EXCELTECH

MARCH QUARTERLY REPORT GROUNDWATER SAMPLING AND ANALYSIS

FOR

SHELL SERVICE STATION
230 MACARTHUR BOULEVARD
OAKLAND, CALIFORNIA

Project No. 1847-2G
April 1991

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

EXCELTECH

April 5, 1991

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 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 March 1, 1991, 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 March 1991 (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 the Department of Transportation. The drums were left on-site pending authorization to have 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).

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.

Discussion

The groundwater surface contour map developed from the March 1, 1991, water level measurements is presented as Figure 2. The map yields a hydraulic gradient of approximately 0.008 directed slightly north of west.

Petroleum hydrocarbons were detected in MW-4 at levels consistent with those reported in January 1991. Hydrocarbons were not present above laboratory detection limits in MW-1, MW-2, or MW-3.

Reporting Requirements

A copy of this report will be forwarded 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 analyses 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.

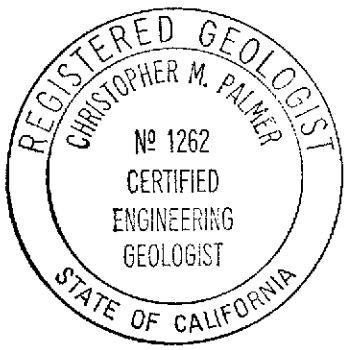
If you have any questions or require additional information, please call.

Sincerely,
Exceltech, Inc.

Jim Durkin
Staff Geologist

Christopher M. Palmer, C.E.G. 1262
Senior Program Geologist

JD/CMP/sw
Enclosure



Exceltech, Inc.
Project No. 1847-2G

Shell Oil Company
Oakland, California

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
	3/1/91	ND	ND	ND	ND	ND	NA		14.34
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
	3/1/91	ND	ND	ND	ND	ND	NA		16.62

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
"ND" for MW-3	3/1/91	1.9	0.059	ND	0.022	ND	NA		14.92
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

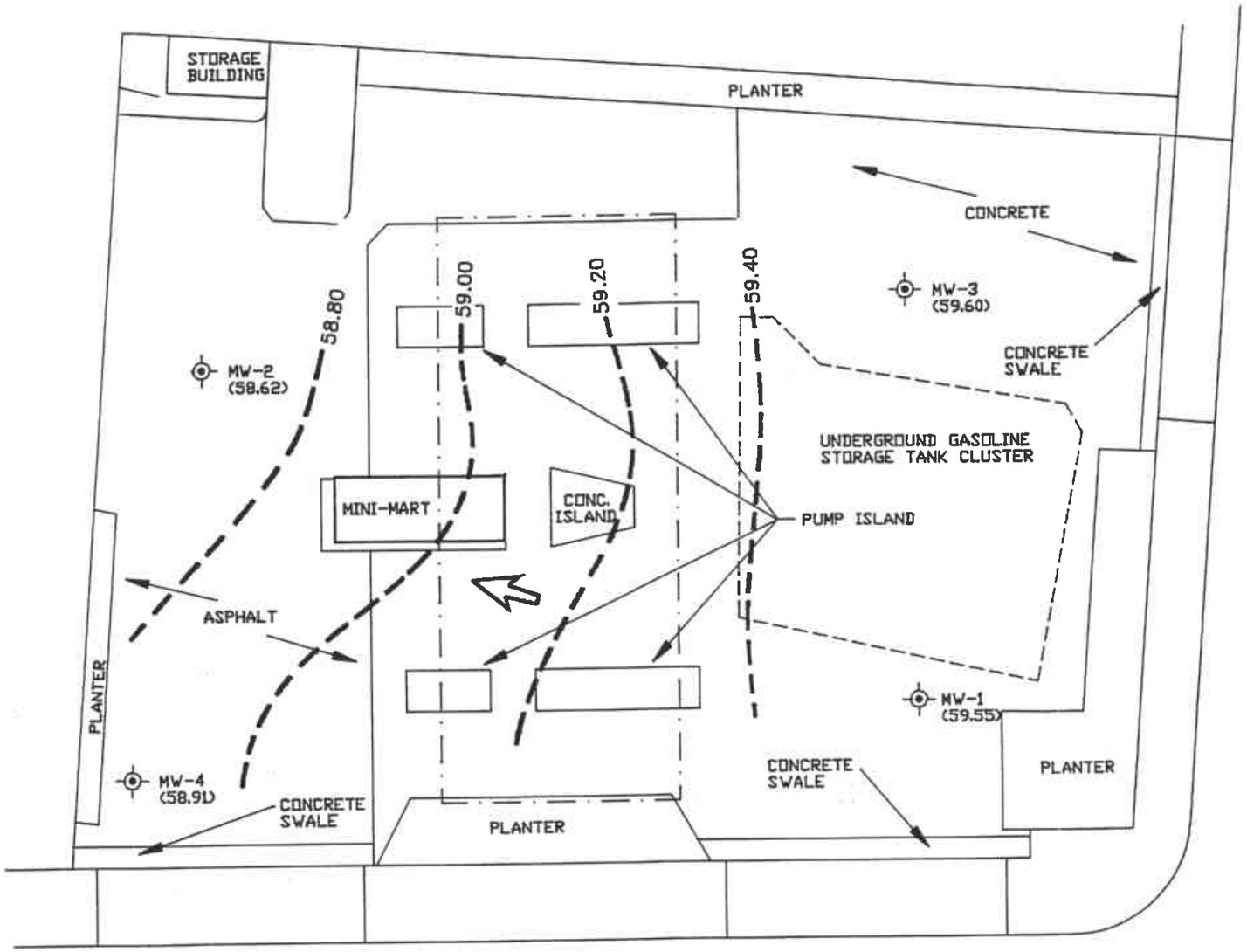
SHELL SERVICE STATION

230 MacARTHUR BOULEVARD

OAKLAND, CALIFORNIA

REVIEWED BY:	APPROVED BY:
JOB #: 1847-2G	DRAWN BY: SLS
DATE:	DRAWING #: FIG: 1

A-1847G-1



LEGEND

MW-4	GROUNDWATER MONITORING WELL
(59.60)	GROUNDWATER SURFACE ELEVATION IN FEET (DATUM: M.S.L.)
59.40	GROUNDWATER SURFACE ELEVATION CONTOUR LINE IN FEET (DATUM: M.S.L.)
	CANOPY
	APPROXIMATE GROUNDWATER FLOW DIRECTION

0 10 20
SCALE IN FEET

N

EXCELTECH

GROUNDWATER ELEVATION CONTOUR MAP (3/1/91)

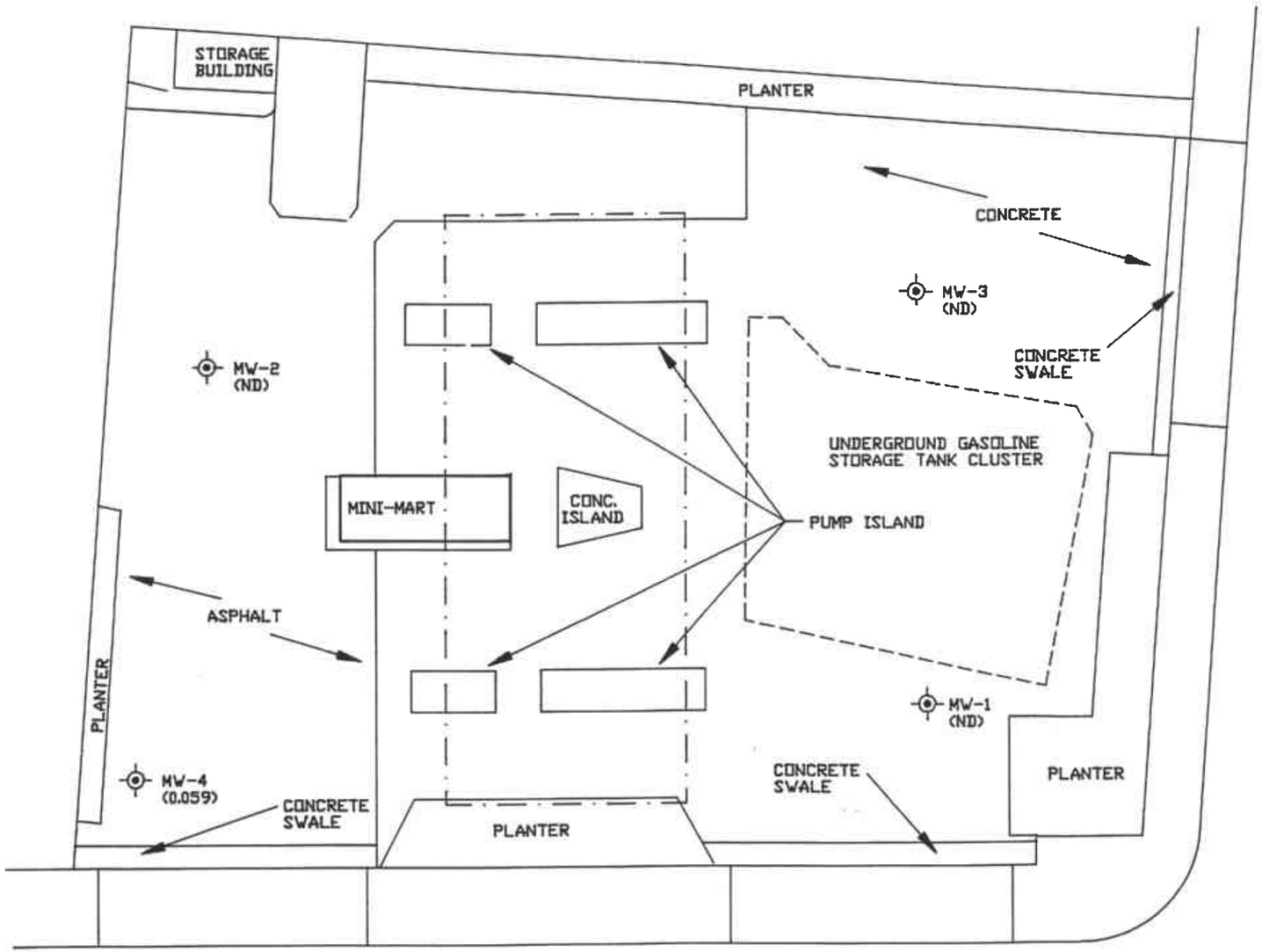
SHELL SERVICE STATION

230 Mac ARTHUR BOULEVARD

OAKLAND, CALIFORNIA

REVIEWED BY:	APPROVED BY: CMP
JOB #: 1847-2G	DRAWN BY: J.D.S.
DATE: 4/4/91	DRAWING #: FIG. 2

1847GW2



PIEDMONT AVENUE

Mac ARTHUR BOULEVARD

LEGEND

MW-4	GROUNDWATER MONITORING WELL
(59.60)	BENZENE CONCENTRATION IN PARTS PER MILLION
(ND)	NOT DETECTED
	CANOPY

0 10 20
SCALE IN FEET

N

BENZENE CONCENTRATION MAP (3/1/91)

SHELL SERVICE STATION

230 Mac ARTHUR BOULEVARD

OAKLAND, CALIFORNIA

EXCELTECH

REVIEWED BY:	APPROVED BY: CMP
JOB #: 1847-2G	DRAWN BY: J.D.S.
DATE: 4/4/91	DRAWING #: FIG. 3

18472G3B

APPENDIX A

GROUNDWATER SAMPLING PROTOCOLS

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

NET NATIONAL ENVIRONMENTAL TESTING, INC.

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

Britt Von Thaden
Exceltech
41674 Christy St.
Fremont, CA 94538

Date: 03-13-91
NET Client Acct No: 18.06
NET Pacific Log No: 6326
Received: 03-05-91 0800

Client Reference Information

SHELL-MacArthur, Project: 1847

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

JS:rct
Enclosure(s)

NET Pacific, Inc.

Client No: 18.06 Date: 03-13-91
Client Name: Exceltech
NET Log No: 6326 Page: 2

Ref: SHELL-MacArthur, Project: 1847

Parameter	Method	Reporting Limit	Descriptor, Lab No. and Results BB1 03-01-91 1200 79095	MW-1 03-01-91 1250 79096	Units
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (WATER)			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			03-07-91	03-07-91	
METHOD GC FID/5030			--	--	
as Gasoline		0.05	ND	ND	mg/L
METHOD 602			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			03-07-91	03-07-91	
Benzene		0.0005	ND	ND	mg/L
Ethylbenzene		0.0005	ND	ND	mg/L
Toluene		0.0005	0.0008	ND	mg/L
Xylenes, total		0.0005	ND	ND	mg/L

Ref: SHELL-MacArthur, Project: 1847

Parameter	Method	Reporting Limit	Descriptor, Lab No. and Results MW-2 03-01-91 1400 79097	 MW-3 03-01-91 1510 79098	Units
PETROLEUM HYDROCARBONS			--	--	
VOLATILE (WATER)			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			03-08-91	03-09-91	
METHOD GC FID/5030			--	--	
as Gasoline		0.05	ND	ND	mg/L
METHOD 602			--	--	
DILUTION FACTOR *			1	1	
DATE ANALYZED			03-08-91	03-09-91	
Benzene		0.0005	ND	ND	mg/L
Ethylbenzene		0.0005	ND	ND	mg/L
Toluene		0.0005	ND	ND	mg/L
Xylenes, total		0.0005	ND	ND	mg/L

Ref: SHELL-MacArthur, Project: 1847

Parameter	Method	Reporting Limit	Descriptor, Lab No. and Results MW-4 03-01-91 1620 79099	Units
PETROLEUM HYDROCARBONS			--	
VOLATILE (WATER)			--	
DILUTION FACTOR *			10	
DATE ANALYZED			03-07-91	
METHOD GC FID/5030			--	
as Gasoline		0.05	1.9	mg/L
METHOD 602			--	
DILUTION FACTOR *			10	
DATE ANALYZED			03-07-91	
Benzene		0.0005	0.059	mg/L
Ethylbenzene		0.0005	0.022	mg/L
Toluene		0.0005	ND	mg/L
Xylenes, total		0.0005	ND	mg/L

NET®

NET Pacific, Inc.

KEY TO ABBREVIATIONS and METHOD REFERENCES

<	:	Less than; When appearing in results column indicates analyte not detected at the value following. This datum supercedes the listed Reporting Limit.
*	:	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 (but do not multiply reported values).
ICVS	:	Initial Calibration Verification Standard (External Standard).
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 100 through 493: see "Methods for Chemical Analysis of Water & Wastes", U.S. EPA, 600/4-79-020, rev. 1983.

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.

SM: see "Standard Methods for the Examination of Water & Wastewater, 16th Edition, APHA, 1985.

CHAIN OF CUSTODY RECORD

63260

PROJECT NO	PROJECT NAME
1847	SHELL-MAC ARTHUR

SAMPLERS (Signature) Dennis Hunter

NO.	DATE	TIME	STATION AND LOCATION	Total
BG1	3/1/91	12:00	Pres VOAs	(3)
MW1	"	12:50	"	"
MW2	"	2:00	"	"
MW3	"	3:10	"	"
MW4	"	4:20	"	"

TEST REQUESTED

TPH/BTEX
X
X
X
X
X

P.O. # WIC# 204-5508-0705

LAB NET

TURN AROUND TIME 5 DAY

REMARKS

AFE 988681

WIC# 2045508 0705

CUSTODY SEALED 3/4/91 @ 20:00 J.L.

RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:
Dennis Hunter	3/1/91	1700	James Smith
Jeffrey Wickham	3/4/91	20:00	(VIA NCL)

RELINQUISHED BY:	DATE:	TIME:	RECEIVED BY:
Mark Detterman	3/4/91	1246	Jeffrey Wickham
	3/5/91	0800	[illegible]

REMARKS:

REPORT TO: BRITT VON TETHDEN

FORM DATED 5-30-89

EXCELTECH
41674 Christy Street
Fremont, C.A. 94538-3114
(415) 659-0404
Fax (415) 651-4677
Conv. Lic No 55025