8-29-91

WEISS ASSOCIATES
Geologic and Environmental Services
Fax: 415-547-5043 Phone: 415-547-5420
5500 Shellmound Street, Emeryville, CA 94608

August 29, 1991

Mr. Lowell Miller
Alameda County Department of Environmental Health
Hazardous Materials Division
80 Swan Way, Room 200
Oakland, CA 94621-1426

Re: Shell Service Station
WIC #204-0072-0502
2160 Otis Drive
Alameda, California 94501
WA Job #81-429-01

Dear Mr. Miller:

This letter describes Weiss Associates' (WA) third quarter 1991 activities at the Shell service station referenced above (Figure 1). This status report satisfies the quarterly reporting requirements outlined in our March 19, 1990 workplan, and prescribed by California Administrative Code Title 23 Waters, Chapter 3, Subchapter 16, Article 5, Section 265.d. Included below are:

- Descriptions and results of activities performed to date in the third quarter 1991, and
- Proposed work for the third quarter 1991 and the fourth quarter 1991.

Proposed ground water sampling frequency modifications, which are on hold pending approval of the Alameda County Department of Environmental Health, are presented in Table 1.

THIRD QUARTER 1991 ACTIVITIES

During this quarter, WA:

- Collected ground water samples from the three site wells,
- Measured ground water depths and determined ground water elevations and the flow direction, and

- Analyzed the ground water samples and tabulated the analytic results.

These activities are described below.

Ground Water Sampling

On July 10, 1991, WA collected ground water samples from monitoring wells MW-1, MW-2, and S-1 (Figure 2), as part of the quarterly ground water monitoring program at Shell Service Station WIC #204-0072-0502 in Alameda, California. Ground water samples from monitoring well MW-2 contained benzene and tetrachloroethene (PCE) above California Department of Health Services (DHS) maximum contaminant levels (MCLs) for drinking water.

Sampling Personnel: WA Environmental Technician Brian Busch

Method of Purging Wells: Dedicated PVC bailers

Volume of Water Purged Prior to Sampling:

- Wells were purged of four well-casing volumes, about 21 to 32 gallons each.

Method of Collecting Ground Water Samples:

	Wells
• Drawn through the sampling ports on the sides of dedicated PVC bailers	MW-1 & MW-2
• Decanted from the dedicated PVC bailer	S-1

Methods of Containing Ground Water Samples:

- 40 ml glass volatile organic analysis (VOA) vials, preserved with hydrochloric acid and packed in protective foam sleeves for total petroleum hydrocarbons as gasoline (TPH-G), benzene, ethylbenzene, toluene, and xylene (BETX), and volatile organic compound (VOC) analyses

- 1000 ml amber glass bottle, preserved with hydrochloric acid for total petroleum hydrocarbons as diesel (TPH-D) analysis

All samples were refrigerated and transported under chain-of-custody to the analytical laboratory.

Water Samples Transported to:

- International Technology Analytical Services, Inc. (IT), San Jose, California, and were received on July 11, 1991

Quality Assurance/Quality Control:

- A travel blank was submitted for analysis.
- An equipment blank was not necessary because all bailers are dedicated to specific wells.

Water sample collection records and chain-of-custody forms are included in Attachments A and B, respectively.

Ground Water Elevations and Flow Direction

- The depth to water was measured in all wells on July 10, 1991. Ground water elevations decreased by 0.6 ft or less from the previous quarter.
- Ground water flows north which is consistent with the flow direction during the past year.

Depth to water measurements and ground water elevations are presented in Table 2. Ground water elevation contours are plotted on Figure 2. Previous ground water elevation contour maps are included in Figure 3.

Chemical Analyses

The Ground Water Samples were Analyzed for:

	Wells
• TPH-G by Modified EPA Method 8015	all wells
• TPH-D by Modified EPA Method 8015	MW-2
• BETX by EPA Method 8020	all wells
• VOCs by EPA Method 8240	MW-2

The laboratory analyzed the samples on July 12, 17 and 19, 1991. The results are presented in Table 3 and the analytic reports are included in Attachment B.

Discussion of Analytic Results of Ground Water for this Quarter:

- Ground water samples from monitoring well MW-2 contained benzene and PCE above DHS MCLs for drinking water.
- No 1,2-dichloroethene was detected in the samples from well MW-2 for the first time.
- No hydrocarbons have been detected in samples from wells MW-1 and S-1 for four consecutive quarters.

ANTICIPATED WORK FOR FOURTH QUARTER 1991

During the fourth quarter 1991, on behalf of Shell Oil, WA plans to:

- Continue quarterly monitoring of ground water at this site, and
- Prepare a quarterly status report presenting all data generated during the third quarter including water sampling results and analysis.

We trust that this submittal satisfies your requirements. Please call if you have any questions.

Sincerely,
Weiss Associates

Thomas Fojut
Staff Geologist

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

TF/JPT:pd

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Attachments: Figures
Tables
A - Water Sample Collection Records
B - Analytic Report and Chain-of-Custody Form

cc: Kurt Miller, Shell Oil Company, P.O. Box 5278, Concord, CA 94520-9998

Lester Feldman, Regional Water Quality Control Board - San Francisco Bay, 2101 Webster Street, Oakland, CA 94612

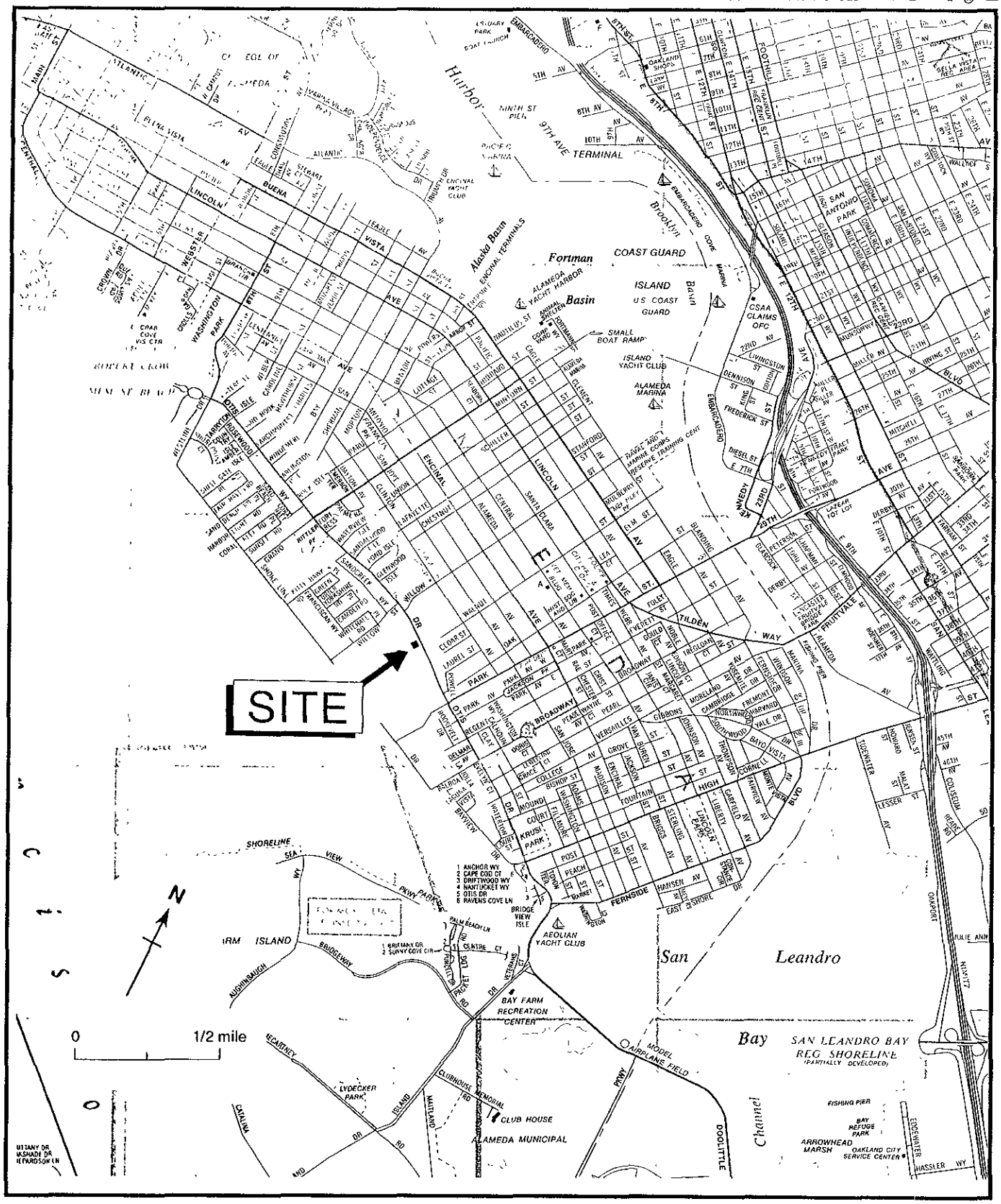


Figure 1. Site Location Map - Shell Service Station, WIC# 204-0072-0502, 2160 Otis Drive, Alameda, CA

8/21/90

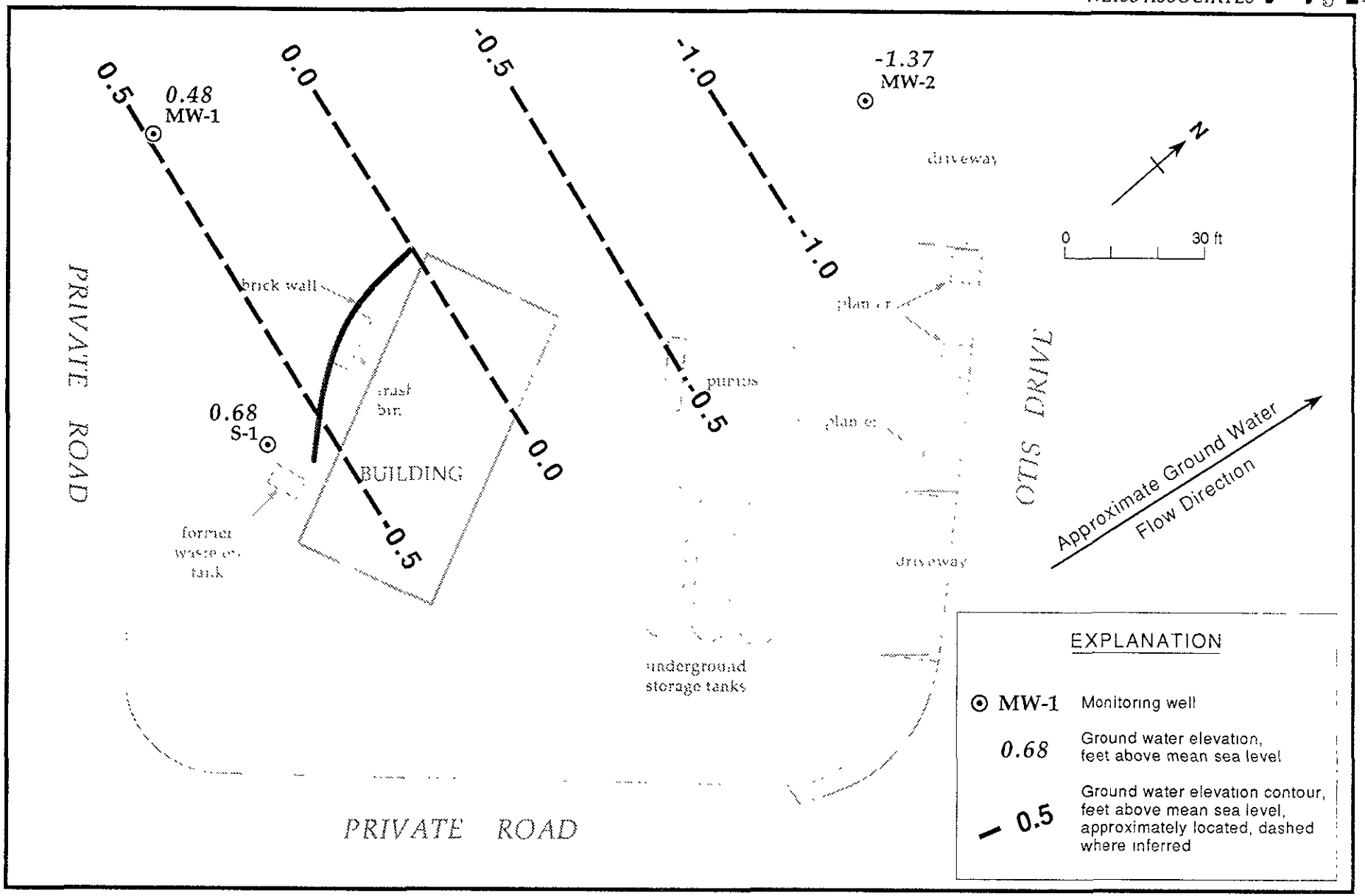
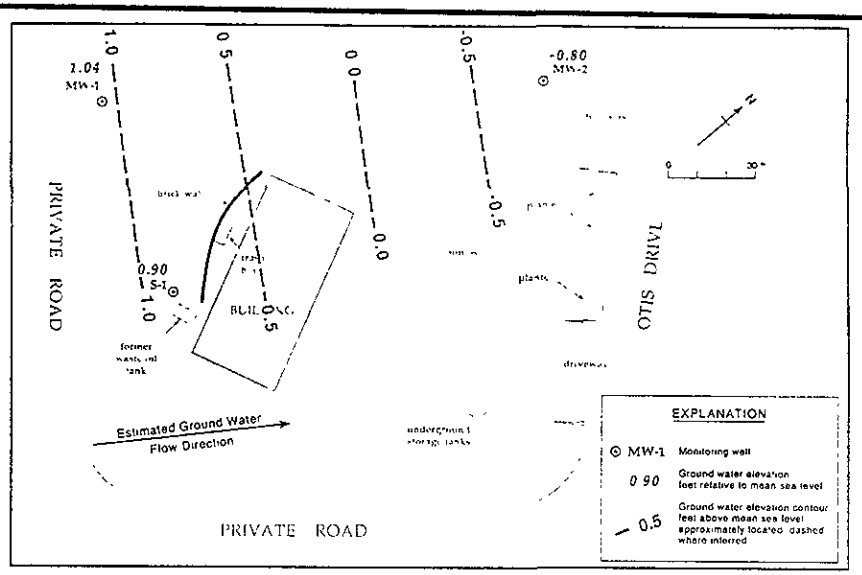
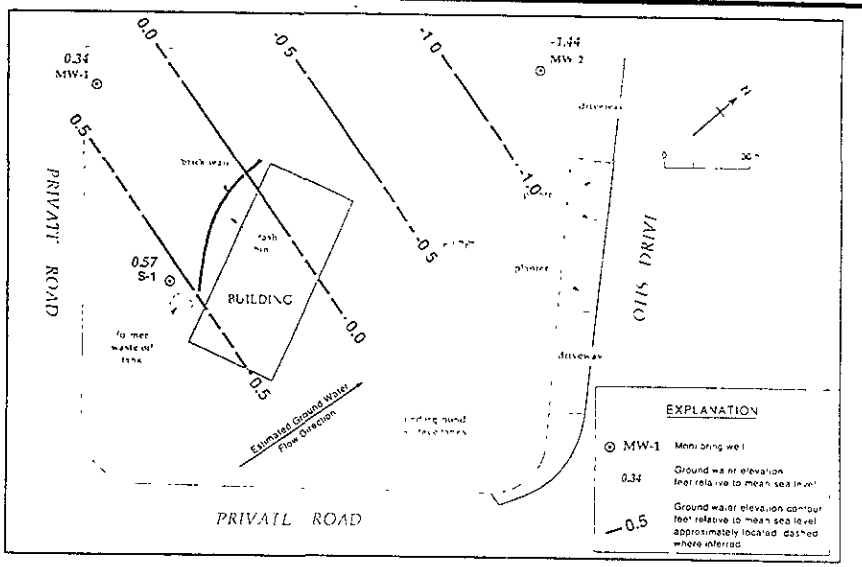


Figure 2. Monitoring Well Locations and Ground Water Elevation Contours - July 10, 1991 - Shell Service Station WIC #204-0072-0502, 2160 Otis Drive, Alameda, California

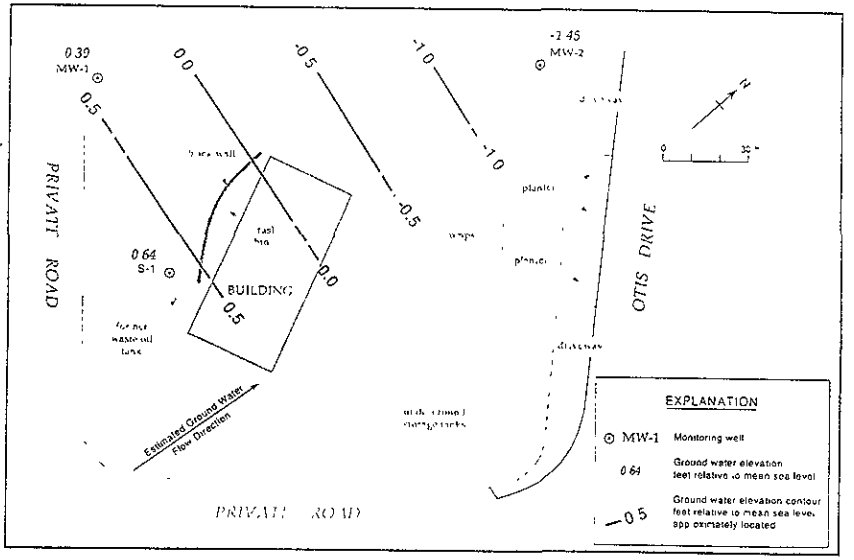
8/26/91



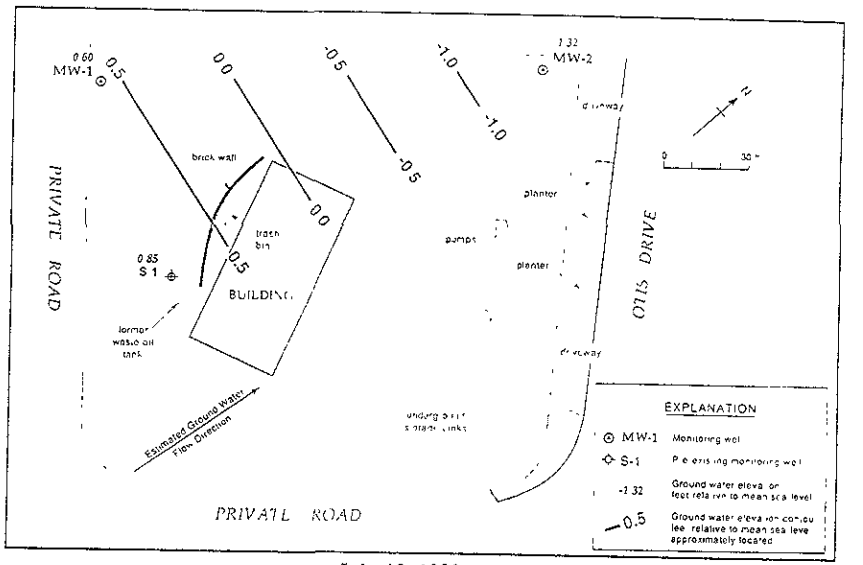
April 9, 1991



January 17, 1991



October 9, 1990



July 10, 1990

Figure 3. Previous Ground Water Elevation Contour Maps - Shell Service Station WIC #204- 0072-0502, 2160 Otis Drive, Alameda, California

Table 1. Proposed Ground Water Sampling Frequency Modifications, Shell Service Station, WIC #204-0072-0502, 2160 Otis Drive, Alameda, California

Well ID	Current Sampling Frequency	Recommended Future Sampling Frequency	Rationale for Recommended Sampling Frequency
S-1	Quarterly	Semi-Annually	Virtually no hydrocarbons detected for eight quarters; source area well
MW-1	Quarterly	Annually	No hydrocarbons detected for six quarters; cross-gradient well
MW-2	Quarterly	Quarterly	Variable hydrocarbon concentrations for six quarters; down-gradient well

Table 2. Ground Water Elevations - Shell Service Station WIC #204-0072-0502, 2160 Otis Drive, Alameda, California

Well ID	Date	Top-of-Casing Elevation (ft above msl)	Depth to Water (ft)	Ground Water Elevation (ft relative to msl)
MW-1	04-11-90	6.00	5.23	0.77
	07-10-90		5.40	0.60
	10-09-90		5.61	0.39
	01-17-91		5.66	0.34
	04-09-91		4.96	1.04
	07-10-91		5.52	0.48
MW-2	04-11-90	3.29	4.51	-1.22
	07-10-90		4.61	-1.32
	10-09-90		4.74	-1.45
	01-17-91		4.73	-1.44
	04-09-91		4.09	-0.80
	07-10-91		4.66	-1.37
S-1	09-11-90	5.10	4.29	0.81
	04-11-90		4.00	1.10
	07-10-90		4.25	0.85
	10-09-90		4.46	0.64
	01-17-91		4.53	0.57
	04-09-91		4.20	0.90
	07-10-91		4.42	0.68

Table 3. 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**	---	---
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**	---	---
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**
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**	---	---
DHS MCLs				NE	NE	0.001	0.680	0.10[l]	1.750	NE	m

-- Table 3 continued on next page --

Table 3. 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 = Unknown alcohol detected at 0.007 ppm; acetone at 0.27 ppm.
c = Metals detected by EPA Method 6010: 0.090 ppm Cr; 0.090 ppm; 0.10 ppm Zn; no cadium (<0.010 ppm). DHS MCLs for Cr = 0.05 ppm; Pb = 0.05 ppm; secondary MCL for Zn = 5 ppm.
d = Chloroform detected at 0.0017 ppm.
e = Chromatographic pattern not typical for gasoline; according to the laboratory, the concentration is due mostly to lighter hydrocarbon compounds.
f = Chloroform detected at 0.0045 ppm; trans-1,2-dichloroethene (t-1,2-DCE) at 0.016 ppm; trichloroethene (TCE) at 0.0012 ppm.
g = Chloroform detected at 0.0017 ppm; 1,2-dichloroethane (1,2-DCA) at 0.00044 ppm; t-1,2-DCE at 0.011 ppm; TCE at 0.00093 ppm.
h = Chloroform detected at 0.015 ppm; cis-1,2-dichloroethene (c-1,2-DCE) at 0.046 ppm; t-1,2-DCE at 0.0067 ppm; tetrachloroethene (PCE) at 0.0016 ppm; TCE at 0.0013 ppm; vinyl chloride at 0.0025 ppm.
i = Chlorobenzene detected at 0.0005 ppm; chloroform at 0.0026 ppm; 1,2-DCA at 0.0005 ppm; c-1,2-DCE at 0.074 ppm; t-1,2-DCE at 0.012 ppm; PCE at 0.0006 ppm; TCE at 0.0012 ppm; vinyl chloride at 0.0030 ppm.
j = Total 1,2-DCE detected at 0.064 ppm.
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 = DHS recommended action level for drinking water; MCL not established
m = 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

WATER SAMPLE COLLECTION RECORDS

WEISS ASSOCIATES

WATER SAMPLING DATA

Well Name S-1 Date 7/10/91 Time of Sampling 13:39

Job Name Shell Alameda I Job Number 81-429-01 Initials BB

Sample Point Description M (M = Monitoring Well)

Location Behind Building; near dumpster

WELL DATA: Depth to Water 4.42 ft (static, pumping) @ 0947 Depth to Product — ft.

Product Thickness — Well Depth 19 ft (spec) Well Depth — ft(sounded) Well Diameter 3 in

Initial Height of Water in Casing 14.58 ft. = volume 5.35 gal.

4 Casing Volumes to be Evacuated. Total to be evacuated 21.4 gal.

EVACUATION METHOD: Pump # and type — Hose # and type —

Bailer# and type 1.5" x 5' PVC Dedicated Yes (Y/N)

Other —

Evacuation Time:					
Stop	10:31	11:30	13:15	12:20	13:38
Start	10:25	11:25	13:10	12:16	13:34

Total Evacation Time 24 min

Total Evacuated Prior to Sampling 21.5 gal.

Evacuation Rate 0.89 gal. per minute

Depth to Water during Evacuation — ft. — time

Depth to Water at Sampling 12.96 ft. 13:42 time

Evacuated Dry? NO After — gal. Time —

80% Recovery = —

% Recovery at Sample Time — Time —

Formulas/Conversions

r = well radius in ft.

h = ht of water col in ft.

vol. in cyl. = $\pi r^2 h$

7.48 gal/ft^3

V_2" casing = 0.163 gal/ft

V_3" casing = 0.367 gal/ft

V_4" casing = 0.653 gal/ft

$V_{4.5}$" casing = 0.826 gal/ft

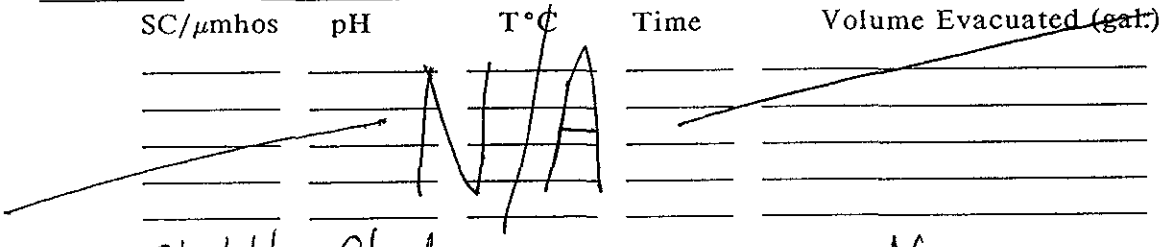
V_6" casing = 1.47 gal/ft

V8 casing = 2.61 gal/ft

CHEMICAL DATA: Meter Brand/Number —

Calibration: — 4.0 — 7.0 — 10.0

Measured: SC/μmhos pH T°C Time Volume Evacuated ~~(gal.)~~



SAMPLE: Color Slightly Cloudy Odor None

Description of matter in sample: Fine suspended silt particles

Sampling Method: Decanted from dedicated PVC bailer.

Sample Port: Rate — gpm Totalizer — gal.

Time —

# of Cont.	Sample ID	Cont. Type[1]	Vol[2]	Fil[3]	Ref[4]	Preservative (specify)	Analytic Method	Turn[5]	LAB
3	071-S1	W/W	40ml	No	Yes	HCl	EPA 8015/8020	N	IT

1 Sample Type Codes: W = Water, S = Soil, Describe Other
Container Type Codes: V = VOA/Teflon Septa, P = Plastic, C or B = Clear/Brown Glass, Describe Other
Cap Codes: PT = Plastic, Teflon lined;
2 = Volume per container; 3 = Filtered (Y/N); 4 = Refrigerated (Y/N)
5 Turnaround [N = Normal, W = 1 week, R = 24 hour, HOLD (spell)]

ADDITIONAL COMMENTS, CONDITIONS, PROBLEMS:

WEISS ASSOCIATES

WATER SAMPLING DATA

Well Name MW-1 Date 7/10/91 Time of Sampling 11:00

Job Name Shell Alameda I Job Number 81-429-01 Initials BB

Sample Point Description M (M = Monitoring Well)

Location WEST CORNER OF LOT

WELL DATA: Depth to Water 5.52 ft (static) pumping @ 09:57 Depth to Product — ft.

Product Thickness — Well Depth 16 ft (spec) Well Depth — ft(sounded) Well Diameter 4 in

Initial Height of Water in Casing 10.48 ft. = volume 6.8 gal.

4 Casing Volumes to be Evacuated. Total to be evacuated 27.2 gal.

EVACUATION METHOD: Pump # and type — Hose # and type —

Bailer# and type 3"x3' PVC Dedicated Yes (Y/N)

Other —

Evacuation Time: Stop 10:57

Start 10:42

Total Evacation Time 15 min

Total Evacuated Prior to Sampling 28 gal.

Evacuation Rate 1.86 gal. per minute

Depth to Water during Evacuation — ft. — time

Depth to Water at Sampling 8.81 ft. 11:02 time

Evacuated Dry? NO After — gal. Time —

80% Recovery = —

% Recovery at Sample Time — Time —

Formulas/Conversions

r = well radius in ft.

h = ht of water col in ft.

vol. in cyl. = $\pi r^2 h$

7.48 gal/ft^3

V_2" casing = 0.163 gal/ft

V_3" casing = 0.367 gal/ft

V_4" casing = 0.653 gal/ft

$V_{4.5}$" casing = 0.826 gal/ft

V_6" casing = 1.47 gal/ft

V8 casing = 2.61 gal/ft

CHEMICAL DATA: Meter Brand/Number —

Calibration: — 4.0 — 7.0 — 10.0

Measured:	SC/µmhos	pH	T°C	Time	Volume Evacuated (gal.)

N/A

SAMPLE: Color Clear Odor None

Description of matter in sample: A few rock/dirt particles

Sampling Method: sampled from port on ded. PVC bailer.

Sample Port: Rate — gpm Totalizer — gal.

Time —

# of Cont.	Sample ID	Cont. Type[1]	Vol[2]	Fil[3]	Ref[4]	Preservative (specify)	Analytic Method	Turn[5]	LAB
3	071-01	W/W	40ml	No	Yes	HCl	EPA 8015/8020	N	IT

1 Sample Type Codes: W = Water, S = Soil, Describe Other
Container Type Codes: V = VOA/Teflon Septa, P = Plastic, C or B = Clear/Brown Glass, Describe Other
Cap Codes: PT = Plastic, Teflon lined;
2 = Volume per container; 3 = Filtered (Y/N); 4 = Refrigerated (Y/N)
5 Turnaround [N = Normal, W = 1 week, R = 24 hour, HOLD (spell)]

ADDITIONAL COMMENTS, CONDITIONS, PROBLEMS:

WEISS ASSOCIATES

WATER SAMPLING DATA

Well Name MW-2 Date 7/10/91 Time of Sampling 12:42

Job Name Shell Alameda I Job Number 81-429-01 Initials BB

Sample Point Description M (M = Monitoring Well)

Location North Corner of lot

WELL DATA: Depth to Water 4.66 ft (static) pumping @ 09:51 Depth to Product — ft.

Product Thickness — Well Depth 17 ft (spec) Well Depth — ft(sounded) Well Diameter 4 in

Initial Height of Water in Casing 12.34 ft. = volume 8.0 gal.

4 Casing Volumes to be Evacuated. Total to be evacuated 32 gal.

EVACUATION METHOD: Pump # and type — Hose # and type —

Bailer# and type 3"x3' PVC Dedicated Yes (Y/N)

Other —

Evacuation Time: Stop 12:12 12:38 —

Start 12:05 12:25 —

Total Evacation Time 20 min

Total Evacuated Prior to Sampling 32 gal.

Evacuation Rate 1.6 gal. per minute

Depth to Water during Evacuation — ft. — time

Depth to Water at Sampling 10.63 ft. 12:45 time

Evacuated Dry? No After — gal. Time —

80% Recovery = —

% Recovery at Sample Time — Time —

Formulas/Conversions

r = well radius in ft.

h = ht of water col in ft.

vol. in cyl. = $\pi r^2 h$

7.48 gal/ft^3

V_2" casing = 0.163 gal/ft

V_3" casing = 0.367 gal/ft

V_4" casing = 0.653 gal/ft

$V_{4.5}$" casing = 0.826 gal/ft

V_6" casing = 1.47 gal/ft

V8 casing = 2.61 gal/ft

CHEMICAL DATA: Meter Brand/Number —

Calibration: — 4.0 — 7.0 — 10.0

Measured:	SC/μmhos	pH	T°C	Time	Volume Evacuated ~~(gal.)~~

SAMPLE: Color Clear / Slightly Cloudy Odor Faint to Moderate

Description of matter in sample: some fine suspended silt particles

Sampling Method: sampled from port on ded. PVC bailer.

Sample Port: Rate — gpm Totalizer — gal. Time —

* purge water had an odor, but no free product detected

# of Cont.	Sample ID	Cont. Type[1]	Vol[2]	Fil[3]	Ref[4]	Preservative (specify)	Analytic Method	Turn[5]	LAB
3	071-02	W/CV	40ml	No	Yes	HCl	EPA 8015	N	IT
3	071-02	W/CV	40ml	↓	↓	↓	EPA 8240	N	
2	071-02	W/BG-PT	1l	↓	↓	↓	EPA 8015	N	↓

1 Sample Type Codes: W = Water, S = Soil, Describe Other
Container Type Codes: V = VOA/Teflon Septa, P = Plastic, C or B = Clear/Brown Glass, Describe Other
Cap Codes: PT = Plastic, Teflon lined;
2 = Volume per container; 3 = Filtered (Y/N); 4 = Refrigerated (Y/N)
5 Turnaround [N = Normal, W = 1 week, R = 24 hour, HOLD (spell)]

ADDITIONAL COMMENTS, CONDITIONS, PROBLEMS:

WEISS ASSOCIATES

WATER SAMPLING DATA

Well Name TRAVEL BLANKS Date 7/10/91 Time of Sampling 08:20

Job Name Shell Alameda I Job Number 81-429-01 Initials BB

Sample Point Description _____ (M = Monitoring Well)

Location _____

WELL DATA: Depth to Water _____ ft (static, pumping) Depth to Product _____ ft.

Product Thickness _____ Well Depth ____ ft (spec) Well Depth _____ ft(sounded) Well Diameter ____ in

Initial Height of Water in Casing _____ ft. = volume _____ gal.

_____ Casing Volumes to be Evacuated. Total to be evacuated _____ gal.

EVACUATION METHOD: Pump # and type _____ Hose # and type _____

Bailer# and type _____ Dedicated _____ (Y/N)

Other _____

Evacuation Time: Stop _____ _____ _____

Start _____ _____ _____

Total Evacation Time _____

Total Evacuated Prior to Sampling _____ gal.

Evacuation Rate _____ gal. per minute

Depth to Water during Evacuation _____ ft. _____ time

Depth to Water at Sampling _____ ft. _____ time

Evacuated Dry? _____ After _____ gal. Time _____

80% Recovery = _____

% Recovery at Sample Time _____ Time _____

Formulas/Conversions

r = well radius in ft.

h = ht of water col in ft.

vol. in cyl. = $\pi r^2 h$

7.48 gal/ft^3

V_2" casing = 0.163 gal/ft

V_3" casing = 0.367 gal/ft

V_4" casing = 0.653 gal/ft

$V_{4.5}$" casing = 0.826 gal/ft

V_6" casing = 1.47 gal/ft

V8 casing = 2.61 gal/ft

CHEMICAL DATA: Meter Brand/Number _____

Calibration: _____ 4.0 _____ 7.0 _____ 10.0

Measured:	SC/μmhos	pH	T°C	Time	Volume Evacuated (gal.)

SAMPLE: Color _____ Odor _____

Description of matter in sample: _____

Sampling Method: _____

Sample Port: Rate ____ gpm Totalizer _____ gal.

Time

# of Cont.	Sample ID	Cont. Type[1]	Vol[2]	Fil[3]	Ref[4]	Preservative (specify)	Analytic Method	Turn[5]	LAB
3	071-21	u/w	40ml	No	Yes	HCl	EPA 8015/8020	N	IT

1 Sample Type Codes: W = Water, S = Soil, Describe Other
Container Type Codes: V = VOA/Teflon Septa, P = Plastic, C or B = Clear/Brown Glass, Describe Other
Cap Codes: PT = Plastic, Teflon lined;
2 = Volume per container; 3 = Filtered (Y/N); 4 = Refrigerated (Y/N)
5 Turnaround [N = Normal, W = 1 week, R = 24 hour, HOLD (spell)]

ADDITIONAL COMMENTS, CONDITIONS, PROBLEMS:

ATTACHMENT B

ANALYTIC RESULTS AND CHAIN-OF-CUSTODY FORM

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

Shell Oil Company
Weiss Associates
5500 Shellmound Street
Emeryville, CA 94608
Tom Fojut

Date: 08/06/91

Work Order: T1-07-131

P.O. Number: MOH 880-021 Vendor #I0002402

This is the Certificate of Analysis for the following samples:

Client Work ID: 81-429-01,2160 Otis Dr.,Almda, CORRECTED REPORT
Date Received: 07/11/91
Number of Samples: 4
Sample Type: aqueous

TABLE OF CONTENTS FOR ANALYTICAL RESULTS

Reviewed and Approved:

Suzanne Veaudry
Project Manager

Company: Shell Oil Company, CORRECTED REPORT
Date: 08/06/91
Client Work ID: 81-429-01,2160 Otis Dr.,Almda

IT ANALYTICAL SERVICES
SAN JOSE, CA

Work Order: T1-07-131

TEST NAME: **Petroleum Hydrocarbons**

SAMPLE ID: **071-01**
SAMPLE DATE: **07/10/91**
LAB SAMPLE ID: **T107131-01**
SAMPLE MATRIX: **aqueous**
RECEIPT CONDITION: **Cool pH < 2**

RESULTS in Milligrams per Liter:

	METHOD	EXTRACTION DATE	ANALYSIS DATE
BTEX	8020		07/12/91
Low Boiling Hydrocarbons	Mod.8015		07/12/91

PARAMETER	DETECTION LIMIT	DETECTED
Low Boiling Hydrocarbons calculated as Gasoline	0.05	**None**
BTEX		
Benzene	0.0005	**None**
Toluene	0.0005	**None**
Ethylbenzene	0.0005	**None**
Xylenes (total)	0.0005	**None**

SURROGATES	% REC
1,3-Dichlorobenzene (Gasoline)	**104.**
1,3-Dichlorobenzene (BTEX)	**99.**

Company: Shell Oil Company, CORRECTED REPORT
Date: 08/06/91
Client Work ID: 81-429-01,2160 Otis Dr.,Almda

IT ANALYTICAL SERVICES
SAN JOSE, CA

Work Order: T1-07-131

TEST NAME: **Vol. Organics by 8240**

SAMPLE ID: **071-02**
SAMPLE DATE: **07/10/91**
LAB SAMPLE ID: **T107131-02**
SAMPLE MATRIX: **aqueous**
RECEIPT CONDITION: **Cool pH < 2**
EXTRACTION DATE: **N/A**
ANALYSIS DATE: **07/19/91**

RESULTS in Milligrams per Liter:

PARAMETER	DETECTION LIMIT	DETECTED	PARAMETER	DETECTION LIMIT	DETECTED
Chloromethane	0.010	None	cis-1,3-Dichloropropene	0.005	None
Bromomethane	0.010	None	Trichloroethene	0.005	None
Vinyl Chloride	0.010	None	Chlorodibromomethane	0.005	None
Chloroethane	0.010	None	1,1,2-Trichloroethane	0.005	None
Dichloromethane	0.005	None	Benzene	0.005	0.0092
Acetone	0.010	None	trans-1,3-Dichloropropene	0.005	None
Carbon Disulfide	0.005	0.014	Bromoform	0.005	None
1,1-Dichloroethene	0.005	None	4-Methyl-2-Pentanone	0.010	None
1,1-Dichloroethane	0.005	None	2-Hexanone	0.010	None
1,2-Dichloroethene (total)	0.005	None	Tetrachloroethene	0.005	0.0069
Chloroform	0.005	0.043	1,1,2,2-Tetrachloroethane	0.005	None
1,2-Dichloroethane	0.005	None	Toluene	0.005	None
2-Butanone	0.010	None	Chlorobenzene	0.005	None
1,1,1-Trichloroethane	0.005	None	Ethylbenzene	0.005	None
Carbon Tetrachloride	0.005	None	Styrene	0.005	None
Vinyl Acetate	0.010	None	Xylenes (total)	0.005	None
Bromodichloromethane	0.005	None	Acrolein	0.010	None
1,2-Dichloropropane	0.005	None	Acrylonitrile	0.010	None

SURROGATES	LIMITS	% REC
1,2-Dichloroethane-d4	76-114	93.
Toluene-d8	88-110	99.
4-Bromofluorobenzene	86-115	94.

Company: Shell Oil Company, CORRECTED REPORT
Date: 08/06/91
Client Work ID: 81-429-01,2160 Otis Dr.,Almda

IT ANALYTICAL SERVICES
SAN JOSE, CA

Work Order: T1-07-131

TEST NAME: **Petroleum Hydrocarbons**

SAMPLE ID: **071-02**
SAMPLE DATE: **07/10/91**
LAB SAMPLE ID: **T107131-02**
SAMPLE MATRIX: **aqueous**
RECEIPT CONDITION: **Cool pH < 2**

RESULTS in Milligrams per Liter:

	METHOD	EXTRACTION DATE	ANALYSIS DATE
BTEX	8020		07/12/91
Low Boiling Hydrocarbons	Mod.8015		07/12/91
High Boiling Hydrocarbons	Mod.8015	07/16/91	07/17/91

PARAMETER	DETECTION LIMIT	DETECTED	
Low Boiling Hydrocarbons calculated as Gasoline	0.05	**0.05**	&
BTEX			
Benzene	0.0005	**0.0084**	
Toluene	0.0005	**None**	
Ethylbenzene	0.0005	**None**	
Xylenes (total)	0.0005	**None**	
High Boiling Hydrocarbons calculated as Diesel	0.05	**None**	

SURROGATES	% REC
1,3-Dichlorobenzene (Gasoline)	**109.**
1,3-Dichlorobenzene (BTEX)	**99.**
nC32 (Diesel)	**51.**

Comments:
& Compounds detected and calculated as low boiling hydrocarbons consist of compounds eluting within the chromatographic range of gasoline, but are not characteristic of the standard gasoline standard pattern.

Company: Shell Oil Company, CORRECTED REPORT
Date: 08/06/91
Client Work ID: 81-429-01,2160 Otis Dr.,Almda

IT ANALYTICAL SERVICES
SAN JOSE, CA

Work Order: T1-07-131

TEST NAME: **Petroleum Hydrocarbons**

SAMPLE ID: **071-51**
SAMPLE DATE: **07/10/91**
LAB SAMPLE ID: **T107131-03**
SAMPLE MATRIX: **aqueous**
RECEIPT CONDITION: **Cool pH < 2**

RESULTS in Milligrams per Liter:

	METHOD	EXTRACTION DATE	ANALYSIS DATE
BTEX	8020		07/12/91
Low Boiling Hydrocarbons	Mod.8015		07/12/91

PARAMETER	DETECTION LIMIT	DETECTED
Low Boiling Hydrocarbons calculated as Gasoline	0.05	**None**
BTEX		
Benzene	0.0005	**None**
Toluene	0.0005	**None**
Ethylbenzene	0.0005	**None**
Xylenes (total)	0.0005	**None**

SURROGATES	% REC
1,3-Dichlorobenzene (Gasoline)	**101.**
1,3-Dichlorobenzene (BTEX)	**98.**

Company: Shell Oil Company, CORRECTED REPORT
Date: 08/06/91
Client Work ID: 81-429-01,2160 Otis Dr.,Almda

IT ANALYTICAL SERVICES
SAN JOSE, CA

Work Order: T1-07-131

TEST NAME: **Petroleum Hydrocarbons**

SAMPLE ID: **071-21**
SAMPLE DATE: **07/10/91**
LAB SAMPLE ID: **T107131-04**
SAMPLE MATRIX: **aqueous**
RECEIPT CONDITION: **Cool pH < 2**

RESULTS in Milligrams per Liter:

	METHOD	EXTRACTION DATE	ANALYSIS DATE
BTEX	8020		07/12/91
Low Boiling Hydrocarbons	Mod.8015		07/12/91

PARAMETER	DETECTION LIMIT	DETECTED
Low Boiling Hydrocarbons calculated as Gasoline	0.05	**None**
BTEX		
Benzene	0.0005	**None**
Toluene	0.0005	**None**
Ethylbenzene	0.0005	**None**
Xylenes (total)	0.0005	**None**

SURROGATES	% REC
1,3-Dichlorobenzene (Gasoline)	**99.**
1,3-Dichlorobenzene (BTEX)	**98.**

Company: Shell Oil Company, CORRECTED REPORT
Date: 08/06/91
Client Work ID: 81-429-01,2160 Otis Dr.,Almda

IT ANALYTICAL SERVICES
SAN JOSE, CA

Work Order: T1-07-131

TEST NAME: **Spike and Spike Duplicates**

SAMPLE ID: **Quality Control**
SAMPLE DATE: **not spec**
LAB SAMPLE ID: **T107131-05A**
EXTRACTION DATE: **07/16/91**
ANALYSIS DATE: **07/17/91**
ANALYSIS METHOD: **Mod.8015**

QUALITY CONTROL REPORT

Laboratory Spike(LS) and Laboratory Spike Duplicate(LSD) Analyses

RESULTS in Micrograms per Liter

PARAMETER	Sample Amt	Spike Amt	LS Result	LSD Result	LS %Rec	LSD %Rec	RPD
Diesel	None	2500.	1365.	1564.	55.	62.	12.

SURROGATES	LS %Rec	LSD %Rec
nC32	77.	35.

Company: Shell Oil Company, CORRECTED REPORT
Date: 08/06/91
Client Work ID: 81-429-01,2160 Otis Dr.,Almda

IT ANALYTICAL SERVICES
SAN JOSE, CA

Work Order: T1-07-131

TEST NAME: **Spike and Spike Duplicates**

SAMPLE ID: **Quality Control**
SAMPLE DATE: **not spec**
LAB SAMPLE ID: **T107131-05A**
EXTRACTION DATE:
ANALYSIS DATE: **07/15/91**
ANALYSIS METHOD: **624**

QUALITY CONTROL REPORT

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Analyses

RESULTS in Micrograms per Liter

PARAMETER	Sample Amt	Spike Amt	MS Result	MSD Result	MS %Rec	MSD %Rec	RPD
1,1-Dichloroethene	None	50.	61.	55.	122.	110.	10.
Trichloroethene	18.	50.	72.	70.	108.	104.	4.
Benzene	None	50.	53.	48.	106.	96.	10.
Toluene	None	50.	56.	52.	112.	104.	7.
Chlorobenzene	None	50.	54.	51.	108.	102.	6.

SURROGATES	MS %Rec	MSD %Rec
1,2-Dichloroethane-d4	87.	84.
Toluene-d8	92.	92.
P-Bromofluorobenzene	91.	86.

Company: Shell Oil Company, CORRECTED REPORT
Date: 08/06/91
Client Work ID: 81-429-01,2160 Otis Dr.,Almda

IT ANALYTICAL SERVICES
SAN JOSE, CA

Work Order: T1-07-131

TEST NAME: **Spike and Spike Duplicates**

SAMPLE ID: **Quality Control**
SAMPLE DATE: **not spec**
LAB SAMPLE ID: **T107131-05B**
EXTRACTION DATE:
ANALYSIS DATE: **07/11/91**
ANALYSIS METHOD: **Mod. 8015**

QUALITY CONTROL REPORT

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Analyses

RESULTS in Micrograms per Liter

PARAMETER	Sample Amt	Spike Amt	MS Result	MSD Result	MS %Rec	MSD %Rec	RPD
Gasoline	ND<50.	500.	442.	425.	88.	85.	3.

SURROGATES	MS %Rec	MSD %Rec
1,3-Dichlorobenzene	106.	109.

Company: Shell Oil Company, CORRECTED REPORT
Date: 08/06/91
Client Work ID: 81-429-01,2160 Otis Dr.,Almda

IT ANALYTICAL SERVICES
SAN JOSE, CA

Work Order: T1-07-131

TEST NAME: **Spike and Spike Duplicates**

SAMPLE ID: **Quality Control**
SAMPLE DATE: **not spec**
LAB SAMPLE ID: **T107131-05C**
EXTRACTION DATE:
ANALYSIS DATE: **07/12/91**
ANALYSIS METHOD: **8020**

QUALITY CONTROL REPORT

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Analyses

RESULTS in Micrograms per Liter

PARAMETER	Sample Amt	Spike Amt	MS Result	MSD Result	MS %Rec	MSD %Rec	RPD
Benzene	ND<0.5	50.0	49.4	50.3	99.	101.	2.
Toluene	ND<0.5	50.0	49.9	50.5	100.	101.	1.
Ethyl benzene	ND<0.5	50.0	50.5	51.1	101.	102.	1.
Xylenes	ND<0.5	150.	160.	162.	107.	108.	1.

SURROGATES	MS %Rec	MSD %Rec
1,3-Dichlorobenzene	100.	99.

Company: Shell Oil Company, CORRECTED REPORT
Date: 08/06/91
Client Work ID: 81-429-01,2160 Otis Dr.,Almda

IT ANALYTICAL SERVICES
SAN JOSE, CA

Work Order: T1-07-131

TEST CODE **8240** TEST NAME **Vol. Organics by 8240**

The method of analysis for volatile organics is taken from E.P.A. Methods 624 and 8240. Water samples and low-level soil samples are analyzed directly using the purge and trap technique. Medium-level soil samples are extracted with methanol and a portion of the extract is analyzed using the purge and trap technique. Final detection is by gas chromatography/mass spectrometry.

TEST CODE **TPHN** TEST NAME **TPH High Boiling by 8015**

The method of analysis for high boiling hydrocarbons s taken from the LUFT field manual. Samples are extracted with solvent and examined by gas chromatography using a flame ionization detector. Results in soils are corrected for moisture content and are reported on a dry soil basis unless otherwise noted.

TEST CODE **TPHV** TEST NAME **TPH Gasoline by 8015**

The method of analysis for low boiling hydrocarbons is taken from EPA Methods modified 8015, 8020 and 5030. The sample is examined using the purge and trap technique. Final detection is by gas chromatography using a flame ionization detector in series with a photoionization detector. The result for total low boiling hydrocarbons is calculated as gasoline. Results in soils are corrected for moisture content and are reported on a dry soil basis unless otherwise noted.

TEST CODE **TPHVB** TEST NAME **TPH Gas,BTEX by 8015/8020**

The method of analysis for low boiling hydrocarbons is taken from EPA Methods modified 8015, 8020 and 5030. The sample is examined using the purge and trap technique. Final detection is by gas chromatography using a flame ionization detector in series with a photoionization detector. The result for total low boiling hydrocarbons is calculated as gasoline. Results in soils are corrected for moisture content and are reported on a dry soil basis unless otherwise noted.

11-01-101

Page 1 of 1

WEISS ASSOCIATES
5500 Shellmound St., Emeryville, CA 94608
Phone: 415-547-5420 FAX: 415-547-5043

Shell Service Station Address: 2160 OTIS DR. ALAMEDA, CA.
Shell Contact: KURT MILLER
WIC #: 204-0072-0502
~~ASE #:~~ EXP. 5461

Please send analytic results and a copy of the signed chain of custody form to:
TOM FOJUT
Project ID: 81.429.01

CHAIN-OF-CUSTODY RECORD AND ANALYTIC INSTRUCTIONS

Lab Personnel: 1) Specify analytic method and detection limit in report.
2) Notify us if there are any anomalous peaks on GC or other scans.
3) ANY QUESTIONS/CLARIFICATIONS: CALL US.

Sampled by: BRIAN BUSCH
Laboratory Name: IT

	No. of Containers	Sample ID	Container Type	Sample Date	Vol[2]	Fil[3]	Ref[4]	Preservative (specify)	Analyze for	Analytic Method	Turn[5]	COMMENTS
01ABC	3	071-01	W/CV	7/10/91	40ml	No	Yes	HCl	TPH-G / BETX	EPA 8015/8020	N	
02ABC	3	071-02	W/CV	"	40ml	"	"	"	TPH-G	EPA 8015	N	
DEF	3	071-02	W/CV	"	40ml	"	"	"	VOC's	EPA 8240	N	
GH	2	071-02	W/BG PT	"	1l	"	"	"	TPH-D	EPA 8015	N	
03ABC	3	071-51	W/CV	"	40ml	"	"	"	TPH-G / BETX	EPA 8015/8020	N	
04ABC	3	071-21	W/CV	"	40ml	"	"	"	TPH-G / BETX	EPA 8015/8020	N	

1 Brian Busch 7/10/91
Released by (Signature), Date

3 [signature] 7/10/91 1754
Released by (Signature), Date

5 _____
Released by (Signature), Date

1 WEISS ASSOCIATES
Affiliation

3 _____
Affiliation

5 _____
Affiliation

2 [signature] 7/10/91 1425
Received by (Signature), Date

4 _____
Shipping Carrier, Method, Date

6 [signature] 7-11-91 12:30
Received by Lab Personnel, Date

x Yes AH
Seal intact?

2 IT CORP
Affiliation

4 _____
Affiliation

6 _____
Affiliation, Telephone

1 Sample Type Codes: W = Water, S = Soil, Describe Other; Container Type Codes: V = VOA/Teflon Septa, P = Plastic, C or B - Clear/Brown Glass, Describe Other; Cap Codes: PT = Plastic, Teflon Lined 2 = Volume per container; 3 = Filtered (Y/N); 4 = Refrigerated (Y/N)
5 Turnaround [N = Normal, W = 1 Week, R = 24 Hour, HOLD (write out)]
ADDITIONAL COMMENTS, CONDITIONS, PROBLEMS: