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SUBSURFACE INVESTIGATION

at

Shell Service Station
WIC# 204-0072-0403
1601 Webster Street
Alameda, California

prepared for

Shell Oil Company
P.O. Box 4848
Anaheim, CA 92803

prepared by

Weiss Associates
5500 Shellmound Street
Emeryville, California

July 6, 1990

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Weiss Associates
5500 Shellmound Street
Emeryville, California

Karen C. Sixt
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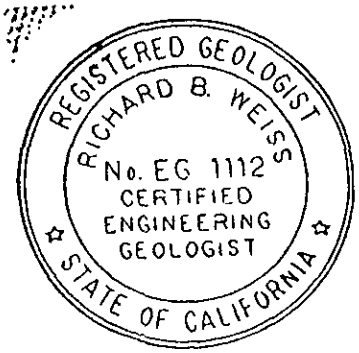
Joseph P. Theisen
Senior Project Hydrogeologist

I certify that Weiss Associates' work on former Shell Service Station WIC #204-0072-0403, 1601 Webster Street, Alameda, California, was conducted under my supervision. To the best of my knowledge, the data contained herein are true and correct and satisfy the specified scope of work for this project.



Richard B. Weiss 7/6/90
Richard B. Weiss Date
Certified Engineering Geologist
No. EG1112

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SUMMARY

Weiss Associates (WA) drilled two soil borings and installed and developed ground water monitoring wells MW-1 and MW-2 in these borings for a subsurface investigation at Shell Service Station WIC #204-0072-0403, located at 1601 Webster Street, in Alameda, California. Total petroleum hydrocarbons as gasoline (TPH-G) were detected at a maximum of 32 parts per million (ppm) in soil samples from boring BH-B.

WA collected ground water from the two new wells and existing well S-1 onsite. Ground water samples from well MW-2 contained 580 parts per billion (ppb) TPH-G, and contained benzene and 1,2-Dichloroethane (DCA) over the California Department of Health Services (DHS) Maximum Contaminant Level (MCL). TPH-G, benzene, ethylbenzene, toluene and xylenes (BETX) and halogenated volatile organic compounds (HVOCs) were not detected in water samples from wells S-1 or MW-1. Total non-polar (hydrocarbon) oil and grease (TOG) was not detected in ground water from any of the wells.

Ground water beneath the site flows northeast.

Although eleven wells are located within approximately one-half mile of the site, none are domestic water supply wells.

1. INTRODUCTION

This report presents the results of Weiss Associates' (WA) subsurface investigation of a former waste oil tank excavation at Shell Service Station WIC #204-0072-0403, located at 1601 Webster Street in Alameda, California (Figure 1). The objectives of this investigation were to determine if hydrocarbons from the former waste oil tank are in soil and ground water beneath the site, and to determine whether existing well S-1 is downgradient of the former waste oil tank excavation.

1.1 SCOPE OF WORK

The scope of work for this investigation was to:

1) Review the site history and prepare a site safety plan,

2) Identify wells within one-half mile of the site and prepare a map showing their locations,

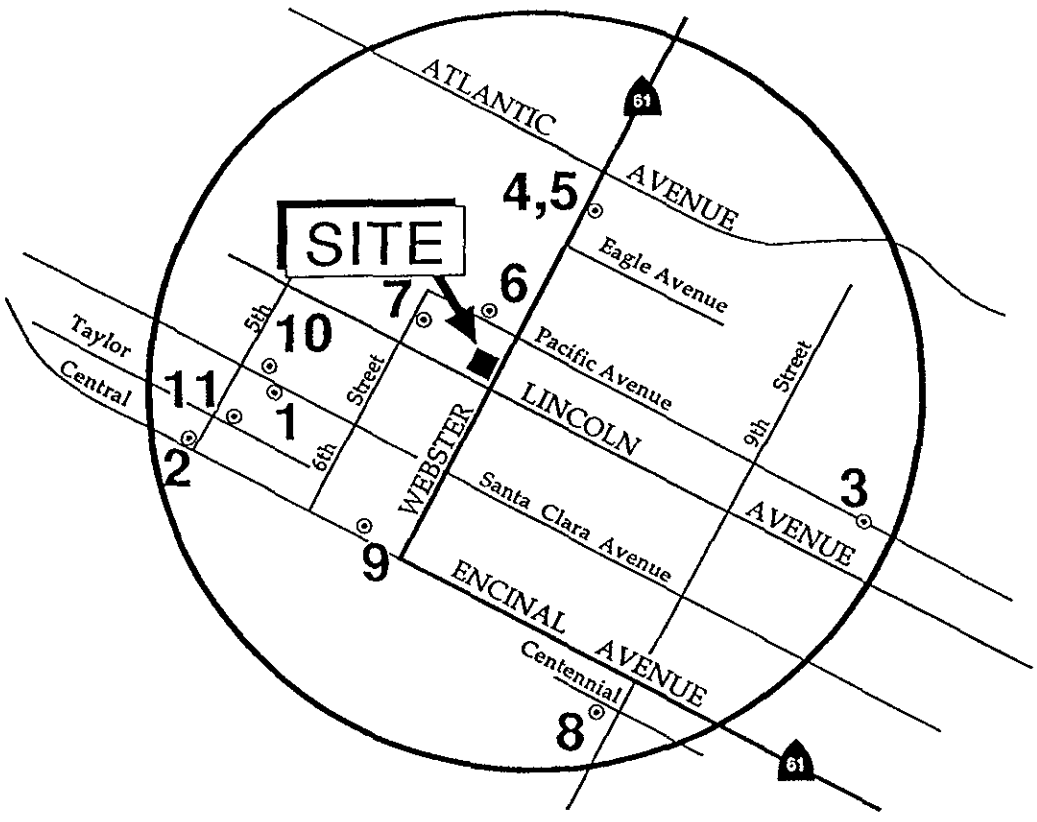
3) Obtain all permits and drill two on-site soil borings. Collect soil samples for subsurface hydrogeologic description and for possible chemical analysis,

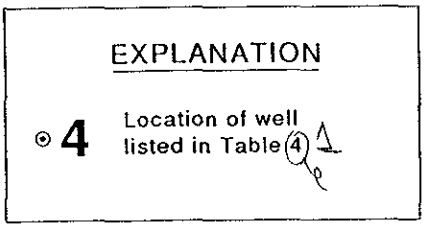
4) Survey the soil samples in the field with a portable photoionization detector (PID) to determine whether the samples contain volatile hydrocarbons,

5) Complete the borings as 4-inch-diameter ground water monitoring wells,

6) Analyze selected soil samples for total petroleum hydrocarbons as gasoline and diesel (TPH-G and TPH-D, respectively), benzene, ethylbenzene, toluene and xylenes (BETX), total oil and grease (TOG) and halogenated volatile organic compounds (HVOCs),

7) Develop the wells, collect water samples and analyze the samples for hydrocarbons and HVOCs,





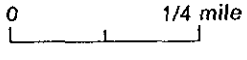


Figure 1. Site Location and Wells Within 1/2 Mile of Shell Service Station WIC #204-007-205, 1601 Webster Street, Alameda, California

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8) Arrange for disposal of drill cuttings and well purge water produced during drilling, well development and water sampling,

9) Survey top-of-casing elevations for each well and determine the ground water flow direction at the site,

10) Perform an area reconnaissance to locate possible off-site hydrocarbon sources and prepare a map of the surrounding properties and businesses, and

11) Report the subsurface investigation procedures and results.

These tasks are described below.

1.2 SITE SETTING AND LOCAL GEOLOGY

The site is located about 13 ft above mean sea level in a mixed commercial and residential area on the west side of Webster Street between Lincoln and Pacific Avenues in northern Alameda, California. Alameda is an island, bordered on the north and west by San Francisco Bay, on the south by San Leandro Bay, and on the east by the Oakland Inner Harbor. Local topography is very flat.

The site is located about 6 miles west of the Hayward Fault, and is in the East Bay Plain ground water basin. The sediments beneath the site are largely sand and silty sand associated with the Merritt Sand, an unconsolidated unit made up of Pleistocene beach and near-shore deposits (Alameda County Flood Control and Water Conservation District [Zone 7], 1988). Although the Merritt Sand contains some ground water, it is not considered a primary water supply source because of its limited areal extent and thickness. The main water-bearing unit in the region is a thick Pleistocene alluvial deposit that extends beneath the entire East Bay Plain Area, including Alameda.

1.3 BACKGROUND

In June 1987 Petroleum Engineering of Santa Rosa, California, removed a steel 550-gallon waste oil tank and replaced it with a 550-gallon fiberglass tank. The steel tank was apparently installed in 1962. Following the tank removal, Blaine Tech Services of San Jose, California, observed and documented the tank condition and collected a soil sample from directly beneath the former tank location (Blaine Tech, 1987). The soil sample contained 14 ppm TPH, 133 ppm TOG and 0.029 ppm 1,1,1-Trichloroethane (TCA).

Ground water was encountered at 9.75 ft depth in the tank excavation. Blaine Tech personnel collected a water sample for chemical analysis. Hydrocarbons detected in the water sample from the excavation included 132 ppm TPH, 244 ppm TOG and low concentrations of benzene, toluene and xylenes.

Based on these analytic results, Pacific Environmental Group of Santa Clara, California (PEG), conducted a subsurface investigation at the site in September 1987 to determine whether compounds apparently released from the former waste oil tank were in ground water beneath the former tank location (PEG, 1987). The investigation consisted of drilling one soil boring, installing ground water monitoring well S-1 in the boring, and analyzing soil and ground water samples. The boring was drilled adjacent to the northeastern side of the waste oil tank pit. Ground water was encountered in the borehole at about 10 ft depth and stabilized in the monitoring well at about 8.5 ft depth. TPH-G was detected at 50 ppm in a soil sample from 4 ft depth, and TOG was detected in three samples at a maximum of 130 ppm in the 4 ft depth sample.

A ground water sample collected by PEG on September 7, 1987, from monitoring well S-1 contained 0.12 ppm acetone. BETX was not detected in the ground water sample.

To confirm the absence of hydrocarbons in ground water and to determine whether the acetone detected in the initial water sample was from laboratory contamination, WA collected a sample from well S-1 on September 11, 1989 (WA, 1989). Chromium and zinc were detected in the ground water sample slightly above the method detection limits, at 0.02 ppm and 0.03

ppm, respectively. Hydrocarbons, PCB's, VOCs and semi-volatile organic compounds (SVOCs) were not detected in the ground water. Since acetone was not detected in the WA sample, it is likely that the acetone detected in ground water in September 1987 was from laboratory contamination.

In December 1989, Shell Oil retained WA to conduct additional subsurface investigation at the site, determine the ground water gradient and monitor ground water.

1.4 AREA SURVEYS

WA conducted an area business and property survey, and located and identified water wells within one-half mile of the site as part of this investigation. These activities are described below.

1.4.1 Area Business and Property Survey

The area business and property survey consisted of an area reconnaisance of neighboring properties and businesses for indications of the use, storage of release of hazardous materials. A Unocal service station is north of the site, and a large tank excavation, formerly an independent gasoline station, is to the northeast (Thosnton, 1990) (Figure 2). An extensive soil remediation project is presently underway at the former independent station, and an adjacent house has been razed to accomodate additional soil excavation. An auto body shop, fire station and BP service station are within a few blocks of the site and are also potential sources of hydrocarbons and/or HVOCs to the subsurface.

1.4.2 Well Survey

WA located and identified wells within one-half mile of the site by reviewing California Department of Water Resources (DWR) and Alameda County Flood Control and Water Conservation District (Zone 7) records. The well survey identified eleven wells within one-half mile of the site. Although five of the wells are water supply wells apparently none are used for domestic water supply (Table 1, Figure 1).

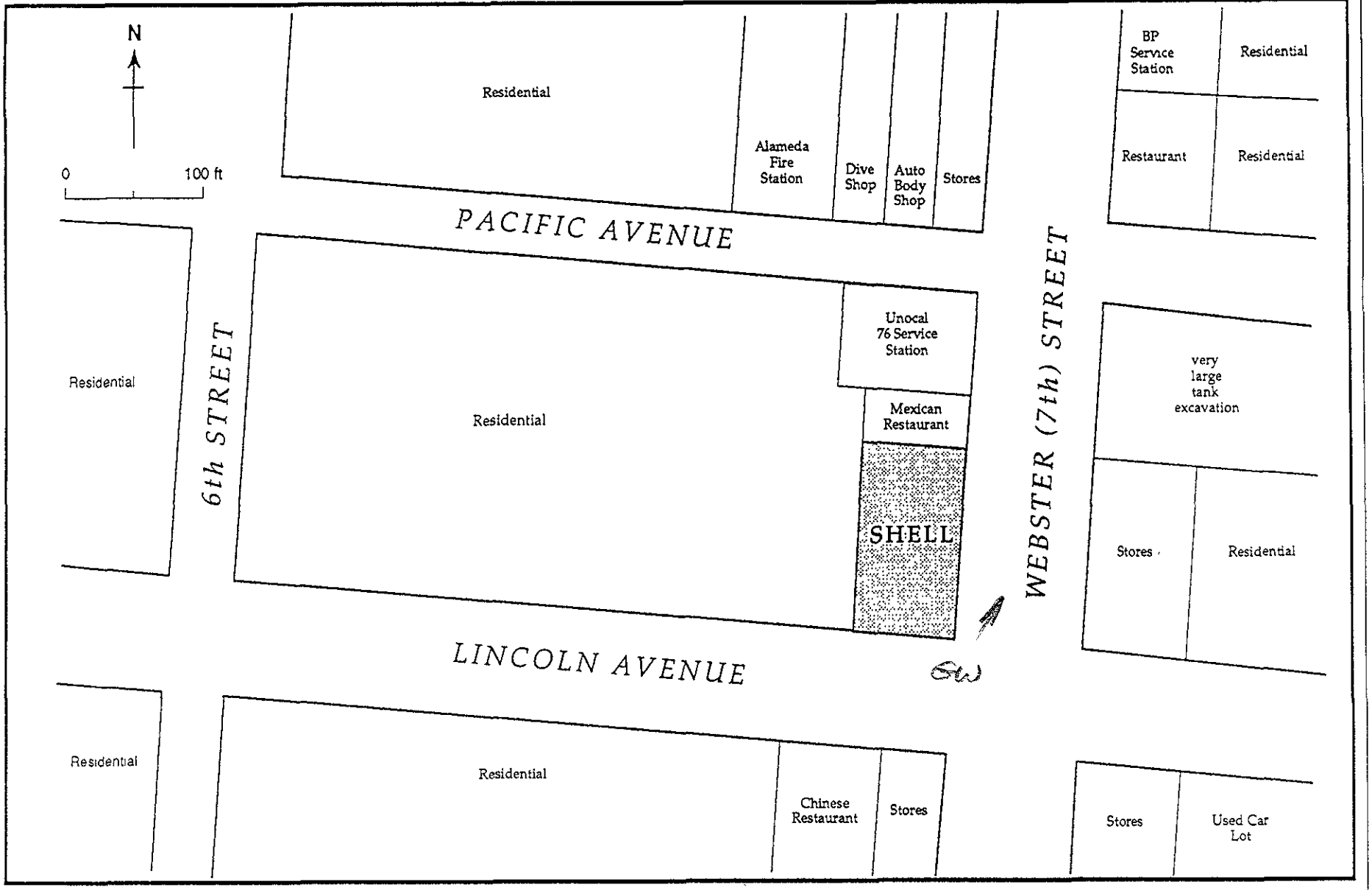

Figure 2. Properties and Businesses in the Vicinity of Shell Service Station WIC # 204007204, 1601 Webster Street, Alameda, California

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Table 1. Wells Within One-Half Mile of Shell Service Station WIC# 204-0072-0403 Alameda, California

Well ID	Well Owner	Well Location	Year Drilled	Well Use
1	PG&E	462 Santa Clara Ave.	1976	CAT
2	Richard Roth	1417 5th St.	1977	IRR
3	PG&E	Pacific Ave./Chapin St.	1976	CAT
4-5	Alameda Housing Authority	1916 Webster St.	1986	MW
6	City of Alameda	354 Pacific St.	1986	MW
7	Daniel Robsinson	1614 6th St.	1977	IRR
8	Lawrence Picetti	920 Centennial Ave.	1987	MW
9	Paul Marrett	645 Central Ave.	1977	IND
10	Richard Faucett	427 Santa Clara Ave.	1977	IRR
11	A.E. Bryant	447 Taylor Ave.	1977	IRR

Abbreviations:

CAT = Cathodic Protection Well
IND = Industrial Well
IRR = Irrigation Well
MW = Monitoring Well

2. SUBSURFACE INVESTIGATION

On April 3, 1990, Soils Exploration Services, of Vacaville, California, drilled two soil borings at the site and installed ground water monitoring wells in the borings with a CME-55 hollow-stem auger drill rig (Figure 3). Robert Kitay, WA Staff Geologist, directed the drilling and well installation, under the supervision of Richard B. Weiss, Certified Engineering Geologist No. EG1112.

Monitoring wells MW-1 and MW-2 were located relative to existing well S-1 to determine the ground water flow direction beneath the site.

2.1 SOIL BORINGS AND SAMPLING

Soil samples were collected in each boring at least every 5 ft to characterize the subsurface sediments and for possible chemical analysis. Samples were collected with a split-barrel sampler lined with steam-cleaned, 2-inch diameter brass tubes. After removal from the sampler, the tubes were immediately trimmed, capped with Teflon tape and plastic end caps, hermetically sealed with duct tape, and labeled and refrigerated for delivery under chain-of-custody to National Environmental Testing, Inc. (NET) of Santa Rosa, California. Drilling equipment was steam cleaned prior to use, and sampling equipment was washed with a trisodium phosphate solution between samples to prevent cross-contamination. Boring logs are presented in Appendix A and chain-of-custody forms for the soil samples are included in Appendix B.

Sediments encountered during drilling consisted primarily of moderate permeability silty sand, with thin clayey sand and clayey silt lenses.

Soil cuttings from the borings were stockpiled on plastic sheeting pending analytic results for soil samples from the borings. The stockpile was covered with plastic to prevent infiltration by rainwater and aeration of volatile compounds. After the results were

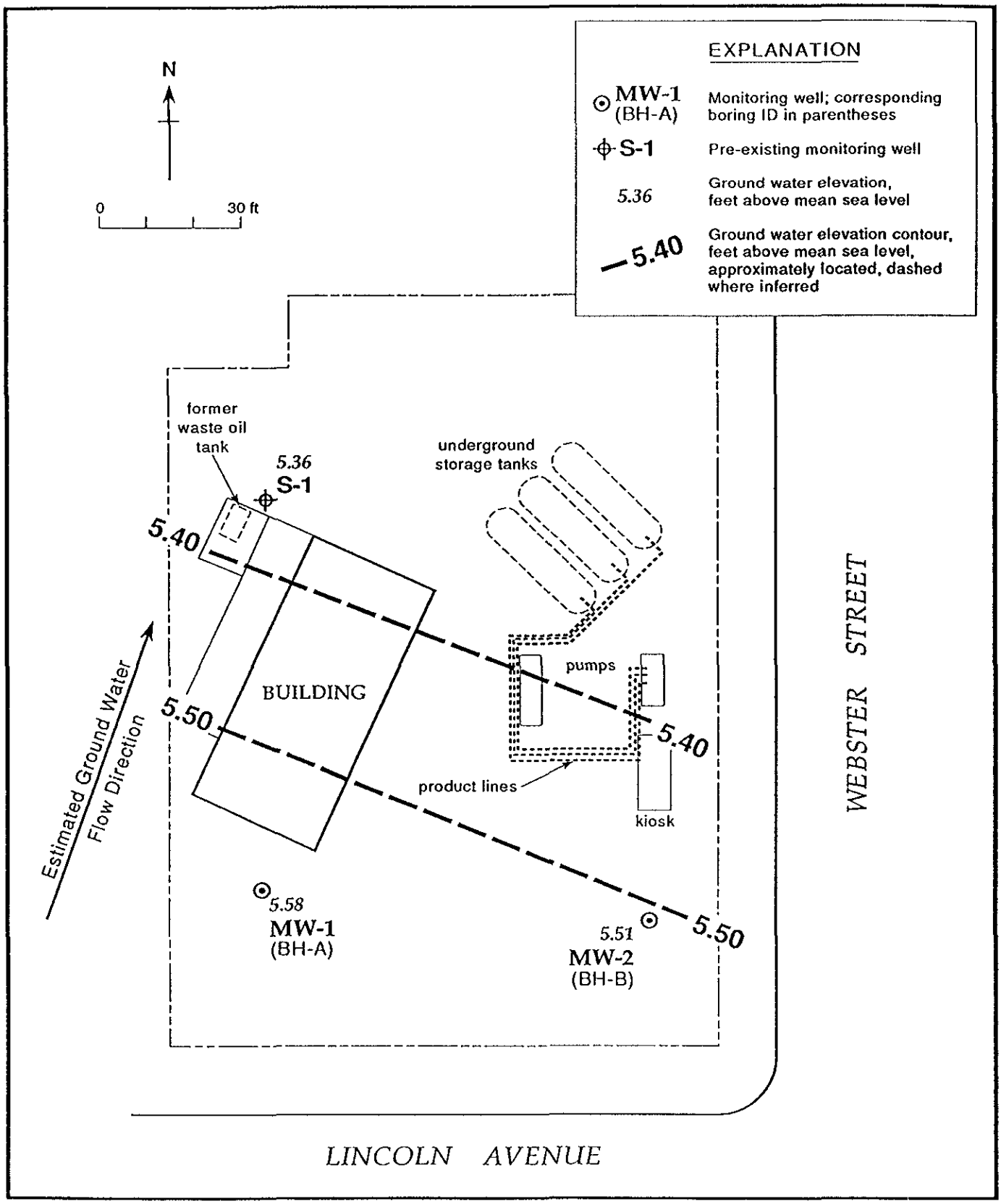

Figure 3. Monitoring Well Locations and Ground Water Elevation Contours - April 11, 1990 - Shell Service Station WIC #204-0072-0403, 1601 Webster Street, Alameda, California

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reviewed, the soil was transported to West Contra Costa Sanitary Landfill by Crosby and Overton, Inc. (C&O) of Oakland, California, for disposal as Class III waste.

2.2 ANALYTIC RESULTS FOR SOIL

Soil samples were surveyed in the field with a PID to qualitatively determine the presence of volatile hydrocarbons. The PID measures vapor concentrations in parts per million by volume (ppmv) and is used for qualitative, not quantitative, assessment. This is because the correlation between the volume measurement of the PID and mass measurement of the analytical tests is not well defined, and because field measurement procedures are not as rigorous as laboratory measurement procedures. PID readings are shown on the boring logs presented in Appendix A.

Analytic results for soil are compiled in Table 2 and laboratory analytic reports are presented in Appendix B. Based on field observations and PID measurements, eight soil samples were analyzed by NET for:

- TPH-G by modified EPA Method 8015, gas chromatography with flame ionization detection (GC/FID), and
- BETX by EPA Method 8020, gas chromatography with photoionization detection (GC/PID).

The soil sample collected from just above static water level in each boring was also analyzed for:

- TOG by American Public Health Association (APHA) Standard Method 503 D&E,
- Halogenated volatile organic compounds (HVOCs) by EPA Method 8010, gas chromatography with Hall electrolytic conductivity detection (GC/HALL), and
- Total petroleum hydrocarbons as diesel (TPH-D) by modified EPA Method 8015, GC/FID.

Table 2. Results of Soil Analyses - Shell Service Station, WIC #204-0072-0403, 1601 Webster Street, Alameda, California

Soil Boring (Well ID)	Sample Depth (ft)	Date Sampled	Analytic Lab	Analytic Method	Sat/ Unsat	TPH-G	TPH-D*	B	E	T	X	HVOCS	TOG**
						<---------- parts per million (mg/kg) ---------->							
BH-A	4.8	4-3-90	NET	8015/8020	Unsat	<1	---	<0.0025	<0.0025	0.0032	0.0030	---	---
(MW-1)	7.8	4-3-90	NET	8015/8020	Unsat	<1	<1	<0.0025	<0.0025	0.0029	<0.0025	ND[a]	<50
				8010/503E									
	10.8	4-3-90	NET	8015/8020	Sat	<1	---	0.0026	<0.0025	0.010	0.0037	---	---
BH-B	5.2	4-3-90	NET	8015/8020	Unsat	<1	---	<0.0025	<0.0025	0.0048	0.013	---	---
(MW-2)	6.8	4-3-90	NET	8015/8020	Unsat	1.3	<1	0.0034	0.010	0.017	0.079	ND[a]	<50
				8010/503E									
	10.2	4-3-90	NET	8015/8020	Sat	20	---	0.530	0.750	3.800	4.000	---	---
	15.2	4-3-90	NET	8015/8020	Sat	32	---	0.15	0.67	1.8	2.6	---	---
	20.2	4-3-90	NET	8015/8020	Sat	<1	---	0.0049	0.0047	0.023	0.029	---	---

Abbreviations:

TPH-G = Total petroleum hydrocarbons as gasoline
TPH-D = Total petroleum hydrocarbons as diesel
B = Benzene
E = Ethylbenzene
T = Toluene
X = Xylenes
HVOCs = Halogenated volatile organic compounds
TOG = Total oil and grease (non-polar)
Sat = Saturated soil sample
Unsat = Unsaturated soil sample
[a] = Not detected at detection limits of 0.002 to 0.05 parts per million (ppm)
<n = Not detected at detection limit of n ppm
* = Analytic results for total petroleum hydrocarbons as motor oil (TPH-MO) are reported with TPH-D results by the laboratory. TPH-MO results are included in the analytic reports in Appendix B.
** = Analytic results for total oil and grease (polar and non-polar) are reported with the hydrocarbon (non-polar) TOG by the laboratory. These results are included in the analytic reports in Appendix B.

Analytical Laboratory:

NET = National Environmental Testing Pacific, Inc., Santa Rosa, California

Analytic Methods:

503E = American Public Health Association Standard Method 503E for TOG
601 = EPA Method 601 for HVOCs
602 = EPA Method 602 for BETX
8015 = Modified EPA Method 8015 for TPH-G, TPH-D and TPH-MO

Analytical Laboratory:

NET = National Environmental Testing Pacific, Inc., Santa Rosa, California

Analytic Methods:

503E = APHA Standard Method 503 for TOG
8010 = EPA Method 8010 (GC/HALL) for HVOCs
8015 = Modified EPA Method 8015 (GC/FID) for TPH-G, TPH-D and TPH-MO
8020 = EPA Method 8020 (GC/PID) for BETX

TPH-G was detected in soil at a maximum of 32 ppm in a saturated sample collected from boring BH-B at 15.2 ft depth. Benzene, ethylbenzene, toluene and xylenes were also detected in unsaturated and saturated soil samples from boring BH-B. Low concentrations of benzene, toluene and xylenes were detected in unsaturated and saturated soil from boring BH-A. TPH-G and ethylbenzene were not detected in soil samples from boring BH-A. TPH-D, TOG and HVOCs were not detected in samples from either boring.

2.3 MONITORING WELL INSTALLATION, DEVELOPMENT AND SAMPLING

Ground water was first encountered at 8.5 and 7.5 ft depth in borings BH-A and BH-B, respectively. Monitoring well MW-1 was installed in boring BH-A, and well MW-2 was installed in boring BH-B. The water level rose slightly in well MW-1 to 8.26 ft, and fell slightly in well MW-2, to 7.72 ft after well installation and development. The well screens extend at least 3 ft above the static ground water level and 12 to 13 ft below the static water level, to about 21 ft total depth in each well. The wells are constructed with 4-inch diameter, 0.020-inch slotted, flush threaded Schedule 40 PVC well screen and blank casing. Lonestar #3 Monterey sand occupies the annular space to 0.5 to 1 ft above the well screens. A 1 ft thick bentonite layer separates the sand from the overlying 3 to 4 ft thick surface seal of Portland Type I and II cement mixed with 3-5% bentonite powder. Well heads are secured with locking plugs and finished at-grade with traffic-rated vaults.

On April 4, 1990, WA geolgist Tom Berry developed the wells using surge block agitation and airlift evacuation. After development, airlift evacuation yielded about 1.8 gallons per minute (gpm) from both well MW-1 and MW-2.

On April 11, 1990, WA environmental technician Dave Charles collected ground water samples from all three wells onsite. The sample from well S-1 was collected in a steam-cleaned Teflon bailer. Samples were collected from wells MW-1 and MW-2 with dedicated 3-inch diameter PVC bailers, and bled into the sample containers through a sampling port on the side of the bailer. Between 17 and 33 gallons, approximately four well casing volumes, were evacuated from each well prior to sampling. The samples were decanted into 40 ml glass volatile organic analysis (VOA) vials. Samples for TPH-D and TOG analysis were decanted into 1 liter glass bottles. All samples were labeled and refrigerated for transport under chain-of-custody to NET.

Ground water from development and sampling, and rinseate generated during steam-cleaning of the drilling augers, was contained in California Department of Transportation (DOT)-approved 55-gallon drums and transported by C&O to the Shell Oil Refinery in Martinez, California, for reclamation.

2.4 ANALYTIC RESULTS FOR GROUND WATER

Analytic results for ground water are summarized in Table 3 and the laboratory analytic reports and chain-of-custody forms are presented in Appendix C. All ground water samples were analyzed for:

- TPH-G&D by modified EPA Method 8015 (GC/FID),
- BETX by EPA Method 602 (GC/PID),
- TOG by APHA Standard Method 503A & E, and
- HVOCs by EPA Method 601 (GC/HALL).

TPH-G was detected in ground water from well MW-2, upgradient of the gasoline tanks, at 580 ppb. Well MW-2 also contained 430 ppb TPH-D, 1,2-dichloroethane (DCA) above the DHS MCL and BETX below the respective MCLs for those compounds. Hydrocarbons were not detected in wells MW-1 or S-1.

Table 3. Analytic Results for Ground Water - Shell Service Station, WIC #204-0072-0403, 1601 Webster Street, Alameda, California

Sample ID	Date Sampled	Sampled By	Analytic Method	Analytic Lab	TPH-G	TPH-D[a]	B	E	T	X	VOCs	TOG[b]	Metals/ Other
					<----------µg/L (ppb)---------->								
MW-1	04-11-90	WA	601/602/8015/503E	NET	<50	<50	<0.5	<0.5	<0.5	<0.5	<0.4-10	<10,000	---
MW-2	04-11-90	WA	601/602/8015/503E	NET	580	430	20	1.2	4.9	73	1.1[c]	<10,000	---
S-1	09-04-87	PEG	624	IT	---	---	<5	<5	<5	<5	*[d]	---	---
	09-11-89	WA	8015/602/503E/ 624/625/6010	IT	<50	<100	<0.5	<1	<1	<3	<0.4-10	<1,000	*[e]
	04-11-90	WA	601/602/8015/503E	NET	<50	<50	<0.5	<0.5	<0.5	<0.5	<0.4-10	<10,000	---
DHS MCLs	---	---	---	---	NE	NE	1	680	100[f]	1,750	0.5[g]	NE	---

Abbreviations:

TPH-G = Total petroleum hydrocarbons as gasoline
TPH-D = Total petroleum hydrocarbons as diesel
B = Benzene
E = Ethylbenzene
T = Toluene
X = Xylenes
VOCs = Volatile Organic compounds including Halogenated volatile organic compounds
SVOCs = Semi-volatile organic compounds
TOG = Total oil and grease (non-polar)
ppb = parts per billion
<n = Not detected at detection limit of n ppb
DHS MCL = Department of Health Services Maximum Contaminant Level
NE = DHS action levels not established
--- = Not analyzed or not applicable

Analytical Laboratory:

NET = National Environmental Testing Pacific, Inc., Santa Rosa, California

Analytic Methods:

503E = American Public Health Association Standard Method 503E for TOG
601 = EPA Method 601 for Halogenated VOCs
602 = EPA Method 602 for BETX
624 = EPA Method 624 for VOCs
625 = EPA Method 625 for SVOCs
6010 = EPA Method 6010 for Metals
8015 = Modified EPA Method 8015 for TPH-G, TPH-D and TPH-MO

Notes:

[a] = Analytic results for total petroleum hydrocarbons as motor oil (TPH-MO) are reported with TPH-D results by the laboratory. TPH-MO results are included in the analytic reports in Appendix C.

[b] = Analytic results for total oil and grease (polar and non-polar) are reported with the hydrocarbon (non-polar) TOG by the laboratory. These results are included in the analytic reports in Appendix C.

Notes: (continued)

[c] = 1,2-dichloroethane detected at 1.1 ppb
[d] = Acetone detected at 120 ppb
[e] = Metals include: Cadmium, <10 ppb; Chromium, 20 ppb; Lead, 60 ppb; Zinc, 30 ppb; also analyzed for PCBs (<0.5 ppb) and SVOCs (<10-50 ppb)
[f] = DHS recommended action level for drinking water
[g] = MCL for 1,2-dichloroethane

2.5 GROUND WATER ELEVATIONS

Top-of-casing elevations were surveyed on April 5, 1990, by John E. Koch of Berkeley, California (California Land Surveyor, License No. LS4811). The datum elevation for the survey was a City of Alameda bench mark at the intersection of Webster Street and Lincoln Avenue.

WA measured depths to ground water depth on April 11, 1990. Ground water elevation data are presented in Table 4 and ground water elevation contours are shown in Figure 3. The ground water flow direction is to the northeast with a gradient of approximately 0.003 ft/ft.

Table 4. Ground Water Elevation Data - Shell Service Station, WIC #204-0072-0403, 1601 Webster Street, Alameda, California

Well ID	Date	Top-of-Casing Elevation (ft above msl)	Depth to Water (ft)	Ground Water Elevation (ft above msl)
S-1	9-11-89	13.77	9.82	3.95
	4-11-90		8.41	5.36
MW-1	4-11-90	13.80	8.22	5.58
MW-2	4-11-90	13.20	7.69	5.51

3. CONCLUSIONS

Soil samples from the boring for well MW-2 contained a maximum of 32 ppm TPH-G in the 15.2 ft depth sample and BETX at a maximum concentration of 4 ppm in the 10.2 ft depth sample. TPH-G and BETX were not detected in any of the soil samples from the boring for well MW-1. TPH-D, TOG and HVOCs were not detected in the soil samples analyzed for these compounds from either boring.

Ground water samples from well MW-2, upgradient of the underground gasoline tanks, contained 580 ppb TPH-G, 430 ppb TPH-D, low concentrations of ethlybenzene, toluene and xylenes, and benzene and DCA over the DHS MCL. No hydrocarbons or HVOCs were detected in ground water from wells S-1 or MW-1.

Ground water flows to the northeast beneath the site, and well S-1 is therefore downgradient of the waste oil tank.

No domestic water supply wells are within one-half mile of the site.

Although the Unocal service station, about 50 ft north of the Shell site, and the former independent gasoline station, about 120 ft northeast of the Shell site, are potential sources of hydrocarbons to the subsurface, based on the April 11, 1990, ground water flow direction, neither of these sites are currently upgradient of the Shell site.

REFERENCES

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Blaine Tech Services, Inc., 1987, Sampling Report 87177-B-1, Shell Service Station, 1601 Webster Street, Alameda, California, consultant's letter-report prepared for Shell Oil Company, June 26, 1987, 3 pp. and 2 attachments.

Pacific Environmental Group, 1987, Soil and Groundwater Investigation at Shell Service Station, 1601 Webster Street, Alameda, California, consultant's letter-report prepared for Shell Oil Company, October 23, 1987, 3 pp. and 7 attachments.

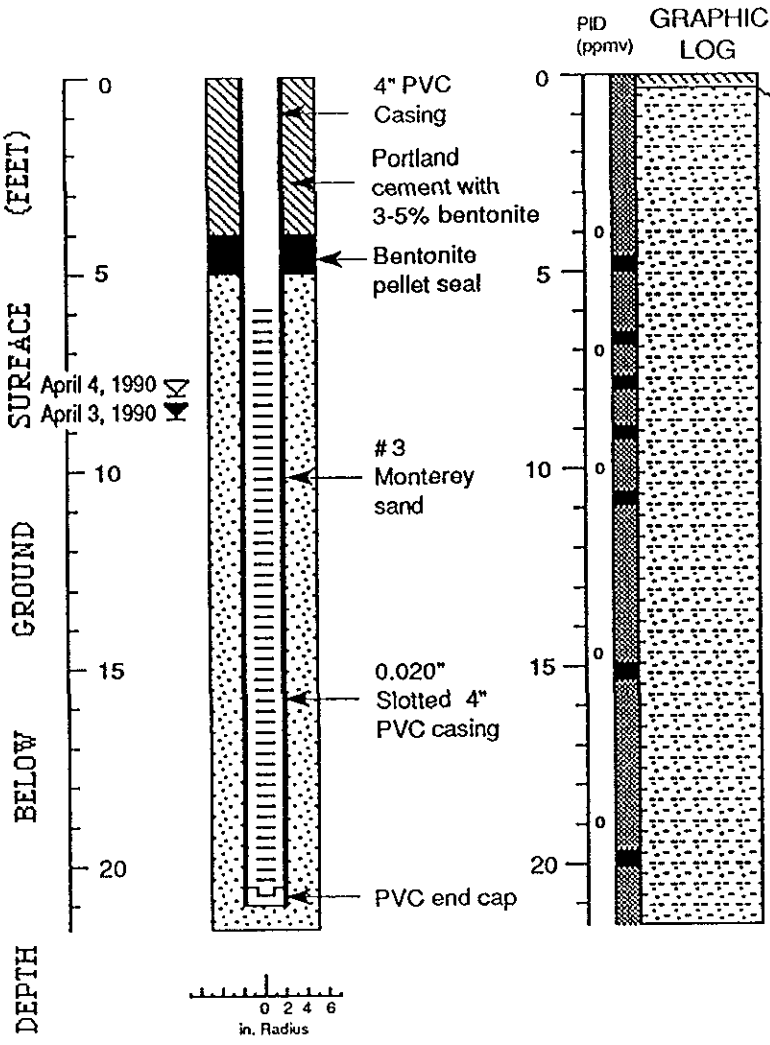
Thosnton, N., 1990, personal communication between Neil Thosnton, Ensco Environmental Services, Inc., Fremont, California, and Robert Kitay, WA geologist, April 3, 1990.

Weiss Associates, 1989, Petition for Tank Closure, Shell Service Station, 1601 Webster Street, Alameda, California, consultant's letter prepared for Shell Oil Company, October 13, 1989, 8 pp. and 4 attachments.

APPENDIX A

Boring Logs

WELL MW-1 (BH-A)



EXPLANATION

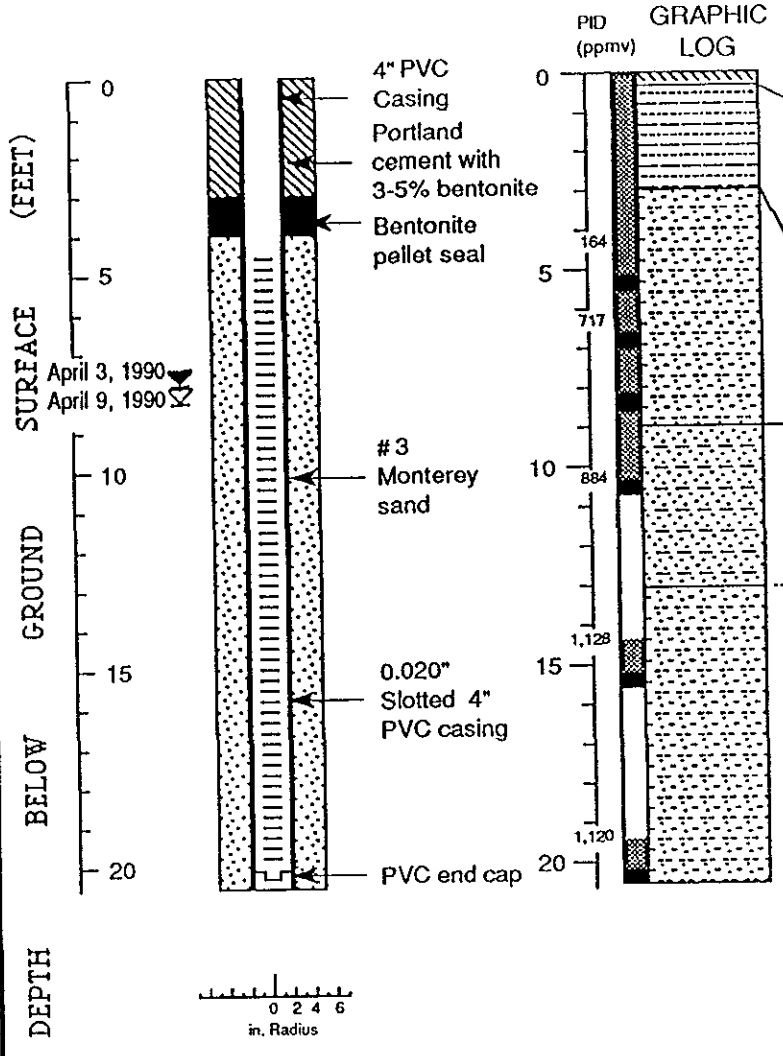
- Water level during drilling (date)
- Water level (date)
- Contact (dotted where approx.)
- Uncertain contact
- Location of recovered drive sample
- Location of drive sample sealed for chemical analysis
- Cutting sample
- K = Estimated hydraulic conductivity

Logged by:	Robert Kitay
Supervisor:	Richard Weiss; EG 1112
Drilling Company:	Soils Exploration Services, Vacaville, CA
Driller:	Russ Ellis
Drilling Method:	Hollow stem auger
Date Drilled:	April 3, 1990
Well Head Completion:	4" Locking well plug, traffic-rated
Type of sampler:	Split-barrel (2")
Ground Surface Elevation:	14.15 ft above msl

Well Construction and Boring Log - Well MW-1 (BH-A)

Shell Service Station
1601 Webster Street
Alameda, California

WELL MW-2 (BH-B)



EXPLANATION

- Water level during drilling (date)
- Water level (date)
- Contact (dotted where approx.)
- Uncertain contact
- Location of recovered drive sample
- Location of drive sample sealed for chemical analysis
- Cutting sample
- K = Estimated hydraulic conductivity

Logged by: Robert Kitay
Supervisor: Richard Weiss; EG 1112
Drilling Company: Soils Exploration Services, Vacaville, CA
Driller: Russ Ellis
Drilling Method: Hollow stem auger
Date Drilled: April 3, 1990
Well Head Completion: 4" Locking well plug, traffic-rated vault
Type of sampler: Split-barrel (2.0")
Ground Surface Elevation: 13.61 ft above msl

Well Construction and Boring Log - Well MW-2 (BH-B)

Shell Service Station
1601 Webster Street
Alameda, California

APPENDIX B

Analytic Reports and Chain-of-Custody Forms for Soil

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Pacific, Inc.
435 Tesconi Circle
Santa Rosa, CA 95401
Tel: (707) 526-7200
Fax: (707) 526-9623

Robert Kitay
Weiss Associates
5500 Shell Mound Rd.
Emeryville, CA 94524

Date: 04-23-90
NET Client Acct. No: 18.09
NET Pacific Log No: 1483
Received: 04-06-90 2300

Client Reference Information

SHELL- 1601 Webster St, Alameda, Project ID: 81-434-02

Sample analysis in support of the project referenced above has been completed and results are presented on following pages. Please refer to the enclosed "Key to Abbreviations" for definition of terms. Should you have questions regarding procedures or results, please feel welcome to contact Client Services.

Approved by:

Jules Skamarack
Laboratory Manager

Enclosure(s)

Ref: SHELL- 1601 Webster St, Alameda, Project ID: 81-434-02

SAMPLE DESCRIPTION: BH-A 4.8' 04-03-90
LAB Job No: (-50336)

Parameter	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS		--	
VOLATILE (SOIL)		--	
DILUTION FACTOR *		1	
DATE ANALYZED		04-12-90	
METHOD GC FID/5030		--	
as Gasoline	1	ND	mg/Kg
METHOD 8020		--	
DILUTION FACTOR *		1	
DATE ANALYZED		04-12-90	
Benzene	2.5	ND	ug/Kg
Ethylbenzene	2.5	ND	ug/Kg
Toluene	2.5	3.2	ug/Kg
Xylenes, total	2.5	3.0	ug/Kg

Ref: SHELL- 1601 Webster St, Alameda, Project ID: 81-434-02

SAMPLE DESCRIPTION: BH-A 10.8' 04-03-90
LAB Job No: (-50339)

Parameter	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS		--	
VOLATILE (SOIL)		--	
DILUTION FACTOR *		1	
DATE ANALYZED		04-12-90	
METHOD GC FID/5030		--	
as Gasoline	1	ND	mg/Kg
METHOD 8020		--	
DILUTION FACTOR *		1	
DATE ANALYZED		04-12-90	
Benzene	2.5	2.6	ug/Kg
Ethylbenzene	2.5	ND	ug/Kg
Toluene	2.5	10	ug/Kg
Xylenes, total	2.5	3.7	ug/Kg

Ref: SHELL- 1601 Webster St, Alameda, Project ID: 81-434-02

SAMPLE DESCRIPTION: BH-B 10.2' 04-03-90
LAB Job No: (-50342)

Parameter	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS		--	
VOLATILE (SOIL)		--	
DILUTION FACTOR *		1	
DATE ANALYZED		04-12-90	
METHOD GC FID/5030		--	
as Gasoline	1	20	mg/Kg
METHOD 8020		--	
DILUTION FACTOR *		10	
DATE ANALYZED		04-16-90	
Benzene	2.5	530	ug/Kg
Ethylbenzene	2.5	750	ug/Kg
Toluene	2.5	3,800	ug/Kg
Xylenes, total	2.5	4,000	ug/Kg

Ref: SHELL- 1601 Webster St, Alameda, Project ID: 81-434-02

SAMPLE DESCRIPTION: BH-B 20.2' 04-03-90
LAB Job No: (-50343)

Parameter	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS		--	
VOLATILE (SOIL)		--	
DILUTION FACTOR *		1	
DATE ANALYZED		04-12-90	
METHOD GC FID/5030		--	
as Gasoline	1	ND	mg/Kg
METHOD 8020		--	
DILUTION FACTOR *		1	
DATE ANALYZED		04-12-90	
Benzene	2.5	4.9	ug/Kg
Ethylbenzene	2.5	4.7	ug/Kg
Toluene	2.5	23	ug/Kg
Xylenes, total	2.5	29	ug/Kg

Ref: SHELL- 1601 Webster St., Alameda, Project ID: 81-434-02

SAMPLE DESCRIPTION: BH-B 5.2' 04-03-90
LAB Job No: (-50372)

Parameter	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS		--	
VOLATILE (SOIL)		--	
DILUTION FACTOR *		1	
DATE ANALYZED		04-12-90	
METHOD GC FID/5030		--	
as Gasoline	1	ND	mg/Kg
METHOD 8020		--	
DILUTION FACTOR *		1	
DATE ANALYZED		04-12-90	
Benzene	2.5	ND	ug/Kg
Ethylbenzene	2.5	ND	ug/Kg
Toluene	2.5	4.8	ug/Kg
Xylenes, total	2.5	13	ug/Kg

Client Acct: 18.09
Client Name: Weiss Associates
NET Log No: 1483

Date: 04-23-90
Page: 7

Ref: SHELL- 1601 Webster St., Alameda, Project ID: 81-434-02

SAMPLE DESCRIPTION: BH-B 15.2' 04-03-90
LAB Job No: (-50373)

Parameter	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS		--	
VOLATILE (SOIL)		--	
DILUTION FACTOR *		10	
DATE ANALYZED		04-17-90	
METHOD GC FID/5030		--	
as Gasoline	1	32	mg/Kg
METHOD 8020		--	
DILUTION FACTOR *		10	
DATE ANALYZED		04-17-90	
Benzene	2.5	150	ug/Kg
Ethylbenzene	2.5	670	ug/Kg
Toluene	2.5	1,800	ug/Kg
Xylenes, total	2.5	2,600	ug/Kg

Ref: SHELL- 1601 Webster St. Alameda, Project: 81-434-02

SAMPLE DESCRIPTION: BH-A 7.8' 04-03-90
LAB Job No: (-50333)

Parameter	Reporting Limit	Results	Units
Oil & Grease(Total)	50	ND	mg/Kg
Oil & Grease(Non-Polar)	100	ND	mg/Kg
METHOD 8010			
DATE ANALYZED		04-11-90	
DILUTION FACTOR*		1	
Bromodichloromethane	2.0	ND	ug/Kg
Bromoform	2.0	ND	ug/Kg
Bromomethane	2.0	ND	ug/Kg
Carbon tetrachloride	2.0	ND	ug/Kg
Chlorobenzene	2.0	ND	ug/Kg
Chloroethane	2.0	ND	ug/Kg
2-Chloroethylvinyl ether	5.0	ND	ug/Kg
Chloroform	2.0	ND	ug/Kg
Chloromethane	2.0	ND	ug/Kg
Dibromochloromethane	2.0	ND	ug/Kg
1,2-Dichlorobenzene	2.0	ND	ug/Kg
1,3-Dichlorobenzene	2.0	ND	ug/Kg
1,4-Dichlorobenzene	2.0	ND	ug/Kg
Dichlorodifluoromethane	2.0	ND	ug/Kg
1,1-Dichloroethane	2.0	ND	ug/Kg
1,2-Dichloroethane	2.0	ND	ug/Kg
1,1-Dichloroethene	2.0	ND	ug/Kg
trans-1,2-Dichloroethene	2.0	ND	ug/Kg
1,2-Dichloropropane	2.0	ND	ug/Kg
cis-1,3-Dichloropropene	2.0	ND	ug/Kg
trans-1,3-Dichloropropene	2.0	ND	ug/Kg
Methylene Chloride	50	ND	ug/Kg
1,1,2,Tetrachloroethane	2.0	ND	ug/Kg
Tetrachloroethene	2.0	ND	ug/Kg
1,1,1-Trichloroethane	2.0	ND	ug/Kg
1,1,2-Trichloroethane	2.0	ND	ug/Kg
Trichloroethene	2.0	ND	ug/Kg
Trichlorofluoromethane	2.0	ND	ug/Kg
Vinyl chloride	2.0	ND	ug/Kg

Ref: SHELL- 1601 Webster St. Alameda, Project: 81-434-02

SAMPLE DESCRIPTION: BH-A 7.8' 04-03-90
LAB Job No: (-50333)

Parameter	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS		--	
VOLATILE (SOIL)		--	
DILUTION FACTOR *		1	
DATE ANALYZED		04-12-90	
METHOD GC FID/5030		--	
as Gasoline	1	ND	mg/Kg
METHOD 8020		--	
DILUTION FACTOR *		1	
DATE ANALYZED		04-12-90	
Benzene	2.5	ND	ug/Kg
Ethylbenzene	2.5	ND	ug/Kg
Toluene	2.5	2.9	ug/Kg
Xylenes, total	2.5	ND	ug/Kg
PETROLEUM HYDROCARBONS		--	
EXTRACTABLE (SOIL)		--	
DILUTION FACTOR *		1	
DATE EXTRACTED		04-12-90	
DATE ANALYZED		04-12-90	
METHOD GC FID/3550		--	
as Diesel	1	ND	mg/Kg
as Motor Oil	10	ND	mg/Kg

Ref: SHELL- 1601 Webster St. Alameda, Project: 81-434-02

SAMPLE DESCRIPTION: BH-B 6.8' 04-03-90
LAB Job No: (-50334)

Parameter	Reporting Limit	Results	Units
Oil & Grease(Total)	50	ND	mg/Kg
Oil & Grease(Non-Polar)	100	ND	mg/Kg
METHOD 8010			
DATE ANALYZED		04-11-90	
DILUTION FACTOR*		1	
Bromodichloromethane	2.0	ND	ug/Kg
Bromoform	2.0	ND	ug/Kg
Bromomethane	2.0	ND	ug/Kg
Carbon tetrachloride	2.0	ND	ug/Kg
Chlorobenzene	2.0	ND	ug/Kg
Chloroethane	2.0	ND	ug/Kg
2-Chloroethylvinyl ether	5.0	ND	ug/Kg
Chloroform	2.0	ND	ug/Kg
Chloromethane	2.0	ND	ug/Kg
Dibromochloromethane	2.0	ND	ug/Kg
1,2-Dichlorobenzene	2.0	ND	ug/Kg
1,3-Dichlorobenzene	2.0	ND	ug/Kg
1,4-Dichlorobenzene	2.0	ND	ug/Kg
Dichlorodifluoromethane	2.0	ND	ug/Kg
1,1-Dichloroethane	2.0	ND	ug/Kg
1,2-Dichloroethane	2.0	ND	ug/Kg
1,1-Dichloroethene	2.0	ND	ug/Kg
trans-1,2-Dichloroethene	2.0	ND	ug/Kg
1,2-Dichloropropane	2.0	ND	ug/Kg
cis-1,3-Dichloropropene	2.0	ND	ug/Kg
trans-1,3-Dichloropropene	2.0	ND	ug/Kg
Methylene Chloride	50	ND	ug/Kg
1,1,2,Tetrachloroethane	2.0	ND	ug/Kg
Tetrachloroethene	2.0	ND	ug/Kg
1,1,1-Trichloroethane	2.0	ND	ug/Kg
1,1,2-Trichloroethane	2.0	ND	ug/Kg
Trichloroethene	2.0	ND	ug/Kg
Trichlorofluoromethane	2.0	ND	ug/Kg
Vinyl chloride	2.0	ND	ug/Kg

Ref: SHELL- 1601 Webster St. Alameda, Project: 81-434-02

SAMPLE DESCRIPTION: BH-B 6.8' 04-03-90
LAB Job No: (-50334)

Parameter	Reporting Limit	Results	Units
PETROLEUM HYDROCARBONS		--	
VOLATILE (SOIL)		--	
DILUTION FACTOR *		1	
DATE ANALYZED		04-12-90	
METHOD GC FID/5030		--	
as Gasoline	1	1.3	mg/Kg
METHOD 8020		--	
DILUTION FACTOR *		1	
DATE ANALYZED		04-12-90	
Benzene	2.5	3.4	ug/Kg
Ethylbenzene	2.5	10	ug/Kg
Toluene	2.5	17	ug/Kg
Xylenes, total	2.5	79	ug/Kg
PETROLEUM HYDROCARBONS		--	
EXTRACTABLE (SOIL)		--	
DILUTION FACTOR *		1	
DATE EXTRACTED		04-12-90	
DATE ANALYZED		04-12-90	
METHOD GC FID/3550		--	
as Diesel	1	ND	mg/Kg
as Motor Oil	10	ND	mg/Kg

Ref: SHELL- 1601 Webster St, Alameda, Project ID: 81-434-02

SAMPLE DESCRIPTION: BH-A/B comp 04-03-90
LAB Job No: (-50335)

Parameter	Reporting Limit	Results	Units
Lead (EPA 7421)	0.2	3.1	mg/Kg
Organic Lead	1	ND	mg/Kg
PETROLEUM HYDROCARBONS		--	
VOLATILE (SOIL)		--	
DILUTION FACTOR *		1	
DATE ANALYZED		04-12-90	
METHOD GC FID/5030		--	
as Gasoline	1	13	mg/Kg
METHOD 8020		--	
DILUTION FACTOR *		1	
DATE ANALYZED		04-12-90	
Benzene	2.5	ND	ug/Kg
Ethylbenzene	2.5	83	ug/Kg
Toluene	2.5	340	ug/Kg
Xylenes, total	2.5	520	ug/Kg

KEY TO ABBREVIATIONS and METHOD REFERENCES

<	:	Less than; When appearing in results column indicates analyte not detected at the value following, which supercedes the listed reporting limit.
mean	:	Average; sum of measurements divided by number of measurements.
mg/Kg (ppm)	:	Concentration in units of milligrams of analyte per kilogram of sample, wet-weight basis (parts per million).
mg/L	:	Concentration in units of milligrams of analyte per liter of sample.
mL/L/hr	:	Milliliters per liter per hour.
MPN/100 mL	:	Most probable number of bacteria per one hundred milliliters of sample.
N/A	:	Not applicable.
NA	:	Not analyzed.
ND	:	Not detected; the analyte concentration is less than applicable listed reporting limit.
NTU	:	Nephelometric turbidity units.
RPD	:	Relative percent difference, 100 [Value 1 - Value 2]/mean value.
SNA	:	Standard not available.
ug/Kg (ppb)	:	Concentration in units of micrograms of analyte per kilogram of sample, wet-weight basis (parts per billion).
ug/L	:	Concentration in units of micrograms of analyte per liter of sample.
umhos/cm	:	Micromhos per centimeter.

Method References

Methods 601 through 625: see "Guidelines Establishing Test Procedures for the Analysis of Pollutants" U.S. EPA, 40 CFR, Part 136, rev. 1988.

Methods 1000 through 9999: see "Test Methods for Evaluating Solid Waste", U.S. EPA SW-846, 3rd edition, 1986.

* Reporting Limits are a function of the dilution factor for any given sample. To obtain the actual reporting limits for this sample, multiply the stated reporting limits by the dilution factor.

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

Shell Service Station Address:
1601 Webster Street
Alameda, CA
Shell Contact: B. Paul Hayes
WIC #: 204-007-205
AFE #: 986647

Please send analytic results
and a copy of the signed chain of custody form to:
Robert Kitay
Project ID: 81-434-02

1483

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: Robert Kitay
Laboratory Name: NET

No. of Containers	Sample ID	Container Type	Sample Date	Vol[2]	Fil[3]	Ref[4]	Preservative (specify)	Analyze for	Analytic Method	Turn[5]	COMMENTS
1	BH-A 4.8	S	4-3-90	2x4"	No	Yes	None	gas, BTXE		Hold	
1	BH-A 6.2	S	4-3-90	2x4"	No	Yes	None			Hold	
1	BH-A 7.8	S	4-3-90	2x4"	No	Yes	None	TPH-G/BETX/HVOCS/TOG 8015/8020/8010/503		N	
1	BH-A 9.2	S	4-3-90	2x4"	No	Yes	None			Hold	
1	BH-A 10.8	S	4-3-90	2x4"	No	Yes	None	gas BTXE		Hold	
1	BH-A 15	S	4-3-90	2x4"	No	Yes	None			Hold	
1	BH-A 19.8	S	4-3-90	2x4"	No	Yes	None			Hold	
1	BH-B 5.2	S	4-3-90	2x4"	No	Yes	None	gas, BTXE		Hold	
1	BH-B 6.8	S	4-3-90	2x4"	No	Yes	None	TPH-G/BETX/HVOCS/TOG 8015/8020/8010/503		N	
1	BH-B 8.2	S	4-3-90	2x4"	No	Yes	None			Hold	
1	BH-B 10.2	S	4-3-90	2x4"	No	Yes	None	gas BTXE		Hold	
1	BH-B 15.2	S	4-3-90	2x4"	No	Yes	None	gas, BTXE		Hold	
1	BH-B 20.2	S	4-3-90	2x4"	No	Yes	None	gas, BTXE		Hold	
—	Comp	please comp.	BH-A 7.8/BH-A 15/BH-B 5.2/BH-B 15.2 and analyze for TPH-G, BETX, and total and organic lead								

* gas, BTXE added to samples per RK to LS 4/5/90

1 Robert E. Kitay 4-6-90
Released by (Signature), Date

1 Weiss Assoc.
Affiliation

2 A. F. Pla 4-6-90
Received by (Signature), Date

2 Weiss Assoc.
Affiliation

3 A. F. Pla 4-6-90
Released by (Signature), Date

3 WEISS ASSOC
Affiliation

4 Lamin Green
Shipping Carrier, Method, Date

4 N.E.T.
Affiliation

5 Lamin Green 4/6/90
Released by (Signature), Date

5 N.E.T.
Affiliation

6 K Temple 4-6-90 2300
Received by Lab Personnel, Date

6 NET Pacific
Affiliation, Telephone

x
Seal intact?

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:
*CUSTODY SEAL APPLIED UPON RECEIPT 4/6/90 2:00p J.W.

F:\ALL\ADMIN\FORMS\COCSHELL.WP2

custody seal intact RK 4/6

APPENDIX C

Analytic Reports and Chain-of-Custody Forms for Water

NATIONAL ENVIRONMENTAL TESTING, INC.

NET Pacific, Inc.
435 Tesconi Circle
Santa Rosa, CA 95401
Tel: (707) 526-7200
Fax: (707) 526-9623

Robert Kitay
Weiss Associates
5500 Shell Mound Rd.
Emeryville, CA 94524

Date: 04-23-90
NET Client Acct No: 18.09
NET Pacific Log No: 1566
Received: 04-13-90 0800

Client Reference Information

SHELL, 1601 Webster Street, Alameda; Project: 81-434-01

Sample analysis in support of the project referenced above has been completed and results are presented on following pages. Please refer to the enclosed "Key to Abbreviations" for definition of terms. Should you have questions regarding procedures or results, please feel welcome to contact Client Services.

Approved by:

Jules Skamarack
Laboratory Manager

Enclosure(s)

Ref: SHELL, 1601 Webster Street, Alameda; Project: 81-434-01

Parameter	Reporting Limit	Descriptor, Lab No. and Results 040-MW1 04-11-90 50757	 040-MW2 04-11-90 50758	 040-S-1 04-11-90 50759	Units
Oil & Grease(Total)	5	ND	ND	ND	mg/L
Oil & Grease(Non-Polar)	10	ND	ND	ND	mg/L
METHOD 601					
DATE ANALYZED		04-18-90	04-18-90	04-18-90	
DILUTION FACTOR*		1	1	1	
Bromodichloromethane	0.4	ND	ND	ND	ug/L
Bromoform	0.4	ND	ND	ND	ug/L
Bromomethane	0.4	ND	ND	ND	ug/L
Carbon tetrachloride	0.4	ND	ND	ND	ug/L
Chlorobenzene	0.4	ND	ND	ND	ug/L
Chloroethane	0.4	ND	ND	ND	ug/L
2-Chloroethylvinyl ether	1.0	ND	ND	ND	ug/L
Chloroform	0.4	ND	ND	ND	ug/L
Chloromethane	0.4	ND	ND	ND	ug/L
Dibromochloromethane	0.4	ND	ND	ND	ug/L
1,2-Dichlorobenzene	0.4	ND	ND	ND	ug/L
1,3-Dichlorobenzene	0.4	ND	ND	ND	ug/L
1,4-Dichlorobenzene	0.4	ND	ND	ND	ug/L
Dichlorodifluoromethane	0.4	ND	ND	ND	ug/L
1,1-Dichloroethane	0.4	ND	ND	ND	ug/L
1,2-Dichloroethane	0.4	ND	1.1	ND	ug/L
1,1-Dichloroethene	0.4	ND	ND	ND	ug/L
trans-1,2-Dichloroethene	0.4	ND	ND	ND	ug/L
1,2-Dichloropropane	0.4	ND	ND	ND	ug/L
cis-1,3-Dichloropropene	0.4	ND	ND	ND	ug/L
trans-1,3-Dichloropropene	0.4	ND	ND	ND	ug/L
Methylene Chloride	10	ND	ND	ND	ug/L
1,1,2,2-Tetrachloroethane	0.4	ND	ND	ND	ug/L
Tetrachloroethene	0.4	ND	ND	ND	ug/L
1,1,1-Trichloroethane	0.4	ND	ND	ND	ug/L
1,1,2-Trichloroethane	0.4	ND	ND	ND	ug/L
Trichloroethene	0.4	ND	ND	ND	ug/L
Trichlorofluoromethane	0.4	ND	ND	ND	ug/L
Vinyl chloride	2.0	ND	ND	ND	ug/L

Ref: SHELL, 1601 Webster Street, Alameda; Project: 81-434-01

Parameter	Reporting Limit	Descriptor, Lab No. and Results 040-MW1 04-11-90 50757	 040-MW2 04-11-90 50758	 040-S-1 04-11-90 50759	Units
PETROLEUM HYDROCARBONS		--	--	--	
VOLATILE (WATER)		--	--	--	
DILUTION FACTOR *		1	1	1	
DATE ANALYZED		04-17-90	04-17-90	04-17-90	
METHOD GC FID/5030		--	--	--	
as Gasoline	0.05	ND	0.58	ND	mg/L
METHOD 602		--	--	--	
DILUTION FACTOR *		1	1	1	
DATE ANALYZED		04-17-90	04-17-90	04-17-90	
Benzene	0.5	ND	20	ND	ug/L
Ethylbenzene	0.5	ND	1.2	ND	ug/L
Toluene	0.5	ND	4.9	ND	ug/L
Xylenes, total	0.5	ND	73	ND	ug/L
PETROLEUM HYDROCARBONS		--	--	--	
EXTRACTABLE (WATER)		--	--	--	
DILUTION FACTOR *		1	1	1	
DATE EXTRACTED		04-18-90	04-18-90	04-18-90	
DATE ANALYZED		04-19-90	04-19-90	04-19-90	
METHOD GC FID/3510		--	--	--	
as Diesel	0.05	ND	0.43	ND	mg/L
as Motor Oil	0.05	ND	ND	ND	mg/L

KEY TO ABBREVIATIONS and METHOD REFERENCES

<	:	Less than; When appearing in results column indicates analyte not detected at the value following, which supercedes the listed reporting limit.
mean	:	Average; sum of measurements divided by number of measurements.
mg/Kg (ppm)	:	Concentration in units of milligrams of analyte per kilogram of sample, wet-weight basis (parts per million).
mg/L	:	Concentration in units of milligrams of analyte per liter of sample.
mL/L/hr	:	Milliliters per liter per hour.
MPN/100 mL	:	Most probable number of bacteria per one hundred milliliters of sample.
N/A	:	Not applicable.
NA	:	Not analyzed.
ND	:	Not detected; the analyte concentration is less than applicable listed reporting limit.
NTU	:	Nephelometric turbidity units.
RPD	:	Relative percent difference, 100 [Value 1 - Value 2]/mean value.
SNA	:	Standard not available.
ug/Kg (ppb)	:	Concentration in units of micrograms of analyte per kilogram of sample, wet-weight basis (parts per billion).
ug/L	:	Concentration in units of micrograms of analyte per liter of sample.
umhos/cm	:	Micromhos per centimeter.

Method References

Methods 601 through 625: see "Guidelines Establishing Test Procedures for the Analysis of Pollutants" U.S. EPA, 40 CFR, Part 136, rev. 1988.

Methods 1000 through 9999: see "Test Methods for Evaluating Solid Waste", U.S. EPA SW-846, 3rd edition, 1986.

* Reporting Limits are a function of the dilution factor for any given sample. To obtain the actual reporting limits for this sample, multiply the stated reporting limits by the dilution factor.

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

Shell Service Station Address:
1601 WEBSTER ST
ALAMEDA, CA

Shell Contact:
WIC #: 204-007-204
AFE #: 986647

Please send analytic results
and a copy of the signed chain of custody form to:

ROBER KITAY - WEISS ASSOC.

1560

Project ID: 81-434-01

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: DAVID CHARLES

Laboratory Name: N.E.T. PACIFIC

No. of Containers	Sample ID	Container Type	Sample Date	Vol[2]	Fil[3]	Ref[4]	Preservative (specify)	Analyze for	Analytic Method	Turn[5]	COMMENTS
3	040-MW1	W/cV	4/11/90	40mL	N	Y	NONE	GAS/BETX	8015/8020	N	
	040-MW-2										
	040-S-1										
	040-MW-1							HVOC's	601		
	040-MW-2										
	040-S-1										
2	040-MW-1	W/B		1L.				8015-DIESEL	EPA.8015-D.		
	040-MW-2										
	040-S-1										
	040-MW-1							TOTAL OIL & GREASE	503 A&E		
	040-MW-2										
	040-S-1										
2	040-21	W/cV		40mL				"HOLD"			

1 David Charles 4/11/90
Released by (Signature), Date

1 Weiss Assoc.
Affiliation

2 [signature] 4/12/90
Received by (Signature), Date

2 WEISS ASS
Affiliation

3 [signature] 4/12/90
Released by (Signature), Date

3 Weiss Ass.
Affiliation

4 Fanni Green
Shipping Carrier, Method, Date

4 N.E.T.
Affiliation

5 Fanni Green
Released by (Signature), Date

5 N.E.T.
Affiliation

6 K Temple 4/12/90 0700
Received by Lab Personnel, Date

6 NET Pacific
Affiliation, Telephone

x K Temple
Seal Intact?

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:

* SEALED UPON RECEIPT J.S.

Released to a secure, locked storage area; sealed and signed - O.C.
P. 7125

F:\ALL\ADMIN\FORMS\COCSHELL.WP2

WEISS ASSOCIATES
Geologic and Environmental Services

Fax: 415-547-5043 Phone: 415-547-5420
5500 Shellmound Street, Emeryville, CA 94608

August 30, 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 #204-0072-0403
1601 Webster Street
Alameda, California 94501
WA Job #81-434-01

Dear Mr. Miller:

This letter describes Weiss Associates' (WA) third quarter 1991 activities at the Shell service station referenced above. 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 in the third quarter 1991, and
- Proposed work for 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 18, 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 #204-0072-0403 in Alameda, California. Ground water samples from well MW-2 (Figure 2) contained benzene and 1,2-dichloroethane (1,2-DCA) above California Department of Health Services (DHS) maximum contaminant levels (MCLs) for drinking water.

Sampling Personnel: WA Environmental Technician Paul Cardoza

Method of Purging Wells: Dedicated PVC bailers

Volume of Water Purged Prior to Sampling:

- Wells were purged of four well-casing volumes, about 16 to 32 gallons each.

Method of Collecting Ground Water Samples:	Wells
• Drawn through sampling ports on the side of dedicated PVC bailers	MW-1 and 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

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

August 30, 1991

Water Samples Transported to:

- International Technology Analytical Services, Inc. (IT), San Jose, California, and were received on July 24, 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 18, 1991. Ground water elevations decreased by 1.5 ft or less from the previous quarter.
- Ground water flows north-northeast. The flow direction has varied from north-northwest to northeast during the past year.

Depth to water measurements and ground water elevations are presented in Table 1. 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
• Total petroleum hydrocarbons as gasoline (TPH-G) by modified EPA Method 8015	all wells
• Benzene, ethylbenzene, toluene and xylenes (BETX) by EPA Method 8020	all wells
• Halogenated volatile organic compounds (HVOCs) by EPA Method 601	MW-1 and MW-2

The laboratory analyzed the samples on April 19, 21, and 22, 1991. The results are presented in Table 2 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 1,2-DCA above DHS MCLs for drinking water.
- TPH-G and BETX concentrations in samples from well MW-2 decreased for the second consecutive quarter.
- No hydrocarbons have been detected in samples from wells MW-1 and S-1 for six and eight consecutive quarters, respectively.

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.

August 30, 1991

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:fcr

E:\ALL\SHELL\425\434QMAU1.WP

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, California 94520-9998

Lester Feldman, Regional Water Quality Control Board - San Francisco Bay, 2101 Webster Street, Suite 500, Oakland, California 94612

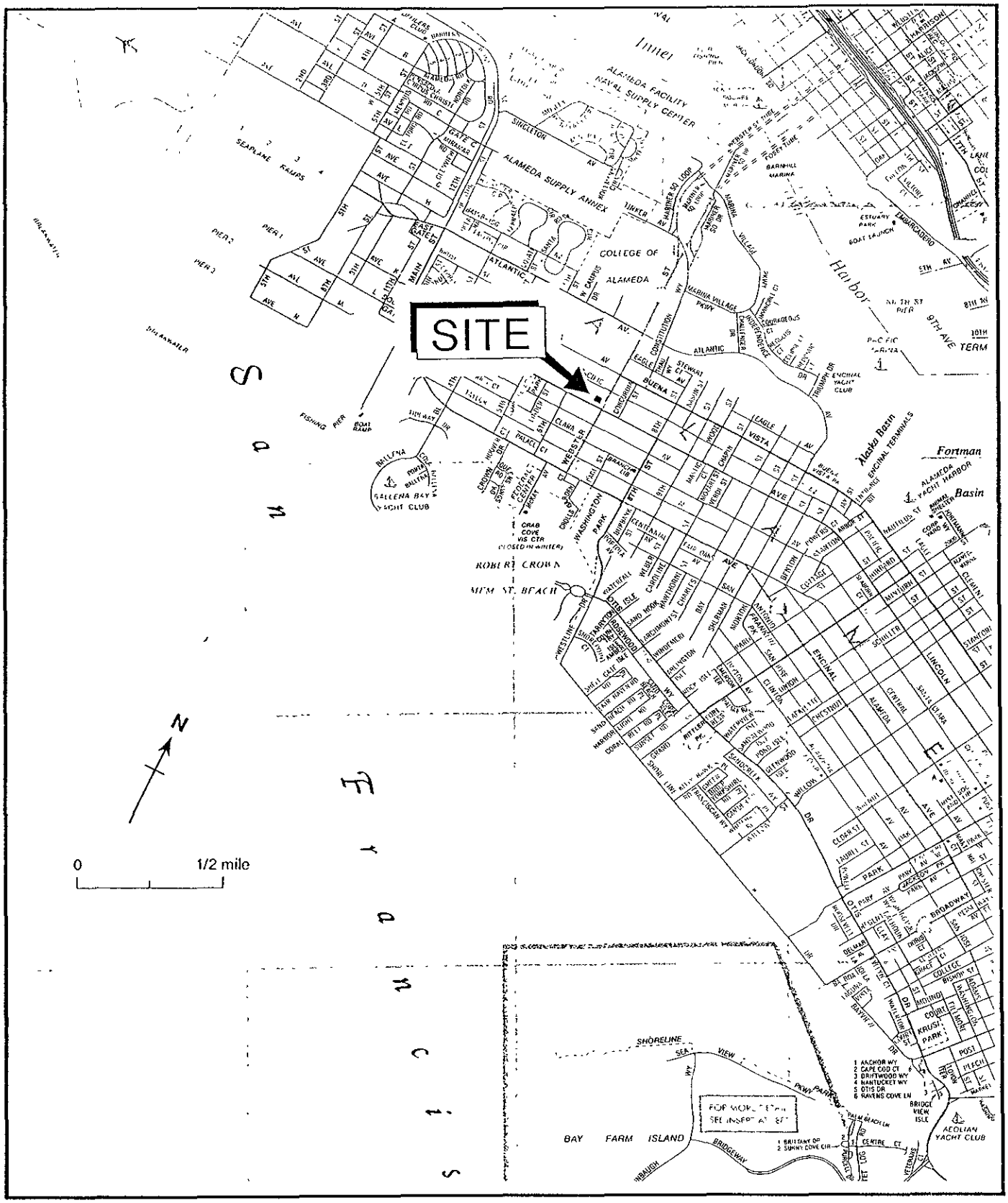


Figure 1. Site Location Map - Shell Service Station, WIC# 204-0072-0403, 1601 Webster Street, Alameda, CA

8/20/90

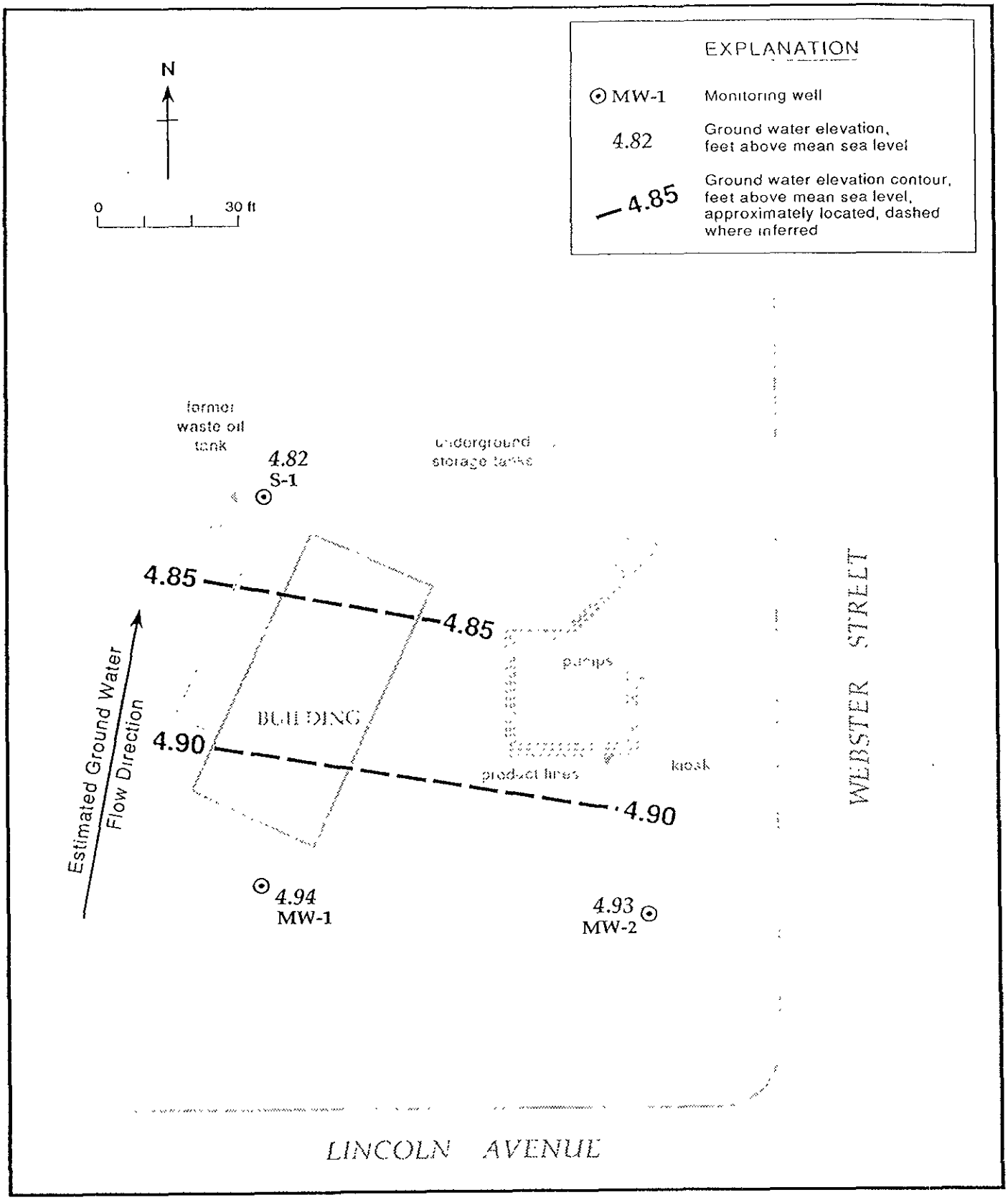
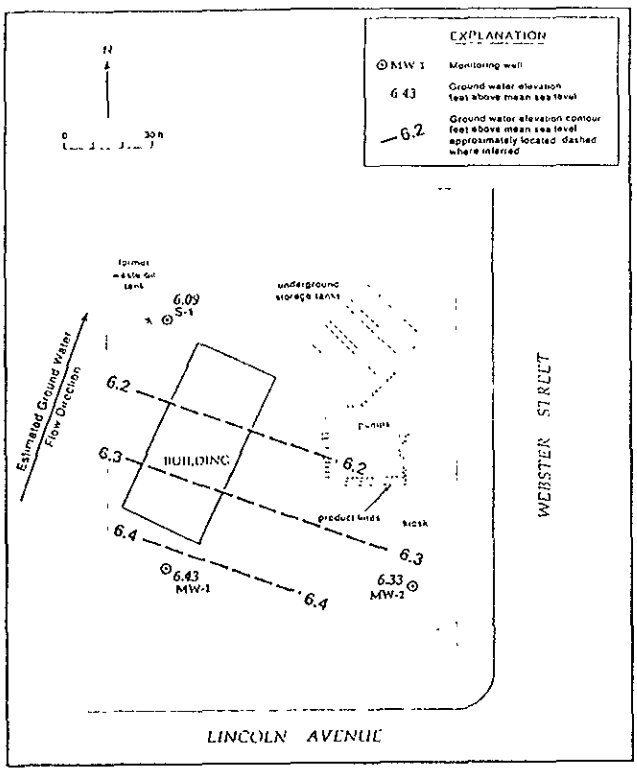
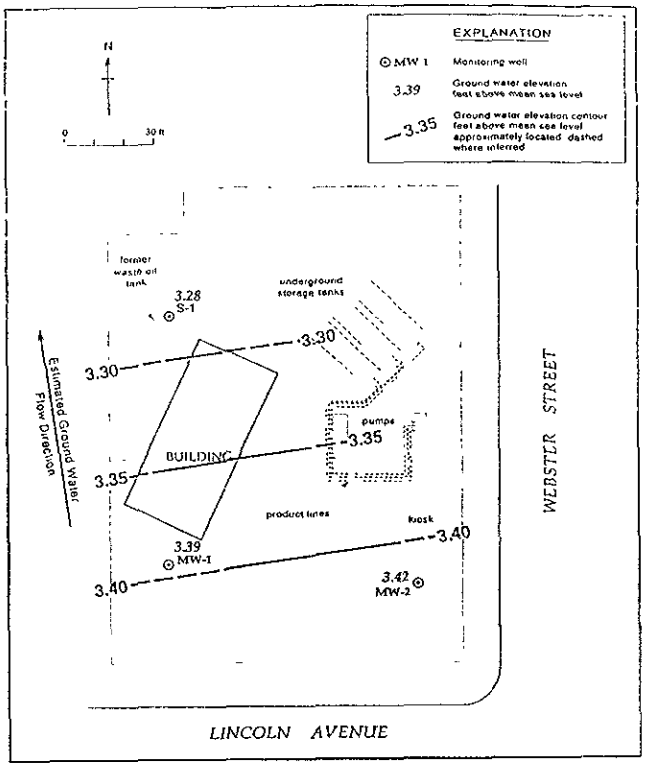


Figure 2. Monitoring Welll Locations and Ground Water Elevation Contours - July 23, 1991 - Shell Service Station WIC #204-0072-0403, 1601 Webster Street, Alameda, California

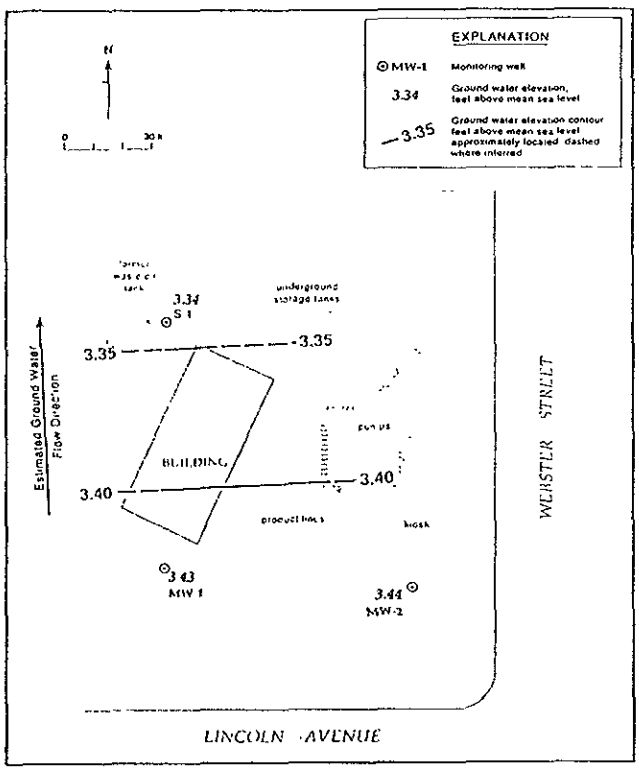
8/27/91



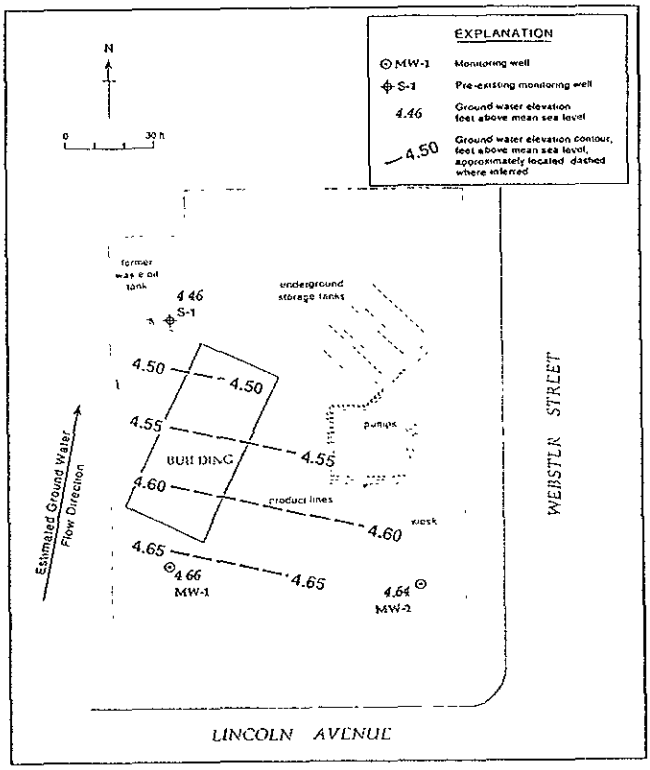
April 11, 1991



January 25, 1991



October 18, 1990



July 18, 1990

Figure 3. Previous Ground Water Elevation Contour Maps - Shell Service Station WIC #204-0072-0403, 1601 Webster Street, Alameda, California

TABLE 1. Proposed Ground Water Sampling Frequency, Shell Service Station WIC #204-0072-0403, 1601 Webster Street, Alameda, California

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

TABLE 2. Ground Water Elevations - Shell Service Station WIC #204-0072-0403, 1601 Webster Street Alameda, California

Well ID	Date	Top-of-Casing Elevation (ft above msl)	Depth to Water (ft)	Ground Water Elevation (ft above msl)
MW-1	04-11-90	13.80	8.22	5.58
	07-18-90		9.14	4.66
	10-18-90		10.37	3.43
	01-25-91		10.41	3.39
	04-11-91		7.37	6.43
	07-18-91		**8.86**	**4.94**
MW-2	04-11-90	13.20	7.69	5.51
	07-18-90		8.56	4.64
	10-18-90		9.76	3.44
	01-25-91		9.78	3.42
	04-11-91		6.87	6.33
	07-18-91		**8.27**	**4.93**
S-1	09-11-89	13.77	9.82	3.95
	04-11-90		8.41	5.36
	07-18-90		9.31	4.46
	10-18-90		10.43	3.34
	01-25-91		10.49	3.28
	04-11-91		7.68	6.09
	07-18-91		**8.95**	**4.82**

TABLE 3. Analytic Results for Ground Water - Shell Service Station, WIC #204-0072-0403, 1601 Webster Street, Alameda, California

Sample ID	Date Sampled	Depth to Water (ft)	TPH-G	TPH-D	B	E	T	X	c-1,2-DCE	1,2-DCA	TOG
			<----------parts per million (mg/L)---------->								
MW-1	04-11-90[a]	8.22	<0.05	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<10
	07-18-90	9.14	<0.05	---	<0.0005	<0.0005	<0.0005	<0.0005	0.003	<0.0005	<5
	10-18-90	10.37	<0.05	---	<0.0005	<0.0005	<0.0005	<0.0005	0.0079	<0.0005	<5
	01-25-91	10.41	<0.05	---	<0.0005	<0.0005	<0.0005	<0.0005	0.0056	<0.0005	---
	04-11-91	7.37	<0.05	---	<0.0005	<0.0005	<0.0005	<0.0005	0.0009	<0.0005	---
	07-18-91	**8.86**	**<0.05**	**---**	**<0.0005**	**<0.0005**	**<0.0005**	**<0.0005**	**0.0044**	**<0.0005**	**---**
MW-2	04-11-90[a]	7.69	0.58	0.43	0.020	0.0012	0.0049	0.073	<0.0005	0.0011	<10
	07-18-90	8.56	1.4	---	0.11	0.071	0.31	0.31	<0.0005	0.0007	<5
	10-18-90	9.76	1.9	1.3[b]	0.11	0.089	0.47	0.40	<0.0005	0.0009	<5
	01-25-91	9.78	8.1	---	0.43	0.48	1.2	2.6	<0.0005	0.0008	---
	04-11-91	6.87	2.6	---	0.13	0.25	0.15	0.33	<0.0005	<0.0005	---
	07-15-91	**8.27**	**1.3**	**---**	**0.10**	**0.084**	**0.059**	**0.12**	**<0.0005**	**0.0008**	**---**
S-1	09-04-87[c]		---	---	<0.005	<0.005	<0.005	<0.005	<0.0005	<0.0005	---
	09-11-89[d]	9.82	<0.05	<0.1	<0.0005	<0.001	<0.001	<0.003	<0.0005	<0.0005	<1
	04-11-90[a]	8.41	<0.05	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<10
	07-18-90	9.31	<0.05	---	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<5
	10-18-90	10.43	<0.05	---	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<5
	01-25-91	10.49	<0.05	---	<0.0005	<0.0005	<0.0005	<0.0005	---	---	---
	04-11-91	7.68	<0.05	---	<0.0005	<0.0005	<0.0005	<0.0005	---	---	---
	07-18-91	**8.95**	**<0.05**	**---**	**<0.0005**	**<0.0005**	**<0.0005**	**<0.0005**	**---**	**---**	**---**
Trip Blank	07-18-90		<0.05	---	<0.0005	<0.0005	<0.0005	<0.0005	---	---	---
	10-18-90		<0.05	---	<0.0005	<0.0005	<0.0005	<0.0005	---	---	---
	01-25-91		<0.05	---	<0.0005	<0.0005	<0.0005	0.0008	---	---	---
	04-11-91		<0.05	---	<0.0005	<0.0005	<0.0005	<0.0005	---	---	---
	07-18-91		**<0.05**	**---**	**<0.0005**	**<0.0005**	**<0.0005**	**<0.0005**	**---**	**---**	**---**
DHS MCLs			NE	NE	0.001	0.680	0.10[e]	1.750	0.0060	0.0005	NE

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, or 8020
E = Ethylbenzene by EPA Method 602, 624, or 8020
T = Toluene by EPA Method 602, 624, or 8020
X = Xylenes by EPA Method 602, 624, or 8020
c-1,2-DCE = cis-1,2-dichloroethylene by EPA Method 601 or 624
1,2-DCA = 1,2-dichloroethane by EPA Method 601 or 624
TOG = Total non-polar oil and grease by American Public Health Association Standard Method 503E
<n = Not detected at detection limit of n ppm
DHS MCL = California Department of Health Services maximum contaminant level for drinking water
NE = Not established
--- = Not analyzed

Analytical Laboratory:

International Technology Analytical Services, San Jose, California

Notes:

a = Samples analyzed by National Environmental Testing Pacific, Inc., Santa Rosa, California
b = Compounds detected and calculated as diesel appear to be the less volatile constituents of gasoline.
c = Sampled by Pacific Environmental Group, Santa Clara, California; 0.12 ppm acetone detected by EPA Method 624; no other volatile organic compounds detected
d = Metals detected by EPA Method 6010; 0.020 ppm chromium, 0.060 ppm lead and 0.030 ppm zinc; no cadmium detected above detection limit of 0.010 ppm; no PCBs or semi-volatile compounds detected by EPA Method 625.
e = DHS recommended action level for drinking water; MCL not established

ATTACHMENT A

WATER SAMPLE COLLECTION RECORDS

WEISS ASSOCIATES

WATER SAMPLING DATA

Well Name MW-1 Date 7/18/91 Time of Sampling 11:20

Job Name Shell Alameda II Job Number 81-434-01 Initials

Sample Point Description M (M = Monitoring Well)

Location Southwest section of station next to "air-water" service

WELL DATA: Depth to Water 8.86 ft (static, pumping) Depth to Product — ft.

Product Thickness — Well Depth 21.0 ft (spec) Well Depth 20.80 ft(sounded) Well Diameter 4 in

Initial Height of Water in Casing 11.94 ft. = volume 7.80 gal.

4 Casing Volumes to be Evacuated. Total to be evacuated 31.2 gal.

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

Bailer# and type 3"x36" PVC Dedicated Y (Y/N)

Other —

Evacuation Time: Stop 10:39

Start 10:24

Total Evacuation Time 15 min

Total Evacuated Prior to Sampling 32 gal.

Evacuation Rate 2.13 gal. per minute

Depth to Water during Evacuation — ft. — time

Depth to Water at Sampling 9.35 ft. 11:16 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.)
	NA			

SAMPLE: Color Clear Odor None

Description of matter in sample: None

Sampling Method: Sample port on dedicated 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/cv	40ml	N	Y	HCL	EPA 8015/8020	N	IT
↓	↓	↓	↓	↓	↓	↓	EPA 601	↓	↓

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 7/15/91 Time of Sampling 12:11

Job Name Shell-Alameda II Job Number 81-434-01 Initials PC

Sample Point Description MW (M = Monitoring Well)

Location Southeast section of station near kiosk

WELL DATA: Depth to Water 8.27 ft (static, pumping) Depth to Product — ft.

Product Thickness — Well Depth 20.0 ft (spec) Well Depth 19.92 ft(sounded) Well Diameter 4 in

Initial Height of Water in Casing 11.65 ft. = volume 7.61 gal.

4 Casing Volumes to be Evacuated. Total to be evacuated 30.44 gal.

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

Bailer# and type 3"x36" PVC Dedicated Y (Y/N)

Other —

Evacuation Time: Stop 11:44 11:55 —

Start 11:37 11:47 —

Total Evacation Time 15min

Total Evacuated Prior to Sampling 32 gal.

Evacuation Rate 2.13 gal. per minute

Depth to Water during Evacuation — ft. — time

Depth to Water at Sampling 9.48 ft. 12:11 time

Evacuated Dry? NO After — gal. Time —

90% 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 (M) Slight

Description of matter in sample: None

Sampling Method: Sampling port on dedicated 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	071-02	w/cv	40ml	N	Y	HCL	EPA 8015/8020 EPA 601	N	ET

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;

= Volume per container; 3 = Filtered (Y/N); 4 = Refrigerated (Y/N)

Turnaround (N = Normal, W = 1 week, R = 24 hour, HOLD (spell))

ADDITIONAL COMMENTS, CONDITIONS, PROBLEMS:

WEISS ASSOCIATES

WATER SAMPLING DATA

Well Name S-1 Date 7/27/91 Time of Sampling 12:30
Job Name Shell-Alameda [illegible] Job Number 31-474-01 Initials PC
Sample Point Description M (M = Monitoring Well)
Location Northwest section of station

WELL DATA: Depth to Water 8.95 ft (static, pumping) Depth to Product — ft.
Product Thickness — Well Depth 20.0 ft (spec) Well Depth 19.32 ft(sounded) Well Diameter 3 in
Initial Height of Water in Casing 10.89 ft. = volume 4 gal.
4 Casing Volumes to be Evacuated. Total to be evacuated 16 gal.

EVACUATION METHOD: Pump # and type — Hose # and type —
Bailer# and type 3"x36" PVC Dedicated Y (Y/N)
Other —

Evacuation Time: Stop 10:09 10:52 12:05
Start 10:01 10:46 11:59
Total Evacation Time 20min
Total Evacuated Prior to Sampling 16 gal.
Evacuation Rate .8 gal. per minute
Depth to Water during Evacuation — ft. — time
Depth to Water at Sampling 9.26 ft. 12:30 time
Evacuated Dry? Yes After 7 gal. Time 10:09
80% Recovery = 11.13
% Recovery at Sample Time 97 Time 12:30
4 casing volumes evacuated after allowing well to recover

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/R			

SAMPLE: Color Clear Odor None
Description of matter in sample: None
Sampling Method: Sample port on dedicated 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	OTI-S1	W/CV	40ml	N	Y	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:

Trip [illegible]

WEISS ASSOCIATES

WATER SAMPLING DATA

Well Name — Date [illegible] Time of Sampling 07:00

Job Name Shell Alameda II Job Number 81-32-01 Initials PC

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 Evacuation 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 ____

NA

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	w/cv	40ml	N	Y	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 REPORT 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: 08/12/91

Work Order: T1-07-311

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

This is the Certificate of Analysis for the following samples:

Client Work ID: 81-434-01/1601 Webster Ala,CA
Date Received: 07/24/91
Number of Samples: 4
Sample Type: aqueous

TABLE OF CONTENTS FOR ANALYTICAL RESULTS

Reviewed and Approved:

Suzanne Veaudry
Project Manager

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Shell Oil Company
Date: 08/12/91
Client Work ID: 81-434-01/1601 Webster Ala,CA

Work Order: T1-07-311

TEST NAME: **Halocarbons by 8010/601**

SAMPLE ID: **071-01**
SAMPLE DATE: **07/18/91**
LAB SAMPLE ID: T107311-01
SAMPLE MATRIX: aqueous
RECEIPT CONDITION: Cool
EXTRACTION DATE: N/A
ANALYSIS DATE: 07/27/91

RESULTS in Milligrams per Liter

PARAMETER	DETECTION LIMIT	DETECTED
Chloromethane	0.001	None
Bromomethane	0.001	None
Vinyl chloride	0.0005	None
Chloroethane	0.0005	None
Methylene Chloride	0.0006	None
1,1-Dichloroethene	0.0005	None
1,1-Dichloroethane	0.0005	None
Chloroform	0.0005	None
1,2-Dichloroethane	0.0005	None
1,1,1-Trichloroethane	0.0005	None
Carbon tetrachloride	0.0005	None
Bromodichloromethane	0.0005	None
1,1,2,2-Tetrachloroethane	0.0005	None
1,2-Dichloropropane	0.0005	None
trans-1,3-dichloropropene	0.0005	None
Trichloroethene	0.0005	None
Dibromochloromethane	0.0005	None
1,1,2-Trichloroethane	0.0005	None
cis-1,3-Dichloropropene	0.0005	None
Bromoform	0.0005	None
Tetrachloroethene	0.0005	None
Dichlorodifluoromethane	0.0005	None
Trichlorofluoromethane	0.0005	None
cis-1,2-Dichloroethene	0.0005	0.0044
trans-1,2-Dichloroethene	0.0005	None
Chlorobenzene	0.0005	None
1,2-Dichlorobenzene	0.0005	None
1,3-Dichlorobenzene	0.0005	None
1,4-Dichlorobenzene	0.0005	None
1,1,2-Trichlorotrifluoroethane	0.0005	None

SURROGATE	LIMITS	% RECOVERY
1-Chloro-2-fluorobenzene (Surr)	70-120%	94.

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Shell Oil Company
Date: 08/12/91
Client Work ID: 81-434-01/1601 Webster Ala,CA

Work Order: T1-07-311

TEST NAME: **Petroleum Hydrocarbons**

SAMPLE ID: **071-01**
SAMPLE DATE: **07/18/91**
LAB SAMPLE ID: **T107311-01**
SAMPLE MATRIX: **aqueous**
RECEIPT CONDITION: **cool pH < 2**

RESULTS in Milligrams per Liter:

	METHOD	EXTRACTION DATE	ANALYSIS DATE
BTEX	8020		07/25/91
Low Boiling Hydrocarbons	Mod.8015		07/25/91

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.

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Shell Oil Company
Date: 08/12/91
Client Work ID: 81-434-01/1601 Webster Ala,CA

Work Order: T1-07-311

TEST NAME: **Halocarbons by 8010/601**

SAMPLE ID: **071-02**
SAMPLE DATE: **07/18/91**
LAB SAMPLE ID: T107311-02
SAMPLE MATRIX: aqueous
RECEIPT CONDITION: Cool
EXTRACTION DATE: N/A
ANALYSIS DATE: 07/27/91

RESULTS in Milligrams per Liter

PARAMETER	DETECTION LIMIT	DETECTED
Chloromethane	0.001	None
Bromomethane	0.001	None
Vinyl chloride	0.0005	None
Chloroethane	0.0005	None
Methylene Chloride	0.0006	None
1,1-Dichloroethene	0.0005	None
1,1-Dichloroethane	0.0005	None
Chloroform	0.0005	None
1,2-Dichloroethane	0.0005	0.0008
1,1,1-Trichloroethane	0.0005	None
Carbon tetrachloride	0.0005	None
Bromodichloromethane	0.0005	None
1,1,2,2-Tetrachloroethane	0.0005	None
1,2-Dichloropropane	0.0005	None
trans-1,3-dichloropropene	0.0005	None
Trichloroethene	0.0005	None
Dibromochloromethane	0.0005	None
1,1,2-Trichloroethane	0.0005	None
cis-1,3-Dichloropropene	0.0005	None
Bromoform	0.0005	None
Tetrachloroethene	0.0005	None
Dichlorodifluoromethane	0.0005	None
Trichlorofluoromethane	0.0005	None
cis-1,2-Dichloroethene	0.0005	None
trans-1,2-Dichloroethene	0.0005	None
Chlorobenzene	0.0005	None
1,2-Dichlorobenzene	0.0005	None
1,3-Dichlorobenzene	0.0005	None
1,4-Dichlorobenzene	0.0005	None
1,1,2-Trichlorotrifluoroethane	0.0005	None

SURROGATE	LIMITS	% RECOVERY
1-Chloro-2-fluorobenzene (Surr)	70-120%	96.

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Shell Oil Company
Date: 08/12/91
Client Work ID: 81-434-01/1601 Webster Ala,CA

Work Order: T1-07-311

TEST NAME: **Petroleum Hydrocarbons**

SAMPLE ID: **071-02**
SAMPLE DATE: **07/18/91**
LAB SAMPLE ID: **T107311-02**
SAMPLE MATRIX: **aqueous**
RECEIPT CONDITION: **cool pH < 2**

RESULTS in Milligrams per Liter:

	METHOD	EXTRACTION DATE	ANALYSIS DATE
BTEX	8020		07/30/91
Low Boiling Hydrocarbons	Mod.8015		07/30/91

PARAMETER	DETECTION LIMIT	DETECTED
Low Boiling Hydrocarbons calculated as Gasoline	0.05	**1.3**
BTEX		
Benzene	0.0005	**0.10**
Toluene	0.0005	**0.059**
Ethylbenzene	0.0005	**0.084**
Xylenes (total)	0.0005	**0.12**

SURROGATES	% REC
1,3-Dichlorobenzene (Gasoline)	170.*
1,3-Dichlorobenzene (BTEX)	109.

*Surrogate elevated due to hydrocarbon interference.

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Shell Oil Company
Date: 08/12/91
Client Work ID: 81-434-01/1601 Webster Ala,CA

Work Order: T1-07-311

TEST NAME: **Petroleum Hydrocarbons**

SAMPLE ID: **071-51**
SAMPLE DATE: **07/18/91**
LAB SAMPLE ID: **T107311-03**
SAMPLE MATRIX: **aqueous**
RECEIPT CONDITION: **cool pH < 2**

RESULTS in Milligrams per Liter:

	METHOD	EXTRACTION DATE	ANALYSIS DATE
BTEX	8020		07/25/91
Low Boiling Hydrocarbons	Mod.8015		07/25/91

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)	98.
1,3-Dichlorobenzene (BTEX)	98.

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Shell Oil Company
Date: 08/12/91
Client Work ID: 81-434-01/1601 Webster Ala,CA

Work Order: T1-07-311

TEST NAME: **Petroleum Hydrocarbons**

SAMPLE ID: **071-21**
SAMPLE DATE: **07/18/91**
LAB SAMPLE ID: **T107311-04**
SAMPLE MATRIX: **aqueous**
RECEIPT CONDITION: **Cool pH < 2**

RESULTS in Milligrams per Liter:

	METHOD	EXTRACTION DATE	ANALYSIS DATE
BTEX	8020		07/25/91
Low Boiling Hydrocarbons	Mod.8015		07/25/91

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)	97.
1,3-Dichlorobenzene (BTEX)	98.

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Shell Oil Company
Date: 08/12/91
Client Work ID: 81-434-01/1601 Webster Ala,CA

Work Order: T1-07-311

TEST NAME: **Halocarbons by 8010/601**

SAMPLE ID: **Quality Control Method Blank**
SAMPLE DATE: **not spec**
LAB SAMPLE ID: **T107311-05**
SAMPLE MATRIX: **aqueous**
RECEIPT CONDITION: **Cool**
EXTRACTION DATE: **N/A**
ANALYSIS DATE: **07/26/91**

RESULTS in Milligrams per Liter

PARAMETER	DETECTION LIMIT	DETECTED
Chloromethane	0.0005	None
Bromomethane	0.0005	None
Vinyl chloride	0.0005	None
Chloroethane	0.0005	None
Methylene Chloride	0.0005	0.0008
1,1-Dichloroethene	0.0005	None
1,1-Dichloroethane	0.0005	None
Chloroform	0.0005	None
1,2-Dichloroethane	0.0005	None
1,1,1-Trichloroethane	0.0005	None
Carbon tetrachloride	0.0005	None
Bromodichloromethane	0.0005	None
1,1,2,2-Tetrachloroethane	0.0005	None
1,2-Dichloropropane	0.0005	None
trans-1,3-dichloropropene	0.0005	None
Trichloroethene	0.0005	None
Dibromochloromethane	0.0005	None
1,1,2-Trichloroethane	0.0005	None
cis-1,3-Dichloropropene	0.0005	None
Bromoform	0.0005	None
Tetrachloroethene	0.0005	None
Dichlorodifluoromethane	0.0005	None
Trichlorofluoromethane	0.0005	None
cis-1,2-Dichloroethene	0.0005	None
trans-1,2-Dichloroethene	0.0005	None
Chlorobenzene	0.0005	None
1,2-Dichlorobenzene	0.0005	None
1,3-Dichlorobenzene	0.0005	None
1,4-Dichlorobenzene	0.0005	None
1,1,2-Trichlorotrifluoroethane	0.0005	None

SURROGATE	LIMITS	% RECOVERY
1-Chloro-2-fluorobenzene (Surr)	70-120%	97.

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Shell Oil Company
Date: 08/12/91
Client Work ID: 81-434-01/1601 Webster Ala,CA

Work Order: T1-07-311

TEST NAME: **Spike and Spike Duplicates**

SAMPLE ID: **Quality Control**
SAMPLE DATE: **not spec**
LAB SAMPLE ID: **T107311-05A**
EXTRACTION DATE:
ANALYSIS DATE: **07/25/91**
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.	408.	387.	82.	77.	6.

SURROGATES	MS %Rec	MSD %Rec
1,3-Dichlorobenzene	108.	98.

IT ANALYTICAL SERVICES
SAN JOSE, CA

Company: Shell Oil Company
Date: 08/12/91
Client Work ID: 81-434-01/1601 Webster Ala,CA

Work Order: T1-07-311

TEST NAME: **Spike and Spike Duplicates**

SAMPLE ID: **Quality Control**
SAMPLE DATE: **not spec**
LAB SAMPLE ID: **T107311-05B**
EXTRACTION DATE:
ANALYSIS DATE: **07/29/91**
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.	498.	486.	100.	97.	3.

SURROGATES	MS %Rec	MSD %Rec
1,3-Dichlorobenzene	125.*	122.*

*Surrogate elevated due to hydrocarbon interference.

Company: Shell Oil Company
Date: 08/12/91
Client Work ID: 81-434-01/1601 Webster Ala,CA

IT ANALYTICAL SERVICES
SAN JOSE, CA

Work Order: T1-07-311

TEST NAME: **Spike and Spike Duplicates**

SAMPLE ID: **Quality Control**
SAMPLE DATE: **not spec**
LAB SAMPLE ID: **T107311-05C**
EXTRACTION DATE:
ANALYSIS DATE: **07/26/91**
ANALYSIS METHOD: **601**

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
Chlorobenzene	None	10.0	10.1	9.91	101.	99.	2.
1,1-Dichloroethene	None	10.0	11.4	10.8	114.	108.	5.
Trichloroethene	None	10.0	10.9	10.7	109.	107.	2.

SURROGATES	MS %Rec	MSD %Rec
Halocarbons	105.	101.

Company: Shell Oil Company
Date: 08/12/91
Client Work ID: 81-434-01/1601 Webster Ala,CA

IT ANALYTICAL SERVICES
SAN JOSE, CA

Work Order: T1-07-311

TEST CODE **601** TEST NAME **Halocarbons by 8010/601**

The method of analysis for volatile halocarbons is taken from EPA Methods 601 and 8010. Samples are examined using the purge and trap technique. Final detection is by gas chromatography using an electrolytic conductivity detector.

Dichloromethane is reported as not detected at an elevated limit of 0.0006 Milligrams per Liter. Sample results for anlaytes are confirmed by history of sample prior to the April 1991 sampling.

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.