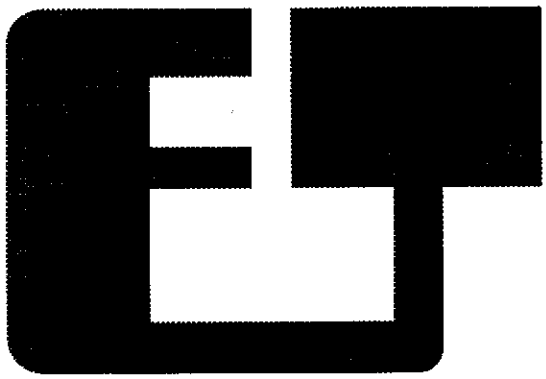


EXCELTECH

DECEMBER QUARTERLY REPORT GROUNDWATER SAMPLING AND ANALYSIS

FOR

SHELL SERVICE STATION
230 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

Project No. 1847-2G
January 1991

Northern California Regional Office 41674 Christy Street, Fremont, CA 94538-3114 (415) 659-0404 Fax: (415) 651-4677 Lic. # 596545

EXCELTECH

January 9, 1991

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

Attention: Ms. Diane Lundquist

Subject: December Quarterly Report
Groundwater Sampling and Analysis
Shell Service Station, 230 MacArthur Boulevard, Oakland, California
Exceltech Project No. 1847-2G

Dear Ms. Lundquist:

At the request of Shell Oil Company, Exceltech, Inc., has prepared this letter report containing the results of the December 3, 1990, groundwater sampling at the subject site in the City of Oakland, Alameda County, California (Figure 1). This report also contains a groundwater surface contour map for December 1990 (Figure 2).

Groundwater Sampling

Groundwater samples were collected from four groundwater monitoring wells on the site in accordance with Exceltech's groundwater sampling protocol (Appendix A). The groundwater purged from the wells and equipment rinse water were placed in drums approved for this purpose by Department of Transportation. The drums were left on-site pending authorization to the water pumped for disposal.

Laboratory Analysis

Sequoia Analytical of Redwood City, California, a state-certified laboratory, analyzed the groundwater samples for the presence of total petroleum hydrocarbons as gasoline (TPHG) and benzene, toluene, ethyl benzene, and total xylenes (BTEX). One sample from MW-4 was also analyzed for total organic carbon (TOC).

Summary of Laboratory Results

Groundwater analyses are summarized in Table 1. Copies of the analytical reports from Sequoia Analytical and chain-of-custody documents are attached in Appendix B. The sample from MW-4 analyzed for TOC indicated a concentration of 12 ppm.

Discussion

The groundwater surface contour map developed from the December 3, 1990, water level measurements is presented as Figure 2. The apparent groundwater surface gradient decreased from 0.5 foot per foot to 0.02 foot per foot during this quarter. The groundwater level dropped from between 0.22 foot to 0.5 foot in three of the wells. The groundwater level in MW-3 rose 0.66 foot.

Hydrocarbon concentrations were detected in MW-4 but have changed slightly since the September 1990 analyses. No hydrocarbon concentrations were detected in the other wells.

Reporting Requirements

Shell Oil company should forward a copy of this report to the following agencies in a timely manner.

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

Regional Water Quality Control Board
San Francisco Bay Region
1800 Harrison Street, Suite 700
Oakland, California 94512-3429
Attention: Ms. Lisa McCann

Alameda County Health Department
Department of Environmental Health
80 Swan Way, Room 200
Oakland, California 94621
Attention: Mr. Gil Wistar

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

1. Exploratory test borings drilled at the site.
2. Observations by field personnel.
3. Results of laboratory analyses performed by a state-certified laboratory.
4. Our understanding of the regulations of the State of California, Alameda County, and 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 some time in the future because of variations in rainfall, temperature, regional water usage, or other factors.

The service performed by Exceltech 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 Oakland 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.

Exceltech includes in this report chemical analytical data from a state-certified laboratory. The analytical results are performed according to procedures suggested by the U.S. EPA and State of California. Exceltech is not responsible for laboratory errors in procedure or reporting.

If you have any questions or require additional information, please call.

Sincerely,
Exceltech, Inc.

Kay Pannell
Staff Geologist

Neil H. Zickefoose, C.E.G. 398
Senior Program Geologist

KP/NHZ/da
Enclosure

TABLE 1

GROUNDWATER ANALYSES DATA

Well	Date Sampled	TPHG (ppm)	Benzene (ppm)	Toluene (ppm)	Ethyl Benzene (ppm)	Total Xylenes (ppm)	TDS (ppm)	Well Elevation (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	B R L	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
	6/6/89	ND	ND	ND	ND	ND	NA		14.05
	9/7/89	ND	ND	ND	ND	ND	NA		14.92
	12/18/89	ND	ND	ND	ND	ND	NA		14.88
	3/8/90	ND	ND	ND	ND	ND	420		14.08
	6/7/90	ND	ND	ND	ND	ND	430		13.89
	9/5/90	ND	ND	ND	ND	ND	500		14.83
	12/3/90	ND	ND	ND	ND	ND	NA		15.05
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
	6/6/89	ND	ND	ND	ND	ND	NA		15.30
	9/7/89	ND	ND	ND	ND	ND	NA		16.76
	12/18/89	ND	ND	0.0005	ND	ND	NA		16.65
	3/8/90	ND	ND	ND	ND	ND	380		15.92
	6/7/90	ND	ND	ND	ND	ND	380		16.10
	9/5/90	ND	ND	ND	ND	ND	400		16.61
	12/3/90	ND	ND	ND	ND	ND	NA		17.06

TABLE 1

GROUNDWATER ANALYSES DATA

Well	Date Sampled	TPHG (ppm)	Benzene (ppm)	Toluene (ppm)	Ethyl Benzene (ppm)	Total Xylenes (ppm)	TDS (ppm)	Well Elevation (ft.)	Depth To Water (ft.)
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
	6/6/89	ND	ND	ND	ND	ND	NA		14.52
	9/7/89	ND	0.00065	ND	ND	ND	NA		15.52
	12/6/89	0.04	0.0013	ND	0.00044	0.00066	NA		19.59
	3/8/90	ND	ND	ND	ND	ND	440		14.72
	6/7/90	ND	ND	ND	ND	ND	490		14.65
	9/5/90	ND	ND	ND	ND	ND	500		15.51
	12/3/90	ND	ND	ND	ND	ND	NA		14.85
MW-4	1/23/90	1.6	0.1	0.01	0.03	0.02	NA	73.83	14.68
	3/8/90	4.2	0.26	0.018	0.088	0.039	480		14.38
	6/7/90	2.0	0.15	0.0069	0.014	0.017	460		14.27
	9/5/90	1.7	0.13	0.01	0.0072	0.018	440		15.40
	12/3/90	2.6	0.1	0.041	0.017	0.059	NA		15.90

Legend

TPHG	Total petroleum hydrocarbons as gasoline
ppm	parts per million
ND	None detected at or above detection limit method
BRL	Below reporting limit
N A	Not Analyzed
TDS	Total dissolved solids

Note: See laboratory reports for detection and reporting limits

BASE: USGS 7.5 MINUTE TOPOGRAPHIC SHEET

N

LEGEND:

SITE LOCATION

0 1

SCALE IN MILES

EXCELTECH

SITE LOCATION MAP

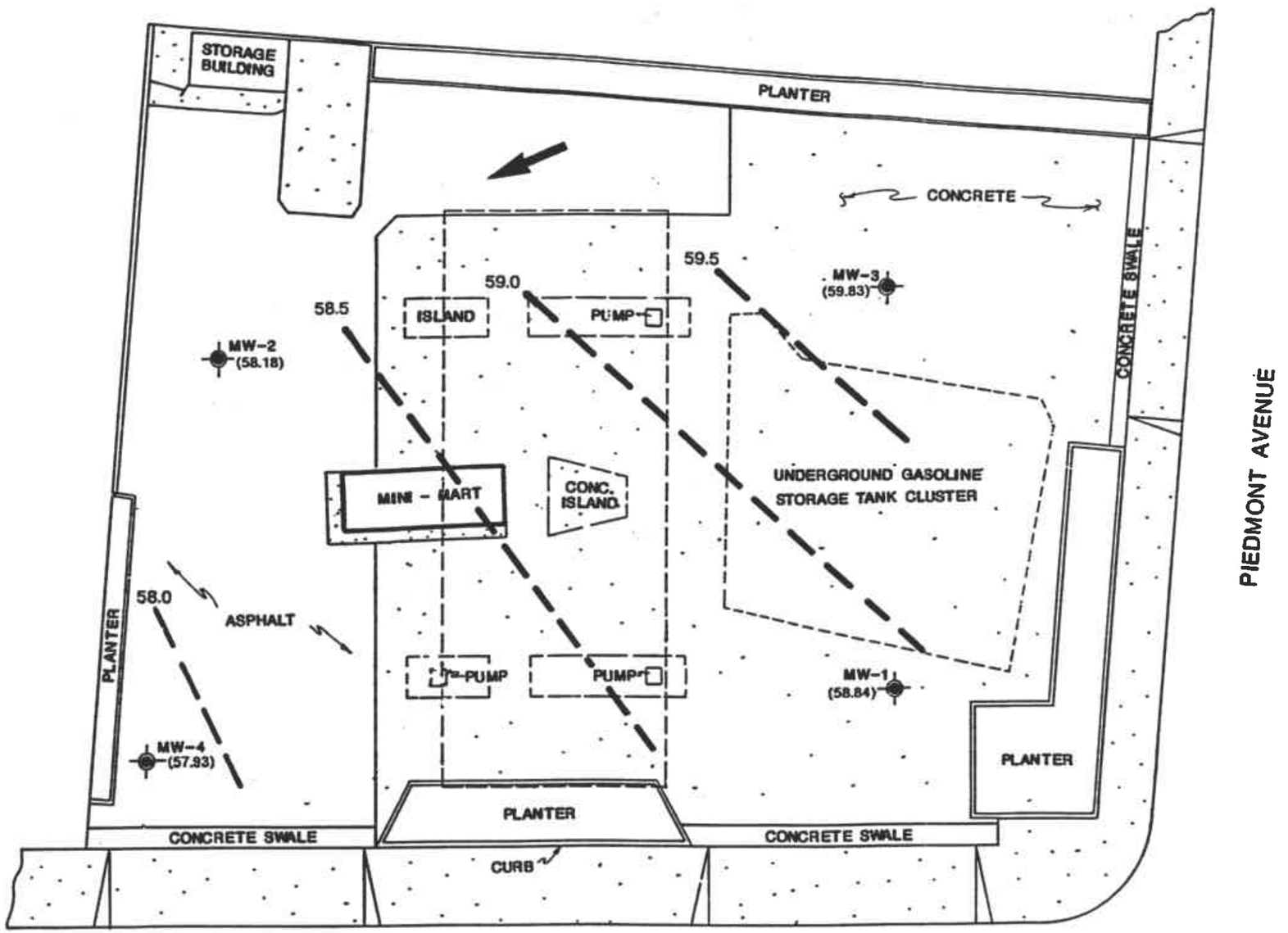
SHELL SERVICE STATION

230 MacARTHUR BOULEVARD

OAKLAND, CALIFORNIA

REVIEWED BY:	APPROVED BY:
K.P.	
JOB #: 1847-2G	DRAWN BY: SLS
DATE: 1/9/91	DRAWING #: FIG: 1

A-1847G-1



LEGEND

- MW-1 — GROUNDWATER MONITORING WELL
- (59.83) — GROUNDWATER ELEVATION IN FEET (DATUM: M.S.L.)
- 59.5 — GROUNDWATER ELEVATION CONTOUR LINE IN FEET (DATUM: M.S.L.)
- APPARENT GROUNDWATER FLOW DIRECTION

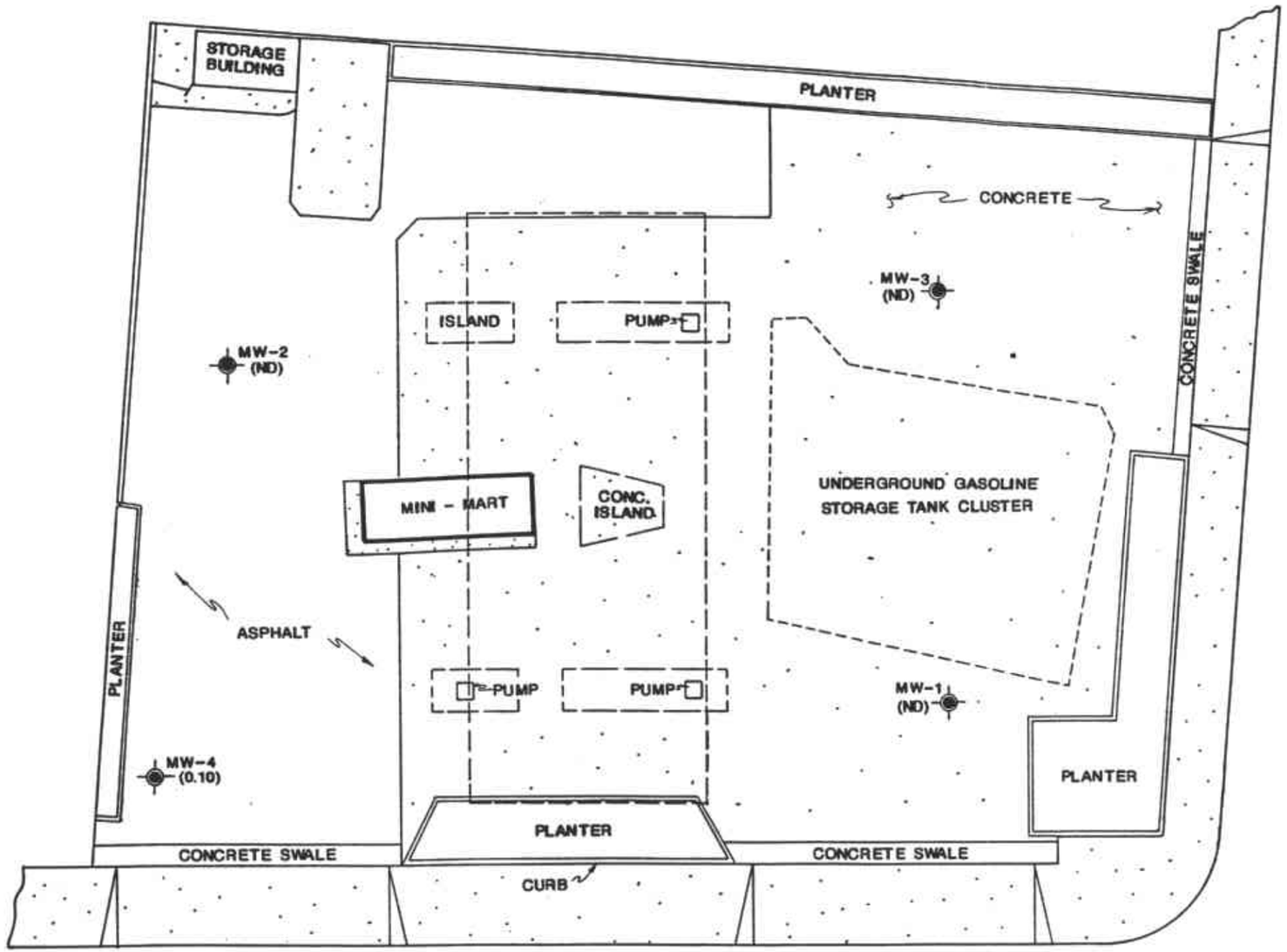
N

0 20

APPROX. SCALE IN FEET

EXCELTECH

GROUNDWATER SURFACE CONTOUR MAP (12/3/90)	REVIEWED BY: K.P.	APPROVED BY:
SHELL SERVICE STATION		
230 Mac ARTHUR BOULEVARD	JOB #: 1847-2G	DRAWN BY: J.D.S.
OAKLAND, CALIFORNIA	DATE: 1/9/91	DRAWING #: FIG. 2



LEGEND

MW-1	GROUNDWATER MONITORING WELL
(0.10)	BENZENE CONCENTRATION IN PARTS PER MILLION
(ND)	NOT DETECTED

N

0 20

APPROX. SCALE IN FEET

EXCELTECH

BENZENE CONCENTRATION MAP (12/3/90)	REVIEWED BY: K.P.	APPROVED BY:
SHELL SERVICE STATION		
230 Mac ARTHUR BOULEVARD	JOB #: 1847-2G	DRAWN BY: J.D.S.
OAKLAND, CALIFORNIA	DATE: 1/9/91	DRAWING #: FIG. 3

APPENDIX A

GROUNDWATER SAMPLING PROTOCOL

EXCELTECH

Groundwater Sampling Protocol

GROUNDWATER SAMPLING PROTOCOL

Sampling of groundwater is performed by Exceltech, Inc. sampling technicians. Summarized field sampling procedures are as follows:

1. Measurements of liquid surface in the well and depth of monitoring well.

2. Field check for presence of floating product.

3. Purge well prior to collecting samples.

4. Monitor groundwater for temperature, pH, and specific conductance during purging.

5. Collect samples using Environmental Protection Agency (EPA) approved sample collection devices, i.e., teflon or stainless steel bailers or pumps.

6. Transfer samples into laboratory-supplied EPA-approved containers.

7. Label samples and log onto chain-of-custody form.

8. Store samples in a chilled ice chest for shipment to a state-certified analytical laboratory.

GROUNDWATER SAMPLING PROCEDURES

Equipment Cleaning

All water samples are placed in precleaned laboratory-supplied bottles. Sample bottles and caps remain sealed until actual usage at the site. All equipment which comes in contact with the well or groundwater is thoroughly cleaned with a trisodium phosphate (TSP) solution and rinsed with deionized or distilled water before use at the site. This cleaning procedure is followed between each well sampled. Wells are sampled in approximate order of increasing contamination. If a teflon cord is used, the cord is cleaned. If a nylon or cotton cord is used, a new cord is used in each well All equipment blanks are collected prior to sampling. The blanks are analyzed periodically to ensure proper cleaning.

Water Level Measurements

Depth to groundwater is measured in each well using a sealed sampling tape or scaled electric sounder prior to purging or sampling. If the well is known or suspected of containing free-phase petroleum hydrocarbons, an optical interface probe is used to measure the hydrocarbon thickness and groundwater level. Measurements are collected and recorded to the nearest 0.01 foot.

Bailer Sheen Check

If no measurable free-phase petroleum hydrocarbons are detected, a clear acrylic bailer is used to determine the presence of a sheen. Any observed film as well as odor and color of the water is recorded.

Groundwater Sampling

Prior to groundwater sampling, each well is purged of "standing" groundwater. Either a bailer, hand pump, or submersible pump is used to purge the well. The amount of purging is dependent on the well yield. In a high yield formation, samples will be collected when normal field measurement, including temperature, pH, and specific conductance stabilize, provided a minimum of three well-casing volumes of water have been removed. Field measurements will be taken after purging each well volume. In low yield formations, the well is purged such that the "standing" water is removed and the well is allowed to recharge. (Normal field measurements will be periodically recorded during the purging process.) In

situations where recovery to 80% of static water level is estimated, or observed to exceed a two hour duration, a sample will be collected when sufficient volume is available for a sample for each parameter. At no time will the well be purged dry so that the recharge rate causes the formation water to cascade into the well.

In wells where free-phase hydrocarbons are detected, the free-phase portion will be bailed from the well and the volume removed recorded. A groundwater sample will be collected if bailing reduces the amount of free-phase hydrocarbons to the point where they are not present in the well. Well sampling will be conducted using one of the aforementioned methods depending on the formation yield. However, if free-phase hydrocarbons persist throughout bailing, then a groundwater samples will not be collected.

Groundwater sample containers are labeled with a unique sample number, location, product name and number, and date of collection. All samples are logged into a chain-of-custody form and placed in a chilled ice chest for shipment to a laboratory certified by the State of California Department of Health Services.

APPENDIX B

LABORATORY REPORT
AND
CHAIN-OF-CUSTODY FORM

CHAIN OF CUSTODY RECORD

PROJECT NO.	PROJECT NAME
1847 G	SHELL MacArthur

SAMPLERS (Signature): Joe Matta

P.O. # 21450

LAB: Sequoia

TURN AROUND TIME: 5 day

NO.	DATE	TIME	SAMPLE DESCRIPTION	TPHG BTEX	TOC	REMARKS
BB1	12-3-90	1330	2 VOA'S	X		
MW1	"	1430	2 VOA'S	X		
MW2	"	1515	2 VOA'S	X		TOTAL ORGANIC
MW3	"	1545	2 VOA'S	X		Carbon
MW4	↓	1610	4 VOA'S	X	X	

RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:
Joe Matta	12/4/90	727		Kay Pannell			
RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:

REMARKS: Reports in PPM.

REPORT TO: Kay Pannell

EXCELTECH
41674 Christy Street
Fremont, C.A. 94538-3114
(415) 659-0404
Fax (415) 651-4677
Contr. Lic. No. 550205

FORM DATED 3-27-90

SEQUOIA ANALYTICAL
680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Exceltech
41674 Christy Street
Fremont, CA 94538
Attention: Kay Pannell

Project: #1847G, Shell, Oakland

Enclosed are the results from 5 water samples received at Sequoia Analytical on December 4,1990. The requested analyses are listed below:

0120248 A	Water, BB1	12/3/90	EPA 5030/8015/8020
0120249 A	Water, MW1	12/3/90	EPA 5030/8015/8020
0120250 A	Water, MW2	12/3/90	EPA 5030/8015/8020
0120251 A	Water, MW3	12/3/90	EPA 5030/8015/8020
0120252 A	Water, MW4	12/3/90	EPA 5030/8015/8020
0120252 C-D	Water, MW4	12/3/90	EPA 415.2

Please contact me if you have any questions. In the meantime, thank you for the opportunity to work with you on this project.

Very truly yours,

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

SEQUOIA ANALYTICAL
680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Exceltech	Client Project ID:	#1847G, Shell, Oakland	Sampled:	Dec 3, 1990
41674 Christy Street	Matrix Descript:	Water	Received:	Dec 4, 1990
Fremont, CA 94538	Analysis Method:	EPA 5030/8015/8020	Analyzed:	Dec 5, 1990
Attention: Kay Pannell	First Sample #:	012-0248 A	Reported:	Dec 11, 1990

TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (EPA 8015/8020)

Sample Number	Sample Description	Low/Medium B.P. Hydrocarbons mg/L (ppm)	Benzene mg/L (ppm)	Toluene mg/L (ppm)	Ethyl Benzene mg/L (ppm)	Xylenes mg/L (ppm)
0120248 A	BB1	N.D.	N.D.	N.D.	N.D.	N.D.
0120249 A	MW1	N.D.	N.D.	N.D.	N.D.	N.D.
0120250 A	MW2	N.D.	N.D.	N.D.	N.D.	N.D.
0120251 A	MW3	N.D.	N.D.	N.D.	N.D.	N.D.
0120252 A	MW4	2.6	0.10	0.041	0.017	0.059
Detection Limits:		**0.030**	**0.00030**	**0.00030**	**0.00030**	**0.00030**

Low to Medium Boiling Point Hydrocarbons are quantitated against a gasoline standard.
Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

120248.ENS <1>

SEQUOIA ANALYTICAL
680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Exceltech
41674 Christy Street
Fremont, CA 94538
Attention: Kay Pannell

Client Project ID: #1847G, Shell, Oakland

QC Sample Group: 0120248-52

Reported: Dec 11, 1990

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	J. Dinsay	J. Dinsay	J. Dinsay	J. Dinsay
Reporting Units:	µg/L	µg/L	µg/L	µg/L
Date Analyzed:	Dec 5, 1990	Dec 5, 1990	Dec 5, 1990	Dec 5, 1990
QC Sample #:	G0114069	G0114069	G0114069	G0114069
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	100	100	100	300
Conc. Matrix Spike:	89	110	95	280
Matrix Spike % Recovery:	89	110	95	93
Conc. Matrix Spike Dup.:	95	110	100	310
Matrix Spike Duplicate % Recovery:	95	110	100	103
Relative % Difference:	6.5	0	5.1	10

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

% Recovery:	Conc. of M.S. - Conc. of Sample / Spike Conc. Added	x 100
Relative % Difference:	Conc. of M.S. - Conc. of M.S.D. / (Conc. of M.S. + Conc. of M.S.D.) / 2	x 100

SEQUOIA ANALYTICAL
680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Exceltech	Client Project ID:	#1847G, Shell, Oakland	Sampled:	Dec 3, 1990
41674 Christy Street	Sample Descript:	Water	Received:	Dec 4, 1990
Fremont, CA 94538			Analyzed:	Dec 11, 1990
Attention: Kay Pannell	First Sample #:	012-0252 C-D	Reported:	Dec 11, 1990

TOTAL ORGANIC CARBON

Sample Number	Sample Description	Detection Limit mg/L	Sample Result mg/L
0120252 C-D	MW4	1.0	12

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

SEQUOIA ANALYTICAL
680 Chesapeake Drive • Redwood City, CA 94063
(415) 364-9600 • FAX (415) 364-9233

Exceltech
41674 Christy Street
Fremont, CA 94538
Attention: Kay Pannell

Client Project ID: #1847G, Shell, Oakland

QC Sample Group: 012-0252

Reported: Dec 11, 1990

QUALITY CONTROL DATA REPORT

ANALYTE	Organic Carbon

Method:	EPA 415.2
Analyst:	M. Fazzio
Reporting Units:	mg/L
Date Analyzed:	Dec 11, 1990
QC Sample #:	012-0144

Sample Conc.:	1.8
Spike Conc. Added:	4.9
Conc. Matrix Spike:	6.9
Matrix Spike % Recovery:	104
Conc. Matrix Spike Dup.:	7.1
Matrix Spike Duplicate % Recovery:	108
Relative % Difference:	2.9

SEQUOIA ANALYTICAL

Vickie Tague
Project Manager

% Recovery:	Conc. of M.S. - Conc. of Sample / Spike Conc. Added	x 100
Relative % Difference:	Conc. of M.S. - Conc. of M.S.D. / (Conc. of M.S. + Conc. of M.S.D.) / 2	x 100

CHAIN OF CUSTODY RECORD

PROJECT NO.	PROJECT NAME
1847 G	SHELL MacArthur

SAMPLERS (Signature): Joe Mata

NO.	DATE	TIME	SAMPLE DESCRIPTION	TPH/G BTEX	TOC					
BBL	12-3-90	1330	2 VOA'S	X						
MW1	"	1430	2 VOA'S	X						
MW2	"	1515	2 VOA'S	X						
MW3	"	1545	2 VOA'S	X						
MW4	↓	1610	4 VOA'S	X	X					

TEST REQUESTED

P.O. # 21450

LAB Sequoia

TURN AROUND TIME 5 day

REMARKS

0120248

0120249

TOTAL ORGANIC C 0120250

0120251 Carbon

0120252

RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:
Joe Mata	12/4/90	727	
RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:

RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:
Kay Pannell	12-4-90	11:28am	
RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:

REMARKS: Reports in PPM

REPORT TO: Kay Pannell

EXCELTECH
41674 Christy Street
Fremont, C.A. 94538-3114
(415) 659-0404
Fax (415) 651-4677
Contr. Lic. No. 550205

FORM DATED 3-27-90