Weiss Associates
Environmental and Geologic Services
5500 Shellmound Street, Emeryville, CA 94608-2411 Fax: 510-547-5043 Phone: 510-547-5420

92 SEP -4 PM 1:15

September 2, 1992

Ms. Juliet Shin
Alameda County Department of
Environmental Health
Hazardous Materials Division
80 Swan Way, Room 200
Oakland, California 94621

Re: Shell Service Station
WIC #204-0072-0502
2160 Otis Drive
Alameda, California
WA Job #81-429-100

Dear Ms. Shin:

As you requested in your August 7, 1992 letter to Dan Kirk of Shell Oil Company, Shell Oil has retained Weiss Associates (WA) to prepare this proposed workplan for additional investigation at the site referenced above (Figure 1). In your letter you requested that Shell identify the source of the hydrocarbons detected in ground water from monitoring well MW-2 and define the extent of hydrocarbons in groundwater at the site.

The specific objectives of our proposed investigation are to:

- Assess whether the low benzene concentrations detected in ground water from monitoring well MW-2 originate from the underground storage tanks (UST's) and/or pump islands, and
- If hydrocarbons are detected in soil and/or ground water downgradient of the tanks and pump islands, assess whether hydrocarbons extend downgradient to the northeast side of Otis Drive and assess the extent of hydrocarbons upgradient of the tanks and pump islands.

To meet these objectives, WA proposes the following scope of work:

- Drill the two initial borings shown on Figure 2 to below the water table using a cuttingless soil boring technique,
- Collect soil samples from the borings using a split-spoon drive sampler, every 5 feet?
- Purge the borings by bailing prior to collecting water samples from each boring,

No. will be analyzed.
soil? water? both??

- Assess whether the samples contain hydrocarbons using a photo-ionization detector and physical observations,
- If field indications of hydrocarbons are detected in soil and/or water samples from the two initial borings, drill and sample soil and ground water from two to three additional borings downgradient of the site across Otis Drive (Area A, Figure 2) and upgradient of the tanks(Area B, 1962),and
- Analyze the soil and ground water samples for benzene, ethyl-benzene, toluene, xylenes, total petroleum hydrocarbons as gasoline and volatile organic compounds by EPA methods 8020, 8015 and 601 respectively,

Due to the shallow ground water depth at the site, WA anticipates that all the borings can be drilled, sampled and backfilled in one day. We will conduct this investigation according to ACDEH guidelines.

After reviewing the analytical results we will assess whether additional wells are required to fully characterize the distribution of dissolved hydrocarbons in ground water.

Thank you for your consideration. Please call if you have any questions or comments.

Sincerely,
Weiss Associates

Thomas Fojut FOR
David C. Elias
Staff Geologist

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

DCE/JPT:de

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Attachments: Figures
Tables
A - Emcon Associates Summary of Analytical Results

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

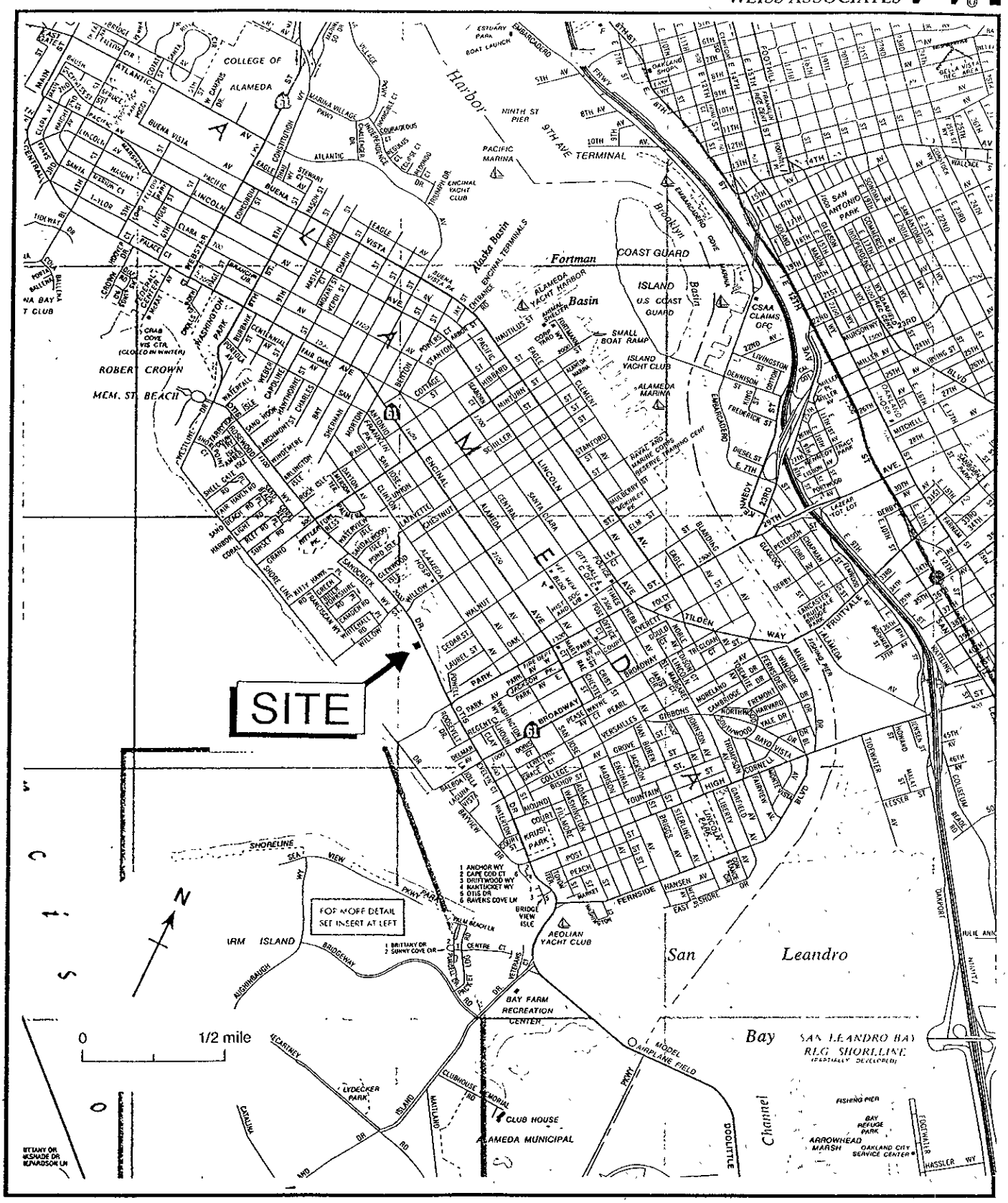

Figure 1. Site Location Map - Shell Service Station, WIC# 204-0072-0502, 2160 Otis Drive, Alameda, CA

8/21/90

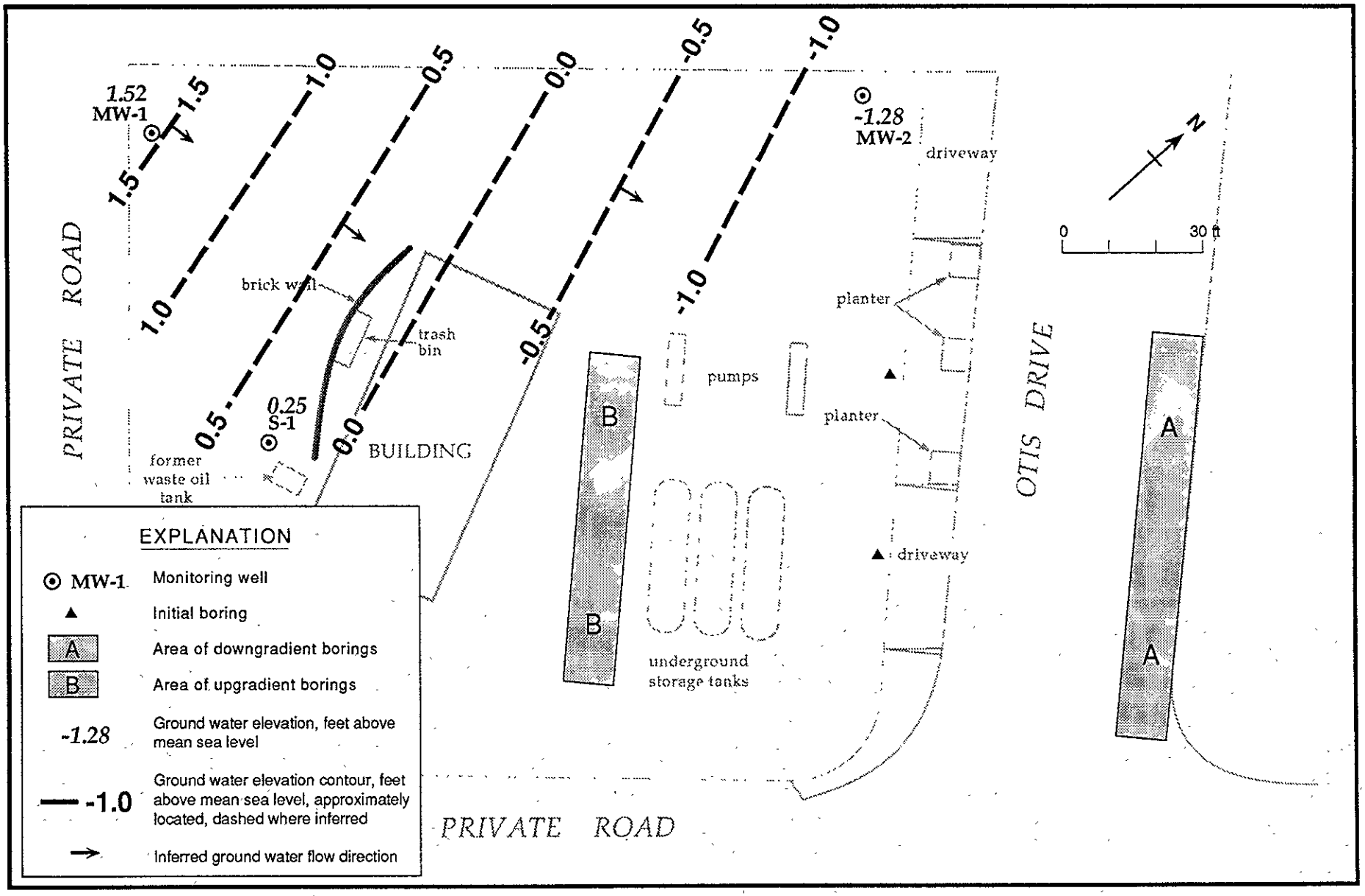

Figure 2. Monitoring Well and Proposed Soil Boring Locations, and Ground Water Elevation Contours - July 1, 1992 - Shell Service Station WIC #204-0072-0502, 2160 Otis Drive, Alameda, California

8/27/92

Table 1. Analytic Results for Ground Water - Shell Service Station WIC# 204-0072-0502, 2160 Otis Drive, Alameda, California

Well ID	Date Sampled	Depth to Water (ft)	Analytical Lab	TPH-G	TPH-D	B	E	T	X	TOG	VOCs
				<----------parts per million (mg/L)---------->							
S-1	09/04/87[a]		IT	---	---	<0.005	<0.005	<0.005	<0.005	---	b
	09/11/89[c]	4.29	IT	<0.05	<0.1	<0.0005	<0.001	<0.001	<0.003	<1.0	<0.005-0.050
	04/11/90	4.00	NET	<0.050	<0.050	<0.0005	<0.0005	<0.0005	<0.0005	<10	d
	07/10/90	4.25	NET	0.090	---	<0.0005	<0.0005	<0.0005	<0.0005	<10	<0.0004-0.010
	10/09/90	4.46	IT	<0.05	---	<0.0005	<0.0005	<0.0005	<0.0005	<5	<0.0005
	01/17/91	4.53	IT	<0.05	---	<0.0005	<0.0005	<0.0005	<0.0005	---	---
	04/09/91	4.20	IT	<0.05	---	<0.0005	<0.0005	<0.0005	<0.0005	---	---
	07/10/91	4.42	IT	<0.05	---	<0.0005	<0.0005	<0.0005	<0.0005	---	---
	10/09/91	**4.87**	**IT**	**<0.05**	---	**<0.0005**	**<0.0005**	**<0.0005**	**<0.0005**	---	---
MW-1	04/11/90	5.23	NET	<0.050	<0.050	<0.0005	<0.0005	<0.0005	<0.0005	<10	<0.0004-0.010
	07/10/90	5.40	NET	0.10	---	<0.0005	<0.0005	<0.0005	<0.0005	<10	<0.0004-0.010
	10/09/90	5.61	IT	<0.05	---	<0.0005	<0.0005	<0.0005	<0.0005	<5	<0.0005
	01/17/91	5.66	IT	<0.05	---	<0.0005	<0.0005	<0.0005	<0.0005	---	---
	04/09/91	4.96	IT	<0.05	---	<0.0005	<0.0005	<0.0005	<0.0005	---	---
	07/10/91	5.52	IT	<0.05	---	<0.0005	<0.0005	<0.0005	<0.0005	---	---
	10/09/91	**5.70**	**IT**	**<0.05**	---	**<0.0005**	**<0.0005**	**<0.0005**	**<0.0005**	---	---
MW-2	04/11/90	4.51	NET	0.20[e]	0.22	0.0027	<0.0005	0.0005	0.0024	<10	f
	07/10/90	4.61	NET	0.57[e]	0.45	0.15	<0.0005	0.0009	0.0031	<10	g
	10/09/90	4.74	IT	190[e]	0.051	55	<0.0005	<0.0005	<0.0005	<5	h
	01/17/91	4.73	IT	0.35[e]	<0.05	0.051	<0.0005	<0.0005	<0.0005	---	i
	04/09/91	4.09	IT	---	<0.05	0.021	<0.005	<0.005	<0.005	---	j
	07/10/91	4.66	IT	0.05[e]	<0.05	0.0084	<0.0005	<0.0005	<0.0005	---	k
	10/09/91	**4.81**	**IT**	**0.15**	---	**0.022**	**<0.0005**	**<0.0005**	**<0.0005**	---	l
Trip Blank	07/10/90		NET	<0.050	---	<0.0005	<0.0005	<0.0005	<0.0005	---	---
	10/09/90		IT	<0.05	---	<0.0005	<0.0005	<0.0005	<0.0005	---	---
	01/17/91		IT	<0.05	---	<0.0005	<0.0005	<0.0005	<0.0005	---	---
	04/09/91		IT	<0.05	---	<0.0005	<0.0005	<0.0005	<0.0005	---	---
	07/10/91		IT	<0.05	---	<0.0005	<0.0005	<0.0005	<0.0005	---	---
	10/09/91		**IT**	**<0.05**	---	**<0.0005**	**<0.0005**	**<0.0005**	**<0.0005**	---	---
DHS MCLs				NE	NE	0.001	0.680	0.10[m]	1.750	NE	n

-- Table 1 continued on next page --

Table 1. Analytic Results for Ground Water - Shell Service Station WIC# 204-0072-0502, 2160 Otis Drive, Alameda, California

Abbreviations:

TPH-G = Total petroleum hydrocarbons as gasoline by Modified EPA Method 8015
TPH-D = Total petroleum hydrocarbons as diesel by Modified EPA Method 8015
B = Benzene by EPA Method 602, 624, 8020, or 8240
E = Ethylbenzene by EPA Method 602, 624, 8020, or 8240
T = Toluene by EPA Method 602, 624, 8020, or 8240
X = Xylenes by EPA Method 602, 624, 8020, or 8240
TOG = Total non-polar oil and grease by American Public Health Association Standard Methods 503A&E
VOCs = Volatile and halogenated volatile organic compounds by EPA Method 601, 624 or 8240
--- = Not analyzed
NE = Not established
DHS MCLs = California Department of Health Services maximum contaminant levels
<n = Not detected above detection limit of n ppm

Analytical Laboratories:

IT = International Technology Analytical Services, San Jose, California
NET = National Environment Testing Pacific Inc., Santa Rosa, California

Notes:

a = Sampled by Pacific Environmental Group, Santa Clara, California
b = 0.007 ppm unknown alcohol and 0.27 ppm acetone detected
c = 0.090 ppm chromium, 0.090 ppm lead and 0.10 ppm Zn detected; no cadmium detected above detection limit of 0.010 ppm by EPA Method 6010. No semi-volatile organic compounds or PCBs detected by EPA Method 625. DHS MCLs for Cr = 0.05 ppm; Pb = 0.05 ppm; secondary MCL for Zn = 5 ppm.
d = 0.0017 ppm chloroform detected
e = Chromatographic pattern not typical for gasoline; according to the laboratory, the concentration is due mostly to lighter hydrocarbon compounds.
f = 0.0045 ppm chloroform, 0.016 ppm trans-1,2-dichloroethene (t-1,2-DCE), and 0.0012 ppm trichloroethene (TCE) detected
g = 0.0017 ppm chloroform, 0.00044 ppm 1,2-dichloroethane (1,2-DCA), 0.011 ppm t-1,2-DCE and 0.00093 ppm TCE detected
h = 0.015 ppm chloroform, 0.046 ppm cis-1,2-dichloroethene (c-1,2-DCE), 0.0067 ppm t-1,2-DCE, 0.0016 ppm tetrachloroethene (PCE), 0.0013 ppm TCE and 0.0025 ppm vinyl chloride detected
i = 0.0005 ppm chlorobenzene, 0.0026 ppm chloroform, 0.0005 ppm 1,2-DCA, 0.074 ppm c-1,2-DCE, 0.012 ppm t-1,2-DCE, 0.0006 ppm PCE, 0.0012 ppm TCE and 0.0030 ppm vinyl chloride detected
j = 0.064 ppm total 1,2-DCE detected
k = 0.014 ppm carbon disulfate, 0.043 ppm chloroform, 0.0069 ppm PCE and 0.0092 ppm benzene detected by EPA Method 8240
l = 0.0074 ppm chloroform 0.054 ppm c-1,2-DCE, 0.016 ppm t-1,2-DCE, 0.0128 ppm PCE, 0.0019 ppm TCE and 0.0017 ppm vinyl chloride detected
m = DHS recommended action level for drinking water; MCL not established
n = DHS MCL for chlorobenzene = 0.030 ppm; 1,2-DCA = 0.0005 ppm; chloroform = 0.100 ppm; TCE = 0.005 ppm; PCE = 0.005 ppm; vinyl chloride = 0.0005 ppm; t-1,2-DCE = 0.010 ppm; c-1,2-DCE = 0.006 ppm

ATTACHMENT A

EMCON ASSOCIATES SUMMARY OF ANALYTICAL RESULTS

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

Shell Station: 2160 Otis Drive
Alameda, California
WIC #: 204-0072-0502

Date: 05/19/92
Project Number: G67-30.01

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)
MW-1	04/09/91	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	NA
MW-1	07/10/91	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	NA
MW-1	10/09/91	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	NA
MW-1	01/24/92	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	NA
MW-1	04/23/92	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	NA
MW-2	04/09/91	NA	0.021	<0.005	<0.005	<0.005	<0.05
MW-2	07/10/91	0.05+	0.0084	<0.0005	<0.0005	<0.0005	<0.05
MW-2	10/09/91	0.15	0.022	<0.0005	<0.0005	<0.0005	NA
MW-2	01/24/92	<0.05	0.0048	<0.0005	<0.0005	<0.0005	NA
MW-2	04/23/92	<0.05	0.0023	<0.0005	0.0015	<0.0005	NA
S-1	04/09/91	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	NA
S-1	07/10/91	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	NA
S-1	10/09/91	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	NA
S-1	01/24/92	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	NA
S-1	04/23/92	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	NA
TB	04/09/91	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	NA
TB	07/10/91	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	NA
TB	10/09/91	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	NA
TB	01/24/92	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	NA
TB	04/23/92	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	NA

TPH-g = total petroleum hydrocarbons as gasoline
TPH-d = total petroleum hydrocarbons as diesel
NA = not analyzed
+ = compounds detected are not characteristic of the standard gasoline chromatographic pattern

Table 3
Summary of Analytical Results
Volatile Organic Compounds by EPA Method 601
Second Quarter 1992
milligrams per liter (mg/l) or parts per million (ppm)

Shell Station: 2160 Otis Drive
Alameda, California
WIC #: 204-0072-0502

Date: 05/19/92
Project Number: G87-30.01

Sample Designation	Water Sample Field Date	Benzene (mg/l)	TCE (mg/l)	TCA (mg/l)	PCE (mg/l)	Chloroform (mg/l)	cis-1,2-DCE (mg/l)	trans-1,2-DCE (mg/l)	1,2-DCA (mg/l)	Carbon Disulfide (mg/l)	Vinyl Chloride (mg/l)
MW-2	04/09/91	NR	NR	NR	NR	NR	0.064@	0.064@	NR	NR	NR
MW-2	07/10/91	0.0092*	NR	NR	0.0069*	0.043*	NR	NR	NR	0.014*	NR
MW-2	10/09/91	NR	0.0019	NR	0.0128	0.0074	0.054	0.016	NR	NR	0.0017
MW-2	01/24/92	NA	0.0025	<0.0005	0.0070	0.0190	0.0160	0.0043	0.0006	NA	<0.0005
MW-2	04/23/92	NA	<0.003	<0.003	0.003	<0.003	0.084	0.018	<0.003	NA	<0.003

TCE = Trichloroethene
TCA = 1,1,1-Trichloroethane
PCE = Tetrachloroethene
cis-1,2-DCE = cis-1,2-Dichloroethene
trans-1,2-DCE = trans-1,2-Dichloroethene
1,2-DCA = 1,2-Dichloroethane
NR = not reported; data not available
@ = reported as total 1,2-DCE to include both cis-1,2-DCE and trans-1,2-DCE
* = analyzed by EPA method 8240
NA = not analyzed