Weiss Associates Environmental and Geologic Services

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September 29, 1992

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

Re: STID #1107
Shell Service Station
29 Wildwood Avenue
Piedmont, California
WA Job #81-463-100

Dear Ms. Eberle:

On behalf of Shell Oil Company, WA is responding to your August 18, 1992 letter to Shell requesting a remediation workplan for the station referenced above. We have reviewed the results of previous subsurface investigations and quarterly ground water monitoring events. A summary of the site background and our recommendations are presented below.

SITE BACKGROUND

In August 1984, EMCON Associates of San Jose, California drilled four soil borings which and installed well E-4 (Figure 1). Petroleum hydrocarbons were detected in soil from three of the borings. No hydrocarbons were detected in soil samples from the boring for well E-4. Well E-4 is a flowing artesian well and is screened in a deeper water-bearing zone than the more recently installed site wells.

In September 1984, new fuel lines and three new single-walled fiberglass underground tanks were installed to replace the former steel fuel tanks.

In June 1987, a former 550-gallon underground waste oil tank was removed. Blaine Tech Services (BTS) of San Jose, California collected a soil sample from the bottom of the tank

excavation at 8 ft depth. No hydrocarbons or volatile organic compounds (VOCs) were detected.

In October 1988, Pacific Telephone encountered hydrocarbon-bearing soil while excavating adjacent to the station along Grand Avenue northwest of the underground fuel storage tanks. Also in October 1988, ENSCO Environmental Services of Fremont, California, drilled soil borings B-1 through B-5 to determine whether soils adjacent to the existing fiberglass gasoline storage tanks contained hydrocarbons. Up to 6,500 ppm TPH-G were detected in soil samples collected at 10 ft depth from the east end of the tanks.

In July 1989, WA drilled soil borings BH-A through BH-I and converted three of the borings into ground water monitoring wells MW-1, MW-2 and MW-3 (Figure 1). The drilling objective was to define the extent of hydrocarbons in soil and to assess whether hydrocarbons were in ground water beneath the site. TPH-G were detected in soil samples from four of the borings, at a maximum of 710 ppm at 3.5 ft depth in the boring for MW-2. Hydrocarbons were detected in ground water samples from wells MW-2 and MW-3, at a maximum of 3.9 ppm TPH-G and 0.38 ppm benzene in MW-3 (Attachment A). No hydrocarbons were detected in water samples from wells MW-1 and E-4.

In January 1990, WA drilled three soil borings downgradient of the site and converted two of them into ground water monitoring wells MW-4 and MW-5 (Figure 2). The drilling objective was to determine the extent of hydrocarbons in ground water crossgradient and downgradient of the site. No TPH-G were detected in any soil samples from the three borings, and no hydrocarbons were detected in ground water samples from either well. A well was not installed in boring BH-L drilled south of the site because the soil was very fine grained and did not produce ground water.

Due to the heavy traffic on Grand Avenue, it was not practical to drill soil borings or install ground water monitoring wells between wells MW-3 and MW-4 to precisely define the extent of hydrocarbons west of the site. However, no hydrocarbons were detected in soil from the boring for well MW-4, which is only about 80 ft west of the site.

A review of all precision tank integrity test results available through May 1992 indicates the existing tanks and piping passed all tests. Although a failure was detected in the high level

system in 1988, the couplings on the fill risers, which were the components of the high level system that failed the test, were subsequently repaired. The amount of product lost, if any, was probably small.

RECOMMENDATIONS

Based on the ground water monitoring results for the past three years, WA does not recommend ground water remediation at this time. This recommendation is based on the following site conditions:

- Hydrocarbons have been consistently detected at elevated concentrations only in ground water samples from well MW-3,
- Analytic results for four of the six wells have been consistently below detection limits,
- No dissolved hydrocarbons have been detected in the crossgradient or downgradient wells, we want to prevent migration of plume.
- The hydrocarbon concentrations in ground water samples from well MW-3 have been stable or declining through time (Attachment A), indicating that natural biodegradation may be reducing the onsite hydrocarbon concentrations,
- Since well E-4 is a flowing artesian well, there is an upward hydraulic gradient beneath the site that inhibits the downward migration of hydrocarbons, and
- Although the benzene concentrations in ground water samples from well MW-3 have exceeded the California Department of Toxic Substances Control maximum contaminant level for drinking water, the concentrations are in a range where natural biodegradation and attenuation should continue to reduce the benzene concentrations.

WA also does not recommend remediating soil at the site at this time for the following reasons:

- Current station operations prevent soil excavation at this time,
- The low soil permeability will probably prevent in-situ remediation by soil vapor extraction, soil washing or other approaches, and sand/gravel layer varies from 6-16' bgs. must check →
- The hydrocarbons currently in the soil are unlikely to migrate far from the site since the soil permeability is low and since the upward hydraulic gradient should inhibit downward hydrocarbon migration from the site.

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WA recommends addressing soil remediation in the future during station reconstruction activities. Since the tanks and product lines currently installed at the site are less than 10 years old and have apparently tested tight since they were installed, and since the tanks and piping continue to be tested regularly, future hydrocarbon releases are unlikely.

In summary, WA recommends continuing quarterly ground water sampling to monitor and confirm the natural biodegradation processes in the ground water. Soil remediation can be addressed in the future to avoid disrupting current station operations. WA will reassess the need for remediation if hydrocarbons are detected in the crossgradient or downgradient wells or if dissolved hydrocarbon concentrations increase significantly in well MW-3.

define

Thank you for your consideration and oversight. Please call us if you have any questions.

Sincerely,
Weiss Associates

N. Scott MacLeod
Project Geologist

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

NSM/JPT:tf

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

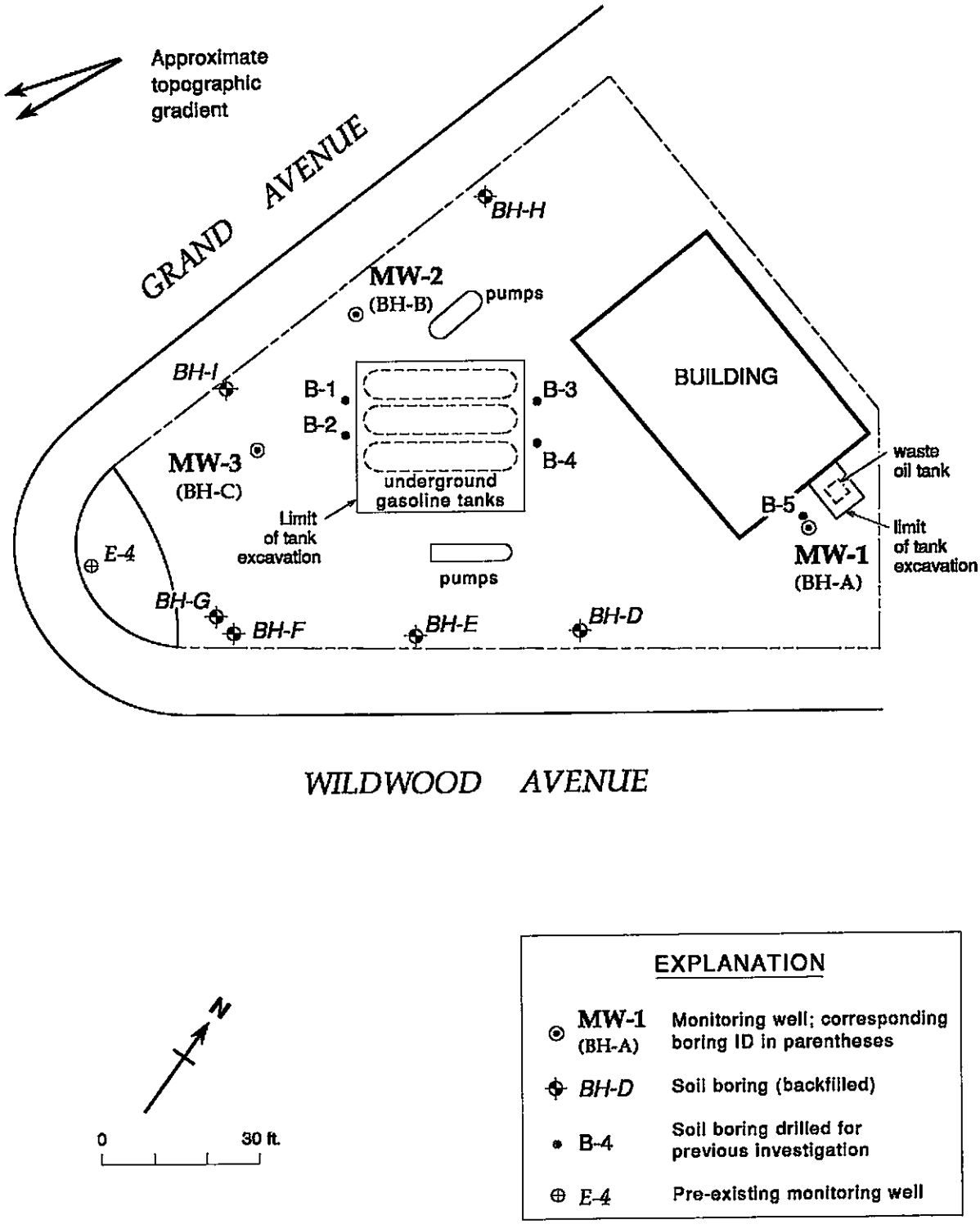

Figure 1. Site Map - Shell Service Station, 29 Wildwood Avenue, Piedmont, California

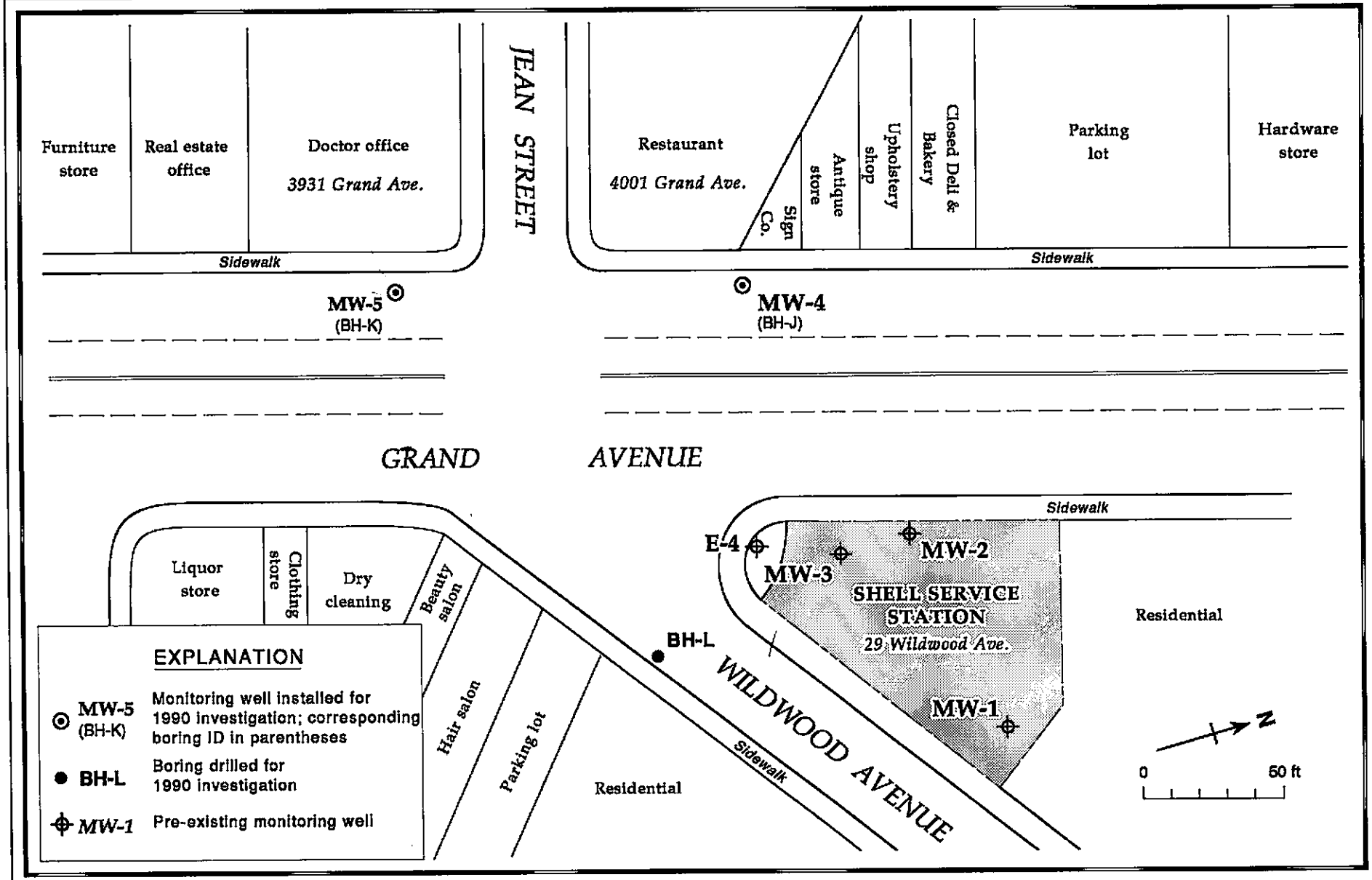

Figure 2. Soil Boring and Monitoring Well Locations - Shell Service Station, WIC #204-6001-0109, 29 Wildwood Avenue, Piedmont, California

3/15/90

ATTACHMENT

ANALYTIC RESULTS FOR GROUND WATER

TABLE 3. Analytic Results for Ground Water, Shell Service Station WIC #204-6001-0109, 29 Wildwood Avenue, Piedmont, California

Well ID	Date Sampled	Depth to Water (ft)	TPH-G	B	E	T	X	HVOCs
			<----------parts per million (mg/L)---------->					
MW-1	07/12/89[a]	2.76	<0.05	<0.0005	<0.001	<0.001	<0.003	b
	01/30/90	3.10	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	---
	04/27/90	3.24	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	---
	07/31/90	4.26	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	---
	10/30/90	4.25	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	---
	01/31/91	3.66	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	---
	04/30/91	3.46	<0.05	0.0008	0.0006	<0.0005	0.0012	---
	07/30/91	**4.14**	**<0.05**	**<0.0005**	**<0.0005**	**<0.0005**	**<0.0005**	---
MW-2	07/12/89[a]	3.66	0.060	0.0027	<0.001	<0.001	<0.003	b
	01/30/90	3.49	<0.05	0.0066	0.00054	<0.0005	0.00093	---
	04/27/90	3.79	0.060	0.0021	<0.0005	<0.0005	<0.0005	---
	07/31/90	4.03	0.070	0.0015	<0.0005	<0.0005	<0.0005	---
	10/30/90	4.21	0.070	<0.0005	<0.0005	0.0007	0.0016	---
	01/31/91	4.09	0.080	<0.0005	0.0009	<0.0005	0.0019	---
	04/30/91	3.95	0.10	0.0059	0.0007	0.0006	0.0020	---
	07/30/91	**4.07**	**<0.05**	**<0.0005**	**<0.0005**	**0.0007**	**<0.0005**	---
MW-3	07/12/89[a]	3.83	3.9	0.38	0.099	0.041	0.030	c
	01/30/90	3.24	5.5	0.44	0.079	0.035	0.13	---
	04/27/90	4.02	4.5	0.31	0.037	0.026	0.11	---
	07/31/90	4.31	3.5	0.21	0.0084	0.017	0.062	---
	10/30/90	4.52	2.3	0.061	<0.0005	<0.0005	0.028	---
	01/31/91	4.33	4.1	0.30	0.019	0.020	0.081	---
	04/30/91	3.79	3.8	0.370	0.0086	0.019	0.060	---
	07/30/91	**4.37**	**3.3**	**0.160**	**0.015**	**0.013**	**0.087**	---
MW-4	01/31/90	4.50	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	---
	04/27/90	3.62	0.13[d]	<0.0005	<0.0005	<0.0005	<0.0005	---
	07/31/90	4.19	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	---
	10/30/90	4.19	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	---
	01/31/91	4.49	0.05[d]	<0.0005	<0.0005	<0.0005	<0.0005	---
	04/30/91	4.02	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	e
	07/30/91	**4.39**	**<0.05**	**<0.0005**	**<0.0005**	**<0.0005**	**<0.0005**	---
MW-5	01/31/90	7.12	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	---
	04/27/90	4.19	0.21[d]	<0.0005	<0.0005	<0.0005	<0.0005	---
	07/31/90	4.09	0.090	<0.0005	<0.0005	<0.0005	<0.0005	---
	10/30/90	4.39	0.10	0.0008	0.0006	0.0007	0.0014	---
	01/31/91	4.49	0.080[d]	<0.0005	<0.0005	<0.0005	<0.0005	---
	04/30/91	4.27	0.09[d]	<0.0005	<0.0005	<0.0005	<0.0005	f
	07/30/91	**4.32**	**0.09[d]**	**<0.0005**	**<0.0005**	**<0.0005**	**<0.0005**	---

--Table 3 continues on next page --

TABLE 3. Analytic Results for Ground Water, Shell Service Station WIC #204-6001-0109, 29 Wildwood Avenue, Piedmont, California (continued)

Well ID	Date Sampled	Depth to Water (ft)	TPH-G	B	E	T	X	HVOCs
			<----------parts per million (mg/L)---------->					
E-4	07/12/89[a]	g	<0.05	<0.0005	<0.001	<0.001	<0.003	---
	01/31/90	g	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	---
	04/27/90	g	0.12[d]	<0.0005	<0.0005	<0.0005	<0.0005	---
	07/31/90	g	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	---
	10/30/90	g	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	---
	01/31/91	g	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	---
	04/30/91	g	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	b
	07/30/91	**g**	**<0.05**	**<0.0005**	**<0.0005**	**0.0006**	**<0.0005**	---
Trip Blank	07/12/89[a]		<0.05	<0.0005	<0.001	<0.001	<0.003	---
	01/31/90		<0.05	<0.0005	<0.0005	<0.0005	<0.0005	---
	04/27/90		<0.05	<0.0005	<0.0005	<0.0005	<0.0005	---
	07/31/90		<0.05	<0.0005	<0.0005	<0.0005	<0.0005	---
	10/30/90		<0.05	<0.0005	<0.0005	<0.0005	<0.0005	---
	01/31/91		<0.05	<0.0005	<0.0005	<0.0005	<0.0005	---
	04/30/91		<0.05	<0.0005	<0.0005	<0.0005	<0.0005	---
	07/30/91		**<0.05**	**<0.0005**	**<0.0005**	**<0.0005**	**<0.0005**	---
Bailer Blank	04/27/90		0.11[d]	<0.0005	<0.0005	<0.0005	<0.0005	---
	01/31/91		<0.05	<0.0005	<0.0005	<0.0005	<0.0005	---
DHS MCLs			NE	0.001	0.680	0.10[h]	1.750	i

Abbreviations:

TPH-G = Total Petroleum Hydrocarbons as Gasoline by Modified EPA Method 8015
B = Benzene by EPA Method 602 or 8020
E = Ethylbenzene by EPA Method 602 or 8020
T = Toluene by EPA Method 602 or 8020
X = Xylenes by EPA Method 602 or 8020
HVOCs = Volatile or halogenated volatile organic compounds by EPA Method 601 or 624
--- = Not analyzed
NE = Not established
DHS MCLs = California Department of Health Services maximum contaminant levels for drinking water
<n = Not detected above detection limit of n ppm

Notes:

a = Analyzed by International Technology Analytical Services, Inc., San Jose, California.
b = No HVOCs detected.
c = BETX detected at 0.41, 0.097, 0.036 and 0.30 ppm, respectively, by EPA Method 624.
d = Non-gasoline peak reported as TPH-G by Modified EPA Method 8015.
e = 0.015 ppm tetrachloroethene (PCE), 0.0041 ppm trichloroethene (TCE) and 0.0034 ppm trans-1,2-dichloroethene (DCE) detected
f = 0.220 ppm PCE, 0.022 ppm TCE and 0.017 ppm DCE detected
g = Artesian well; potentiometric elevation above top-of-casing elevation.
h = DHS recommended action level for drinking water; MCL not established.
i = DHS MCLs for PCE = 0.005 ppm; TCE = 0.005 ppm; DCE = 0.01 ppm.

Analytical Laboratory:

National Environmental Testing (NET) Pacific, Inc., Santa Rosa, California

TABLE 2
SUMMARY OF ANALYTICAL RESULTS
SHELL OIL COMPANY
29 Wildwood Avenue, Piedmont, California

Sample Type: Water
Units: mg/l (ppm), unless otherwise noted

Sample Designation	Sample Date	TPH as Gasoline	Benzene	Toluene	Ethyl-benzene	Total Xylenes	Tetra-chloro-ethene	Trichloro-ethene	Dichloro-ethene
MW-1	04/30/91	ND	0.0008	ND	0.0006	0.0012	--	--	--
	07/30/91	ND	ND	ND	ND	ND	--	--	--
	10/29/91	ND	ND	ND	ND	ND	--	--	--
	01/20/92	ND	ND	ND	ND	ND	--	--	--
	04/14/92	0.07	0.016	ND	0.0031	0.0021	--	--	--
MW-2	04/30/91	0.10	0.0059	0.0006	0.0007	0.0020	--	--	--
	07/30/91	ND	ND	ND	ND	ND	--	--	--
	10/29/91	ND	ND	ND	ND	ND	--	--	--
	01/20/92	ND	0.00084	ND	0.00041	0.00048	--	--	--
	04/14/92	ND	ND	ND	ND	ND	--	--	--
MW-3	04/30/91	3.8	0.370	0.019	0.0086	0.06	--	--	--
	07/30/91	3.3	0.160	0.013	0.015	0.087	--	--	--
	10/29/91	1.0	0.035	0.0028	0.0029	0.0081	--	--	--
	01/20/92	6.9	0.38	0.018	0.047	0.048	--	--	--
	04/14/92	6.0	0.48	0.038	0.041	0.055	--	--	--
MW-4	04/30/91	ND	ND	ND	ND	ND	0.015	0.0041	0.0034
	07/30/91	ND	ND	ND	ND	ND	--	--	--
	10/29/91	ND	ND	ND	ND	ND	--	--	--
	01/20/92	ND	ND	ND	ND	ND	--	--	--
	04/14/92	ND	ND	ND	ND	ND	--	--	--

TABLE 2
SUMMARY OF ANALYTICAL RESULTS
SHELL OIL COMPANY
29 Wildwood Avenue, Piedmont, California

Sample Type: Water
Units: mg/l (ppm), unless otherwise noted

Sample Designation	Sample Date	TPH as Gasoline	Benzene	Toluene	Ethyl-benzene	Total Xylenes	Tetra-chloro-ethene	Trichloro-ethene	Dichloro-ethene
MW-5	04/30/91	0.09	ND	ND	ND	ND	0.220	0.022	0.017
	07/30/91	0.09	ND	ND	ND	ND	--	--	--
	10/29/91	ND	ND	ND	ND	ND	--	--	--
	01/20/92	ND	ND	ND	ND	ND	--	--	--
	04/14/92	ND**	ND	ND	ND	ND	--	--	--
E-4	04/30/91	ND	ND	ND	ND	ND	--	--	--
	07/30/91	ND	ND	0.0006	ND	ND	--	--	--
	10/29/91	ND	ND	ND	ND	ND	--	--	--
	01/20/92	ND	ND	ND	ND	ND	--	--	--
	04/14/92	ND	ND	ND	ND	ND	--	--	--
Trip Blank	04/30/91	ND	ND	ND	ND	ND	--	--	--
	07/30/91	ND	ND	ND	ND	ND	--	--	--
	10/29/91	ND	ND	ND	ND	ND	--	--	--
	01/20/92	--	--	--	--	--	--	--	--
	04/14/92	ND	ND	ND	ND	ND	--	--	--

ND = Not detected.
** = The analysis Petroleum Hydrocarbons as Gasoline shows several unknown peaks.