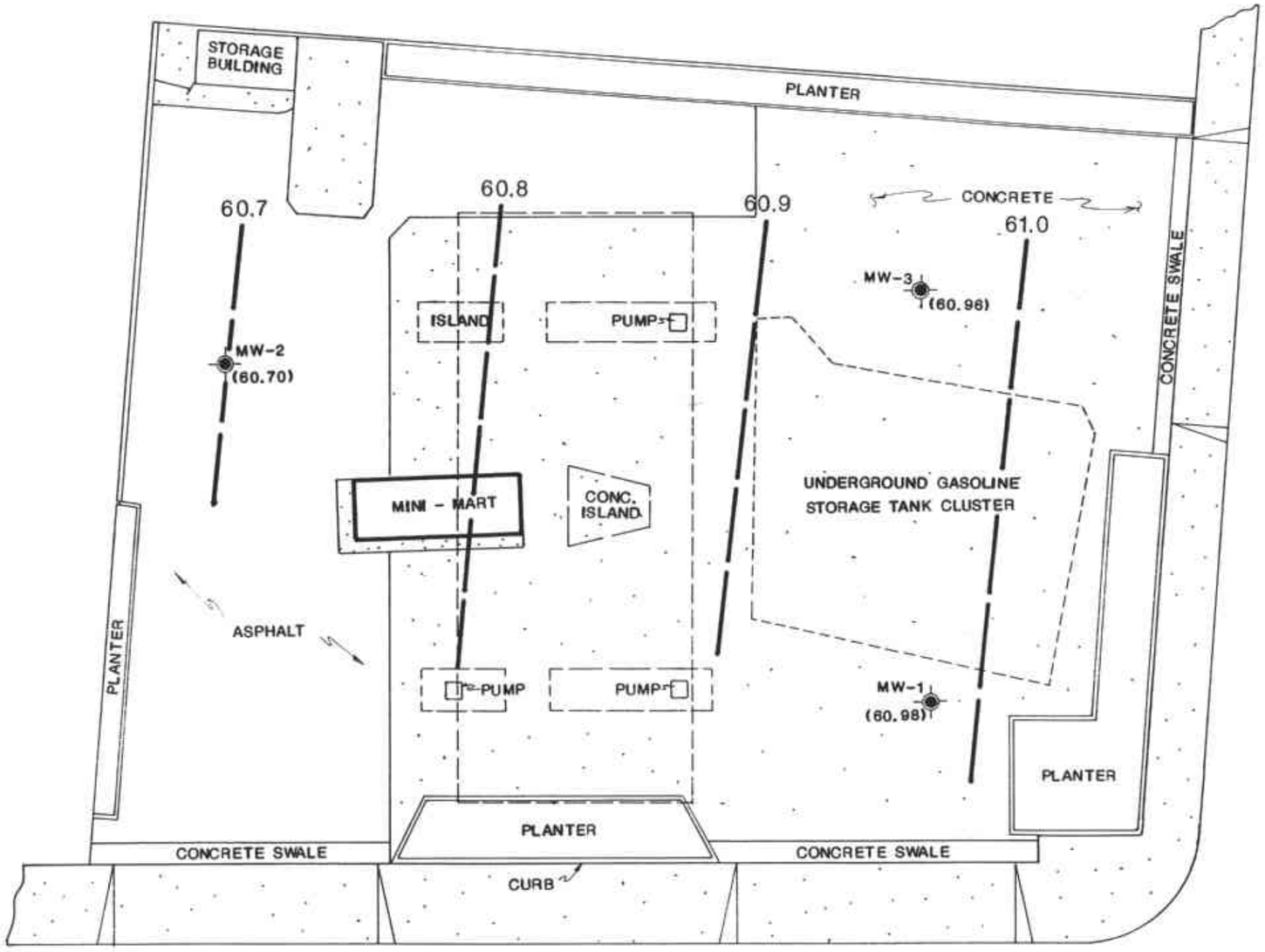
SHELL SERVICE STATION

230 MacARTHUR BOULEVARD

OAKLAND, CALIFORNIA

REVIEWED BY:	APPROVED BY:
JOB #: 1847G	DRAWN BY: SLS
DATE: 9-16-88	DRAWING #: FIG: 1

A-1847G-1



LEGEND

- MW-1 GROUNDWATER MONITORING WELL
- (60.96) GROUNDWATER ELEVATION IN FEET (DATUM: M.S.L.)
- 60.0 GROUNDWATER ELEVATION CONTOUR IN FEET (DATUM: M.S.L.)

N

0 20

APPROX. SCALE IN FEET

ensco environmental services, Inc.

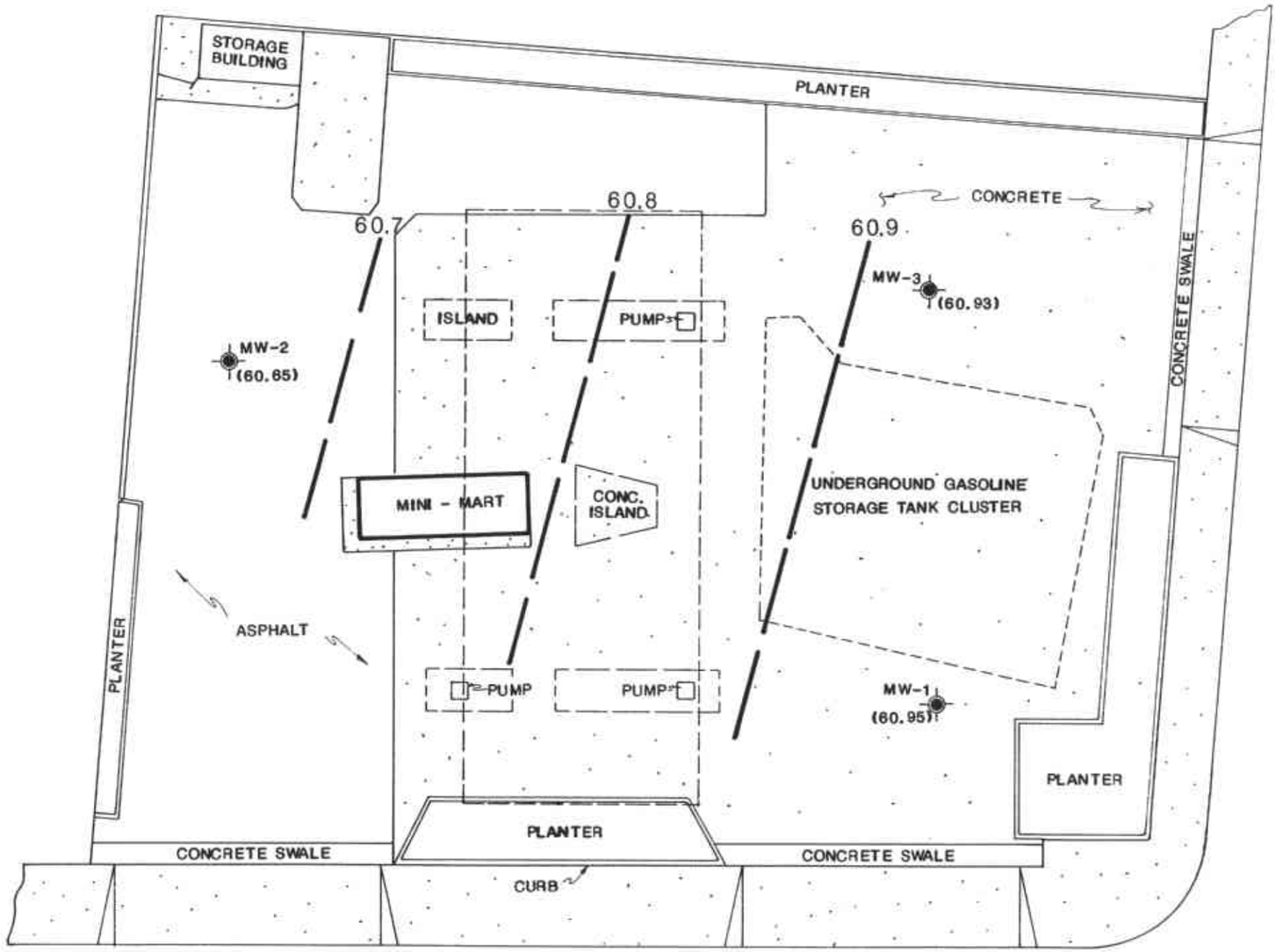
GROUNDWATER ELEVATION MAP (1/20/89)

SHELL SERVICE STATION

230 Mac ARTHUR BOULEVARD

OAKLAND, CALIFORNIA

REVIEWED BY:	APPROVED BY:
JOB #: 1847G	DRAWN BY: J.C.
DATE: 3-8-89	DRAWING #: FIG. 2



LEGEND

MW-1 GROUNDWATER MONITORING WELL

(60.95) GROUNDWATER ELEVATION IN FEET (DATUM: M.S.L.)

60.9 GROUNDWATER ELEVATION CONTOUR IN FEET (DATUM: M.S.L.)

N

0 20

APPROX. SCALE IN FEET

ensco environmental services, inc.

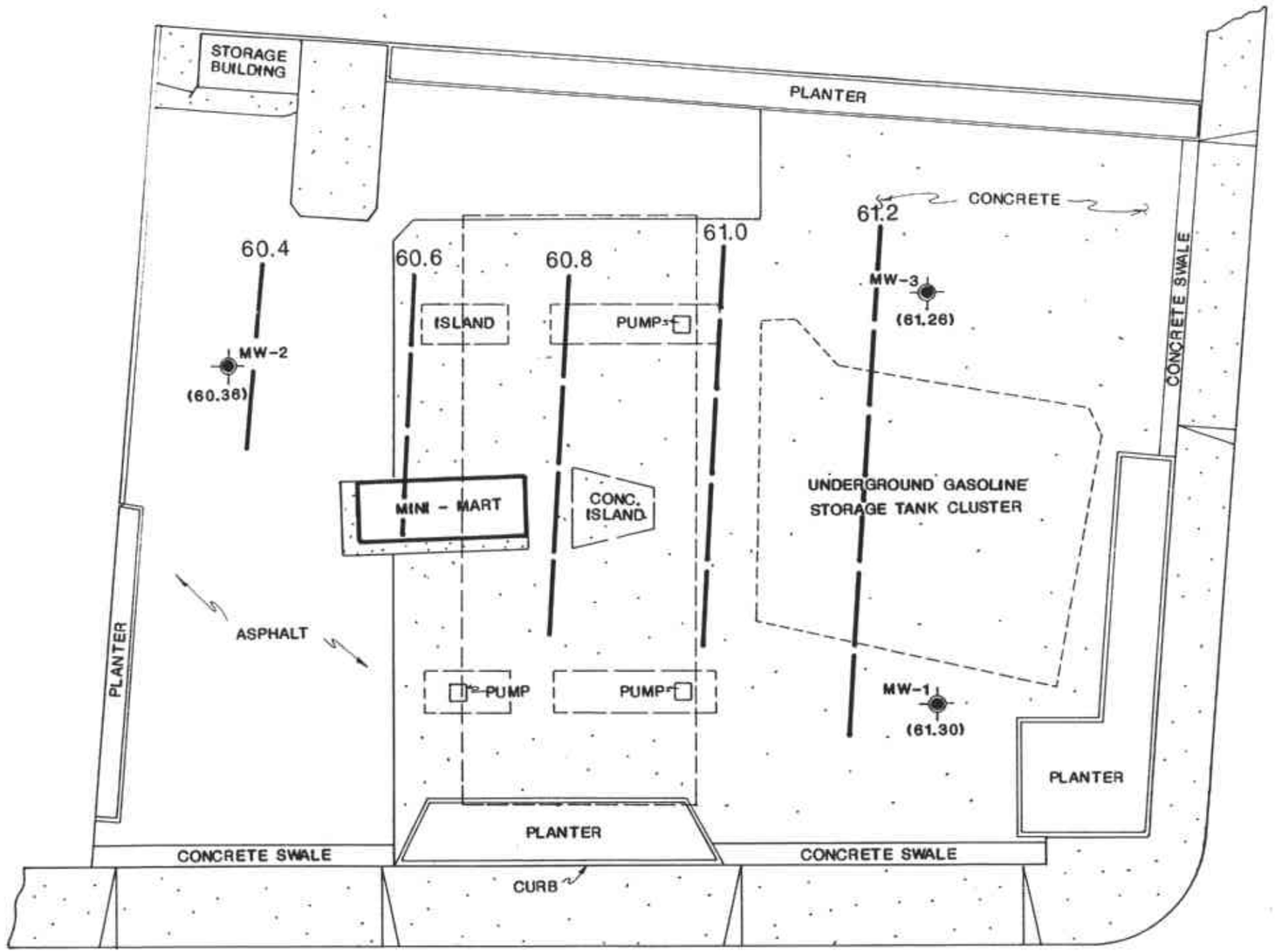
GROUNDWATER ELEVATION MAP (2/6/89)

SHELL SERVICE STATION

230 Mac ARTHUR BOULEVARD

OAKLAND, CALIFORNIA

REVIEWED BY:	APPROVED BY:
JOB #: 1847G	DRAWN BY: J.C.
DATE: 3-8-89	DRAWING #: FIG. 3



LEGEND

MW-1 GROUNDWATER MONITORING WELL

(61.26) GROUNDWATER ELEVATION IN FEET (DATUM: M.S.L.)

60.8 GROUNDWATER ELEVATION CONTOUR LINE IN FEET (DATUM: M.S.L.)

N

0 20

APPROX. SCALE IN FEET

ensco environmental services, Inc.

GROUNDWATER ELEVAION MAP (3/10/89)

SHELL SERVICE STATION

230 Mac ARTHUR BOULEVARD

OAKLAND, CALIFORNIA

REVIEWED BY:	APPROVED BY:
JOB #: 1847G	DRAWN BY: J.C.
DATE: 3-27-89	DRAWING #: FIG. 4

APPENDIX A

LABORATORY ANALYTICAL DATA

ANAMETRIX INC
Environmental & Analytical Chemistry

1961 Concourse Drive, Suite E
San Jose, CA 95131
(408) 432-8192 • Fax (408) 432-8198

Kent Parrish
Ensco Environmental Services, Inc.
41674 Christy Street
Fremont, CA 94538-3114

January 24, 1989
Work Order Number 8901063
Date Received 01/12/89
PO No. 12050
Site: Shell Oil Company
230 MacArthur
Oakland, CA
Ensco Proj. No. 1847g

Dear Mr. Parrish:

Two water samples were received for analysis of BTEX plus total petroleum hydrocarbons as gasoline by gas chromatography, using the following method(s):

ANAMETRIX I.D.	SAMPLE I.D.	METHOD(S)
8901063-01	1847g MW-1	TPHg/BTEX
-02	" MW-3	"

RESULTS

See enclosed data sheets, Pages 2 thru 3.

NOTE: Amounts reported are net values, i.e. corrected for method blank contamination.

If there is any more that we can do, please give us a call. Thank you for using ANAMETRIX, INC.

Sincerely,

Shizuko A. Kozain

Shizuko A. Kozain
GC Chemist

SAK/dg

ANALYSIS DATA SHEET - PETROLEUM HYDROCARBON COMPOUNDS
ANAMETRIX, INC. (408) 432-8192

Sample I.D.	: 1847g MW-1	Anametrix I.D.	: 8901063-01
Matrix	: WATER	Analyst	: aw
Date sampled	: 01-10-89	Supervisor	: [illegible]
Date anl.TPHg	: 01-19-89	Date released	: 01-24-89
Date ext.TPHd	: NA	Date ext. TOG	: NA
Date anl.TPHd	: NA	Date anl. TOG	: NA

CAS #	Compound Name	Detection Limit (ppm)	Amount Found (ppm)
71-43-2	Benzene	0.0005	ND
108-88-3	Toluene	0.0005	ND
100-41-4	Ethylbenzene	0.0005	ND
1330-20-7	Total Xylenes	0.001	ND
	TVH as Gasoline	0.05	ND

ND - Not detected at or above the practical quantitation limit for the method.
TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using EPA Method 5030.
TPHd - Total Petroleum Hydrocarbons as diesel is determined by GCFID following either EPA Method 3510 or 3550.
TOG - Total Oil & Grease is determined by Standard Method 503E.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA 8020.

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

Shell Oil Company
230 Mac Arthur
Oakland, CA

ANALYSIS DATA SHEET - PETROLEUM HYDROCARBON COMPOUNDS
ANAMETRIX, INC. (408) 432-8192

Sample I.D.	: 1847g MW-3	Anametrix I.D.	: 8901063-02
Matrix	: WATER	Analyst	: [illegible]
Date sampled	: 01-10-89	Supervisor	: [illegible]
Date anl.TPHg	: 01-19-89	Date released	: 01-24-89
Date ext.TPHd	: NA	Date ext. TOG	: NA
Date anl.TPHd	: NA	Date anl. TOG	: NA

CAS #	Compound Name	Detection Limit (ppm)	Amount Found (ppm)
71-43-2	Benzene	0.0005	ND
108-88-3	Toluene	0.0005	ND
100-41-4	Ethylbenzene	0.0005	ND
1330-20-7	Total Xylenes	0.001	ND
	TVH as Gasoline	0.05	ND

ND - Not detected at or above the practical quantitation limit for the method.
TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using EPA Method 5030.
TPHd - Total Petroleum Hydrocarbons as diesel is determined by GCFID following either EPA Method 3510 or 3550.
TOG - Total Oil & Grease is determined by Standard Method 503E.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA 8020.

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

Shell Oil Company
230 Mac Arthur
Oakland, CA

Anametrix

CHAIN OF CUSTODY RECORD

P.O. 12052

PROJECT NO	PROJECT NAME
1847q	SHELL, 230 MacARTHUR, OAKLAND

SAMPLERS. (Signature) [signature]

NO	DATE	TIME	GRAB	STATION AND CONTAINER	TPH G/BTEX	TEST REQUESTED	REMARKS
mW-1	1-10-89	3:59		2 PRESERVED VOA's	X		Requested TAT
mW-3	1-10-89	4:35		2 PRESERVED VOA's	X		

RELINQUISHED BY	DATE	TIME	RECEIVED BY	RELINQUISHED BY	DATE	TIME	RECEIVED BY
[signature]							
RELINQUISHED BY	DATE	TIME	RECEIVED BY	RELINQUISHED BY	DATE	TIME	RECEIVED BY LABORATORY
					1-12-89	10:10	[signature]

REMARKS Report to Kent Parrish

DISTRIBUTION

ensco environmental services, inc.
41674 Christy Street
Fremont, CA 94538-3114
(415) 659-0404
Fax (415) 651-4677
Contr Lic No 464324

FORM DATED 1-28-87

ANAMETRIX INC
Environmental & Analytical Chemistry

1961 Concourse Drive Suite E
San Jose, CA 95131
(408) 432-8192 • Fax (408) 432-8198

Kent Parrish
Ensco Environmental Services
41674 Christy Street
Fremont, CA 94538-3114

February 07, 1989
Anametrix W.O.#: 8901118
Date Received : 01/23/89
Purchase Order#: 12228
Site: Shell Oil Company
230 MacArthur Blvd.
Oakland, CA
Ensco Proj. #1847G

Dear Mr. Parrish:

Your sample has been received for analysis. The REPORT SUMMARY lists your sample identifications and the analytical methods you requested. The following sections are included in this report: RESULTS.

NOTE: Amounts reported are net values, i.e. corrected for method blank contamination.

If there is any more that we can do, please give us a call. Thank you for using ANAMETRIX, INC.

Sincerely,

ANAMETRIX, INC.

Sarah Schoen, Ph.D.
GC Manager

SRS/dg

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

Client : Ensco Environmental Services
Address : 41674 Christy Street
City : Fremont, CA 94538-3114
Attn. : Kent Parrish

Anametrix W.O.#: 8901118
Date Received : 01/23/89
Purchase Order#: 12228
Project No. : 1847G
Date Released : 02/07/89

Anametrix I.D.	Sample I.D.	Matrix	Date Sampled	Method	Date Extract	Date Analyzed	Inst I.D.
RESULTS							
8901118-01	1847G MW2	WATER	01/20/89	TPHg		01/30/89	N/A

Shell Oil Company
230 MacArthur Blvd.
Oakland, CA

ANALYSIS DATA SHEET - PETROLEUM HYDROCARBON COMPOUNDS
ANAMETRIX, INC. (408) 432-8192

Sample I.D.	: 1847G MW2	Anametrix I.D.	: 8901118-01
Matrix	: WATER	Analyst	: AW
Date sampled	: 01/20/89	Supervisor	: RS
Date anl.TPHg	: 01/30/89	Date released	: 02/07/89
Date ext.TPHd	: N/A	Date ext. TOG	: N/A
Date anl.TPHd	: N/A	Date anl. TOG	: N/A

CAS #	Compound Name	Detection Limit (ppm)	Amount Found (ppm)
71-43-2	Benzene	0.0005	ND
108-88-3	Toluene	0.0005	ND
100-41-4	Ethylbenzene	0.0005	ND
1330-20-7	Total Xylenes	0.001	ND
	TVH as Gasoline	0.05	ND

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TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using EPA Method 5030.
TPHd - Total Petroleum Hydrocarbons as diesel is determined by GCFID following either EPA Method 3510 or 3550.
TOG - Total Oil & Grease is determined by Standard Method 503E.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA 8020.

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

Shell Oil Company
230 MacArthur Blvd.
Oakland, CA

ANAMETRIX, INC.

LABORATORY SERVICES

ENVIRONMENTAL • ANALYTICAL CHEMISTRY

1961 CONCOURSE DR., SUITE E • SAN JOSE, CA 95131

TEL: (408) 432-8192 • FAX: (408) 432-8198

SUBCONTRACTED WORK REFERENCE GUIDE

Client: ENSCO

41674 Christy Street

Fremont Ca 94538

Attn: Kent Parrish

Date recvd from Subcontractor: 2-1-89

Anametrix Project #: 8901118

Client Project #: 1847 G. Macarthur Oakland

Subcontractor: Mc Intosh

Date project recvd : 1-23-89

ANAMETRIX SAMPLE I.D.	CLIENT SAMPLE I.D.	METHOD
01	mw2	T.D.S.

\1317

SML

McINTOSH LABORATORIES

2292 TRADE ZONE BLVD. SAN JOSE, CALIFORNIA 95131 (408)946-3935

Date Reported: 1/30/89
Date Received: 1/24/89
Date sampled : 1/24/89
Sampled by : Client

: Anametrix, Inc.
: 1961 Concourse Drive, Suite E
: San Jose, Calif. 95131
: Attn: Narine Sylvia

Sample Identification: SML/42056 - #8901118-01

Parameter	Methodology Reference	Analytical Results Milligrams/liter
Aluminum (Al)	EPA 202.1/7020	:
Arsenic (As)	EPA 206.3/7061	:
Antimony (Sb)	EPA 204.1/7040	:
Barium (Ba)	EPA 208.1/7080	:
Boron (B)	EPA 212.3	:
Cadmium (Cd)	EPA 213.1/7130	:
Chromium (Cr+6)	EPA 7196	:
Chromium (Cr)	EPA 218.1/7190	:
Copper (Cu)	EPA 220.1/7210	:
Cyanide (CN)	EPA 335.1/9010	:
Fluoride (F)	EPA 340.2	:
Lead (Pb)	EPA 239.1/7420	:
Manganese (Mn)	EPA 243.1/7460	:
Mercury (Hg)	EPA 245.1/7470	:
Nickel (Ni)	EPA 249.1/7520	:
Ammonia (N)	EPA 350.2	:
Nitrogen (TKN)	EPA 351.3	:
Phenolics	EPA 420.1/9065	:
Selenium (Se)	EPA 270.3/7741	:
Silver (Ag)	EPA 272.1/7760	:
Zinc (Zn)	EPA 289.1/7950	:
Demand (BOD)	EPA 405.1	:
Demand (COD)	EPA 410.1,2,3,4	:
Oil & Grease	EPA 413.1/9070	:
Carbon, Organic	EPA 415.1/9060	:
pH (Std. Units)	EPA 150.1	:
Solids,Suspended	EPA 160.2	:
Solids, (TDS)	EPA 160.1	: 456

By:

ANAMETRIX

CHAIN OF CUSTODY RECORD

PO # 12228

PROJECT NO	PROJECT NAME
1847g	SHELL 230 MACARTHUR BLVD, OAKLAND

SAMPLERS: (Signature)
By

NO	DATE	TIME	DRIVE	GRAB	STATION AND LOCATION	TPHG/BTEX	TPH (Extractable Diesel and Motor Oil)	TEST REQUESTED	REMARKS
MW2	1-20-89	11:45			3 PRESERVED VOA'S, 1 1L AMBER	X	X	NORMAL T.A.T	CLEAR NO ODOR

RELINQUISHED BY	DATE	TIME	RECEIVED BY:
By RICHARD			
RELINQUISHED BY	DATE	TIME	RECEIVED BY:

RELINQUISHED BY:	DATE	TIME	RECEIVED BY
RELINQUISHED BY	DATE	TIME	RECEIVED BY LABORATORY
	1-23-89	9:45	Tej Memrotra

REMARKS
REPORT TO KENT PARRISH

DISTRIBUTION

FORM DOE 1-28-87

ensco environmental services, inc.
41674 Christy Street
Fremont, CA 94538-3114
(415) 659-0404
Fax (415) 651-4677
Cont No 464324

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

REPORT

Kent Parrish
Ensco Environmental Services
41674 Christy St.
Fremont, CA 94538-3114

February 23, 1989
Anametrix W.O.#: 8902054
Date Received : 02/08/89
Purchase Order#: 12376
Site: Shell Oil
230 MacArthur Blvd.
Oakland, CA

Dear Mr. Parrish:

Your samples have been received for analysis. The REPORT SUMMARY lists your sample identifications and the analytical methods you requested. The following sections are included in this report: RESULTS.

NOTE: Amounts reported are net values, i.e. corrected for method blank contamination.

If there is any more that we can do, please give us a call. Thank you for using ANAMETRIX, INC.

Sincerely,

ANAMETRIX, INC.

Sarah Schoen

Sarah Schoen, Ph.D.
GC Manager

SS/dm

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

Client : Ensco Environmental Services
Address : 41674 Christy St.

City : Fremont, CA 94538-3114
Attn. : Kent Parrish

Anametrix W.O.#: 8902054
Date Received : 02/08/89
Purchase Order#: 12376
Project No. : 1847G
Date Released : 02/23/89

Anametrix I.D.	Sample I.D.	Matrix	Date Sampled	Method	Date Extract	Date Analyzed	Inst I.D.
RESULTS							
8902054-01	1847G BB-1	WATER	02/06/89	TPH		02/15/89	N/A
8902054-02	1847G MW 2	WATER	02/06/89	TPH		02/15/89	N/A
8902054-03	1847G MW 3	WATER	02/06/89	TPH		02/15/89	N/A
8902054-04	1847G MW 1	WATER	02/06/89	TPH		02/15/89	N/A

ANALYSIS DATA SHEET - PETROLEUM HYDROCARBON COMPOUNDS
ANAMETRIX, INC. (408) 432-8192

Sample I.D. : 1847G BB-1
Matrix : WATER
Date sampled : 02/06/89
Date anl.TPHg: 02/15/89
Date ext.TPHd: N/A
Date anl.TPHd: N/A

Anametrix I.D. : 8902054-01
Analyst : [signature]
Supervisor : [signature]
Date released : 02/23/89
Date ext. TOG : N/A
Date anl. TOG : N/A

CAS #	Compound Name	Detection Limit (ppm)	Amount Found (ppm)
71-43-2	Benzene	0.0005	ND
108-88-3	Toluene	0.0005	0.0013
100-41-4	Ethylbenzene	0.0005	ND
1330-20-7	Total Xylenes	0.001	0.006
	TPH as Gasoline	0.05	ND

ND - Not detected at or above the practical quantitation limit for the method.
TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using EPA Method 5030.
TPHd - Total Petroleum Hydrocarbons as diesel is determined by GCFID following either EPA Method 3510 or 3550.
TOG - Total Oil & Grease is determined by Standard Method 503E.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA 8020.

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

Shell Oil
230 MacArthur Blvd.
Oakland, CA

ANALYSIS DATA SHEET - PETROLEUM HYDROCARBON COMPOUNDS
ANAMETRIX, INC. (408) 432-8192

Sample I.D. : 1847G MW 2
Matrix : WATER
Date sampled : 02/06/89
Date anl.TPHg: 02/15/89
Date ext.TPHd: N/A
Date anl.TPHd: N/A

Anametrix I.D. : 8902054-02
Analyst : [illegible]
Supervisor : [illegible]
Date released : 02/23/89
Date ext. TOG : N/A
Date anl. TOG : N/A

CAS #	Compound Name	Detection Limit (ppm)	Amount Found (ppm)
71-43-2	Benzene	0.0005	ND
108-88-3	Toluene	0.0005	ND
100-41-4	Ethylbenzene	0.0005	ND
1330-20-7	Total Xylenes	0.001	ND
	TPH as Gasoline	0.05	ND

ND - Not detected at or above the practical quantitation limit for the method.
TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using EPA Method 5030.
TPHd - Total Petroleum Hydrocarbons as diesel is determined by GCFID following either EPA Method 3510 or 3550.
TOG - Total Oil & Grease is determined by Standard Method 503E.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA 8020.

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

Shell Oil
235 MacArthur Blvd.
Oakland, CA

ANALYSIS DATA SHEET - PETROLEUM HYDROCARBON COMPOUNDS
ANAMETRIX, INC. (408) 432-8192

Sample I.D.	: 1847G MW 3	Anametrix I.D.	: 8902054-03
Matrix	: WATER	Analyst	: RK
Date sampled	: 02/06/89	Supervisor	: JRG
Date anl.TPHg:	02/15/89	Date released	: 02/23/89
Date ext.TPHd:	N/A	Date ext. TOG	: N/A
Date anl.TPHd:	N/A	Date anl. TOG	: N/A

CAS #	Compound Name	Reporting Limit (ppm)	Amount Found (ppm)
71-43-2	Benzene	0.0005	ND
108-88-3	Toluene	0.0005	ND
100-41-4	Ethylbenzene	0.0005	ND
1330-20-7	Total Xylenes	0.001	ND
	TPH as Gasoline	0.05	0.07

ND - Below reporting limit.
TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using EPA Method 5030.
TPHd - Total Petroleum Hydrocarbons as diesel is determined by GCFID following either EPA Method 3510 or 3550.
TOG - Total Oil & Grease is determined by Standard Method 503E.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA 8020.

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

Shell Oil
235 MacArthur Blvd.
Oakland, CA

ANALYSIS DATA SHEET - PETROLEUM HYDROCARBON COMPOUNDS
ANAMETRIX, INC. (408) 432-8192

Sample I.D.	: 1847G MW 1	Anametrix I.D.	: 8902054-04
Matrix	: WATER	Analyst	:
Date sampled	: 02/06/89	Supervisor	:
Date anl.TPHg	: 02/15/89	Date released	: 02/23/89
Date ext.TPHd	: N/A	Date ext. TOG	: N/A
Date anl.TPHd	: N/A	Date anl. TOG	: N/A

CAS #	Compound Name	Detection Limit (ppm)	Amount Found (ppm)
71-43-2	Benzene	0.0005	ND
108-88-3	Toluene	0.0005	ND
100-41-4	Ethylbenzene	0.0005	ND
1330-20-7	Total Xylenes	0.001	ND
	TPH as Gasoline	0.05	ND

ND - Not detected at or above the practical quantitation limit for the method.
TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using EPA Method 5030.
TPHd - Total Petroleum Hydrocarbons as diesel is determined by GCFID following either EPA Method 3510 or 3550.
TOG - Total Oil & Grease is determined by Standard Method 503E.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA 8020.

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

Shell Oil
230 MacArthur Blvd.
Oakland, CA

ANAMETRIX, INC.
LABORATORY SERVICES
ENVIRONMENTAL • ANALYTICAL CHEMISTRY
1961 CONCOURSE DR., SUITE E • SAN JOSE, CA 95131
TEL: (408) 432-8192 • FAX: (408) 432-8198

client MoC
Oakland
1847G

SUBCONTRACTED WORK REFERENCE GUIDE

Client: ENSCO
41674 Christy Street
Fremont, Ca 94538-3114

Attn: Kent Parrish

Date recvd from Subcontractor: 2-22-89
Anametrix Project #: 8902054
Client Project #: 1847 G
Subcontractor: McIntosh Labs.
Date project recvd : 2-8-89

ANAMETRIX SAMPLE I.D.	CLIENT SAMPLE I.D.	METHOD
02	MW2	Total Dissolved Solids

\1317

SML

McINTOSH LABORATORIES

2292 TRADE ZONE BLVD. SAN JOSE, CALIFORNIA 95131 (408)946-3935

Date Reported: 2/16/89
Date Received: 2/8/89
Date sampled : 2/6/89
Sampled by : Client

: Anametrix, Inc.
: 1961 Concourse Drive, Suite E
: San Jose, Calif. 95131
: Attn: N. Sylvia

Sample Identification: SML/42224 - MW-2 #8902054

Parameter	Methodology Reference	Analytical Results Milligrams/liter
Aluminum (Al)	EPA 202.1/7020	:
Arsenic (As)	EPA 206.3/7061	:
Antimony (Sb)	EPA 204.1/7040	:
Barium (Ba)	EPA 208.1/7080	:
Boron (B)	EPA 212.3	:
Cadmium (Cd)	EPA 213.1/7130	:
Chromium (Cr+6)	EPA 7196	:
Chromium (Cr)	EPA 218.1/7190	:
Copper (Cu)	EPA 220.1/7210	:
Cyanide (CN)	EPA 335.1/9010	:
Fluoride (F)	EPA 340.2	:
Lead (Pb)	EPA 239.1/7420	:
Manganese (Mn)	EPA 243.1/7460	:
Mercury (Hg)	EPA 245.1/7470	:
Nickel (Ni)	EPA 249.1/7520	:
Ammonia (N)	EPA 350.2	:
Nitrogen (TKN)	EPA 351.3	:
Phenolics	EPA 420.1/9065	:
Selenium (Se)	EPA 270.3/7741	:
Silver (Ag)	EPA 272.1/7760	:
Zinc (Zn)	EPA 289.1/7950	:
Demand (BOD)	EPA 405.1	:
Demand (COD)	EPA 410.1,2,3,4	:
Oil & Grease	EPA 413.1/9070	:
Carbon, Organic	EPA 415.1/9060	:
pH (Std. Units)	EPA 150.1	:
Solids,Suspended	EPA 160.2	:
Solids, TDS	EPA 160.1	: 400

By: [signature]

ANAMETRIX

CHAIN OF CUSTODY RECORD

P.O.# 12376

PROJECT NO	PROJECT NAME
18476	SHELL 230 MacARTHUR BLVD, OAKLAND

SAMPLERS (Signature): [signature]

NO	DATE	TIME	DRIVE	GRAB	STATION AND LOCATION	TDS (ONE PER SITE)	TPHG BTEX									REMARKS
BG-1	2-6-89	11:50 AM			3 PRES VOA'S		X									BAILER BLANK
MW-2	2-6-89	11:56 AM			3 PRES VOA'S + ① 1L AMBER	X	X									
MW-3	2-6-89	12:40 PM			3 PRES VOA'S		X									
MW-1	2-6-89	1:12 PM			" " "		X									

TEST REQUESTED

NORMAL T.A.T

RELINQUISHED BY	DATE	TIME	RECEIVED BY:	RELINQUISHED BY:	DATE	TIME	RECEIVED BY
[signature]							
RELINQUISHED BY	DATE	TIME	RECEIVED BY:	RELINQUISHED BY	DATE	TIME	RECEIVED BY LABORATORY
					2/8/89	10:35	Taghi Memarzadeh

REMARKS

REPORT TO KENT HARRISON

DISTRIBUTION

ensco environmental services, inc.
41674 Christy Street
Fremont, CA 94538-3114
(415) 659-0404
Fax (415) 651-4677
Contr Lic No 464324

FORM DATED 1-28-87

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

REPORT

Kent Parrish
Ensco Environmental Services
41674 Christy Street
Fremont, Ca 94538

March 20, 1989
Anametrix W.O.#: 8903073
Date Received : 03/13/89
Purchase Order#: 12705
Site: Shell Oil
230 MacArthur Blvd.
Oakland, CA

Dear Mr. Parrish:

Your samples have been received for analysis. The REPORT SUMMARY lists your sample identifications and the analytical methods you requested. The following sections are included in this report: RESULTS.

NOTE: Amounts reported are net values, i.e. corrected for method blank contamination.

If there is any more that we can do, please give us a call. Thank you for using ANAMETRIX, INC.

Sincerely,

ANAMETRIX, INC.

Sarah Schoen, Ph.D.
GC Manager

SRS/lm

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

Client : Ensco Environmental Services
Address : 41674 Christy Street

City : Fremont, Ca 94538
Attn. : Kent Parrish

Anametrix W.O.#: 8903073
Date Received : 03/13/89
Purchase Order#: 12705
Project No. : 1847G
Date Released : 03/20/89

Anametrix I.D.	Sample I.D.	Matrix	Date Sampled	Method	Date Extract	Date Analyzed	Inst I.D.
RESULTS							
8903073-01	1847G BB-1	WATER	03/10/89	TPH		03/13/89	N/A
8903073-02	1847G MW-2	WATER	03/10/89	TPH		03/13/89	N/A
8903073-03	1847G MW-3	WATER	03/10/89	TPH		03/13/89	N/A
8903072-04	1847G MW-1	WATER	03/10/89	TPH		03/13/89	N/A

Shell Oil
230 MacArthur Blvd.
Oakland, CA

ANALYSIS DATA SHEET - PETROLEUM HYDROCARBON COMPOUNDS
ANAMETRIX, INC. (408) 432-8192

Sample I.D. : 1847G BB-1
Matrix : WATER
Date sampled : 03/10/89
Date anl.TPHg: 03/13/89
Date ext.TPHd: N/A
Date anl.TPHd: N/A

Anametrix I.D. : 8903073-01
Analyst : JC
Supervisor : RS
Date released : 03/20/89
Date ext. TOG : N/A
Date anl. TOG : N/A

CAS #	Compound Name	Detection Limit (ppm)	Amount Found (ppm)
71-43-2	Benzene	0.0005	ND
108-88-3	Toluene	0.0005	ND
100-41-4	Ethylbenzene	0.0005	ND
1330-20-7	Total Xylenes	0.001	ND
	TPH as Gasoline	0.05	ND

ND - Not detected at or above the practical quantitation limit for the method.
TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using EPA Method 5030.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA 8020.

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

Shell Oil
230 MacArthur Blvd.
Oakland, CA

ANALYSIS DATA SHEET - PETROLEUM HYDROCARBON COMPOUNDS
ANAMETRIX, INC. (408) 432-8192

Sample I.D. : 1847G MW-2
Matrix : WATER
Date sampled : 03/10/89
Date anl.TPHg: 03/13/89
Date ext.TPHd: N/A
Date anl.TPHd: N/A

Anametrix I.D. : 8903073-02
Analyst : TC
Supervisor : RJS
Date released : 03/20/89
Date ext. TOG : N/A
Date anl. TOG : N/A

CAS #	Compound Name	Detection Limit (ppm)	Amount Found (ppm)
71-43-2	Benzene	0.0005	ND
108-88-3	Toluene	0.0005	ND
100-41-4	Ethylbenzene	0.0005	ND
1330-20-7	Total Xylenes	0.001	ND
	TPH as Gasoline	0.05	ND

ND - Not detected at or above the practical quantitation limit for the method.
TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using EPA Method 5030.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA 8020.

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

Shell Oil
230 MacArthur Blvd.
Oakland, CA

ANALYSIS DATA SHEET - PETROLEUM HYDROCARBON COMPOUNDS
ANAMETRIX, INC. (408) 432-8192

Sample I.D. : 1847G MW-3
Matrix : WATER
Date sampled : 03/10/89
Date anl.TPHg: 03/13/89
Date ext.TPHd: N/A
Date anl.TPHd: N/A

Anametrix I.D. : 8903073-03
Analyst : JC
Supervisor : SR
Date released : 03/20/89
Date ext. TOG : N/A
Date anl. TOG : N/A

CAS #	Compound Name	Detection Limit (ppm)	Amount Found (ppm)
71-43-2	Benzene	0.0005	ND
108-88-3	Toluene	0.0005	ND
100-41-4	Ethylbenzene	0.0005	ND
1330-20-7	Total Xylenes	0.001	ND
	TPH as Gasoline	0.05	0.15

ND - Not detected at or above the practical quantitation limit for the method.
TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using EPA Method 5030.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA 8020.

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

Shell Oil
230 MacArthur Blvd.
Oakland, CA

ANALYSIS DATA SHEET - PETROLEUM HYDROCARBON COMPOUNDS
ANAMETRIX, INC. (408) 432-8192

Sample I.D.	: 1847G MW-1	Anametrix I.D.	: 8903072-04
Matrix	: WATER	Analyst	: JC
Date sampled	: 03/10/89	Supervisor	: JW
Date anl.TPHg	: 03/13/89	Date released	: 03/20/89
Date ext.TPHd	: N/A	Date ext. TOG	: N/A
Date anl.TPHd	: N/A	Date anl. TOG	: N/A

CAS #	Compound Name	Detection Limit (ppm)	Amount Found (ppm)
71-43-2	Benzene	0.0005	ND
108-88-3	Toluene	0.0005	ND
100-41-4	Ethylbenzene	0.0005	ND
1330-20-7	Total Xylenes	0.001	ND
	TPH as Gasoline	0.05	ND

ND - Not detected at or above the practical quantitation limit for the method.
TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using EPA Method 5030.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA 8020.

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

Shell Oil
230 MacArthur Blvd.
Oakland, CA

ANAMETRIX, INC.
LABORATORY SERVICES
ENVIRONMENTAL • ANALYTICAL CHEMISTRY
1961 CONCOURSE DR., SUITE E • SAN JOSE, CA 95131
TEL: (408) 432-8192 • FAX: (408) 432-8198

SUBCONTRACTED WORK REFERENCE GUIDE

Client: ENSCO
41674 Christy Street
Fremont, Ca. 94538-3114

Attn: Kent Parrish

Date recvd from Subcontractor: 3-16-89
Anametrix Project #: 8903073
Client Project #: 1847G
Subcontractor: McIntosh Labs
Date project recvd: 3-13-89

ANAMETRIX SAMPLE I.D.	CLIENT SAMPLE I.D.	METHOD
02.	MW-2	Total Dissolved Solids

\1317

SML

McINTOSH LABORATORIES

2292 TRADE ZONE BLVD. SAN JOSE, CALIFORNIA 95131 (408)946-3935

Date Reported: 3/16/89
Date Received: 3/13/89
Date sampled : 3/10/89
Sampled by : Client

: Anametrix
: 1961 Concourse Drive, Suite E
: San Jose, Calif. 95131
: Attn: N. Sylvia

Sample Identification: SML/42596 - 8903073 MW-2 - Shell Oil Co.
230 Mac Arthur Blvd., Oakland

Parameter	Methodology Reference	Analytical Results Milligrams/liter
Aluminum (Al)	EPA 202.1/7020	:
Arsenic (As)	EPA 206.3/7061	:
Antimony (Sb)	EPA 204.1/7040	:
Barium (Ba)	EPA 208.1/7080	:
Boron (B)	EPA 212.3	:
Cadmium (Cd)	EPA 213.1/7130	:
Chromium (Cr+6)	EPA 7196	:
Chromium (Cr)	EPA 218.1/7190	:
Copper (Cu)	EPA 220.1/7210	:
Cyanide (CN)	EPA 335.1/9010	:
Fluoride (F)	EPA 340.2	:
Lead (Pb)	EPA 239.1/7420	:
Manganese (Mn)	EPA 243.1/7460	:
Mercury (Hg)	EPA 245.1/7470	:
Nickel (Ni)	EPA 249.1/7520	:
Ammonia (N)	EPA 350.2	:
Nitrogen (TKN)	EPA 351.3	:
Phenolics	EPA 420.1/9065	:
Selenium (Se)	EPA 270.3/7741	:
Silver (Ag)	EPA 272.1/7760	:
Zinc (Zn)	EPA 289.1/7950	:
Demand (BOD)	EPA 405.1	:
Demand (COD)	EPA 410.1,2,3,4	:
Oil & Grease	EPA 413.1/9070	:
Carbon, Organic	EPA 415.1/9060	:
pH (Std. Units)	EPA 150.1	:
Solids,Suspended	EPA 160.2	:
Solids, (TDS)	EPA 160.1	: 407

By:

Anametrix

CHAIN OF CUSTODY RECORD

P.O. # 12705

PROJECT NO	PROJECT NAME	
8476	Shell Oakland	230 MacArthur Blvd

SAMPLERS (Signature)
John Monroe

TEST REQUESTED: TDS; TPH-G/BTEX

48 hr TAT

NO	DATE	TIME	DRIVE	GRAB	STATION AND LOCATION	TDS	TPH-G/BTEX	REMARKS
DB-1	3/04/89	12:44			2 pres VOA		X	
MW-2	"	12:58			2 pres VOA, 1 amber liter	X	X	
MW-3	"	1:37			2 pres VOA		X	
MW-1	✓	2:13			4		X	

RELINQUISHED BY	DATE	TIME	RECEIVED BY	RELINQUISHED BY	DATE	TIME	RECEIVED BY
RELINQUISHED BY	DATE	TIME	RECEIVED BY	RELINQUISHED BY	DATE	TIME	RECEIVED BY LABORATORY
					3-13-89	10:45	Tyhi Memarzadeh

REMARKS: Report to Kent Parrish

DISTRIBUTION

ensco environmental services, inc.
41674 Christy Street
Fremont, CA 94538-3114
(415) 659-0404
Fax (415) 651-4677
Contr Lic No 464324

FORM DATED 1-28-87

Anametrix

CHAIN OF CUSTODY RECORD

P.O. #13194

PROJECT NO	PROJECT NAME	
1826G	Shell Dublin	7194 Amador Valley Blvd Dublin

SAMPLERS: (Signature)
John Monroe, Jim Durkin

NO	DATE	TIME	DRIVE	GRAB	STATION AND LOCATION	TEST REQUESTED: TPHG/BTEX	TDS	TSS	Alkalinity	Hardness	Iron					REMARKS
BB-1	4/5/89	9:55			2 unpres VOA	X										48 hr TAT
MW-5	↓	10:15			2 unpres VOA, 1 amber liter, 2 nitric acid pres pint, 1 unpres pint	X	X	X	X	X	X					
RW-1		11:20			2 unpres VOA, amber liter, 2 nitric acid pres pint,	X	X	X	X	X	X					
	↓				↓											

RELINQUISHED BY	DATE	TIME	RECEIVED BY:
[signature]			
RELINQUISHED BY	DATE	TIME	RECEIVED BY:
[signature]			

RELINQUISHED BY:	DATE	TIME	RECEIVED BY
RELINQUISHED BY	DATE	TIME	RECEIVED BY LABORATORY
	4/6/89	9:45	[signature] Memorandum

REMARKS Report to have station address on all pages, in ppm

Report For Rich Gartow

DISTRIBUTION

FORM DATED 1-28-87

ensco environmental services, inc.
41674 Christy Street
Fremont, CA 94538-3114
(415) 659-0404
Fax (415) 651-4677
Contr Lic No 464324

APPENDIX B

EES PROTOCOLS

ENSCO ENVIRONMENTAL SERVICES, INC.

WATER SAMPLING PROTOCOL

SOIL SAMPLING PROTOCOL

I. SOIL SAMPLING BY DRILLING RIG

1) Review site proposal for boring locations and special instructions. Confirm boring locations in field with client. Have Underground Service Alert (USA) mark utilities in area prior to drilling.

2) Prior to initiating an exploratory boring, all equipment to be used during drilling and sampling operation is steam cleaned. Such equipment includes, but is not limited to, augers, bits, drilling rod, samplers, and brass sampler liners. Additionally, between sampling intervals, the sampler is thoroughly cleaned with a dilute trisodium phosphate solution and rinsed with clean tap water or distilled water.

3) Each exploratory boring is drilled with a truck-mounted drilling rig using either solid flight or hollow stem augers. The boring is advanced to the desired sampling depth and the sampler is lowered to the bottom of the hole. The sampler is driven a maximum of 18 inches into the undisturbed soils ahead of the auger by a 140-pound, rig-operated hammer falling 30 inches. The number of blows required to drive the sampler the final 12 inches is recorded on the boring log. When necessary, the sampler may be pushed by the drill rig hydraulics. In this case, the pressure exerted (in pounds per square inch) is recorded. After the sampler has penetrated the full depth, it is retrieved to the surface.

4) The samplers commonly used are either a California modified sampler (3 inch or 2.5 inch O.D.) or a standard penetrometer (2 inch O.D.). The standard penetrometer does not contain sample liners and is used to determine soil strength characteristics and visually characterize the subsurface materials. If samples are collected for laboratory analysis the California modified sampler, equipped with brass liners, is used except when the analysis will include copper or zinc. In this instance, the sample should be taken with the standard penetrometer and placed in a labeled plastic bag.

Upon retrieval, the sampler is disassembled into its component parts. One or more of the liners is selected for chemical analysis. The ends of the selected liner(s) are sealed with aluminum foil or teflon tape, capped with plastic caps, labeled, logged on chain-of-custody forms and stored in a chilled ice chest for preservation in the field and during transport to the analytical laboratory. All labels are pre-written with indelible ink to minimize handling time.

5) Samples are checked for the presence of contamination in the field by the geologist. Any discoloration or odor is noted on the boring log. Each sample is classified in the field by a geologist using the Unified Soil Classification System and a Munsell soil color chart. In addition, samples may also be field-screened with a photo ionization detector (calibrated daily) or threshold limit value sniffer. In either case, the instrument probe is held adjacent to freshly crumbled soil and the stabilized reading value is recorded on the log. Other visual screening techniques include examination of the sample under hand-lens magnification as-well-as floating sheen inspection resulting from immersion in water.

6) Samples are held in the possession of Ensco Environmental Services personnel until transferred to the analytical laboratory. Transfer to the laboratory is accomplished with either delivery by Ensco Environmental Services personnel, pick-up by laboratory personnel, or transfer by a personal delivery service. Each transfer of responsibility is recorded on a chain-of-custody log that accompanies the sample.

II. SOIL SAMPLING BY HAND

1) Some situations require that samples be collected by hand without the assistance of a drill rig (e.g., soil stock piles, excavation sidewall sampling, etc.). When possible, soil samples will be collected using a steel core sampler equipped with clean brass liners which is advanced into the soil with a slide hammer. In other cases, the outer surface of the soil is removed and a brass liner is driven into the soil by hand or with a hammer. To avoid damaging the liner, a block of wood is held next to the liner so that the hammer strikes the block rather than the liner. The liner is removed and handled as described above. In deep excavations where safety factors preclude the direct sampling of the bottom or side wall, soil is retrieved by a backhoe bucket and this soil is sampled.

ENSCO ENVIRONMENTAL SERVICES, INC.

LABORATORY PROCEDURES

LABORATORY PROCEDURES

Selection of the Laboratory

The laboratories selected to perform the analytical work are certified by the California State Department of Health Services as being qualified to perform the selected analyses. The selected laboratories are reviewed by Ensco Environmental Services, Inc. to ensure that an adequate quality control program is in place and certified by the State of California.

Chain-of-Custody Control

The following procedures are used during sampling and analytical activities to provide chain-of-custody control during transfer of samples from collection through delivery to the laboratories. Record keeping activities used to achieve chain-of-custody control are:

- Contact made by sampling organization with facility supervisor and laboratory prior to sampling to alert them of dates of sampling and sample delivery.
- Well location map with well identification number prominently displayed.
- Field log book for documenting sampling activities in the field.
- Labels for identifying individual samples.
- Chain-of-custody record for documenting transfer and possession of samples.
- Laboratory analysis request sheet for documenting analyses to be performed.

Field Filtration of Samples

Samplers will refrain from filtering TOC, TOX or other organic compound samples as the increased handling required may result in the loss of chemical constituents of interest. Allowing the samples to settle prior to analysis followed by decanting the sample is preferable to filtration of these instances. If filtration is necessary for the determination of extractable organic compounds, the filtration should be performed in the laboratory. It may be necessary to run parallel sets of filtered and unfiltered samples with standards to establish the recovery of hydrophobic compounds when sample must be filtered. All the materials' precautions used in the construction of the sampling train should be observed for filtration apparatus. Vacuum filtration of ground water samples is not recommended.

Water samples for dissolved inorganic chemical constituents (e.g., metals, alkalinity and anionic species) will be filtered in the field.

Sample Containers

Sample containers vary with each type of analytical parameter. Selected container types and materials are non-reactive with the sample and the particular analytical parameter being tested. Appropriate containers for volatile organics are glass bottles of at least 40 milliliters in size fitted with teflon-faced silicon septa. Sample containers are properly cleaned and sterilized by the certified laboratory according to the EPA protocol for the individual analysis.

Sample Preservation and Shipment

Various preservatives are used by the certified laboratory to retard changes in samples. Sample shipment from Ensco Environmental Services to laboratories performing the selected analyses routinely occurs within 24 hours of sample collection.

Analytical Procedures

The analysis of ground water samples is conducted in accordance with accepted quantitative analytical procedures. The following four publications are considered the primary references for ground water sample analysis, and the contracts with the laboratories analyzing the samples stipulate that the methods set out in these publications be used. Please note that procedures used are periodically updated by federal and state agencies, and the certified laboratories amend analysis as required by the update.

- Standard Methods for the Examination of Water and Wastewater, 16th Ed., American Public Health Association, et al., 1985.
- Methods for Chemical Analysis of Water and Wastes, U.S. EPA, 600/4-79-020, March 1979.
- Test Methods for Evaluation of Solid Waste: Physical/Chemical Methods, U.S. EPA SW-846, 1982.
- Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater, EPA, 600/4-82-057, 1982.
- Practical Guide for Ground water Sampling, EPA, 600/2-85/104, September 1985.
- RCRA Ground-Water Monitoring Technical Enforcement Guidance Document, EPA, September 1986.

Analytical Methods

The analytical methods used by the selected laboratories are those required by the type of analysis (fuels, metals, etc.). These methods are those currently approved by the State Regional Water Quality Control Board.

SHELL STATUS LOG

Project Number 1847G
230 MacArthur Boulevard
Oakland, CA

Date Mailed	Report Dated	Description
9/30/88		Preliminary Soil and Groundwater Report to
		Stan Roller
11/7/88		Preliminary Soil and Groundwater Report to
		Alameda County Health Department and Alameda
		County Water-Zone 7 (Craig Mayfield)
2/6/89		January Quarterly Report to Diane Lundquist
4/7/89	4/5/89	April Quarterly Report to Diane Lundquist
5/3/89	4/5/89	April Quarterly Report to Alameda County
		Health Department, Alameda County Water-
		Zone 7 (Craig Mayfield), and CRWQCB