Weiss Associates Environmental and Geologic Services

5500 Shellmound Street, Emeryville, CA 94608-2411 Fax. 510-547-5043 Phone: **510-547-5420**

February 24, 1993

Juliet Shin
Alameda County Department
of Environmental Health
Hazardous Materials Division
80 Swan Way, Room 200
Oakland, California 94621-1426

Re: Subsurface Investigation
Shell Service Station
WIC #204-0072-0502
2160 Otis Drive
Alameda, California
WA Job #81-429-06

Dear Ms. Shin:

This letter presents the results of Weiss Associates' (WA) subsurface investigation at the Shell service station referenced above (Figure 1). The investigation was conducted in response to an August 7, 1992 letter from Scott Seery of Alameda County Health Care Services (ACHCS) to Dan Kirk of Shell Oil Company. The objective of this investigation was to assess whether the low hydrocarbon concentrations detected in ground water samples from well MW-2 originated from the pump islands, the under ground storage tanks (USTs) or a different source. Presented below is a summary of our scope of work and our investigation results.

SCOPE OF WORK

WA's scope of work for this investigation was to:

- Drill three soil borings downgradient of the existing USTs and pump islands (Figure 2),
- Collect soil and grab ground water samples from the borings and analyze the samples for petroleum hydrocarbons to assess whether hydrocarbons are in soil or ground water downgradient of the existing tanks and pump islands, and
- Report the results.

INVESTIGATION RESULTS

Site Setting

Geographic Location: The site is located in Alameda, about six miles west of the Hayward Fault within the East Bay Plain ground water basin.

Topography: The site is about 5 ft above mean sea level. Local topography slopes very gently southwestward.

Surroundings: Mixed commercial and residential development.

Wells in the Site Vicinity: Although the well survey identified 15 wells within one-half mile of the site, only one well, located one-half mile to the east and crossgradient of the site, is used for domestic water supply.

Site Geology: The sediments beneath the site are primarily sand and silty sand associated with the Merritt Sand, an unconsolidated unit comprised of Pleistocene beach and near-shore deposits[1]. Although the Merritt Sand contains some ground water, it is not considered a primary water supply because of its limited areal extent and thickness. The main regional water-bearing unit is a thick pleistocene alluvial deposit that extends beneath the entire East Bay Plain Area, including Alameda.

Previous Investigations

1987 Waste Oil Tank Removal: In June 1987, Petroleum Engineering of Santa Rosa, California removed a 550-gallon waste oil tank and installed a new 550-gallon fiberglass tank in the former tank pit. Immediately following the tank removal, Blaine Tech Services (BTS) of San Jose, California collected a soil sample beneath the former tank location at 7 ft depth and from the excavation sidewall at 3.5 ft depth. The soil samples from 7 and 3.5 ft depth contained

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[1] Alameda County Flood Control and Water Conservation District (ACFCWCD), 1988, Geohydrology and Groundwater - Quality Overview, East Bay Plain Area, Alameda County, California, 205(J) Report, 83 pp. and 6 appendices.

1,700 and 47 parts per million (ppm) petroleum oil and grease (POG) respectively[2]. Blaine Tech records indicate that the tank had no holes at the time of removal.

1987 Well Installation: In September 1987, Pacific Environmental Group (PEG) of Santa Clara, California drilled one soil boring and installed monitoring well S-1 to assess whether hydrocarbons detected during tank excavation sampling were in ground water. Up to 1,600 ppm POG were detected in soil samples from the boring and up to 0.27 ppm acetone was detected in ground water samples from the well.

1990 Well Installation: In April 1990, WA drilled soil borings BH-A and BH-B and installed ground water monitoring wells MW-1 and MW-2 in the borings to assess the ground water flow direction and the distribution of hydrocarbons in ground water. No total petroleum hydrocarbons as gasoline (TPH-G) were detected in any of the soil samples. POG was detected at 270 ppm in a saturated soil sample from 4.8 ft depth in boring BH-B.

Quarterly Sampling: Except for an apparently anomalous analytic result detected in October 1990, the highest hydrocarbon concentrations detected to date are 0.57 ppm TPH-G, and 0.15 ppm benzene in well MW-2. However, the average concentrations detected to date are only about 0.15 ppm TPH-G and 0.03 ppm benzene. In October 1990, 190 ppm TPH-G and 55 ppm benzene, but no ethylbenzene, toluene or xylenes were detected in well MW-2. This analytic data appears to be incorrect since this TPH-G and benzene concentration is significantly higher than previous or subsequent results, and since toluene, xylenes and ethylbenzene are usually detected in conjunction with high benzene concentrations. We have requested the chromatograms from the lab and anticipate resolving this discrepancy in the near future.

Drilling

Drilling Date:	December 17, 1992
Drilling Geologist:	David C. Elias, WA Staff Geologist
Drilling Method:	Cuttingless sampling system using a CME-55 drill rig. (Drilling and sampling procedures are presented in Attachment A.)
Number of Borings:	3 (BH-C, BH-D, BH-E, Figure 2)
Boring Depths:	8-9 ft

[2] BTS, June 26, 1987, Sampling Report 87165-T-1, Shell Service Station, 2160 Otis Drive, Alameda, California, Consultant's letter-report prepared for Shell Oil Company, 3 pages and 2 attachments.

Soil Sampling Method:	Steam-cleaned split-barrel drive sampler lined with brass tubes. One sample was collected from each boring from immediately above the water table, which is about four to five ft deep beneath the site.
Analytical Methods for Soil:	Modified EPA method 8015 for Total petroleum hydrocarbons as gasoline (TPH-G), EPA method 8020 for benzene, ethylbenzene, toluene and xylenes (BETX) and EPA method 8010 for halogenated volatile organic compounds (HVOCs).
Sediments Encountered:	Sand to 9 ft depth. Boring logs are presented in Attachment B.
Ground Water Sampling Method:	Steam cleaned PVC Bailer.
Analytical Methods for Ground: Water:	Modified EPA method 8015 for TPH-G, EPA method 8020 for BETX and EPA method 601 for HVOCs.
Waste Disposal:	Steam clean rinsate and purge water were recycled at the Shell Refinery in Martinez, California. No soil cuttings were generated.

CONCLUSIONS

Hydrocarbon Distribution in Soil: The only hydrocarbons detected in soil were 1.5 ppm TPH-G from boring BH-E and 0.0042 ppm ethylbenzene from boring BH-D. Both of these hydrocarbon concentrations are only slightly over laboratory detection limits of 1.0 and 0.0025 ppm respectively. No HVOCs were detected in any of the soil samples. Based on the results of this and previous investigations, there is no evidence of a hydrocarbon release from the tanks or pump islands. Based on the soil analytic results for well MW-2 and the three new borings, hydrocarbons do not appear to extend offsite in soil downgradient of the tanks and pump islands.

Hydrocarbon Distribution in Ground Water: No TPH-G, BETX or HVOCs were detected in any of the ground water samples from the borings. Therefore, the low hydrocarbon concentrations detected in ground water samples from monitoring well MW-2 do not appear to originate from the existing USTs or pump islands. It is also unlikely that the hydrocarbons originated from the former waste oil tank since no hydrocarbons were detected in ground water from the adjacent boring BH-E. Although TPH-G have been quantified in ground water samples from MW-2, the analytical laboratory has consistently noted that the chromatogram is not typical of gasoline. In addition, the HVOCs detected are not typically associated with a gasoline release. Therefore, possible sources of the hydrocarbons and low HVOC concentrations detected in well MW-2 may include:

- An adjacent, offsite source,
- A small onsite surface spill, or ← what was former site use?
- A small spill associated with the former site use or surrounding properties.

Please call if you have any questions or comments.

Sincerely,
Weiss Associates

David C. Elias
Staff Geologist

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

DCE/JPT:de

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Attachments: Figures
Tables
A - Sampling Procedures
B - Boring Logs
C - Analytic Results for Soil and Ground Water
D - Previous Ground Water Analytic Results

cc: Dan Kirk, Shell Oil Company, P.O. Box 4023, Concord, California 94524
Tom Callaghan, California Regional Water Quality Control Board, San Francisco Bay Region, 2101 Webster Street, Suite 500, Oakland, California 94612

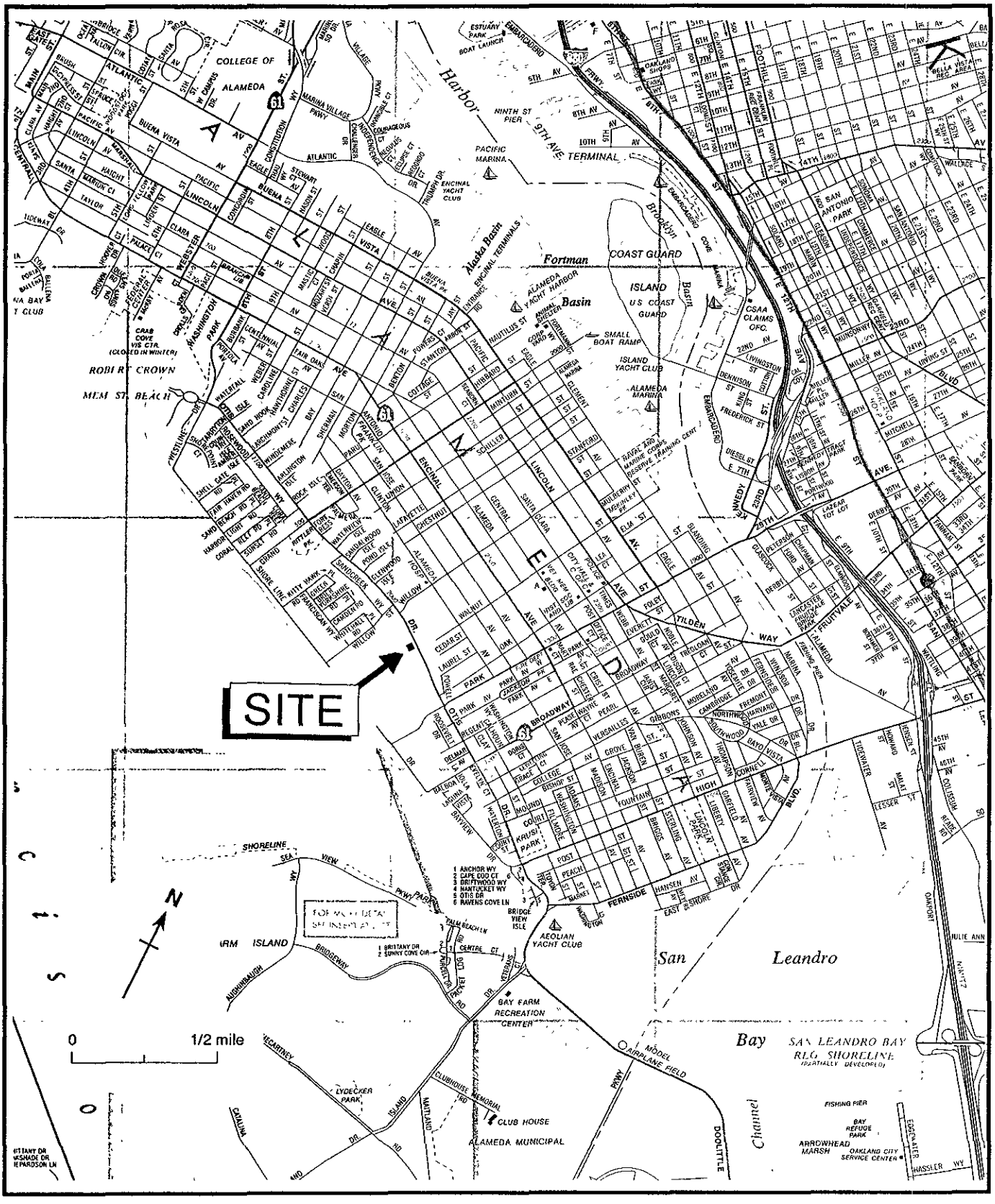


Figure 1. Site Location Map - Shell Service Station, WIC# 204-0072-0502, 2160 Otis Drive, Alameda, CA

8/21/90

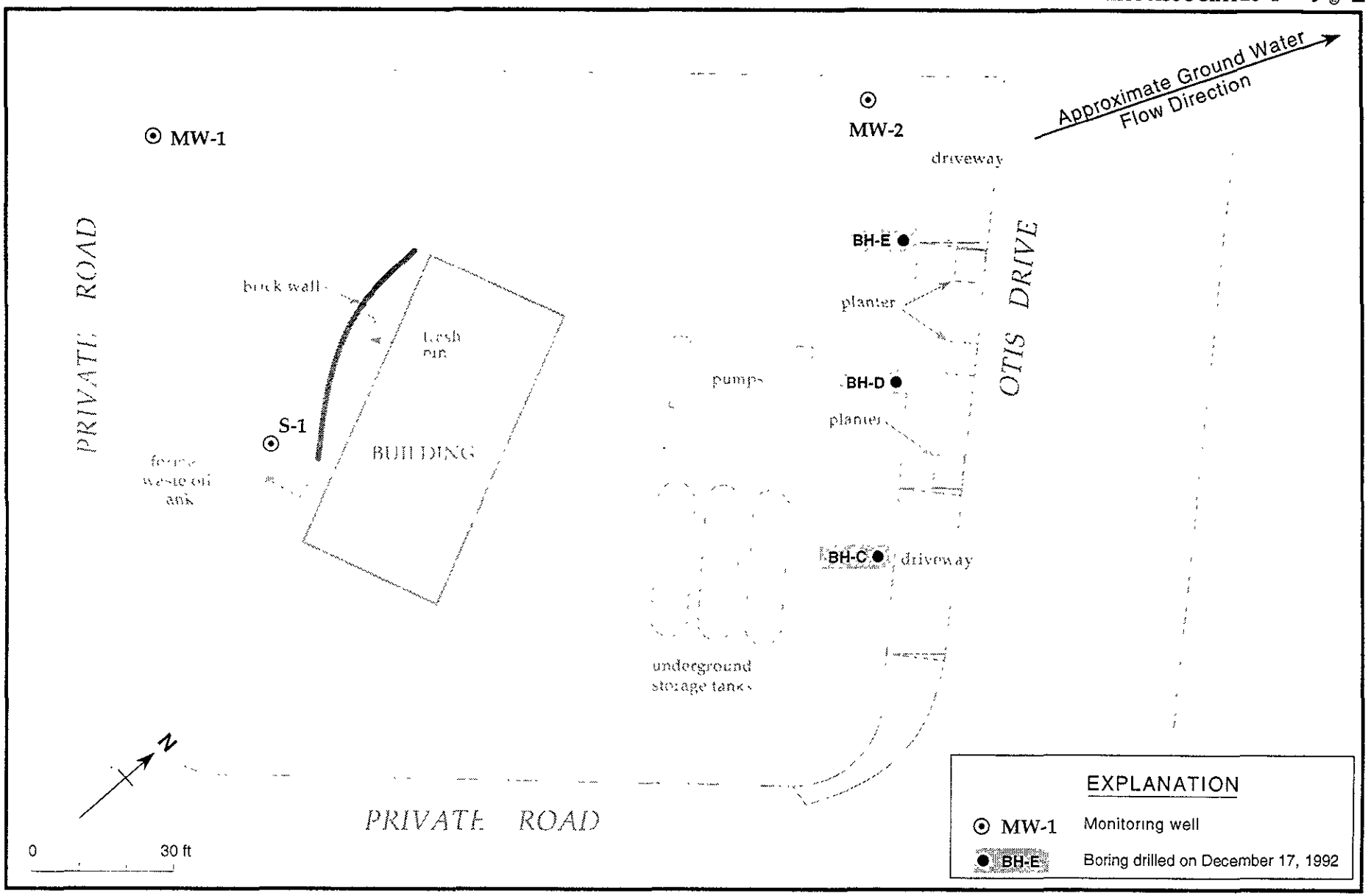


Figure 2. Monitoring Well and Soil Boring Locations - Shell Service Station - WIC #204-0072-0502, 2160 Otis Drive, Alameda, California

2/24/93

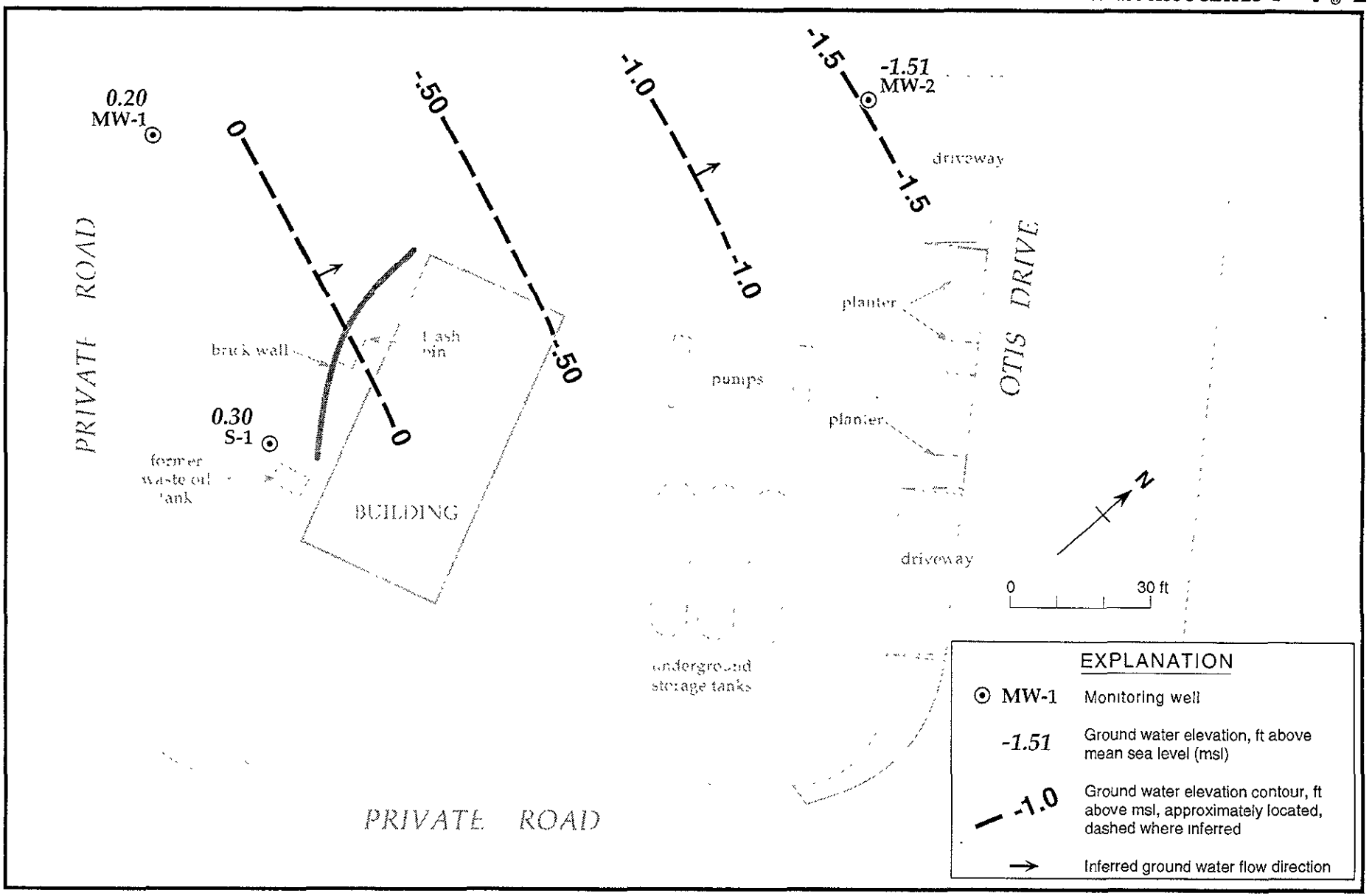


Figure 3. Ground Water Elevations - October 2, 1992 - Shell Service Station WIC #204-0072-0502, 2160 Otis Drive, Alameda, California

2/16/93

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

Well ID	Date Sampled	Depth to Water (ft)	TPH-G	B	E	T	X	HVOCs
			<----------parts per million (mg/L)---------->					
BH-C	12/17/92	5.0	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	ND[a]
BH-D	12/17/92	5.0	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	ND[a]
BH-E	12/17/92	5.5	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	ND[a]
Trip Blank	12/17/92		<0.05	<0.0005	<0.0005	<0.0005	<0.0005	---
DTSC MCLs			NE	0.001	0.680	0.10[b]	1.750	

Abbreviations:

TPH-G = Total petroleum hydrocarbons as gasoline by Modified EPA Method 8015
B = Benzene by EPA Method 8020
E = Ethylbenzene by EPA Method 8020
T = Toluene by EPA Method 8020
X = Xylenes by EPA Method 8020
HVOCs = Halogenated volatile organic compounds by EPA Method 601
--- = Not analyzed
NE = Not established
DTSC MCLs = California Department of Toxic Substances Control maximum contaminant levels for drinking water
<n = Not detected at detection limits of n ppm

Analytical Laboratories:

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

Notes:

a = Not detected at detection limits of 0.0004 to 0.010 parts per million (ppm)

b = DTSC recommended action level for drinking water; MCL not established

Table 2. Cumulative Analytic Results for Soil - Shell Service Station, WIC 204-0072-0502, 2160 Otis Drive, Alameda, California

Soil Boring (Well ID)	Sample Depth (ft)	Date Sampled	Analytic Lab	Analytic Method	Sat/ Unsat	TPH-G	TPH-D	TPH-MO	B	E	T	X	HVOCs	POG
						<----------parts per million (mg/kg)---------->								
BH-A (MW-1)	3.8	04/02/90	NET	8015/8020 8010/503E	Unsat	<1	<1	<10	<0.0025	<0.0025	<0.0025	<0.0025	ND[a]	<50
	6.8	04/02/90	NET	8015/8020	Sat	<1	---	---	<0.0025	<0.0025	<0.0025	<0.0025	---	---
	14.2	04/02/90	NET	8015/8020	Sat	<1	---	---	<0.0025	<0.0025	<0.0025	<0.0025	---	---
BH-B (MW-2)	3.2	04/02/90	NET	8015/8020	Unsat	<1	---	---	<0.0025	<0.0025	<0.0025	<0.0025	---	---
	4.8	04/02/90	NET	8015/8020 8010/503E	Sat	<1	<1	28	<0.0025	<0.0025	<0.0025	<0.0025	ND[a]	270
	10.2	04/02/90	NET	8015/8020	Sat	<1	---	---	0.008	<0.0025	<0.0025	<0.0025	---	---
BH-C	4.2	12/17/92	NET	8015/8020 8010	Unsat	<1	---	---	<0.0025	<0.0025	<0.0025	<0.0025	ND[a]	---
BH-D	4.7	12/17/92	NET	8015/8020 8010	Unsat	<1	---	---	<0.0025	0.0042	<0.0025	<0.0025	ND[a]	---
BH-E	4.5	12/17/92	NET	8015/8020 8010	Unsat	1.5	---	---	<0.0025	<0.0025	<0.0025	<0.0025	ND[a]	---

Abbreviations:

TPH-G = Total petroleum hydrocarbons as gasoline
TPH-D = Total petroleum hydrocarbons as diesel
TPH-MO = Total petroleum hydrocarbons as motor oil
B = Benzene
E = Ethylbenzene
T = Toluene
X = Xylenes
HVOCs = Halogenated volatile organic compounds
POG = Petroleum oil and grease (non-polar)
Sat = Saturated soil sample
Unsat = Unsaturated soil sample
<n = Not detected at detection limit of n ppm

Analytical Laboratory:

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

Analytic Methods:

503E = APHA Standard Method 503 for POG
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

Notes:

a = Not detected at detection limits of 0.002 to 0.05 parts per million (ppm)

ATTACHMENT A

SAMPLING PROCEDURES

STANDARD FIELD PROCEDURES

WA has developed standard procedures for drilling and sampling soil borings and installing, developing and sampling ground water monitoring wells. These procedures comply with Federal, State and local regulatory guidelines. Specific procedures are summarized below.

SOIL BORING AND SAMPLING

Objectives/Supervision

Soil sampling objectives include characterizing subsurface lithology, assessing whether the soils exhibit obvious hydrocarbon or other compound vapor or staining, and collecting samples for analysis at a State-certified laboratory. All borings are logged using the Unified Soil Classification System by a trained geologist working under the supervision of a California Registered Geologist (RG) or a Certified Engineering Geologist (CEG).

Soil Boring and Sampling

Deep soil borings or borings for well installation are typically drilled using hollow-stem augers. Split-barrel samplers lined with steam-cleaned brass or stainless steel tubes are driven through the hollow auger stem into undisturbed sediments at the bottom of the borehole using a 140 pound hammer dropped 30 inches. Soil samples can also be collected without using hollow-stem augers by progressively driving split-barrel soil samplers to depths of up to 30 ft.

Soil samples are collected at least every five ft to characterize the subsurface sediments and for possible chemical analysis. Near the water table and at lithologic changes, the sampling interval may be less than five ft.

Drilling and sampling equipment is steam-cleaned prior to drilling and between borings to prevent cross-contamination. Sampling equipment is washed between samples with trisodium phosphate or an equivalent EPA-approved detergent.

Sample Analysis

After noting the lithology at each end of the sampling tubes, the tube chosen for analysis is immediately trimmed of excess soil and capped with teflon tape and plastic end caps. The sample is labelled, stored at or below 4°C, and transported under chain-of-custody to a State-certified analytic laboratory.

Screening

One of the remaining tubes is partially emptied leaving about one-third of the soil in the tube. The tube is capped with plastic end caps and set aside to allow hydrocarbons to volatilize from the soil. After ten to fifteen minutes, a portable photoionization detector (PID) measures volatile hydrocarbon vapor concentrations in the tube headspace, extracting the vapor through a slit in the cap. PID measurements are used along with the stratigraphy and ground water depth to select soil samples for analysis.

Grouting

If the borings are not completed as wells, the borings are filled to the ground surface with cement grout poured or pumped through a tremie pipe. If wells are completed in the borings, the well installation, development and sampling procedures summarized below are followed.

MONITORING WELL INSTALLATION, DEVELOPMENT AND SAMPLING

Well Construction and Surveying

Wells are installed to monitor ground water quality and determine the ground water elevation, flow direction and gradient. Well depths and screen lengths are based on ground water depth, occurrence of hydrocarbons or other compounds in the borehole, stratigraphy and state and local regulatory guidelines. Well screens typically extend 15 ft below and 5 ft above the static water level at the time of drilling. However, the well screen will generally not extend into or through a clay layer that is at least three ft thick.

Well casing and screen are flush-threaded, Schedule 40 PVC. Screen slot size varies according to the sediments screened, but slots are generally 0.010 or 0.020 inches wide. A rinsed and graded sand occupies the annular space between the boring and the well screen to about one to two ft above the well screen. A two ft thick hydrated bentonite seal separates the sand from the overlying sanitary surface seal composed of cement with 3-5% bentonite.

Well-heads are secured by locking well-caps inside traffic-rated vaults finished flush with the ground surface. A stovepipe may be installed between the well-head and the vault cap for additional security.

The well top-of-casing elevation is surveyed with respect to mean sea level and the well is surveyed for horizontal location with respect to an onsite or nearby offsite landmark.

Well Development

After 24 hours, the wells are developed using a combination of ground water surging and extraction. Surging agitates the ground water and dislodges fine sediments from the sand pack. After about ten minutes of surging, ground water is extracted from the well using bailing, pumping and/or reverse air-lifting through an eductor pipe to remove the sediments from the well. Surging and extraction continue until at least ten well-casing volumes of ground water are extracted and the sediment volume in the ground water is negligible. All equipment is steam-cleaned prior to use and air used for air-lifting is filtered to prevent oil entrained in the compressed air from entering the well. Wells that are developed using air-lift evacuation are not sampled until at least 24 hours after they are developed.

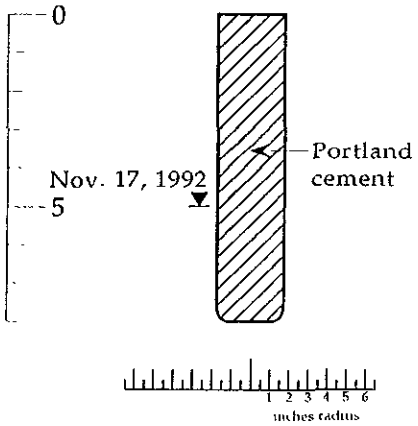
Ground Water Sampling

Depending on local regulatory guidelines, three to four well-casing volumes of ground water are purged prior to sampling. Purging continues until ground water pH, conductivity, and temperature have stabilized. Ground water samples are collected using bailers or pumps and are decanted into the appropriate containers supplied by the analytic laboratory. Samples are labelled, placed in protective foam sleeves, stored at 4°C, and transported under chain-of-custody to the laboratory. Laboratory-supplied trip blanks accompany the samples and are analyzed to check for cross-contamination. An equipment blank may be analyzed if non-dedicated sampling equipment is used.

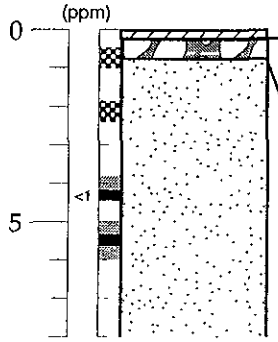
ATTACHMENT B

BORING LOGS

BORING BH-C



DEPTH BELOW GROUND SURFACE (FEET)



DESCRIPTION

Asphaltic concrete

Silty GRAVEL (GM); gray; medium dense; damp; 30% fines; 10% fine to very coarse sand; 60% gravel to 1" diameter; high K; [fill]

SAND (SP); olive to light brown; loose; moist; 5% fines; 95% very fine to fine sand; high K

Wet at 4'

EXPLANATION

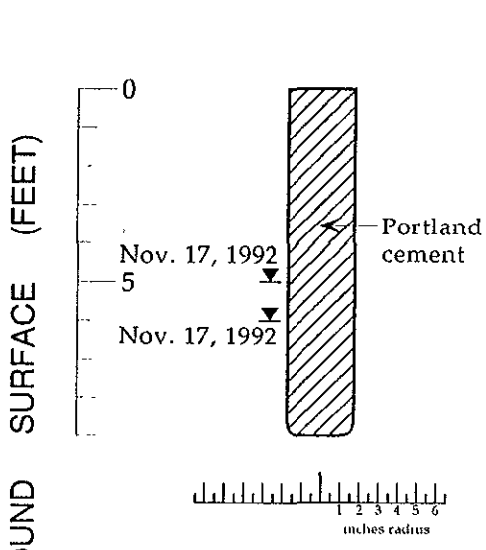
- ▼ Water level during drilling (date)
- ▽ Water level (date)
- ——····—— Contact (dotted where approximate)
- —?—?— Uncertain contact
- ////////// Gradational contact
- Location of recovered drive sample
- Location of drive sample sealed for chemical analysis
- Cutting sample
- K = Estimated hydraulic conductivity

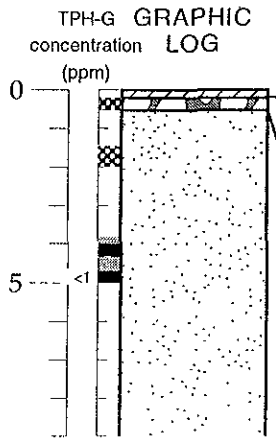
Logged By: David C. Elias
Supervisor: Joseph P. Theisen; CEG #1645
Drilling Company: Soils Exploration Drilling, Vacaville, CA
License Number: C57-582696
Driller: Scott Fitchie
Drilling Method: Cuttingless system
Date Drilled: December 17, 1992
Type of Sampler: Split barrel (2" ID)
Ground Surface Elevation: 4 ft above mean sea level
TPH-G: Total petroleum hydrocarbons as gasoline in soil by modified EPA Method 8015

Boring Log Construction Details - Boring BH-C - Shell Service Station WIC #204-0072-0502, 2160 Otis Drive, Alameda, California

2/16/93

BORING BH-D





DESCRIPTION

Asphaltic concrete

Silty GRAVEL (GM); gray; medium dense; damp; 30% fines; 10% fine to very coarse sand; 60% gravel to 1" diameter; high K; [fill]

SAND (SP); olive to light brown; loose; moist; 5% fines; 95% very fine to fine sand; high K

Wet at 4'

EXPLANATION

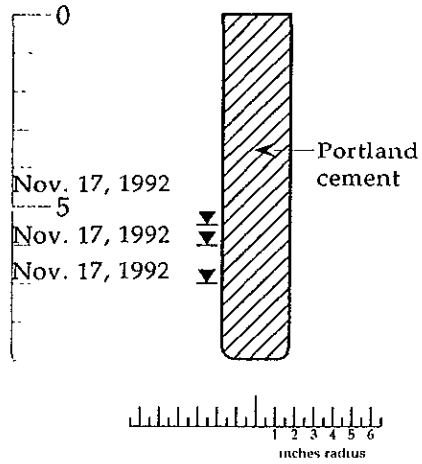
- Water level during drilling (date)
- Water level (date)
- Contact (dotted where approximate)
- Uncertain contact
- Gradational contact
- Location of recovered drive sample
- Location of drive sample sealed for chemical analysis
- Cutting sample
- K = Estimated hydraulic conductivity

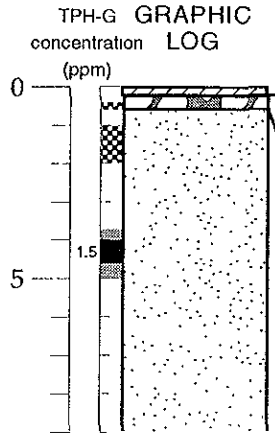
Logged By: David C. Elias
Supervisor: Joseph P. Theisen; CEG #1645
Drilling Company: Soils Exploration Drilling, Vacaville, CA
License Number: C57-582696
Driller: Scott Fitchie
Drilling Method: Cuttingless system
Date Drilled: December 17, 1992
Type of Sampler: Split barrel (2" ID)
Ground Surface Elevation: 4 ft above mean sea level
TPH-G: Total petroleum hydrocarbons as gasoline in soil by modified EPA Method 8015

Boring Log Construction Details - Boring BH-D - Shell Service Station WIC #204-0072-0502, 2160 Otis Drive, Alameda, California

2/16/93

BORING BH-E





DESCRIPTION

Asphaltic concrete

Silty GRAVEL (GM); gray; medium dense; damp; 30% fines; 10% fine to very coarse sand; 60% gravel to 1" diameter; high K; [fill]

SAND (SP); olive to light brown; moist; loose; 5% fines; 95% very fine to fine sand; high K

Gray black and wet at 4.8'

EXPLANATION

- ▼ Water level during drilling (date)
- ▽ Water level (date)
- ——····· Contact (dotted where approximate)
- —?—?— Uncertain contact
- ////////// Gradational contact
- Location of recovered drive sample
- Location of drive sample sealed for chemical analysis
- Cutting sample
- K = Estimated hydraulic conductivity

Logged By: David C. Elias
Supervisor: Joseph P. Theisen; CEG #1645
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License Number: C57-582696
Driller: Scott Fitchie
Drilling Method: Cuttingless system
Date Drilled: December 17, 1992
Type of Sampler: Split barrel (2" ID)
Ground Surface Elevation: 4 ft above mean sea level
TPH-G: Total petroleum hydrocarbons as gasoline in soil by modified EPA Method 8015

Boring Log Construction Details - Boring BH-E - Shell Service Station WIC #204-0072-0502, 2160 Otis Drive, Alameda, California

2/16/93

ATTACHMENT C

ANALYTIC REPORT FOR SOIL AND GROUND WATER

NET NATIONAL ENVIRONMENTAL TESTING, INC.

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

David Elias
Weiss Associates
5500 Shellmound St.
Emeryville, CA 94608

Date: 12/30/1992
NET Client Acct. No: 1809
NET Pacific Job No: 92.49921
Received: 12/19/1992

Client Reference Information

SHELL, 2160 Otis St. Alameda, Job No; 81-429-06

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 for!
Laboratory Manager

Enclosure(s)

Ref: SHELL, 2160 Otis St. Alameda, Job No; 81-429-06

SAMPLE DESCRIPTION: BH-C-4.2
Date Taken: 12/17/1992
Time Taken:
LAB Job No: (-147774)

Parameter	Method	Reporting Limit	Results	Units
TPH (Gas/BTXE,Solid)				
METHOD 5030 (GC,FID)			--	
DATE ANALYZED			12-22-92	
DILUTION FACTOR*			1	
as Gasoline	5030	1	ND	mg/Kg
METHOD 8020 (GC,Solid)			--	
DATE ANALYZED			12-22-92	
DILUTION FACTOR*			1	
Benzene	8020	0.0025	ND	mg/Kg
Ethylbenzene	8020	0.0025	ND	mg/Kg
Toluene	8020	0.0025	ND	mg/Kg
Xylenes (Total)	8020	0.0025	ND	mg/Kg
SURROGATE RESULTS			--	
Bromofluorobenzene	5030		102	% Rec.

Ref: SHELL, 2160 Otis St. Alameda, Job No; 81-429-06

SAMPLE DESCRIPTION: BH-C-4.2
Date Taken: 12/17/1992
Time Taken:
LAB Job No: (-147774)

Parameter	Method	Reporting Limit	Results	Units
METHOD 8010 (GC,Solid)				
DATE ANALYZED			12-28-92	
DILUTION FACTOR*			1	
Bromodichloromethane	8010	0.002	ND	mg/Kg
Bromoform	8010	0.002	ND	mg/Kg
Bromomethane	8010	0.002	ND	mg/Kg
Carbon tetrachloride	8010	0.002	ND	mg/Kg
Chlorobenzene	8010	0.002	ND	mg/Kg
Chloroethane	8010	0.002	ND	mg/Kg
2-Chloroethylvinyl ether	8010	0.005	ND	mg/Kg
Chloroform	8010	0.002	ND	mg/Kg
Chloromethane	8010	0.002	ND	mg/Kg
Dibromochloromethane	8010	0.002	ND	mg/Kg
1,2-Dichlorobenzene	8010	0.002	ND	mg/Kg
1,3-Dichlorobenzene	8010	0.002	ND	mg/Kg
1,4-Dichlorobenzene	8010	0.002	ND	mg/Kg
Dichlorodifluoromethane	8010	0.002	ND	mg/Kg
1,1-Dichloroethane	8010	0.002	ND	mg/Kg
1,2-Dichloroethane	8010	0.002	ND	mg/Kg
1,1-Dichloroethene	8010	0.002	ND	mg/Kg
trans-1,2-Dichloroethene	8010	0.002	ND	mg/Kg
1,2-Dichloropropane	8010	0.002	ND	mg/Kg
cis-1,3-Dichloropropene	8010	0.002	ND	mg/Kg
trans-1,3-Dichloropropene	8010	0.002	ND	mg/Kg
Methylene chloride	8010	0.050	ND	mg/Kg
1,1,2,2-Tetrachloroethane	8010	0.002	ND	mg/Kg
Tetrachloroethene	8010	0.002	ND	mg/Kg
1,1,1-Trichloroethane	8010	0.002	ND	mg/Kg
1,1,2-Trichloroethane	8010	0.002	ND	mg/Kg
Trichloroethene	8010	0.002	ND	mg/Kg
Trichlorofluoromethane	8010	0.002	ND	mg/Kg
Vinyl chloride	8010	0.002	ND	mg/Kg
SURROGATE RESULTS			--	
1,4-Difluorobenzene			91	% Rec.
Bromochloromethane			118	% Rec.

Ref: SHELL, 2160 Otis St. Alameda, Job No; 81-429-06

SAMPLE DESCRIPTION: BH-D-4.7
Date Taken: 12/17/1992
Time Taken:
LAB Job No: (-147775)

Parameter	Method	Reporting Limit	Results	Units
TPH (Gas/BTXE,Solid)				
METHOD 5030 (GC,FID)			--	
DATE ANALYZED			12-22-92	
DILUTION FACTOR*			1	
as Gasoline	5030	1	ND	mg/Kg
METHOD 8020 (GC,Solid)			--	
DATE ANALYZED			12-22-92	
DILUTION FACTOR*			1	
Benzene	8020	0.0025	ND	mg/Kg
Ethylbenzene	8020	0.0025	0.0042	mg/Kg
Toluene	8020	0.0025	ND	mg/Kg
Xylenes (Total)	8020	0.0025	ND	mg/Kg
SURROGATE RESULTS			--	
Bromofluorobenzene	5030		102	% Rec.

Ref: SHELL, 2160 Otis St. Alameda, Job No; 81-429-06

SAMPLE DESCRIPTION: BH-D-4.7
Date Taken: 12/17/1992
Time Taken:
LAB Job No: (-147775)

Parameter	Method	Reporting Limit	Results	Units
METHOD 8010 (GC,Solid)				
DATE ANALYZED			12-28-92	
DILUTION FACTOR*			1	
Bromodichloromethane	8010	0.002	ND	mg/Kg
Bromoform	8010	0.002	ND	mg/Kg
Bromomethane	8010	0.002	ND	mg/Kg
Carbon tetrachloride	8010	0.002	ND	mg/Kg
Chlorobenzene	8010	0.002	ND	mg/Kg
Chloroethane	8010	0.002	ND	mg/Kg
2-Chloroethylvinyl ether	8010	0.005	ND	mg/Kg
Chloroform	8010	0.002	ND	mg/Kg
Chloromethane	8010	0.002	ND	mg/Kg
Dibromochloromethane	8010	0.002	ND	mg/Kg
1,2-Dichlorobenzene	8010	0.002	ND	mg/Kg
1,3-Dichlorobenzene	8010	0.002	ND	mg/Kg
1,4-Dichlorobenzene	8010	0.002	ND	mg/Kg
Dichlorodifluoromethane	8010	0.002	ND	mg/Kg
1,1-Dichloroethane	8010	0.002	ND	mg/Kg
1,2-Dichloroethane	8010	0.002	ND	mg/Kg
1,1-Dichloroethene	8010	0.002	ND	mg/Kg
trans-1,2-Dichloroethene	8010	0.002	ND	mg/Kg
1,2-Dichloropropane	8010	0.002	ND	mg/Kg
cis-1,3-Dichloropropene	8010	0.002	ND	mg/Kg
trans-1,3-Dichloropropene	8010	0.002	ND	mg/Kg
Methylene chloride	8010	0.050	ND	mg/Kg
1,1,2,2-Tetrachloroethane	8010	0.002	ND	mg/Kg
Tetrachloroethene	8010	0.002	ND	mg/Kg
1,1,1-Trichloroethane	8010	0.002	ND	mg/Kg
1,1,2-Trichloroethane	8010	0.002	ND	mg/Kg
Trichloroethene	8010	0.002	ND	mg/Kg
Trichlorofluoromethane	8010	0.002	ND	mg/Kg
Vinyl chloride	8010	0.002	ND	mg/Kg
SURROGATE RESULTS			--	
1,4-Difluorobenzene			92	% Rec.
Bromochloromethane			69	% Rec.

Ref: SHELL, 2160 Otis St. Alameda, Job No; 81-429-06

SAMPLE DESCRIPTION: BH-E-4.5
Date Taken: 12/17/1992
Time Taken:
LAB Job No: (-147776)

Parameter	Method	Reporting Limit	Results	Units
TPH (Gas/BTXE,Solid)				
METHOD 5030 (GC,FID)			--	
DATE ANALYZED			12-22-92	
DILUTION FACTOR*			1	
as Gasoline	5030	1	1.5	mg/Kg
METHOD 8020 (GC,Solid)			--	
DATE ANALYZED			12-22-92	
DILUTION FACTOR*			1	
Benzene	8020	0.0025	ND	mg/Kg
Ethylbenzene	8020	0.0025	ND	mg/Kg
Toluene	8020	0.0025	ND	mg/Kg
Xylenes (Total)	8020	0.0025	ND	mg/Kg
SURROGATE RESULTS			--	
Bromofluorobenzene	5030		83	% Rec.

Ref: SHELL, 2160 Otis St. Alameda, Job No; 81-429-06

SAMPLE DESCRIPTION: BH-E-4.5
Date Taken: 12/17/1992
Time Taken:
LAB Job No: (-147776)

Parameter	Method	Reporting Limit	Results	Units
METHOD 8010 (GC,Solid)				
DATE ANALYZED			12-28-92	
DILUTION FACTOR*			1	
Bromodichloromethane	8010	0.002	ND	mg/Kg
Bromoform	8010	0.002	ND	mg/Kg
Bromomethane	8010	0.002	ND	mg/Kg
Carbon tetrachloride	8010	0.002	ND	mg/Kg
Chlorobenzene	8010	0.002	ND	mg/Kg
Chloroethane	8010	0.002	ND	mg/Kg
2-Chloroethylvinyl ether	8010	0.005	ND	mg/Kg
Chloroform	8010	0.002	ND	mg/Kg
Chloromethane	8010	0.002	ND	mg/Kg
Dibromochloromethane	8010	0.002	ND	mg/Kg
1,2-Dichlorobenzene	8010	0.002	ND	mg/Kg
1,3-Dichlorobenzene	8010	0.002	ND	mg/Kg
1,4-Dichlorobenzene	8010	0.002	ND	mg/Kg
Dichlorodifluoromethane	8010	0.002	ND	mg/Kg
1,1-Dichloroethane	8010	0.002	ND	mg/Kg
1,2-Dichloroethane	8010	0.002	ND	mg/Kg
1,1-Dichloroethene	8010	0.002	ND	mg/Kg
trans-1,2-Dichloroethene	8010	0.002	ND	mg/Kg
1,2-Dichloropropane	8010	0.002	ND	mg/Kg
cis-1,3-Dichloropropene	8010	0.002	ND	mg/Kg
trans-1,3-Dichloropropene	8010	0.002	ND	mg/Kg
Methylene chloride	8010	0.050	ND	mg/Kg
1,1,2,2-Tetrachloroethane	8010	0.002	ND	mg/Kg
Tetrachloroethene	8010	0.002	ND	mg/Kg
1,1,1-Trichloroethane	8010	0.002	ND	mg/Kg
1,1,2-Trichloroethane	8010	0.002	ND	mg/Kg
Trichloroethene	8010	0.002	ND	mg/Kg
Trichlorofluoromethane	8010	0.002	ND	mg/Kg
Vinyl chloride	8010	0.002	ND	mg/Kg
SURROGATE RESULTS			--	
1,4-Difluorobenzene			82	% Rec.
Bromochloromethane			71	% Rec.

Ref: SHELL, 2160 Otis St. Alameda, Job No; 81-429-06

SAMPLE DESCRIPTION: BH-C
Date Taken: 12/17/1992
Time Taken:
LAB Job No: (-147780)

Parameter	Method	Reporting Limit	Results	Units
TPH (Gas/BTXE,Liquid)				
METHOD 5030 (GC,FID)			--	
DATE ANALYZED			12-22-92	
DILUTION FACTOR*			1	
as Gasoline	5030	0.05	ND	mg/L
METHOD 8020 (GC,Liquid)			--	
DATE ANALYZED			12-22-92	
DILUTION FACTOR*			1	
Benzene	8020	0.0005	ND	mg/L
Ethylbenzene	8020	0.0005	ND	mg/L
Toluene	8020	0.0005	ND	mg/L
Xylenes (Total)	8020	0.0005	ND	mg/L
SURROGATE RESULTS			--	
Bromofluorobenzene	5030		87	% Rec.

Ref: SHELL, 2160 Otis St. Alameda, Job No; 81-429-06

SAMPLE DESCRIPTION: BH-C
Date Taken: 12/17/1992
Time Taken:
LAB Job No: (-147780)

Parameter	Method	Reporting Limit	Results	Units
METHOD 8010 (GC,Liquid)				
DATE ANALYZED			12-28-92	
DILUTION FACTOR*			1	
Bromodichloromethane	8010	0.0004	ND	mg/L
Bromoform	8010	0.0004	ND	mg/L
Bromomethane	8010	0.0004	ND	mg/L
Carbon tetrachloride	8010	0.0004	ND	mg/L
Chlorobenzene	8010	0.0004	ND	mg/L
Chloroethane	8010	0.0004	ND	mg/L
2-Chloroethylvinyl ether	8010	0.001	ND	mg/L
Chloroform	8010	0.0004	ND	mg/L
Chloromethane	8010	0.0004	ND	mg/L
Dibromochloromethane	8010	0.0004	ND	mg/L
1,2-Dichlorobenzene	8010	0.0004	ND	mg/L
1,3-Dichlorobenzene	8010	0.0004	ND	mg/L
1,4-Dichlorobenzene	8010	0.0004	ND	mg/L
Dichlorodifluoromethane	8010	0.0004	ND	mg/L
1,1-Dichloroethane	8010	0.0004	ND	mg/L
1,2-Dichloroethane	8010	0.0004	ND	mg/L
1,1-Dichloroethene	8010	0.0004	ND	mg/L
trans-1,2-Dichloroethene	8010	0.0004	ND	mg/L
1,2-Dichloropropane	8010	0.0004	ND	mg/L
cis-1,3-Dichloropropene	8010	0.0004	ND	mg/L
trans-1,3-Dichloropropene	8010	0.0004	ND	mg/L
Methylene chloride	8010	0.010	ND	mg/L
1,1,2,2-Tetrachloroethane	8010	0.0004	ND	mg/L
Tetrachloroethene	8010	0.0004	ND	mg/L
1,1,1-Trichloroethane	8010	0.0004	ND	mg/L
1,1,2-Trichloroethane	8010	0.0004	ND	mg/L
Trichloroethene	8010	0.0004	ND	mg/L
Trichlorofluoromethane	8010	0.0004	ND	mg/L
Vinyl chloride	8010	0.0004	ND	mg/L
SURROGATE RESULTS			--	
1,4-Difluorobenzene			102	% Rec.
1,4-Dichlorobutane			95	% Rec.

Ref: SHELL, 2160 Otis St. Alameda, Job No; 81-429-06

SAMPLE DESCRIPTION: BH-D
Date Taken: 12/17/1992
Time Taken:
LAB Job No: (-147781)

Parameter	Method	Reporting Limit	Results	Units
TPH (Gas/BTXE,Liquid)				
METHOD 5030 (GC,FID)			--	
DATE ANALYZED			12-22-92	
DILUTION FACTOR*			1	
as Gasoline	5030	0.05	ND	mg/L
METHOD 8020 (GC,Liquid)			--	
DATE ANALYZED			12-22-92	
DILUTION FACTOR*			1	
Benzene	8020	0.0005	ND	mg/L
Ethylbenzene	8020	0.0005	ND	mg/L
Toluene	8020	0.0005	ND	mg/L
Xylenes (Total)	8020	0.0005	ND	mg/L
SURROGATE RESULTS			--	
Bromofluorobenzene	5030		80	% Rec.

Ref: SHELL, 2160 Otis St. Alameda, Job No; 81-429-06

SAMPLE DESCRIPTION: BH-D
Date Taken: 12/17/1992
Time Taken:
LAB Job No: (-147781)

Parameter	Method	Reporting Limit	Results	Units
METHOD 8010 (GC,Liquid)				
DATE ANALYZED			12-28-92	
DILUTION FACTOR*			1	
Bromodichloromethane	8010	0.0004	ND	mg/L
Bromoform	8010	0.0004	ND	mg/L
Bromomethane	8010	0.0004	ND	mg/L
Carbon tetrachloride	8010	0.0004	ND	mg/L
Chlorobenzene	8010	0.0004	ND	mg/L
Chloroethane	8010	0.0004	ND	mg/L
2-Chloroethylvinyl ether	8010	0.001	ND	mg/L
Chloroform	8010	0.0004	ND	mg/L
Chloromethane	8010	0.0004	ND	mg/L
Dibromochloromethane	8010	0.0004	ND	mg/L
1,2-Dichlorobenzene	8010	0.0004	ND	mg/L
1,3-Dichlorobenzene	8010	0.0004	ND	mg/L
1,4-Dichlorobenzene	8010	0.0004	ND	mg/L
Dichlorodifluoromethane	8010	0.0004	ND	mg/L
1,1-Dichloroethane	8010	0.0004	ND	mg/L
1,2-Dichloroethane	8010	0.0004	ND	mg/L
1,1-Dichloroethene	8010	0.0004	ND	mg/L
trans-1,2-Dichloroethene	8010	0.0004	ND	mg/L
1,2-Dichloropropane	8010	0.0004	ND	mg/L
cis-1,3-Dichloropropene	8010	0.0004	ND	mg/L
trans-1,3-Dichloropropene	8010	0.0004	ND	mg/L
Methylene chloride	8010	0.010	ND	mg/L
1,1,2,2-Tetrachloroethane	8010	0.0004	ND	mg/L
Tetrachloroethene	8010	0.0004	ND	mg/L
1,1,1-Trichloroethane	8010	0.0004	ND	mg/L
1,1,2-Trichloroethane	8010	0.0004	ND	mg/L
Trichloroethene	8010	0.0004	ND	mg/L
Trichlorofluoromethane	8010	0.0004	ND	mg/L
Vinyl chloride	8010	0.0004	ND	mg/L
SURROGATE RESULTS			---	
1,4-Difluorobenzene			89	% Rec.
1,4-Dichlorobutane			79	% Rec.

Ref: SHELL, 2160 Otis St. Alameda, Job No; 81-429-06

SAMPLE DESCRIPTION: BH-E
Date Taken: 12/17/1992
Time Taken:
LAB Job No: (-147782)

Parameter	Method	Reporting Limit	Results	Units
TPH (Gas/BTXE,Liquid)				
METHOD 5030 (GC,FID)			--	
DATE ANALYZED			12-22-92	
DILUTION FACTOR*			1	
as Gasoline	5030	0.05	ND	mg/L
METHOD 8020 (GC,Liquid)			--	
DATE ANALYZED			12-22-92	
DILUTION FACTOR*			1	
Benzene	8020	0.0005	ND	mg/L
Ethylbenzene	8020	0.0005	ND	mg/L
Toluene	8020	0.0005	ND	mg/L
Xylenes (Total)	8020	0.0005	ND	mg/L
SURROGATE RESULTS			--	
Bromofluorobenzene	5030		88	% Rec.

Ref: SHELL, 2160 Otis St. Alameda, Job No; 81-429-06

SAMPLE DESCRIPTION: BH-E
Date Taken: 12/17/1992
Time Taken:
LAB Job No: (-147782)

Parameter	Method	Reporting Limit	Results	Units
METHOD 8010 (GC,Liquid)				
DATE ANALYZED			12-28-92	
DILUTION FACTOR*			1	
Bromodichloromethane	8010	0.0004	ND	mg/L
Bromoform	8010	0.0004	ND	mg/L
Bromomethane	8010	0.0004	ND	mg/L
Carbon tetrachloride	8010	0.0004	ND	mg/L
Chlorobenzene	8010	0.0004	ND	mg/L
Chloroethane	8010	0.0004	ND	mg/L
2-Chloroethylvinyl ether	8010	0.001	ND	mg/L
Chloroform	8010	0.0004	ND	mg/L
Chloromethane	8010	0.0004	ND	mg/L
Dibromochloromethane	8010	0.0004	ND	mg/L
1,2-Dichlorobenzene	8010	0.0004	ND	mg/L
1,3-Dichlorobenzene	8010	0.0004	ND	mg/L
1,4-Dichlorobenzene	8010	0.0004	ND	mg/L
Dichlorodifluoromethane	8010	0.0004	ND	mg/L
1,1-Dichloroethane	8010	0.0004	ND	mg/L
1,2-Dichloroethane	8010	0.0004	ND	mg/L
1,1-Dichloroethene	8010	0.0004	ND	mg/L
trans-1,2-Dichloroethene	8010	0.0004	ND	mg/L
1,2-Dichloropropane	8010	0.0004	ND	mg/L
cis-1,3-Dichloropropene	8010	0.0004	ND	mg/L
trans-1,3-Dichloropropene	8010	0.0004	ND	mg/L
Methylene chloride	8010	0.010	ND	mg/L
1,1,2,2-Tetrachloroethane	8010	0.0004	ND	mg/L
Tetrachloroethene	8010	0.0004	ND	mg/L
1,1,1-Trichloroethane	8010	0.0004	ND	mg/L
1,1,2-Trichloroethane	8010	0.0004	ND	mg/L
Trichloroetnene	8010	0.0004	ND	mg/L
Trichlorofluoromethane	8010	0.0004	ND	mg/L
Vinyl chloride	8010	0.0004	ND	mg/L
SURROGATE RESULTS			--	
1,4-Difluorobenzene			98	% Rec.
1,4-Dichlorobutane			82	% Rec.

Ref: SHELL, 2160 Otis St. Alameda, Job No; 81-429-06

SAMPLE DESCRIPTION: BH-21
Date Taken: 12/17/1992
Time Taken:
LAB Job No: (-147783)

Parameter	Method	Reporting Limit	Results	Units
TPH (Gas/BTXE,Liquid)				
METHOD 5030 (GC,FID)			--	
DATE ANALYZED			12-22-92	
DILUTION FACTOR*			1	
as Gasoline	5030	0.05	ND	mg/L
METHOD 8020 (GC,Liquid)			--	
DATE ANALYZED			12-22-92	
DILUTION FACTOR*			1	
Benzene	8020	0.0005	ND	mg/L
Ethylbenzene	8020	0.0005	ND	mg/L
Toluene	8020	0.0005	ND	mg/L
Xylenes (Total)	8020	0.0005	ND	mg/L
SURROGATE RESULTS			--	
Bromofluorobenzene	5030		78	% Rec.

Ref: SHELL, 2160 Otis St. Alameda, Job No; 81-429-06

QUALITY CONTROL DATA

Parameter	Reporting Limits	Units	Cal Verf Stand % Recovery	Blank Data	Spike % Recovery	Duplicate Spike % Recovery	RPD
Gasoline	0.05	mg/L	98	ND	80	93	13
Benzene	0.0005	mg/L	75	ND	84	112	29
Toluene	0.0005	mg/L	108	ND	92	101	8.8
Gasoline	1	mg/Kg	100	ND	107	90	18
Benzene	0.0025	mg/Kg	93	ND	97	87	11
Toluene	0.0025	mg/Kg	106	ND	99	93	5.8

COMMENT: Blank Results were ND on other analytes tested.

QUALITY CONTROL DATA

Parameter	Reporting Limits	Units	Cal Verf Stand % Recovery	Blank Data	Spike % Recovery	Duplicate Spike % Recovery	RPD
Benzene	0.0005	mg/L	100	ND	98	78	23
Toluene	0.0005	mg/L	99	ND	97	78	22
1,1-Dichloroethene	0.0004	mg/L	86	ND	74	31	19
Trichloroethene	0.0004	mg/L	96	ND	90	71	24
Chlorobenzene	0.0004	mg/L	95	ND	89	68	27
Benzene	0.0025	mg/Kg	87	ND	97	99	2.0
Toluene	0.0025	mg/Kg	89	ND	96	91	5.3
1,1-Dichloroethene	0.0020	mg/Kg	100	ND	108	135	22
Trichloroethene	0.0020	mg/Kg	117	ND	101	112	10
Chlorobenzene	0.0020	mg/Kg	86	ND	90	92	2.2

COMMENT: Blank Results were ND on other analytes tested.

NET®

KEY TO ABBREVIATIONS and METHOD REFERENCES

<	:	Less than; When appearing in results column indicates analyte not detected at the value following. This datum supercedes the listed Reporting Limit.
*	:	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 (but do not multiply reported values).
ICVS	:	Initial Calibration Verification Standard (External Standard).
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 100 through 493: see "Methods for Chemical Analysis of Water & Wastes", U.S. EPA, 600/4-79-020, rev. 1983.

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.

SM: see "Standard Methods for the Examination of Water & Wastewater, 17th Edition, APHA, 1989.

SHELL OIL COMPANY
RETAIL ENVIRONMENTAL ENGINEERING - WEST

CHAIN OF CUSTODY RECORD
Serial No: 1393

Date: 12-17-92
Page 1 of 2

Site Address: 2160 OTIS ST., ALAMEDA, CALIF.

WIC#: 204-0072-0502

Shell Engineer: DAN KIRK
Phone No.: 675-6168
Fax #: 675-6172

Consultant Name & Address: WEISS ASSOCIATES
5500 SHELLMOUND ST EMERYVILLE 94608

Consultant Contact: DAVID ELIAS
WA JOB #: 81-429-06
Phone No.: (510) 547-5420
Fax #: 547-5043

Comments:

Sampled by: David Elias

Printed Name: DAVID ELIAS

Analysis Required

CUSTODY SEALED 12/18 700 seal intact

LAB: NET

CHECK ONE (1) BOX ONLY	CT/DT	TURN AROUND TIME
Quarterly Monitoring ☐	5461	24 hours ☐
Site Investigation ☒	5441	48 hours ☐
Soil Classify/Disposal ☐	5442	15 days ☒ (Normal)
Water Classify/Disposal ☐	5443	Other ☐
Soil/Air Rem. or Sys. O & M ☐	5452	NOTE: Notify Lab as soon as Possible of 24/48 hrs. TAT.
Water Rem. or Sys. O & M ☐	5453	
Other ☐		

Sample ID	Date	Sludge	Soil	Water	Air	No. of conts.	TPH (EPA 8015 Mod. Gas)	TPH (EPA 8015 Mod. Diesel)	BTEX (EPA 8020/602)	Volatile Organics (EPA 8240)	Test for Disposal	Combination TPH 8015 & BTEX 8020	VOC (8010/601)	Asbestos	Container Size	Preparation Used	Composite Y/N	MATERIAL DESCRIPTION	SAMPLE CONDITION/ COMMENTS
BH-C-4.2	12/11/92		X			1						X	X		1.5x4.0	NO		Soil & GAS	
BH-C-5.3	↓		↓			↓									↓	↓			HOLD
BH-D-4.0																			HOLD
BH-D-4.7												X	X						
BH-E-4.0																			HOLD
BH-E-4.5												X	X						
BH-C				X		3						X	X		VOA			H_2O + GAS	
BH-D				X		3						X	X		VOA			↓	

STORED IN SECURE PLACE

Relinquished By (signature):	Printed Name:	Date / Time:	Received (signature):	Printed Name:	Date / Time:
David Elias	DAVID ELIAS	Date: 12/18/92 Time: 12:12	[signature]	J. Bean	Date: 12/18 Time: 12:12
[signature]	J. BEAN	Date: 12/18 Time: 700			Date: Time:
		Date: Time:	[signature]	K. Temple	Date: 12/19/92 Time: 0900

THE LABORATORY MUST PROVIDE A COPY OF THIS CHAIN-OF-CUSTODY WITH INVOICE AND RESULTS.

Rev 5/2/92 Shell Oil Chn. of Custody

SHELL OIL COMPANY
RETAIL ENVIRONMENTAL ENGINEERING - WEST

CHAIN OF CUSTODY RECORD
Serial No: 1393

Date: 12-17-92
Page 2 of 2

Site Address: 2160 OTIS ST., ALAMEDA, CALIF.

WIC#: 204-0072-0502

Shell Engineer: DAN KIRK — Phone No.: 675-6168 Fax #: 675-6172

Consultant Name & Address: WEISS ASSOCIATES 5500 SHELLMOUND ST EMERYVILLE 94608

Consultant Contact: DAVID ELIAS — Phone No.: (510) 547-5420 Fax #: 547-5043

WA JOB #: 81-429-06

Comments:

Sampled by: [signature]

Printed Name: DAVID ELIAS

LAB: NET

Analysis Required

CHECK ONE (1) BOX ONLY	CT/DT
Quarterly Monitoring ☐	5461
Site Investigation ☒	5441
Soil Classify/Disposal ☐	5442
Water Classify/Disposal ☐	5443
Soil/Air Rem. or Sys. O & M ☐	5452
Water Rem. or Sys. O & M ☐	5453
Other ☐	

TURN AROUND TIME: 24 hours ☐ 48 hours ☐ 16 days ☒ (Normal) Other ☐

NOTE: Notify Lab as soon as Possible of 24/48 hrs. TAT.

Sample ID	Date	Sludge	Soil	Water	Air	No. of conts.	TPH (EPA 8015 Mod. Gas)	TPH (EPA 8015 Mod. Diesel)	BTEX (EPA 8020/602)	Volatile Organics (EPA 8240)	Test for Disposal	Combination TPH 8015 & BTEX 8020	VOC (8010/601)	Asbestos	Container Size	Preparation Used	Composite Y/N	MATERIAL DESCRIPTION	SAMPLE CONDITION/ COMMENTS
BH-E	12/17/92			X		3						X	X					gas + H_2O	
BH-21	↓			↓		2						X						↓	

(CUSTODY SEALED 12-18 @ 7:00 [signature]) seal intact

STORED IN A SECURE PLACE

Relinquished By (signature):	Printed Name:	Date/Time	Received (signature):	Printed Name:	Date/Time
[signature]	DAVID ELIAS	Date: 12/18/92 Time: 12:18	[signature]	J. BEAN	Date: 12-18 Time: 12:18
[signature]	J. BEAN	Date: 12-18 Time: 7:00pm	[signature]		Date: Time:
		Date: Time:	[signature]	K. Temple	Date: 12/19/92 Time: 0900

THE LABORATORY MUST PROVIDE A COPY OF THIS CHAIN-OF-CUSTODY WITH INVOICE AND RESULTS

Rev 8/6/92 — Shell Oil Chn of Custody

ATTACHMENT D

PREVIOUS GROUND WATER ANALYTICAL RESULTS

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

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

-- Table 1 continued on next page --

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

Abbreviations:

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

Analytical Laboratories:

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

Notes:

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

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

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

Date: 11/12/92
Project Number: G67-30.01

Sample Designation	Water Sample Field Date	TPH-g (mg/l)	Benzene (mg/l)	Toluene (mg/l)	Ethyl-benzene (mg/l)	Total Xylenes (mg/l)	TPH-d (mg/l)
MW-1	10/09/91	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	NA
MW-1	01/24/92	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	NA
MW-1	04/23/92	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	NA
MW-1	07/01/92	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	NA
MW-1	10/02/92	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	NA
MW-2	10/09/91	0.15	0.022	<0.0005	<0.0005	<0.0005	NA
MW-2	01/24/92	<0.05	0.0048	<0.0005	<0.0005	<0.0005	NA
MW-2	04/23/92	<0.05	0.0023	<0.0005	0.0015	<0.0005	NA
MW-2	07/01/92	0.13	0.019	<0.0005	<0.0005	<0.0005	NA
MW-2	10/02/92	0.12	0.0078	<0.0005	<0.0005	0.0008	NA
MW-2D	10/02/92	0.19	0.011	<0.0005	<0.0005	0.0008	NA
S-1	10/09/91	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	NA
S-1	01/24/92	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	NA
S-1	04/23/92	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	NA
S-1	07/01/92	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	NA
S-1	10/02/92	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	NA
FB	07/01/92	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	NA
FB	10/02/92	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	NA

TPH-g = total petroleum hydrocarbons as gasoline
TPH-d = total petroleum hydrocarbons as diesel
NA = Not analyzed

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

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

Date: 11/12/92
Project Number: G67-30.01

Sample Designation	Water Sample Field Date	TPH-g (mg/l)	Benzene (mg/l)	Toluene (mg/l)	Ethyl-benzene (mg/l)	Total Xylenes (mg/l)	TPH-d (mg/l)
TB	10/09/91	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	NA
TB	01/24/92	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	NA
TB	04/23/92	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	NA
TB	07/01/92	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	NA
TB	10/02/92	<0.05	<0.0005	<0.0005	<0.0005	<0.0005	NA

TPH-g = total petroleum hydrocarbons as gasoline
TPH-d = total petroleum hydrocarbons as diesel
NA = Not analyzed

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

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

Date: 11/12/92
Project Number: G67-30.01

Sample Designation	Water Sample Field Date	Benzene (mg/l)	TCE (mg/l)	TCA (mg/l)	PCE (mg/l)	Chloroform (mg/l)	cis-1,2-DCE (mg/l)	trans-1,2-DCE (mg/l)	1,2-DCA (mg/l)	Carbon Disulfide (mg/l)	Vinyl Chloride (mg/l)
MW-2	10/09/91	NR	0.0019	NR	0.0128	0.0074	0.054	0.016	NR	NR	0.0017
MW-2	01/24/92	NA	0.0025	<0.0005	0.0070	0.0190	0.0160	0.0043	0.0006	NA	<0.0005
MW-2	04/23/92	NA	<0.003	<0.003	0.003	<0.003	0.084	0.018	<0.003	NA	<0.003
MW-2	07/01/92	NA	0.002	<0.001	0.002	<0.001	0.054	0.014	<0.001	NA	0.001
MW-2	10/02/92	NA	0.001	<0.001	<0.001	<0.001	0.061	0.012	<0.001	NA	<0.001

TCE = Trichloroethene
TCA = 1,1,1-Trichloroethane
PCE = Tetrachloroethene
cis-1,2-DCE = cis-1,2-Dichloroethene
trans-1,2-DCE = trans-1,2-Dichloroethene
1,2-DCA = 1,2-Dichloroethane
NR = Not reported; data not available
NA = Not analyzed