ensco
environmental
services, inc.

MARCH QUARTERLY REPORT
GROUNDWATER SAMPLING
AND ANALYSIS

FOR

SHELL SERVICE STATION
230 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

Project No. 1847-2G
March 1990

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

March 29, 1990

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

Attention: Ms. Diane Lundquist

Subject: March Quarterly Report
Groundwater Sampling and Analysis
Shell Gas Station, 230 MacArthur Boulevard, Oakland, California
EES Project No. 1847-2G

Dear Ms. Lundquist:

At the request of Shell Oil Company, Ensco Environmental Services, Inc. (EES) has prepared this letter report containing the results of the March 8, 1990 groundwater sampling at the subject site in the City of Oakland, Alameda County, California (Figure 1). This report also contains monthly groundwater elevation maps for January, February, and March 1990, and information regarding the installation of one groundwater monitoring well, MW-4.

Groundwater Monitoring Well Installation

The groundwater monitoring well, MW-4, was installed on January 9, 1990. The soil boring logs, well construction permit, and well construction details are presented in Appendix A.

Groundwater Sampling

Groundwater samples were collected from four groundwater monitoring wells on the site in accordance with EES's groundwater sampling protocol (Appendix B). The groundwater purged from the wells and equipment rinse water were placed in Department of Transportation-approved drums and left on-site pending authorization to have them pumped for disposal. A summary of groundwater sampling data are presented on Table 1.

Laboratory Analysis

NET Pacific, Inc. of Santa Rosa, 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). Samples were also analyzed for total dissolved solids (TDS).

Summary of Laboratory Results

The results of the groundwater analyses are summarized in Table 1. Copies of the analytical reports from NET Pacific and chain-of-custody documents are attached in Appendix C.

Discussion

Groundwater surface contour maps were developed from the water level measurements and are presented as Figures 2, 3, and 4. The apparent groundwater surface inclination increased from 0.005 feet per foot to 0.008 feet per foot during this quarter. Hydrocarbon concentrations in MW-4 has increased from January 1990. Hydrocarbon concentrations in the nearby wells have decreased to non-detectable limits.

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 94612-3429
Attention: Ms. Lisa McCann

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

Limitations

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

1. The exploratory test borings drilled at the site.
2. The observations by field personnel.
3. The results of laboratory analyses performed by a state-certified laboratory.
4. 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 some time 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 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.

EES 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. EES is not responsible for laboratory errors in procedure or result reporting.

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

Sincerely,
Ensco Environmental Services, Inc.

Kay Pannell
Staff Geologist

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

KP/NHZ/sw
Enclosure

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

EXCELTECH

ANNOUNCEMENT

Ensco Environmental Services, Inc. (EES) announces the return of its original name:

Exceltech.

Exceltech (ET) had been our firm's name from its inception in 1983 until its purchase by Environmental Systems Company (ENSCO) in 1987. **Beginning with this report, we are issuing all documents and correspondence under our new name, Exceltech.**

By restoring the Exceltech name, we are attempting to distinguish ourselves as an environmental remediation and consulting company with a much broader range of services than our parent company, ENSCO, a firm primarily associated with large-scale hazardous waste incineration. The new Exceltech will maintain its reputation as a results-oriented company. More than ever, we are committed to providing our clients with high quality work and innovative solutions for environmental concerns.

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	N D	N D	N D	N D	N D	N A	73.89	13.30
	10/4/88	B R L	0.008	0.0043	B R L	0.009	N A		13.65
	11/10/88	B R L	B R L	B R L	B R L	B R L	N A		13.55
	12/9/88	N D	N D	N D	N D	N D	N A		13.22
	1/10/89	N D	N D	N D	N D	N D	N A		12.86
	1/20/89	N A	N A	N A	N A	N A	N A		12.91
	2/6/89	N D	N D	N D	N D	N D	N A		12.94
	3/10/89	N D	N D	N D	N D	N D	N A		12.59
	6/6/89	N D	N D	N D	N D	N D	N A		14.05
	9/7/89	N D	N D	N D	N D	N D	N A		14.92
	12/18/89	N D	N D	N D	N D	N D	N A		14.88
	3/8/90	ND	ND	ND	ND	ND	420		14.08
MW-2	7/14/88	N D	0.0079	0.0026	0.0011	0.004	N A	75.24	15.18
	10/4/88	0.09	B R L	0.0013	0.0025	0.012	N A		15.30
	11/10/88	B R L	B R L	B R L	B R L	0.002	N A		15.17
	12/9/88	N D	N D	0.0006	N D	0.003	N A		14.82
	1/20/89	N D	N D	N D	N D	N D	456		14.54
	2/6/89	N D	N D	N D	N D	N D	400		14.59
	3/10/89	N D	N D	N D	N D	N D	407		14.88
	6/6/89	N D	N D	N D	N D	N D	N A		15.30
	9/7/89	N D	N D	N D	N D	N D	N A		16.76
	12/18/89	N D	N D	0.0005	N D	N D	N A		16.65
	3/8/90	ND	ND	ND	ND	ND	380		15.92
MW-3	7/14/88	N D	N D	N D	N D	N D	N A	74.68	14.05
	10/4/88	B R L	B R L	B R L	B R L	0.005	N A		14.60
	11/10/88	B R L	B R L	B R L	B R L	B R L	N A		14.35
	12/9/88	N D	N D	N D	N D	N D	N A		14.04
	1/10/89	N D	N D	N D	N D	N D	N A		13.70
	1/20/89	N A	N A	N A	N A	N A	N A		13.72
	2/6/89	0.07	N D	N D	N D	N D	N A		13.75
	3/10/89	0.15	N D	N D	N D	N D	N A		13.42
	6/6/89	N D	N D	N D	N D	N D	N A		14.52
	9/7/89	N D	0.00065	N D	N D	N D	N A		15.52
	12/6/89	0.04	0.0013	N D	0.00044	0.00066	N A		19.59
	3/8/90	ND	ND	ND	ND	ND	440		14.72
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

TPHG	Total petroleum hydrocarbons as gasoline
ppm	parts per million
N D	None detected at or above detection limit method
B R L	Below reporting limit
N A	Not Analyzed
T D S	Total dissolved solids

Note: See lab reports for detection limits and reporting limits

LEGEND:

SITE LOCATION

BASE: USGS 7.5 MINUTE TOPOGRAPHIC SHEET

0 1

SCALE IN MILES

ensco environmental services, Inc.

SITE LOCATION MAP

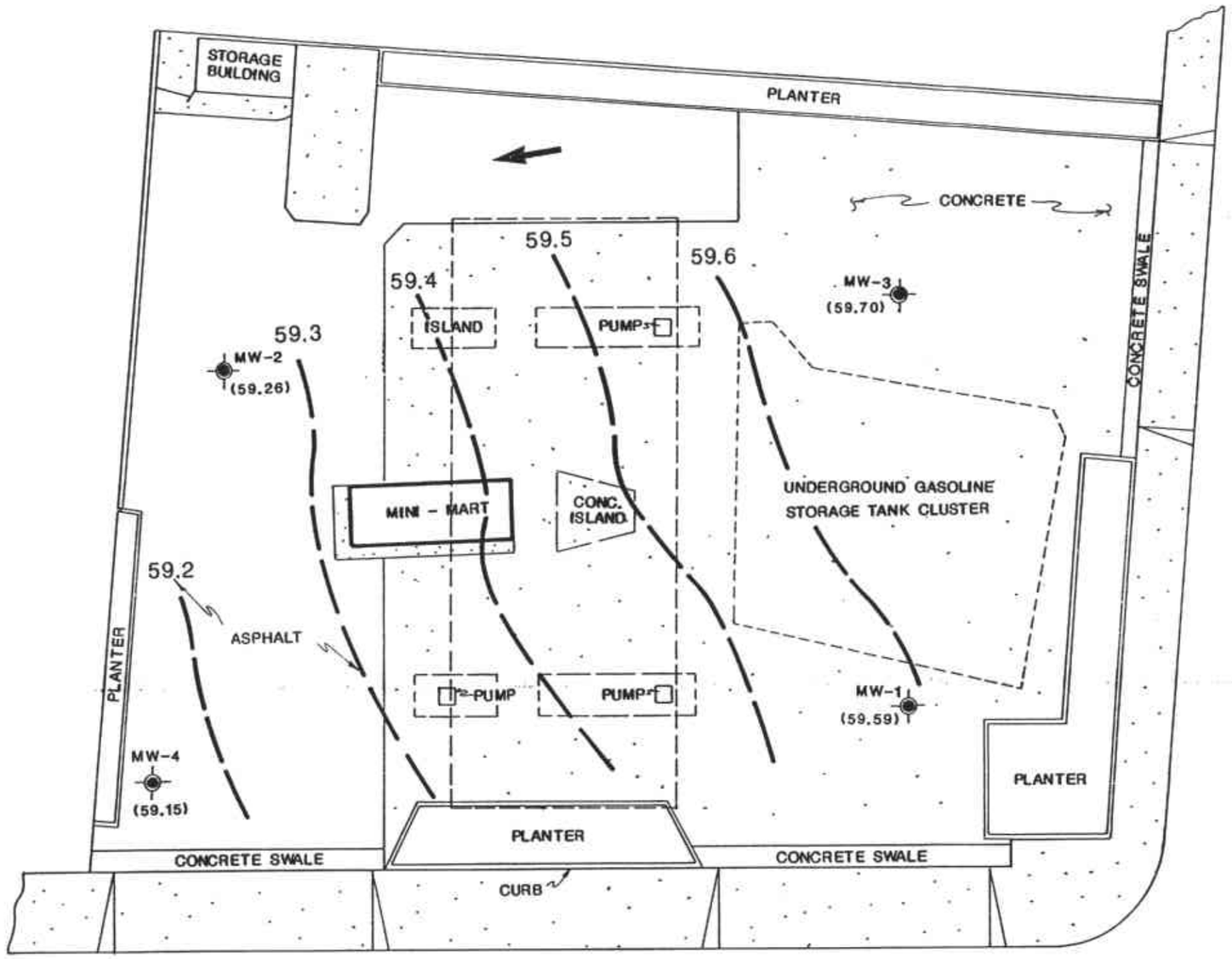
SHELL SERVICE STATION

230 MacARTHUR BOULEVARD

OAKLAND, CALIFORNIA

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

A-1847G-1



LEGEND

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

N

0 20

APPROX. SCALE IN FEET

ensco environmental services, Inc.

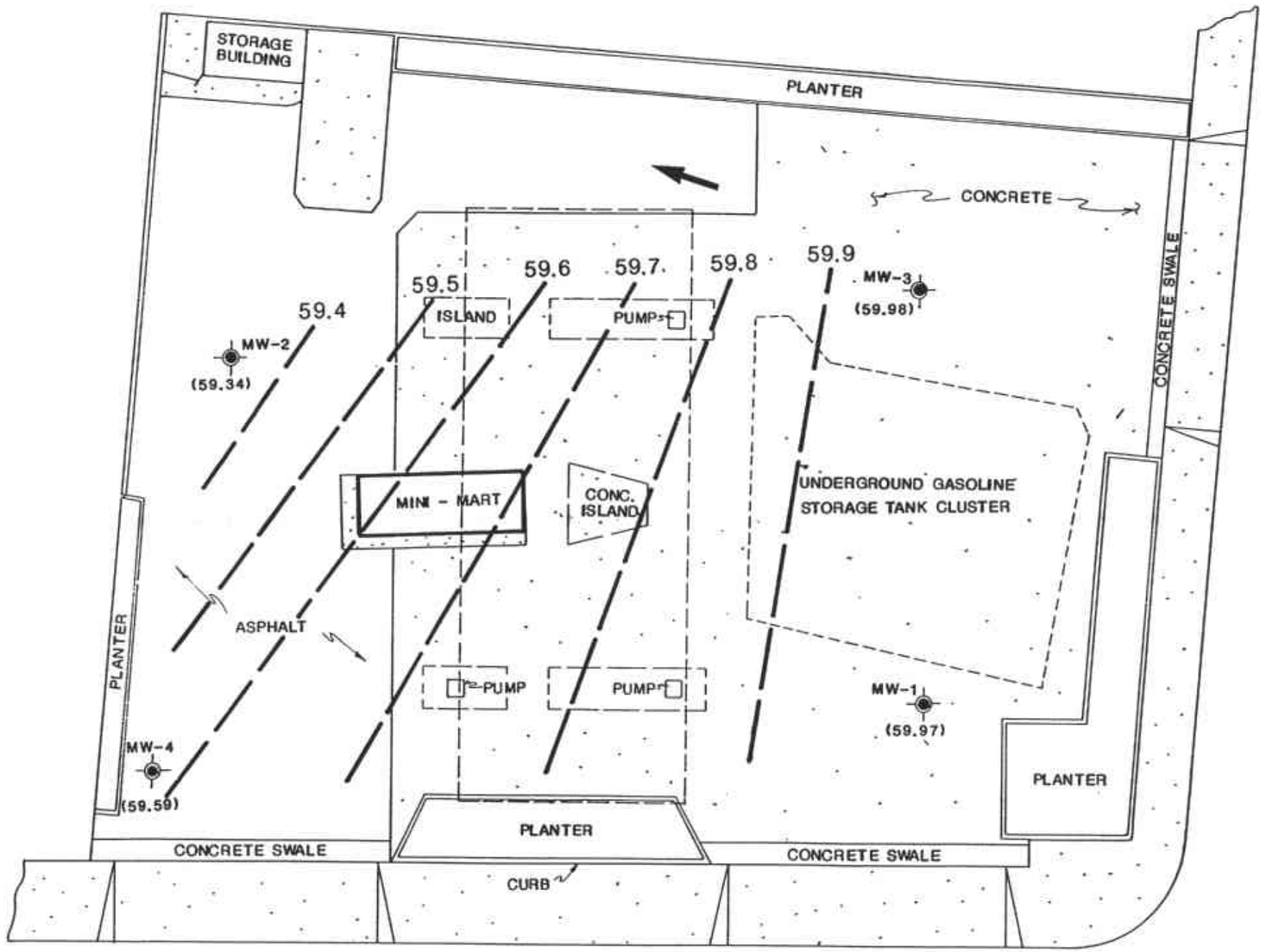
GROUNDWATER ELEVATION MAP (1/23/90)

SHELL SERVICE STATION

230 Mac ARTHUR BOULEVARD

OAKLAND, CALIFORNIA

REVIEWED BY:	APPROVED BY:
K.P.	TMB
JOB #: 1847-2G	DRAWN BY: J.C.
DATE: 2/13/90	DRAWING #: FIG. 2



LEGEND

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

N

0 20

APPROX. SCALE IN FEET

ensco environmental services, Inc.

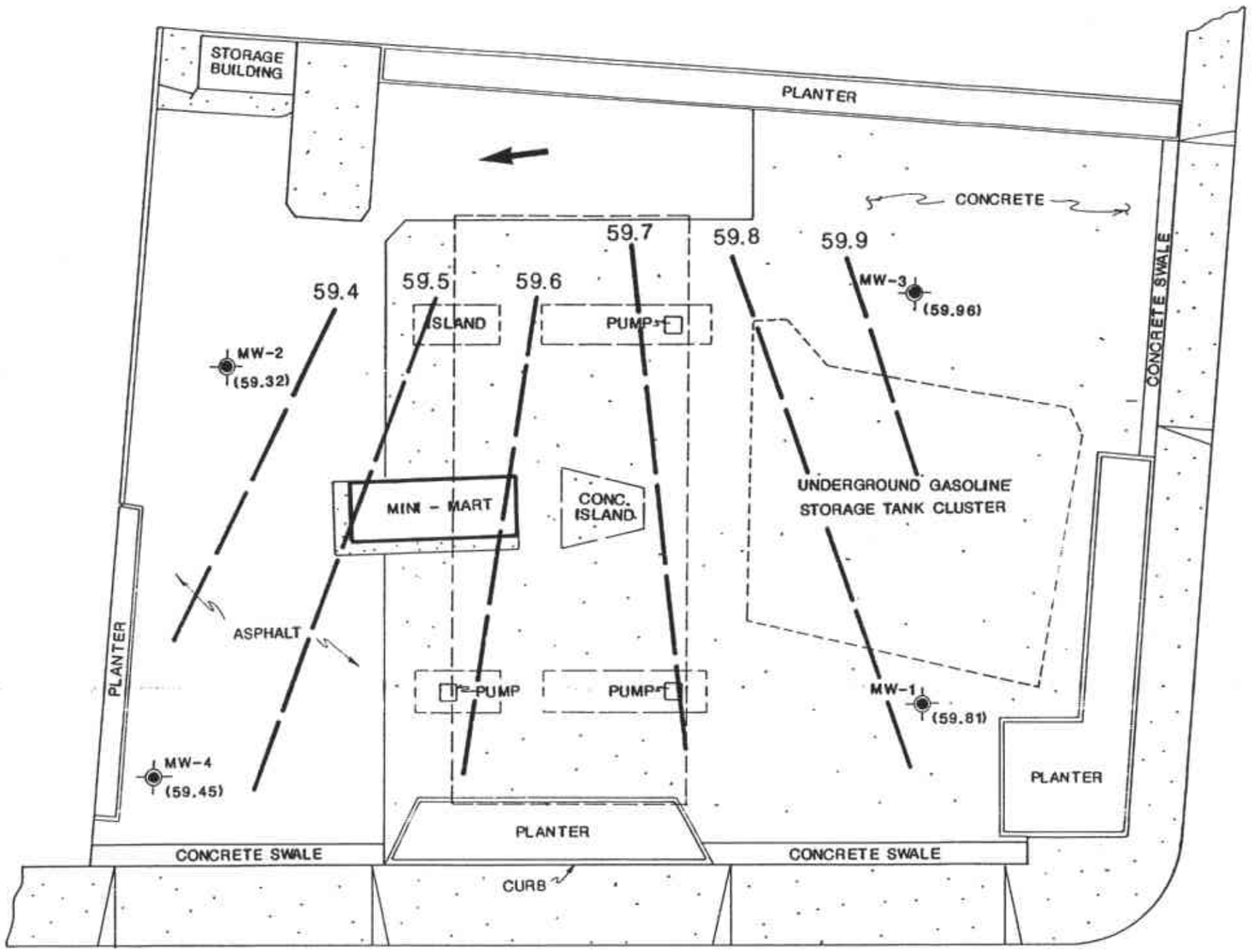
GROUNDWATER ELEVATION MAP (2/22/90)

SHELL SERVICE STATION

230 Mac ARTHUR BOULEVARD

OAKLAND, CALIFORNIA

REVIEWED BY:	APPROVED BY:
K. P.	TMP
JOB #: 1847-2G	DRAWN BY: J.C.
DATE: 3/13/90	DRAWING #: FIG. 3



LEGEND

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

N

0 20

APPROX. SCALE IN FEET

ensco environmental services, Inc.

GROUNDWATER ELEVATION MAP (3/21/90)

SHELL SERVICE STATION

230 Mac ARTHUR BOULEVARD

OAKLAND, CALIFORNIA

REVIEWED BY:	APPROVED BY:
K.P.	[illegible]
JOB #: 1847-2G	DRAWN BY: J.C.
DATE: 3/27/90	DRAWING #: FIG. 4

APPENDIX A

SOIL BORING LOGS
WELL CONSTRUCTION PERMIT
WELL CONSTRUCTION DETAILS

ensco environmental services, inc.

STANDARD SYMBOLS

Legend

- Soil Sample Location
- Soil Sample Collected for Laboratory Analysis
- No Soil Recovery
- First Encountered Ground Water Level
- Piezometric Ground Water Level
- Disturbed or Bag Soil Sample

2.5YR 6/2 Soil color according to Munsell Soil Color Charts. (1975 Edition)

Penetration Sample drive hammer weight - 140 pounds falling 30 inches. Blows required to drive sampler 1 foot are indicated on the logs

NOS No Odor or Sheen

UNIFIED SOIL CLASSIFICATION SYSTEM

Compiled by B.W. Pipkin, Univ. of Southern California

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAMES
COARSE-GRAINED SOILS More than half of material is larger than no. 200 sieve size	GRAVELS More than half of coarse fraction is larger than no. 4 sieve size	Clean Gravels	GW	Well-graded gravels, gravel-sand mixtures, little or no fines
			GP	Poorly graded gravels, gravel-sand mixture, little or no fines
		Gravels with Fines	GM	Silty gravels, gravel-sand-silt mixtures
			GC	Clayey gravels, gravel-sand-clay mixtures
	SANDS More than half of coarse fraction is smaller than no. 4 sieve size	Clean Sands	SW	Well-graded sands, gravelly sand, little or no fines
			SP	Poorly graded sands, gravelly sands, little or no fines
		Sands with Fines	SM	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS More than half of material is smaller than no. 200 sieve size	SILTS AND CLAYS	Low Liquid Limit	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts, with slight plasticity
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
			OL	Organic silts and organic silty clays of low plasticity
		High Liquid Limit	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity, organic silts
Highly Organic Soils			Pt	Peat and other highly organic soils

NOTES:

1. Boundary Classification: Soils possessing characteristics of two groups are designated by combinations of group symbols. For example, GW-GC, well-graded gravel-sand mixture with clay binder
2. All sieve sizes on this chart are U.S. Standard.
3. The terms "silt" and "clay" are used respectively to distinguish materials exhibiting lower plasticity from those with higher plasticity.
4. For a complete description of the Unified Soil Classification System, see "Technical Memorandum No. 3-357," prepared for Office, Chief of Engineers, by Waterways Equipment Station, Vicksburg Mississippi, March 1953. (See also Data Sheet 17.)

EXPLORATORY BORING LOG

ensco environmental services, inc.

PROJECT NAME: Shell Oil Company
230 MacArthur Blvd.
Oakland, CA

BORING NO. MW-4

DATE DRILLED: 1/9/90

PROJECT NUMBER: 1847-2G

LOGGED BY: J.M.

DEPTH (ft.)	SAMPLE No	BLOWS/FOOT	UNIFIED SOIL CLASSIFICATION	SOIL DESCRIPTION	WATER LEVEL	OVA READING ppm
1–5			CL	SANDY CLAY, light olive brown (2.5Y 5/6), 30-40% rounded to subangular fine to medium grained sand, ~ 10% coarse gravel to 2", iron stain, black mottling, hard, very low plasticity, dry to damp		
6	MW-4-1	64				0
7–8			SW	SAND, light olive brown (2.5Y 5/6), fine to medium grained sand, 30% clay, rounded to subangular, poorly sorted, medium dense		
9–10	MW-4-2	40	CL	SANDY CLAY, light olive brown (2.5Y 5/6), 35-45% sand, rounded to subangular, fine to medium grained, iron stain, very stiff, low plasticity, damp		0
11–13				Silty lenses	▼	
14–15	MW-4-3	27	SP	SAND, olive gray (5Y 4/2), fine to medium grained sand, well sorted, rounded to subrounded, some iron stain, clay 10-20%, silt 10-20%, loose, moist	▽	0
16–17			CL	SILTY CLAY, brown (10YR 5/3), silt ~ 40%, black and gray mottling, iron stain, root holes and organic matter, very stiff, low plasticity, moist to damp		
18–20	MW-4-4	33				0
21						

REVIEWED BY R.G./C.E.G.

EXPLORATORY BORING LOG

ensco environmental services, inc.

PROJECT NAME: Shell Oil Company
230 MacArthur Blvd.
Oakland, CA

BORING NO. MW-4

DATE DRILLED: 1/9/90

PROJECT NUMBER: 1847-2G

LOGGED BY: J.M.

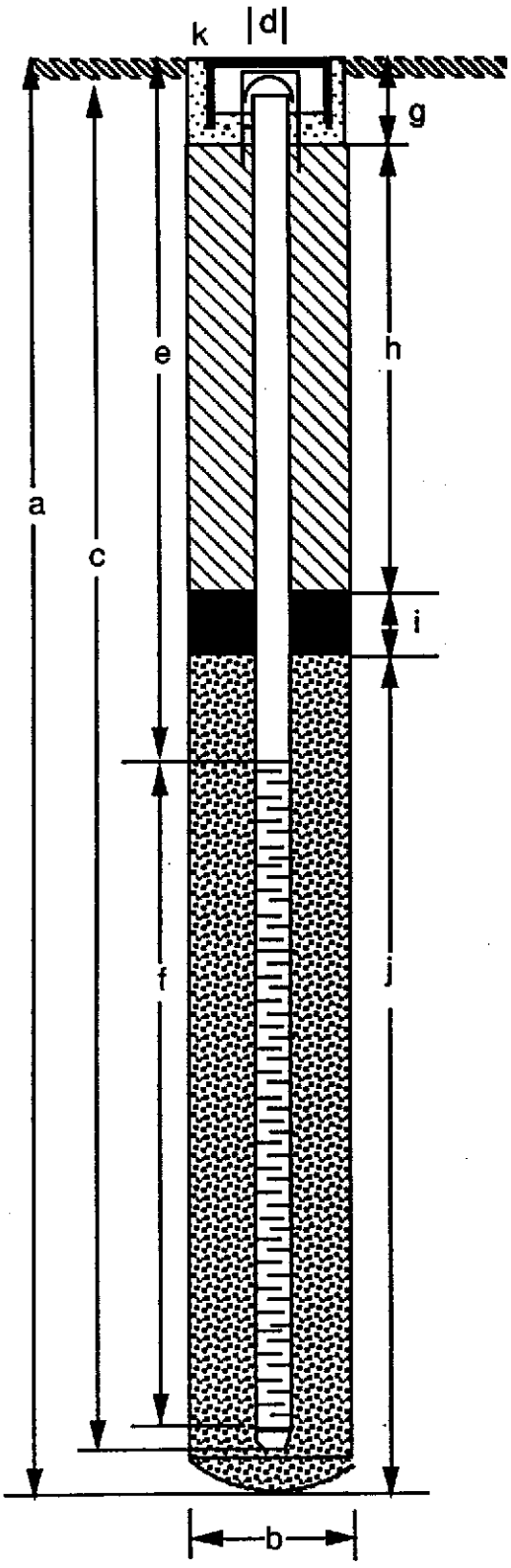
DEPTH (ft.)	SAMPLE No	BLOWS/FOOT	UNIFIED SOIL CLASSIFICATION	SOIL DESCRIPTION	WATER LEVEL	OVM READING ppm
22–24			CL	same as above		
25	MW-4-5	33				0
26				Bottom of Boring = 25.5 feet		
27–42						

REVIEWED BY R.G./C.E.G.

Monitoring Well Detail

PROJECT NUMBER 1847-2G
PROJECT NAME Shell -Oakland
COUNTY Alameda
WELL PERMIT NO. 90116

BORING / WELL NO. MW-4
TOP OF CASING ELEV. 73.83
GROUND SURFACE ELEV. 74.46
DATUM 72.96



EXPLORATORY BORING

a. Total depth 25.5 ft.
b. Diameter 12 in.
Drilling method Hollow stem auger

WELL CONSTRUCTION

c. Casing length 25 ft.
Material schedule 40 PVC
d. Diameter 4 in.
e. Depth to top perforations 15 ft.
f. Perforated length 10 ft.
Perforated interval from 15 to 25 ft.
Perforation type slotted screen
Perforation size 0.020 in.
g. Surface seal 1 ft.
Seal material concrete
h. Backfill 12 ft.
Backfill material neat cement grout
i. Seal 1 ft.
Seal material bentonite
j. Gravel pack 11 ft.
Pack material clean sand
k.

ensco
environmental
services, inc.

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
5997 PARKSIDE DRIVE ♦ PLEASANTON, CALIFORNIA 94566 ♦ (415) 484-2600

21 February 1990

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

Gentlemen:

Enclosed is Groundwater Protection Ordinance permit 90116 for a monitoring well construction project at 230 West MacArthur Boulevard in Oakland for Shell Oil Company.

Please note that permit condition A-2 requires that a well construction report be submitted after completion of the work. The report should include drilling and completion logs, location sketch, and permit number.

If you have any questions, please contact Wyman Hong or Craig Mayfield at 484-2600.

Very truly yours,

Mun J. Mar
General Manager

By
J. Killingstad, Chief
Water Resources Engineering

WH:bkm
Enc.

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT

5997 PARKSIDE DRIVE • PLEASANTON, CALIFORNIA 94566 • (415) 484-2600

GROUNDWATER PROTECTION ORDINANCE PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

(1) LOCATION OF PROJECT SHELL Service Station
230 W. MacArthur Blvd.
Oakland CA

(2) CLIENT
Name SHELL OIL COMPANY
Address 1390 Willow Pass Rd Phone
City Concord CA Zip 94520

(3) APPLICANT
Name Ensco Environmental Services
(Kay Pannell)
Address 41674 Christy St Phone (415) 659-0404
City Fremont CA Zip 94538-3114

(4) DESCRIPTION OF PROJECT
Water Well Construction X Geotechnical ___
Cathodic Protection ___ Well Destruction ___

(5) PROPOSED WATER WELL USE
Domestic ___ Industrial ___ Irrigation ___
Municipal ___ Monitoring X Other ___

(6) PROPOSED CONSTRUCTION
Drilling Method:
Mud Rotary ___ Air Rotary ___ Auger hollow stem
Cable ___ Other ___

WELL PROJECTS
Drill Hole Diameter * In. Depth(s) 25 ft.
Casing Diameter 4 In. Number
Surface Seal Depth * ft. of Wells 1
Driller's License No. 450205

GEOTECHNICAL PROJECTS
Number ___
Diameter ___ In. Maximum Depth ___ ft.

(7) ESTIMATED STARTING DATE 12-18-89
ESTIMATED COMPLETION DATE 12-18-89

(8) I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE Kay Pannell Date 12-1-89

FOR OFFICE USE

PERMIT NUMBER 90116
LOCATION NUMBER

Approved Wyman Hong Date 16 Feb 90
Wyman Hong

PERMIT CONDITIONS

Circled Permit Requirements Apply

(A.) GENERAL
1. A permit application should be submitted so as to arrive at the Zone 7 office five days prior to proposed starting date.
2. Notify this office (484-2600) at least one day prior to starting work on permitted work and before placing well seals.
3. Submit to Zone 7 within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well projects, or bore hole logs and location sketch for geotechnical projects. Permitted work is completed when the last surface seal is placed or the last boring is completed.
4. Permit is void if project not begun within 90 days of approval date.

(B.) WATER WELLS, INCLUDING PIEZOMETERS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie, or equivalent.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic, irrigation, and monitoring wells unless a lesser depth is specially approved.

C. GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material.

D. CATHODIC. Fill hole above anode zone with concrete placed by tremie, or equivalent.

E. WELL DESTRUCTION. See attached.

* Drill Hole Diameter: 8 inches
Surface Seal Depth: 13 feet
As discussed with Ensco representative Kay Pannell.

91987

APPENDIX B

GROUNDWATER SAMPLING PROTOCOL

GROUNDWATER SAMPLING PROTOCOL

Sampling of groundwater is performed by Ensco Environmental Services, Inc. (EES) 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 tri sodium 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 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 onto 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 C

LABORATORY ANALYTICAL RESULTS AND CHAIN-OF-CUSTODY FORM

NET NATIONAL ENVIRONMENTAL TESTING, INC.

NET Pacific, Inc.
435 Tesconi Circle
Santa Rosa, CA 95401
Tel: (707) 526-7200
Fax: (707) 526-9623

Kay Pannell
ENSCO Environmental
41674 Christy St.
Fremont, CA 94538

Date: 03-19-90
NET Client Acct. No: 18.06
NET Pacific Log No: 1057
Received: 03-09-90 0700

Client Reference Information

SHELL, 230 MacArthur, Oakland; Project: 1847G

Sample analysis in support of the project referenced above has been completed and results are presented on following pages. Please refer to the enclosed "Key to Abbreviations" for definition of terms. Should you have questions regarding procedures or results, please feel welcome to contact Client Services.

Approved by:

Jules Skamarack
Laboratory Manager

Enclosure(s)

Ref: SHELL, 230 MacArthur, Oakland; Project: 1847G

SAMPLE DESCRIPTION: BB-1 03-08-90 1112
LAB Job No: (-48254)

Parameter	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS		--	
VOLATILE (WATER)		--	
DILUTION FACTOR *		1	
DATE ANALYZED		03-13-90	
METHOD GC FID/5030		--	
as Gasoline	0.05	ND	ppm
METHOD 602		--	
Benzene	0.5	ND	ppm
Ethylbenzene	0.5	ND	ppm
Toluene	0.5	ND	ppm
Xylenes, total	0.5	ND	ppm

Ref: SHELL, 230 MacArthur, Oakland; Project: 1847G

SAMPLE DESCRIPTION: MW-1 03-08-90 1143
LAB Job No: (-48257)

Parameter	Reporting Limit	Results	Units
Tot. Dissolved Solids(TFR)	10	420	ppm
PETROLEUM HYDROCARBONS		--	
VOLATILE (WATER)		--	
DILUTION FACTOR *		1	
DATE ANALYZED		03-14-90	
METHOD GC FID/5030		--	
as Gasoline	0.05	ND	ppm
METHOD 602		--	
Benzene	0.5	ND	ppm
Ethylbenzene	0.5	ND	ppm
Toluene	0.5	ND	ppm
Xylenes, total	0.5	ND	ppm

Client Acct: 18.06
Client Name: ENSCO Environmental
NET Log No: 1057

Date: 03-19-90
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Ref: SHELL, 230 MacArthur, Oakland; Project: 1847G

SAMPLE DESCRIPTION: MW-2 03-08-90 1230
LAB Job No: (-48258)

Parameter	Reporting Limit	Results	Units
Tot. Dissolved Solids(TFR)	10	380	ppm
PETROLEUM HYDROCARBONS		--	
VOLATILE (WATER)		--	
DILUTION FACTOR *		1	
DATE ANALYZED		03-14-90	
METHOD GC FID/5030		--	
as Gasoline	0.05	ND	ppm
METHOD 602		--	
Benzene	0.5	ND	ppm
Ethylbenzene	0.5	ND	ppm
Toluene	0.5	ND	ppm
Xylenes, total	0.5	ND	ppm

Ref: SHELL, 230 MacArthur, Oakland; Project: 1847G

SAMPLE DESCRIPTION: MW-3 03-08-90 1318
LAB Job No: (-48259)

Parameter	Reporting Limit	Results	Units
Tot. Dissolved Solids(TFR)	10	440	ppm
PETROLEUM HYDROCARBONS		--	
VOLATILE (WATER)		--	
DILUTION FACTOR *		1	
DATE ANALYZED		03-14-90	
METHOD GC FID/5030		--	
as Gasoline	0.05	ND	ppm
METHOD 602		--	
Benzene	0.5	ND	ppm
Ethylbenzene	0.5	ND	ppm
Toluene	0.5	ND	ppm
Xylenes, total	0.5	ND	ppm

Client Acct: 18.06
Client Name: ENSCO Environmental
NET Log No: 1057

Date: 03-19-90
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Ref: SHELL, 230 MacArthur, Oakland; Project: 1847G

SAMPLE DESCRIPTION: MW-4 03-08-90 1403
LAB Job No: (-48260)

Parameter	Reporting Limit	Results	Units
Tot. Dissolved Solids(TFR)	10	480	ppm
PETROLEUM HYDROCARBONS		--	
VOLATILE (WATER)		--	
DILUTION FACTOR *		10	
DATE ANALYZED		03-14-90	
METHOD GC FID/5030		--	
as Gasoline	0.05	4.2	ppm
METHOD 602		--	
Benzene	0.5	0.26	ppm
Ethylbenzene	0.5	0.088	ppm
Toluene	0.5	0.018	ppm
Xylenes, total	0.5	0.039	ppm

KEY TO ABBREVIATIONS and METHOD REFERENCES

<	:	Less than; When appearing in results column indicates analyte not detected at the value following, which supercedes the listed reporting limit.
mean	:	Average; sum of measurements divided by number of measurements.
mg/Kg (ppm)	:	Concentration in units of milligrams of analyte per kilogram of sample, wet-weight basis (parts per million).
mg/L	:	Concentration in units of milligrams of analyte per liter of sample.
mL/L/hr	:	Milliliters per liter per hour.
MPN/100 mL	:	Most probable number of bacteria per one hundred milliliters of sample.
N/A	:	Not applicable.
NA	:	Not analyzed.
ND	:	Not detected; the analyte concentration is less than applicable listed reporting limit.
NTU	:	Nephelometric turbidity units.
RPD	:	Relative percent difference, 100 [Value 1 - Value 2]/mean value.
SNA	:	Standard not available.
ug/Kg (ppb)	:	Concentration in units of micrograms of analyte per kilogram of sample, wet-weight basis (parts per billion).
ug/L	:	Concentration in units of micrograms of analyte per liter of sample.
umhos/cm	:	Micromhos per centimeter.

Method References

Methods 601 through 625: see "Guidelines Establishing Test Procedures for the Analysis of Pollutants" U.S. EPA, 40 CFR, Part 136, rev. 1988.

Methods 1000 through 9999: see "Test Methods for Evaluating Solid Waste", U.S. EPA SW-846, 3rd edition, 1986.

* Reporting Limits are a function of the dilution factor for any given sample. To obtain the actual reporting limits for this sample, multiply the stated reporting limits by the dilution factor.

CHAIN OF CUSTODY RECORD

1057

PROJECT NO	PROJECT NAME
1847-6	Shell 230 MacArthur Oakland

SAMPLERS (Signature): Michael K Hamelin

NO.	DATE	TIME	STATION AND LOCATION	TEST REQUESTED: TPHG/BTEX	TEST REQUESTED: Total dissolved Solids						P.O. # / LAB / TURN AROUND TIME / REMARKS
BB-1	3-8-90	11:12	2 Prsv VOAs	X							
MW-1	"	11:43	" + 1 Amber liter	X	X						
MW-2	"	12:30	" "	X	X						
MW-3	"	1:18	" "	X	X						
MW-4	"	2:03	" "	X	X						
											P.O. #
											LAB NET Pacific
											TURN AROUND TIME 5 day
											REMARKS
											AFE# 986645
											WIC #204 5508-0703

RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:	RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:
Michael K. Hamelin	3/8/90	5:10P	Britt Van Pruda	Britt Van Pruda	3/9/90	5:25P	Jeff Sindle
Jeff Sindle	3/8/90			(VIA NCS)	3/9/90	0700	

REMARKS:

REPORT TO: Kay Pannell

FORM DATED 5-30-89

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