



September 14, 1992

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

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 August 19, 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 (Figure 1). 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 2). 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 A)<sup>1</sup>. Hydrocarbon concentrations in soil samples from borings B-1, MW-2 and MW-

<sup>1</sup> Harding Lawson Associates, January 2, 1992, Consultant's Quarterly Technical Report, Fourth Quarter 1991 prepared for Shell Oil Company regarding the Shell service station at 6039 College Avenue in Oakland, California, 9 pages and 7 appendices.



5, which are upgradient, crossgradient and downgradient of the tanks, respectively, were near or below laboratory practical quantification limits (PQLs).

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, 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 2, Tables 2 and 6 - Attachment B). 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 is 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, collect soil samples from both borings and convert one boring into a ground water monitoring well. The borings will be drilled in Claremont Avenue as indicated on Figure 2. WA will analyze soil samples from five ft depth intervals for TPH-G and benzene, ethylbenzene, toluene and xylenes (BETX) following our standard sampling procedures which were presented in our August 1992 work plan. The monitoring well will be developed using a steel auto-bailer and sampled on the day of the well installation.

scope reduced from 8-17-92 proposal!

1/6!

<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.



Contrary to what you requested, WA does not recommend drilling soil borings south of monitoring well MW-4 or installing an additional well between MW-4 and MW-5. Our rationale for this recommendation includes:

- The objective of drilling additional borings between MW-4 and MW-5 would be to assess the extent of hydrocarbons for excavation. However the properties south of the site are developed and cannot be excavated. Therefore, WA does not recommend additional borings at this time.
- Since MW-5 is located only <sup>85</sup>60 ft downgradient from MW-4, and since water samples from MW-5 have never contained TPH-G, BETX or TPH-MO, the downgradient extent of hydrocarbons is defined by MW-5. An additional well between wells MW-4 and MW-5 with intermediate hydrocarbon concentrations would not provide any significant additional data. Therefore, we do not recommend installing an additional well between MW-4 and MW-5.

*incorrect!  
What about  
in-situ  
treatment?  
Site  
closure?  
Definition?  
incorrect*

In summary, since the horizontal extent of dissolved hydrocarbons between wells MW-4 and MW-5 is characterized within 60 ft of the property line, and since additional soil borings will not significantly increase the definition of hydrocarbon-bearing soil and ground water, WA does not recommend further investigation of this area.

Once the analytic results have been received and evaluated, WA will prepare a brief subsurface investigation report presenting the results of the investigation. The report will include:

- Site background,
- Topographic and geologic setting,
- Site location map,
- A site map with previous and current structures and well the location,
- Tabulated soil and ground water analytic results,
- Tabulated ground water elevation data,
- Conclusions,
- Boring Logs, and
- Laboratory analytic reports and chain-of-custody forms.

Mr. Scott Seery  
September 14, 1992

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Please call us if you have any questions or comments.



Sincerely,  
Weiss Associates

*Thomas Fogin FOR*

David C. Elias  
Staff Geologist

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Senior Hydrogeologist

DCE/JPT:de

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Attachments: A - Soil Analytic Tables  
B - Ground Water Analytic Table

cc: Dan Kirk, Shell Oil Company, P.O. Box 5278, Concord, California 94520-9998  
Lester Feldman, Regional Water Quality Control Board - San Francisco Bay, 2101 Webster  
Street, Suite 500, Oakland, California 94612

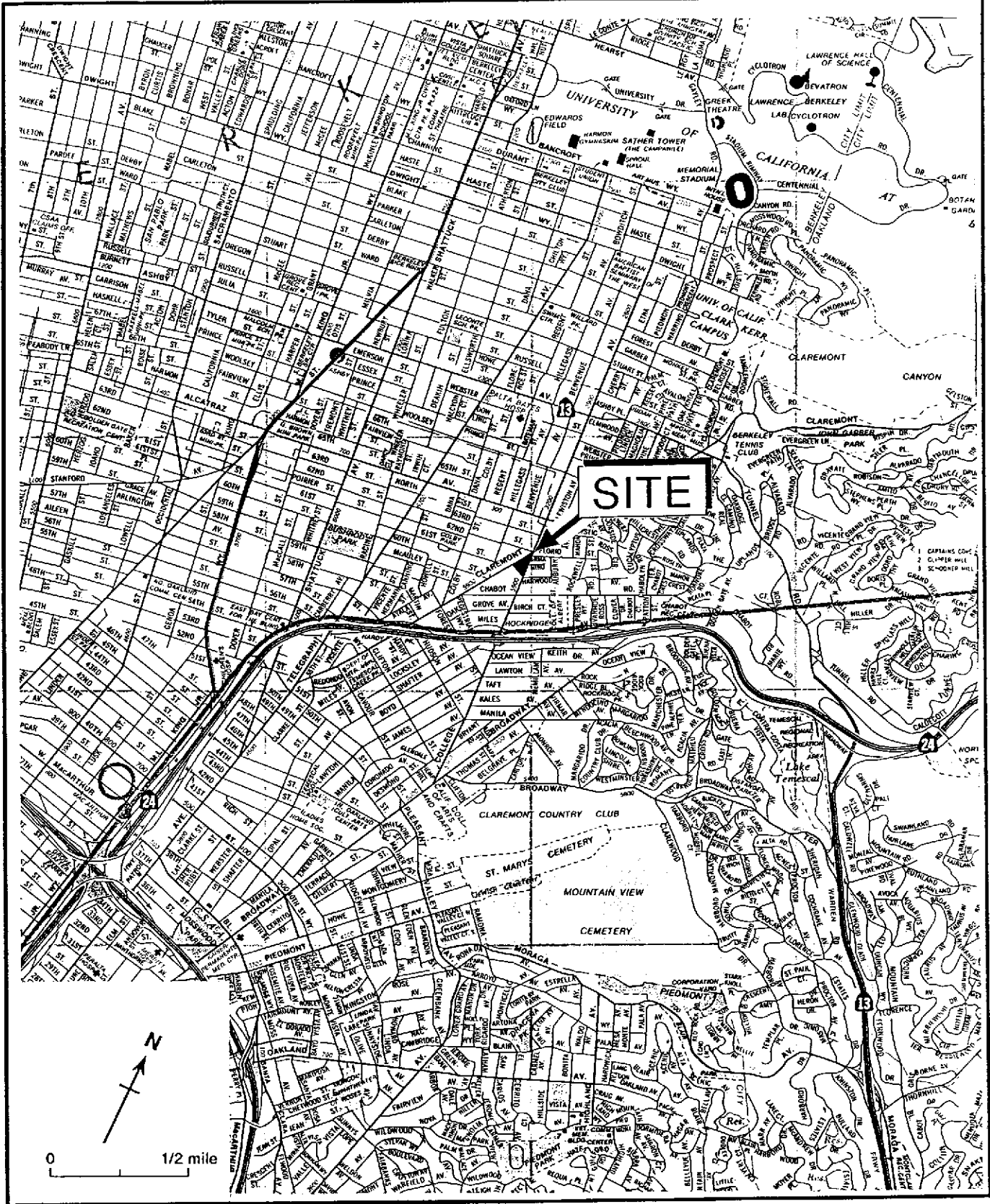


Figure 1. Site Location Map - Shell Service Station WIC #204-5508-3301, 6039 College Avenue, Oakland, California

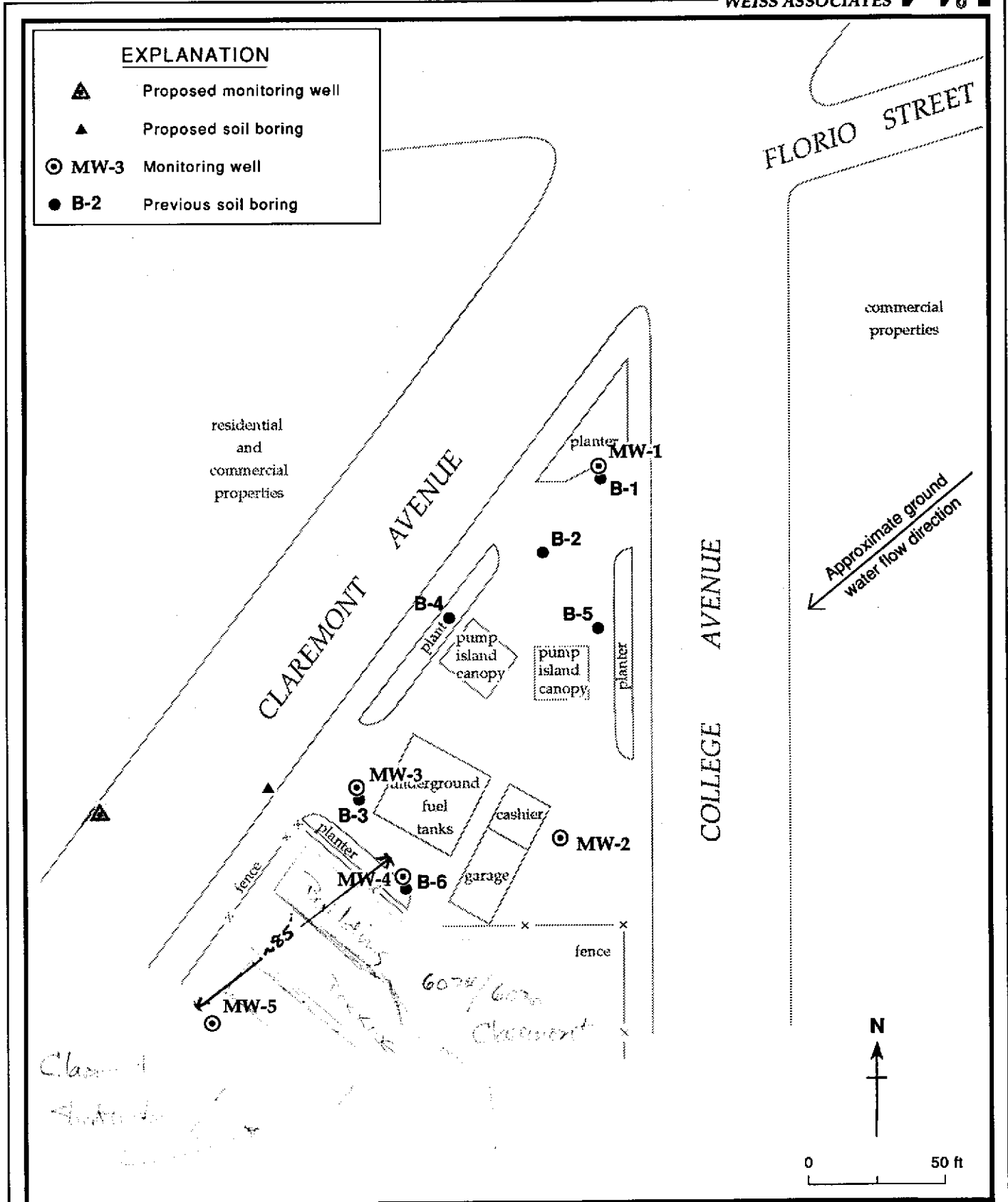


Figure 2. Proposed Monitoring Well and Soil Boring Locations - Shell Service Station WIC #204-5510-0303, 6039 College Avenue, Oakland, California

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.

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	380	---	---	---	---	1100	91
/SM 503 D&E											
Halogenated VOCs	---	---	---	ND @ 0.5	ND @ 0.5	---	---	---	---	ND @ 0.05	ND @ 0.005
/EPA 8010				to 2.5	to 0.25					to 0.25	to 0.025
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



**ATTACHMENT B**  
**GROUND WATER ANALYTIC TABLES**

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

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

Date: 06/29/92  
 Project Number: G67-39.01

Sample Desig- nation	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	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-1	05/28/92	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	<0.05	NA
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-2	05/28/92	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	NA	NA
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	0.69#	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-3	05/28/92	2.3	0.20	0.009	0.071	0.017	1.1*	4.6

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

NA = Not analyzed

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

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

\* = Concentration reported as diesel is primarily due to the presence of a lighter petroleum product, possibly gasoline

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

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

Date: 06/29/92  
 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-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
MW-4	05/28/92	FP	FP	FP	FP	FP	FP	FP
MW-5	08/30/91	ND	ND	ND	ND	ND	0.08+	ND
MW-5	03/18/92	<0.03	<0.0003	<0.0003	<0.0003	<0.0003	<0.05	NA
MW-5	05/28/92	IW	IW	IW	IW	IW	IW	IW
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
TB	05/28/92	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	NA	NA

TPH-g = total petroleum hydrocarbons as gasoline

TPH-d = total petroleum hydrocarbons as diesel

TPH-mo = total petroleum hydrocarbons as motor oil

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

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

ND = None detected

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

NA = Not analyzed

IW = Inaccessible well; well was inaccessible and was not sampled

Table 6. Groundwater Analytical Results  
Concentrations in Parts Per Billion (ppb)

Sample No.	Sample Date	EPA 8020				EPA 8015 - Modified		
		Benzene	Toluene	Ethyl-Benzene	Xylenes	Total Petroleum Hydrocarbons		
						Gasoline	Diesel	Motor Oil
MW-1	02/13/90	ND @ 0.3	0.67	0.37	3.2	95	650	770
	05/14/90	0.70	0.57	0.71	3.5	95	ND @ 50	770
	09/12/90	ND @ 0.3	ND @ 0.3	ND @ 0.3	ND @ 0.3	ND @ 30	84	ND @ 50
	11/27/90	NS	NS	NS	NS	NS	NS	NS
	03/08/91	ND @ 0.5	ND @ 0.5	ND @ 0.5	ND @ 0.5	ND @ 50	50	ND @ 50
	06/03/91	ND @ 0.5	ND @ 0.5	ND @ 0.5	ND @ 0.5	ND @ 50	ND @ 50	ND @ 500
	08/30/91	ND @ 0.5	ND @ 0.5	ND @ 0.5	ND @ 0.5	ND @ .05	520	ND @ 500
	11/22/91	ND @ 0.5	ND @ 0.5	ND @ 0.5	ND @ 0.5	ND @ 0.5	ND @ 50	ND @ 500
MW-2	02/13/90	ND @ 0.3	ND @ 0.3	ND @ 0.3	ND @ 0.3	ND @ 30	560	ND @ 50
	05/14/90	ND @ 0.3	ND @ 0.3	ND @ 0.3	ND @ 0.3	ND @ 30	ND @ 50	ND @ 50
	09/12/90	ND @ 0.3	ND @ 0.3	ND @ 0.3	ND @ 0.3	ND @ 30	ND @ 50	ND @ 50
	11/27/90	ND @ 0.3	ND @ 0.3	ND @ 0.3	ND @ 0.3	ND @ 30	ND @ 50	ND @ 50
	03/08/91	ND @ 0.5	ND @ 0.5	ND @ 0.5	ND @ 0.5	ND @ 50	ND @ 50	ND @ 500
	06/03/91	ND @ 0.5	ND @ 0.5	ND @ 0.5	ND @ 0.5	ND @ 50	ND @ 50	ND @ 500
	08/30/91	ND @ 0.5	ND @ 0.5	ND @ 0.5	ND @ 0.5	ND @ 0.5	ND @ 50	ND @ 500
	11/22/91	ND @ 0.5	ND @ 0.5	ND @ 0.5	ND @ 0.5	ND @ 0.5	ND @ 50	ND @ 500
MW-3	02/13/90	320	29	110	33	4,700	3,100	3,000
	05/14/90	130	8.6	40	17	1,400	620	40,000
	09/12/90	58	5.8	16	15	2,000	1,500	19,000
	11/27/90	18	1.5	8.7	2.5	540	240	460
	03/08/91	630	33	270	18	3,400	2,100	ND @ 500
	06/03/91	260	13	98	24	1,700	690*	ND @ 500
	08/30/91	44	6.1	10	2.9	870	370**	500
	11/22/91	18	1.2	3.3	2.9	310	140	500

--- = Analysis not performed on sample

ND = Not present above the stated detection limit

-D = Duplicate sample

NS = Not sampled

\* = Laboratory reported that these compounds appear to be the less volatile constituents of gasoline.

\*\* = Compounds are within the chromatographic range for gasoline but are not characteristic of the standard gasoline pattern.

Table 6. (Continued)

Sample No.	Sample Date	EPA 8020				EPA 8015 - Modified		
		Benzene	Toluene	Ethyl-Benzene	Xylenes	Total Petroleum Hydrocarbons		
						Gasoline	Diesel	Motor Oil
MW-3-D	02/13/90	380	8.6	160	57	4,600	4,500	8,300
	05/14/90	120	31	38	13	820	660	10,000
MW-4	02/13/90	ND @ 0.3	ND @ 0.3	ND @ 0.3	ND @ 0.3	ND @ 30	1,200	3,000
	05/14/90	160	7	1.9	3.1	650	350	12,000
	09/12/90	91	1.1	0.75	0.79	440	260	2,600
	11/27/90	64	1.2	0.80	2.7	470	2,400	1,000
	03/08/91	330	3.5	88	5.8	1,100	2,600	15,000
	06/03/91	240	2.3	1.6	2.3	670*	1,100**	ND @ 500
	08/30/91	64	1.8	0.9	0.9	570	280**	2,000
11/22/91	NS	NS	NS	NS	NS	NS	NS	
MW-4-D	09/12/90	85	1.0	0.71	0.81	520	1,100	16,000
MW-5	08/30/91	ND @ 0.5	ND @ 0.5	ND @ 0.5	ND @ 0.5	ND @ 50	80**	ND @ 500
	11/22/91	ND @ 0.5	ND @ 0.5	ND @ 0.5	ND @ 0.5	ND @ 50	50	ND @ 500
Trip Blank	02/13/90	ND @ 0.3	ND @ 0.3	ND @ 0.3	ND @ 0.3	ND @ 30	--	--
	05/14/90	ND @ 0.3	ND @ 0.3	ND @ 0.3	ND @ 0.3	ND @ 30	--	--
	09/12/90	ND @ 0.3	ND @ 0.3	ND @ 0.3	ND @ 0.3	ND @ 30	--	--
	03/08/91	ND @ 0.5	ND @ 0.5	ND @ 0.5	ND @ 0.5	ND @ 50	--	--
	08/30/91	ND @ 0.5	ND @ 0.5	ND @ 0.5	ND @ 0.5	ND @ 50	--	--
	11/22/91	ND @ 0.5	ND @ 0.5	ND @ 0.5	ND @ 0.5	ND 2 50	--	--

--- = Analysis not performed on sample

ND = Not present above the stated detection limit

-D = Duplicate sample

NS = Not sampled

\* = Compounds are within the chromatographic range for gasoline but are not characteristic of the standard gasoline pattern.

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