



August 17, 1992

Scott Seery  
Alameda County Department  
of Environmental Health  
Hazardous Materials Division  
80 Swan Way, Room 200  
Oakland, CA 94621

# 3719

Re: STID #3719  
Shell Service Station  
6039 College Avenue  
Oakland, California  
WIC #204-5508-3301  
WA Job #81-618-100

Dear Mr. Seery:

On behalf of Shell Oil Company, Weiss Associates (WA) is responding to your July 20, 1992 letter to Dan Kirk of Shell Oil Company requesting additional investigation to determine the extent of hydrocarbons in the subsurface beneath the Shell station referenced above. We have reviewed soil analytic data from previous site investigations and ground water analytic data from quarterly monitoring well samplings. The distribution of hydrocarbons in soil and ground water and our recommendations for additional work are presented below.

#### HYDROCARBON DISTRIBUTION IN SOIL

In January and February 1990 and August 1991, Harding Lawson Associates (HLA) of Concord, California collected two to three soil samples each from soil borings B-1 through B-6 and from the borings for wells MW-2 through MW-5 to assess the vertical and horizontal extent of hydrocarbons in soil beneath the site (Figure 1). Total petroleum hydrocarbons as gasoline (TPH-G), diesel (TPH-D) and/or motor oil (TPH-MO) were detected primarily between 15 and 23 ft depth in the borings drilled near the underground fuel storage tanks (Tables 3 and 4 - Attachment B)<sup>1</sup>. Hydrocarbon concentrations in soil samples from borings B-1, MW-2 and MW-5, which are upgradient, crossgradient and downgradient of the tanks, respectively, were near or below laboratory practical quantification limits (PQLs).

<sup>1</sup> Harding Lawson Associates, October 10, 1991, Consultant's Quarterly Technical Report, Third Quarter 1991 prepared for Shell Oil Company regarding the Shell service station at 6039 College Avenue in Oakland, California, 9 pages and 7 appendices.



Since the depth to water has fluctuated between 11.0 and 20.5 ft since November 1990<sup>2</sup>, the seven to eight ft thick layer of hydrocarbon-bearing soil near the underground fuel storage tanks is probably caused by water table fluctuations smearing hydrocarbons across the soils.

Since hydrocarbon concentrations in soil samples collected from immediately above and below the water table from the borings drilled north, east and south of the tanks were near or below detection limits, the vertical and horizontal extent of hydrocarbons in soil are adequately defined in these directions. However, <sup>NO!</sup> as you indicated, the extent of hydrocarbons in soil west of the tanks has not been fully characterized.

#### HYDROCARBON DISTRIBUTION IN GROUND WATER

On March 18, 1992, monitoring well MW-4 contained 0.24 ft of floating hydrocarbons and water samples from well MW-3 contained 6.1 ppm TPH-G. However, no hydrocarbons were detected in ground water samples from wells MW-1, MW-2 and MW-5 (Figure 1, Table 2 - Attachment C). Therefore, the extent of hydrocarbons in ground water is defined to the north, east and south of the site. To remediate the floating hydrocarbons detected at the site, Shell recently installed a floating hydrocarbon skimmer in well MW-4 that will be purged monthly.

#### PROPOSED INVESTIGATION

Since the extent of hydrocarbons in soil and ground water west of the site has not been assessed, WA proposes to drill two soil borings and collect soil and ground water samples from the borings. Due to the limited area available for drilling, the borings will be located in Claremont Avenue as indicated on Figure 1. WA will analyze selected soil samples from five ft depth intervals for TPH-G, TPH-D, TPH-MO, petroleum hydrocarbons as oil and grease, and benzene, ethylbenzene, toluene and xylenes (BETX) following our standard field procedures (Attachment A). WA will temporarily install well screen in the borings and purge four well casing volumes of ground water from the borings prior to collecting water samples. After collecting the water samples, we will remove the well screen and backfill the borings with cement grout installed through a tremie pipe. If the water samples indicate that dissolved hydrocarbons extend significantly beneath Claremont Avenue, WA will evaluate the need for a crossgradient well west of the site.

NO!  
need  
permanent  
well  
points

<sup>2</sup> Weiss Associates, May 20, 1992, Consultant's letter-report prepared for Shell Oil Company regarding quarterly ground water monitoring for the Shell service station at 6039 College Avenue in Oakland, California, 2 pages and 2 attachments.

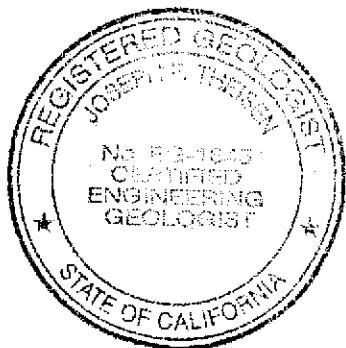
Mr. Scott Seery  
August 17, 1992

3

Weiss Associates



Once the analytic results have been received and evaluated, WA will prepare a brief report presenting the results of the investigation. Please call us if you have any questions or comments.



Sincerely,  
Weiss Associates

N. Scott MacLeod  
Project Geologist

Joseph P. Theisen, C.E.G.  
Senior Hydrogeologist

NSM/JPT:nm

C:\WP51\SHELL\OAK-618\618L1AU2.WP

Attachments: A - Standard Field Procedures  
B - Soil Analytic Tables  
C - Ground Water Analytic Table

cc: Dan Kirk, Shell Oil Company, P.O. Box 5278, Concord, California 94520-9998  
Rafat A. Shahid, Alameda County Department of Environmental Health, Hazardous  
Materials Division, 80 Swan Way, Room 200, Oakland, California 94621  
Gil Jensen, Alameda County District Attorney's Office, 1225 Fallon Street 94612  
Thomas Peacock, Alameda County Department of Environmental Health, Hazardous  
Materials Division, 80 Swan Way, Room 200, Oakland, California 94621  
Richard Hiatt, Regional Water Quality Control Board - San Francisco Bay, 2101 Webster  
Street, Suite 500, Oakland, California 94612  
Sandra Malos, State Water Resources Control Board, 901 P Street, Sacramento, California  
95814  
Claremont Sheet Metal and Heating, 6066 Claremont Avenue, Oakland, California 94618

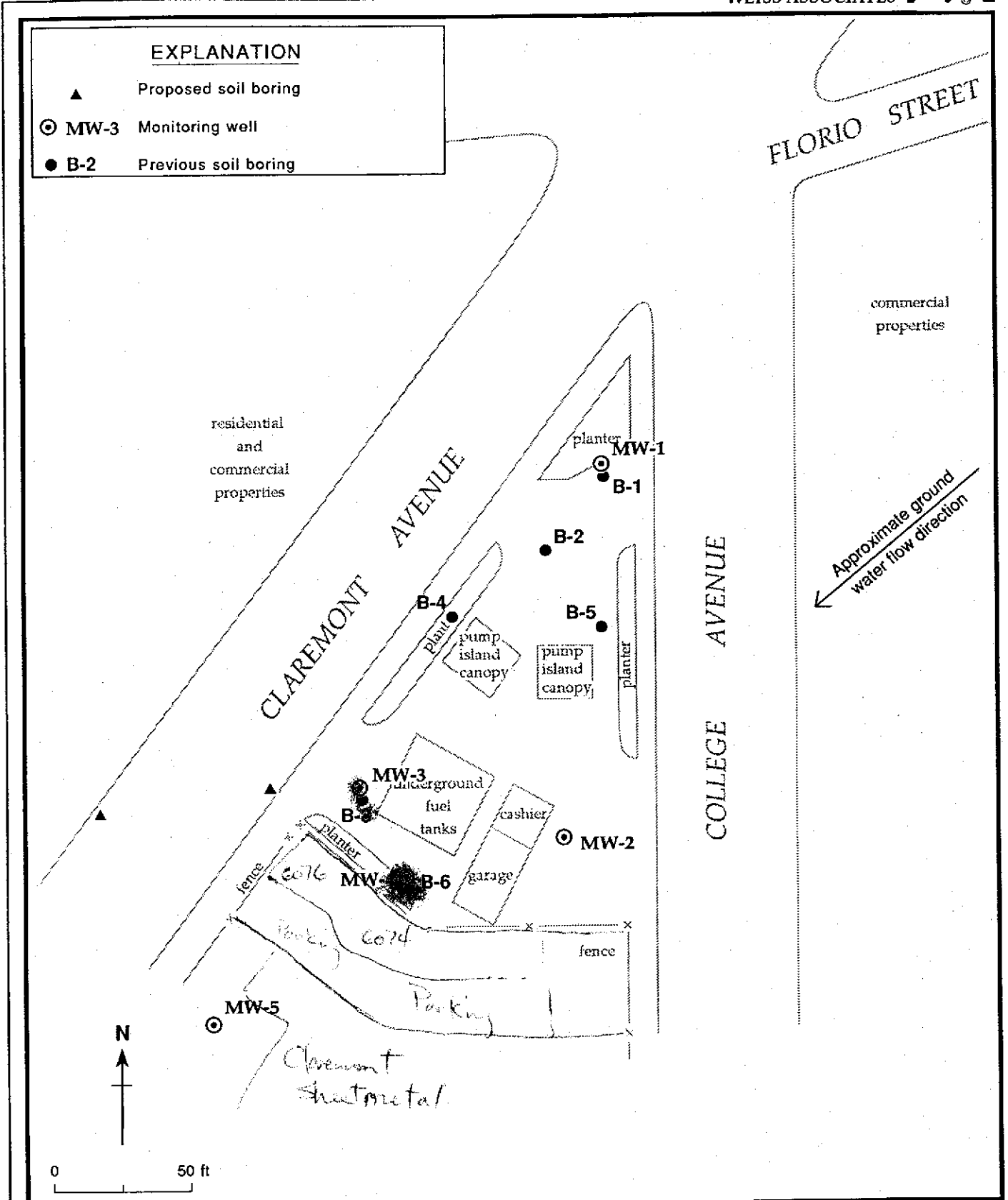


Figure 1. Proposed Boring Locations - Shell Service Station WIC #204-5510-0303, 6039 College Avenue, Oakland, California

**ATTACHMENT A**  
**STANDARD FIELD PROCEDURES**



WA has developed standard procedures for drilling and sampling soil borings and collecting ground water samples. These procedures comply with Federal, State and local regulatory guidelines. Specific procedures are summarized below.

## **SOIL BORING AND SAMPLING**

### **Objectives/Supervision**

Soil sampling objectives include characterizing subsurface lithology, assessing whether the soils exhibit obvious hydrocarbon or other compound vapor or staining, and collecting samples for analysis at a State-certified laboratory. All borings are logged using the Unified Soil Classification System by a trained geologist working under the supervision of a California Registered Geologist (RG) or a Certified Engineering Geologist (CEG).

### **Soil Boring and Sampling**

Deep soil borings or borings for well installation are typically drilled using hollow-stem augers. Split-barrel samplers lined with steam-cleaned brass or stainless steel tubes are driven through the hollow auger stem into undisturbed sediments at the bottom of the borehole using a 140 pound hammer dropped 30 inches. Soil samples can also be collected without using hollow-stem augers by progressively driving split-barrel soil samplers to depths of up to 30 ft.

Soil samples are collected at least every five ft to characterize the subsurface sediments and for possible chemical analysis. Near the water table and at lithologic changes, the sampling interval may be less than five ft.

Drilling and sampling equipment is steam-cleaned prior to drilling and between borings to prevent cross-contamination. Sampling equipment is washed between samples with trisodium phosphate or an equivalent EPA-approved detergent.

### **Sample Analysis**

After noting the lithology at each end of the sampling tubes, the tube chosen for analysis is immediately trimmed of excess soil and capped with teflon tape and plastic end caps. The sample is labelled, stored at or below 4°C, and transported under chain-of-custody to a State-certified analytic laboratory.

## Screening



One of the remaining tubes is partially emptied leaving about one-third of the soil in the tube. The tube is capped with plastic end caps and set aside to allow hydrocarbons to volatilize from the soil. After ten to fifteen minutes, a portable photoionization detector (PID) measures volatile hydrocarbon vapor concentrations in the tube headspace, extracting the vapor through a slit in the cap. PID measurements are used along with the stratigraphy and ground water depth to select soil samples for analysis.

## Grouting

If the borings are not completed as wells, the borings are filled to the ground surface with cement grout poured or pumped through a tremie pipe. If wells are completed in the borings, the well installation, development and sampling procedures summarized below are followed.

## GROUND WATER SAMPLING

Depending on local regulatory guidelines, three to four well-casing or boring volumes of ground water are purged prior to sampling. If necessary, purging continues until ground water pH, conductivity, and temperature have stabilized. Ground water samples are collected using bailers or pumps and are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labelled, placed in protective foam sleeves, stored at 4°C, and transported under chain-of-custody to the laboratory. Laboratory-supplied trip blanks accompany the samples and are analyzed to check for cross-contamination. An equipment blank may be analyzed if non-dedicated sampling equipment is used.

**ATTACHMENT B**  
**SOIL ANALYTIC TABLES**



Table 3. Soil Analytical Results - Borings  
Concentrations in Parts Per Million (ppm)

Sample Depth	B-1-22.5'	B-2-18'	B-2-24'	B-3-19'	B-3-21'	B-4-18.5'	B-4-25'	B-5-22'	B-5-23'	B-6-19.5'	B-6-22.5
Approx. GW Depth	21'	22'	22'	18'	18'	20'	20'	19'	19'	18'	18'
Sample Date	01/04/90	01/05/90	01/05/90	01/05/90	01/05/90	01/04/90	01/04/90	01/04/90	01/04/90	01/05/90	01/05/90
Parameter											
/Method											
Benzene	ND @ 0.05	0.62	ND @ 0.05	0.24	0.19	0.57	ND @ 0.05	ND @ 0.05	ND @ 0.05	0.28	ND @ 0.05
Toluene	ND @ 0.1	ND @ 0.1	ND @ 0.1	0.18	ND @ 0.1	0.11	ND @ 0.1	ND @ 0.1	ND @ 0.1	ND @ 0.1	ND @ 0.1
Ethylbenzene	ND @ 0.1	0.48	ND @ 0.1	4.1	0.53	0.65	ND @ 0.1	ND @ 0.1	ND @ 0.1	1.3	ND @ 0.1
Xylenes	ND @ 0.1	1.2	ND @ 0.1	9.8	0.68	1.3	ND @ 0.1	ND @ 0.1	ND @ 0.1	2.1	ND @ 0.1
/EPA 8020											
TPH as Gasoline	8.1	130	1.8	610	71	170	ND @ 1	ND @ 1	4.4	260	ND @ 1
TPH as Motor Oil	---	---	---	110000	14000	---	---	---	---	12000	320
TPH as Diesel	---	---	---	5900	750	---	---	---	---	600	16
/EPA 8015											
Oil and Grease	---	---	---	810	388	---	---	---	---	1100	91
/SM 503 D&E											
Halogenated VOCs	---	---	---	ND @ 0.5	ND @ 0.5	---	---	---	---	ND @ 0.05	ND @ 0.005
/EPA 8010											
Cadmium	---	---	---	ND @ 0.5	ND @ 0.5	---	---	---	---	ND @ 0.5	ND @ 0.5
Chromium	---	---	---	48	61	---	---	---	---	86	73
Zinc	---	---	---	51	54	---	---	---	---	52	60
/EPA 6010											
Lead/EPA 7241	---	---	---	13	7.6	---	---	---	---	8.1	9.2

--- = Analysis not performed on sample

ND = Not present above the stated detection limit

Table 4. Soil Analytical Results - Well Borings  
 Shell 6039 College Avenue, Oakland  
 Concentrations in parts per million (ppm)

Sample/Depth	MW-2-11'	MW-2-15.5'	MW-2-20.5'	MW-3-10'	MW-3-15.5'	MW-3-20.5'	MW-4-10.5'	MW-4-15.5'	MW-4-20.5'	MW-5-6'	MW-5-16'	MW-5-21'
Approx. GW Depth	17'	17'	17'	16'	16'	16'	17'	17'	17'	17"	17'	17'
Sample Date	2/08/90	2/08/90	2/08/90	2/07/90	2/07/90	2/07/90	2/07/90	2/07/90	2/07/90	8/24/91	8/24/91	08/24/91
Parameter /Method												
Benzene	ND @ 0.05	ND @ 0.05	ND @ 0.05	ND @ 0.05	1.1	ND @ 0.05	ND @ 0.05	0.31	0.06	ND @ 0.005	ND @ 0.005	ND @ 0.005
Toluene	ND @ 0.1	ND @ 0.1	ND @ 0.1	ND @ 0.1	0.7	ND @ 0.1	ND @ 0.11	0.34	ND @ 0.1	ND @ 0.005	ND @ 0.005	ND @ 0.005
Ethylbenzene	ND @ 0.1	ND @ 0.1	ND @ 0.1	ND @ 0.1	3.1	ND @ 0.1	ND @ 0.1	0.92	0.46	ND @ 0.005	0.028	ND @ 0.005
Xylenes	ND @ 0.1	ND @ 0.1	ND @ 0.1	0.11	1.9	ND @ 0.1	ND @ 0.1	2.6	0.57	ND @ 0.005	0.10	ND @ 0.005
/EPA 8020												
TPH as Gasoline	ND @ 1	ND @ 1	ND @ 1	12	230	28	ND @ 1	140	72	ND @ 1	23*	ND @ 1
TPH as Motor Oil	ND @ 10	ND @ 1	ND @ 10	ND @ 10	1,800	ND @ 10	ND @ 1	6,400	46,000	ND @ 12	13	ND @ 12
TPH as Diesel	ND @ 1	ND @ 1	1.1	4.4	200	9.9	1.2	61	2200	ND @ 1.2	7**	ND @ 1.2
/EPA 8015												
PCBs/EPA 8080	---	---	---	ND @ 0.05	ND @ 0.05	ND @ 0.05	ND @ 0.05	ND @ 0.05	ND @ 0.05	---	---	---
TOG /503E	---	---	---	---	---	---	---	---	---	ND @ 50	ND @ 50	ND @ 50

--- = Analysis not performed on sample

ND = Not present above the stated detection limit

TPH = Total petroleum hydrocarbons

PCBs = Polychlorinated biphenyls

TOG = Total oil and grease

\* = Compounds detected are due to petroleum mixture other than gasoline

\*\* = Not characteristic of standard diesel pattern

\*\*\* = Results include compounds apparently due to gasoline as well as those due to diesel.

**ATTACHMENT C**  
**GROUND WATER ANALYTIC TABLE**

Table 2  
Summary of Analytical Results  
First Quarter 1992  
milligrams per liter (mg/l) or parts per million (ppm)

Shell Station: 6039 College Avenue  
Oakland, California  
WIC #: 204-5508-3301

Date: 04/02/92  
Project Number: G67-39.01

Sample Designation	Water Sample Field Date	TPH-g	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPH-d	TPH-mo
		(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)	(mg/l)
MW-1	11/27/90	NA	NA	NA	NA	NA	NA	NA
MW-1	03/08/91	ND	ND	ND	ND	ND	0.05	ND
MW-1	06/03/91	ND	ND	ND	ND	ND	ND	ND
MW-1	08/30/91	ND	ND	ND	ND	ND	0.52	ND
MW-1	03/18/92	<0.03	<0.0003	<0.0003	<0.0003	<0.0003	<0.05	NA
MW-2	11/27/90	ND	ND	ND	ND	ND	ND	ND
MW-2	03/08/91	ND	ND	ND	ND	ND	ND	ND
MW-2	06/03/91	ND	ND	ND	ND	ND	ND	ND
MW-2	08/30/91	ND	ND	ND	ND	ND	ND	ND
MW-2	03/18/92	<0.03	<0.0003	<0.0003	<0.0003	<0.0003	NA	NA
MW-3	11/27/90	0.54	0.018	0.0015	0.0087	0.0025	0.24	0.46
MW-3	03/08/91	3.4	0.63	0.033	0.27	0.018	2.1	ND
MW-3	06/03/91	1.7	0.26	0.013	0.098	0.024	0.89#	ND
MW-3	08/30/91	0.87	0.044	0.0061	0.01	0.0029	0.37+	0.5
MW-3	03/18/92	6.1	0.62	0.028	0.22	0.038	1.9	20.
MW-4	11/27/90	0.47	0.054	0.0012	0.0008	0.0027	2.4	1.0
MW-4	03/08/91	1.1	0.33	0.0035	0.088	0.0058	2.6	15.
MW-4	06/03/91	0.67&	0.24	0.0023	0.0016	0.0023	1.1+	ND
MW-4	08/30/91	0.57	0.064	0.0018	0.0009	0.0009	0.28+	2.0
MW-4	03/18/92	FP	FP	FP	FP	FP	FP	FP

TPH-g = total petroleum hydrocarbons as gasoline

TPH-d = total petroleum hydrocarbons as diesel

TPH-mo = total petroleum hydrocarbons as motor oil

NA = not analyzed

ND = none detected

# = compounds appear to be the less volatile constituents of gasoline

+ = results include compounds apparently due to gasoline as well as those due to diesel

& = compounds detected within the gasoline range are not characteristic of the standard gasoline chromatographic pattern

FP = floating product; well contained floating product and was not sampled

Table 2  
 Summary of Analytical Results  
 First Quarter 1992  
 milligrams per liter (mg/l) or parts per million (ppm)

Shell Station: 6039 College Avenue  
 Oakland, California  
 WIC #: 204-5508-3301

Date: 04/02/92  
 Project Number: G67-39.01

Sample Designation	Water Sample Field Date	TPH-g (mg/l)	Benzene (mg/l)	Toluene (mg/l)	Ethyl-benzene (mg/l)	Total Xylenes (mg/l)	TPH-d (mg/l)	TPH-mo (mg/l)
MW-5	08/30/91	ND	ND	ND	ND	NO	0.08+	ND
MW-5	03/18/92	<0.03	<0.0003	<0.0003	<0.0003	<0.0003	<0.05	NA
TB	11/27/90	ND	ND	ND	ND	ND	NA	NA
TB	03/08/91	ND	ND	ND	ND	ND	NA	NA
TB	06/03/91	ND	ND	ND	ND	ND	NA	NA
TB	08/30/91	ND	ND	ND	ND	ND	NA	NA
TB	03/18/92	<0.03	<0.0003	<0.0003	<0.0003	<0.0003	<0.05	NA

TPH-g = total petroleum hydrocarbons as gasoline

TPH-d = total petroleum hydrocarbons as diesel

TPH-mo = total petroleum hydrocarbons as motor oil

ND = none detected

+ = results include compounds apparently due to gasoline as well as those due to diesel

NA = not analyzed