Weiss Associates Environmental and Geologic Services

5500 Shellmound Street, Emeryville, CA 94608-2411 Fax: 510-547-5043 Phone: **510-450-6000**

January 26, 1995

[redacted]
Alameda County Department of
Environmental Health
1131 Harbor Bay Parkway, 2nd Floor
Alameda, California 94502-6577

Re: Subsurface Investigation
ACDEH #3769
Shell Service Station
WIC #204-5510-0600
4255 MacArthur Boulevard
Oakland, California
WA Job #81-0757.20

Dear Ms. Shin:

This letter presents the results of Weiss Associates' (WA) subsurface investigation conducted at the Shell service station referenced above (Figure 1). The investigation objectives were to identify potential onsite and offsite hydrocarbon sources, and assess the extent of hydrocarbons in soil and ground water up and downgradient of the site. Presented below are our scope of work and the results of this and previous investigations.

SCOPE OF WORK

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

- Obtain the necessary drilling permits and prepare a site-specific health and safety plan;
- Review files at Alameda County Health Care Services Agency and conduct an aerial photograph search and review for potential offsite hydrocarbon sources;
- Drill two on site soil borings and collect soil and ground water samples from the borings for hydrocarbon analysis;
- Drill one offsite soil boring and collect soil samples from the boring for hydrocarbon analysis;
- Complete the offsite soil boring as a ground water monitoring well;

- Develop and collect ground water samples from the newly installed monitoring well for hydrocarbon analyses;
- Survey the top of casing of the monitoring well, measure ground water depths in all site wells and prepare a ground water elevation contour map;
- Dispose of the drill cuttings and well purge water; and
- Report the investigation results.

SITE SUMMARY

Location: The site is located on the west corner of High Street and MacArthur Boulevard in Oakland, California. The station is located about 175 ft above mean sea level in the East Bay foothills. There is apparently no natural drainage within one-half mile of the site.

Surroundings: Primarily commercial area with some nearby residential development.

Adjacent Hydrocarbon Sources: WA conducted a review of available files at Alameda County Department of Environmental Health for a Unocal 76 service station located northeast across MacArthur Boulevard (Figure 2) and a former Chevron service station which was located east and directly across the intersection of MacArthur Boulevard and High Street from the Shell site. Files for the former Chevron station, known as Amir Chevron, document the removal of four underground storage tanks and demolition of the buildings prior to November 1989. Chevron has conducted a subsurface investigation at the former Chevron station, installing several monitoring wells onsite. No other information was available regarding the former Chevron station. No files were available for review for the Unocal 76 service station.

PREVIOUS INVESTIGATIONS

1985 Subsurface Investigation: In June 1985, Emcon Associates drilled three soil borings and installed one ground water monitoring well near the underground fuel tanks.[1] Two samples collected between 4 and 10 ft depth contained 15,800 and 2 parts per million (ppm) total

---

1 Emcon Associates, July 26, 1985, consultant's letter report describing a soil and ground water investigation at the Shell service station located at MacArthur and High Streets in Oakland, California prepared for Gettler-Ryan, Inc., 2 pages, 1 figure, 4 plates and 1 appendix.

petroleum hydrocarbons as gasoline (TPH-G), respectively. No TPH-G were detected in the other four samples collected at depths between 10 and 20 ft. A ground water sample from the monitoring well installed immediately downgradient of the storage tanks contained 840 parts per billion (ppb) TPH-G, 76 ppb benzene, 22 ppb toluene, and 57 ppb xylenes and ethylbenzene.

1985 Underground Storage Tank Replacement:: In December 1985, the underground storage tanks were replaced, and approximately 810 cubic yards of hydrocarbon-bearing soil was transported to a disposal facility. During the excavation, Gettler-Ryan collected soil samples for hydrocarbon and heavy metals analyses.[2] Up to 22,000 ppm total volatile hydrocarbons, 500 ppm benzene, 2,200 ppm toluene, and 4,500 ppm xylenes were detected in the soil. In addition, chromium, copper, zinc, lead and arsenic were detected in some soil samples. There is no documentation of the excavation and tank replacement other than the analytic results.

1992 Site Reconnaissance: In July 1992, GeoStrategies Inc. (GSI) performed a site reconnaissance and verified that the original monitoring well had been destroyed during the 1985 tank replacement activities.[3]

1993 Subsurface Investigation: In November 1993, WA installed ground water monitoring wells MW-1, MW-2 and MW-3 to assess water quality up- and downgradient of the existing underground fuel storage tanks, and to determine the ground water flow direction and gradient beneath the site.[4] Hydrocarbons were detected in ground water in onsite and downgradient monitoring wells. The soil boring and ground water analytic data for this investigation are tabulated in Table 1 and 2, respectively.

Quarterly Ground Water Monitoring: As of this date, ground water beneath the site has been monitored for 5 quarters. The water table ranges from about 8 to 15 ft depth across the site (Table 3). Based on the ground water elevation data from these wells, ground water flows to the south-southwest with a gradient of about 0.10 ft/ft (Figure 2). Quarterly ground water analytic results are tabulated in Table 2.

---

2 Gettler-Ryan, December 2, 1985, sampling reports from Trace Analysis Laboratory, Inc. of Hayward, California, copy of analytic reports.

3 Shell Oil Company, August 14, 1992, letter to the Alameda County Health Care Services Department of Environmental Health, Hazardous Materials Division regarding the Shell service station at 4255 MacArthur Boulevard in Oakland, 2 pages and 3 attachments.

4 WA, March 15, 1994, Subsurface investigation of the Shell service station at 4255 MacArthur Boulevard, Oakland, California, consultant's letter report prepared for Shell Oil Company, 7 pages, 6 figures, 3 tables and 3 attachments.

NOVEMBER 1994 SOIL AND GROUND WATER INVESTIGATION

Permits Obtained:	Alameda County Flood Control and Water Conservation District, Zone 7 Permit No. 94708 and State of California Department of Transportation Encroachment Permit No. 0494-6SV-1215 (Attachment A).
Drilling Date:	November 3, 1994
Drilling Geologist:	WA Geologist Faith Morris-Daverin under the supervision of Certified Engineering Geologist James W. Carmody.
Drilling Contractor and Method:	Gregg Drilling and Testing, Inc. of Pacheco, California drilled all borings using a Semco rig. Soil borings BH-D and BH-E were drilled using 6-inch diameter hollow stem augers. Boring BH-F was drilled using 8-inch diameter hollow stem augers. Drilling and sampling procedures are presented as Attachment B.
Number of Borings:	Three: Borings BH-D, BH-E and BH-F (Figure 2).
Boring Depths:	20 to 31 ft below ground surface (bgs).
Lithology Encountered:	Predominantly silty clay, silty sand and sandy clay with low estimated hydraulic conductivity (K) from ground surface to the total depth explored in borings BH-D and BH-E. In boring BH-F, silty clay and sandy clay with low estimated K from ground surface to 14 ft bgs and clayey sand with moderate to high estimated K from 14 ft bgs to the total depth explored. The boring logs are presented as Attachment C.
Soil Analyses:	All soil samples from the borings were analyzed for TPH-G and benzene, ethylbenzene, toluene and xylenes (BETX) by EPA Methods 8015 and 8020, respectively. The analytic results are tabulated in Table 1 and the analytic reports and chain-of-custody forms are included as Attachment D.

Analytic Laboratory:	National Environmental Testing, Inc. (NET) of Santa Rosa, California.

NOVEMBER 1994 WELL CONSTRUCTION

Number of Wells:	One. Boring BH-F was completed as ground water monitoring well MW-4 (Figure 2).
Well Materials:	Two-inch diameter schedule 40 PVC well casing with 0.010-inch slotted screen and Monterey #1/20 sand.
Screened Interval:	From 11 to 31 ft bgs. The well construction details are presented as Attachment C.
Well Development and Flow Rate:	Monitoring well MW-4 was developed on November 17, 1994, using surge block agitation and bailer excavation. Monitoring well MW-4 yielded about 0.5 gallon per minute (gpm) during development.
Well Survey:	The top-of-casing elevation of monitoring well MW-4 was surveyed by licensed land surveyor PLS Surveys, Incorporated of Alameda, California. The survey report is presented in Attachment E.
Ground Water Flow Direction and Gradient:	Based on ground water elevation data for this investigation, ground water flows towards the west with a gradient of about 0.01 ft/ft. According to four quarters of quarterly monitoring data, ground water generally flowed towards the south-southwest.
Ground Water Sampling and Analyses:	On November 28, 1994, a ground water sample was collected from MW-4 and analyzed for TPH-G and BETX by EPA Methods 8015 and 8020, respectively. Prior to sampling, three well casing volumes of ground water were removed from MW-4. A PVC bailer was used to collect the water samples.
Analytical Laboratory:	Sequoia Analytical of Redwood City, California.

Waste Disposal:

Purge water from well development and sampling were contained in 55-gallon drums and transported by Crosby and Overton, Inc. of Oakland to the Shell refinery in Martinez, California for recycling. Soil samples were collected from the soil cuttings for disposal characterization. Upon landfill approval, about 2 cubic yards of soil were transported by Manley & Sons Trucking, Inc. of Sacramento, California to the BFI Landfill of Livermore, California for disposal.

HYDROCARBON DISTRIBUTION IN SOIL

The hydrocarbons in soil beneath the site appear to be limited to depths between 4 and 18 ft bgs. Soil from 5 ft bgs in boring BH-F, located adjacent to the pump island, contained concentrations of TPH-G and benzene at 5,900 ppm and 23 ppm, respectively. In the previous investigation, soil collected from 11.3 and 16 ft bgs in MW-3 contained concentrations of TPH-G and benzene at 1,700 ppm and 3.3 ppm, respectively. Soil collected from abount 10 to 15 ft bgs in boring BH-F, located adjacent to the freeway onramp, contained TPH-G up to 13 ppm and benzene up to 0.29 ppm, respectively.

HYDROCARBON DISTRIBUTION IN GROUND WATER

Ground water samples collected from MW-4 contained 2,900 ppb TPH-G and 200 ppb benzene. During recent samplings, ground water samples collected from wells MW-1, MW-2 and MW-3 contained up to 390,000 ppb TPH-G and up to 40,000 ppb benzene. Separate-phase hydrocarbons have been measured in MW-3. Installing additional monitoring wells to further assess the downgradient extent of hydrocarbons may not be possible due to the freeway and highly developed properties west of the site. Well MW-4, adjacent to the freeway, was the only feasible location downgradient of the site for a monitoring well.

We trust that this submittal meets your needs. Please call if you have any questions or comments.

Sincerely,
Weiss Associates

Faith Morris-Daverin
Staff Geologist

James W. Carmody, C.E.G.
Senior Project Hydrogeologist

FMD\fmd
J:\SHELL\3057\REPORTS\SSITANS.DOC

Attachments: Figures
Tables
A - Drill Permits
B - Standard Field Procedures
C - Boring Logs
D - Analytic Reports and Chain-of-Custody forms
E - Survey Report

cc: Dan Kirk, Shell Oil Company, P.O. Box 4023, Concord, California 94524
Kevin Graves, 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 #204-5510-0600, 4255 MacArthur Boulevard, Oakland, California

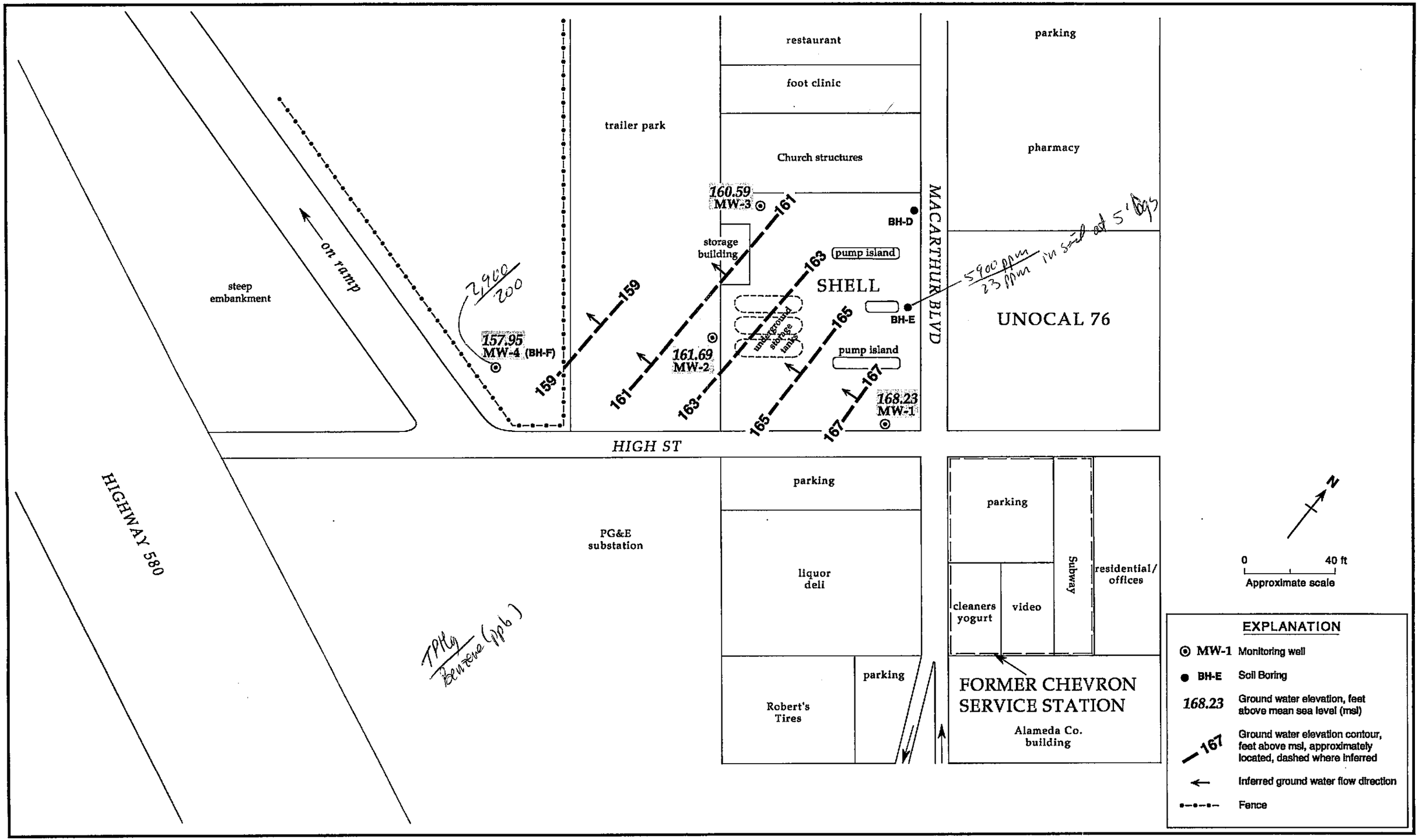


Figure 2. Montoring Well and Soil Boring Locations and Ground Water Elevation Contours - November 28, 1994 - Shell Service Station WIC #204-5510-0600, 4255 MacArthur Boulevard, Oakland, California

Table 1. Analytic Results for Soil - Shell Service Station WIC #204-5510-0600, 4255 MacArthur Boulevard, Oakland, California

Boring ID (Well ID)	Sample Depth (ft)	Date Sampled	Ground Water Depth (ft)	TPH-G	B	E	T	X
				← parts per million (mg/kg) →				
BH-A	6.0	11/03/93	8.56	<1	<0.0025	<0.0025	<0.0025	<0.0025
(MW-1)	10.5	11/03/93		26	0.4	0.12	0.028	0.62
	14.0	11/03/93		24	0.028	0.062	0.02	0.32
	18.0	11/03/93		<1	<0.0025	<0.0025	<0.0025	<0.0025
	22.0	11/03/93		<1	0.0063	0.0097	0.0094	0.057
BH-B	6.0	11/03/93	12.07	<1	<0.0025	<0.0025	<0.0025	<0.0025
(MW-2)	9.0	11/03/93		7.6	0.069	0.044	<0.0025	0.11
	14.0	11/03/93		66	0.07	0.53	0.44	2.6
	18.5	11/03/93		<1	0.032	0.0042	0.012	0.02
	24.0	11/03/93		<1	0.021	0.0037	0.023	0.021
BH-C	6.5	11/04/93	15.27	<1	<0.0025	<0.0025	<0.0025	<0.0025
(MW-3)	11.3	11/04/93		1,700	1.1	33	2.5	44
	16.0	11/04/93		610	3.3	6.9	5.7	33
	22.5	11/04/93		<1	<0.0025	<0.0025	<0.0025	<0.0025
BH-D	5.0	11/03/94	NE	<1	<0.0025	<0.0025	<0.0025	<0.0025
	10.0	11/03/94		<1	0.13	0.011	<0.0025	0.01
	15.0	11/03/94		<1	<0.0025	<0.0025	<0.0025	<0.0025
	20.0	11/03/94		<1	<0.0025	<0.0025	<0.0025	0.015
BH-E	5.0	11/03/94	NE	5,900	23	120	160	430
	10.0	11/03/94		<1	0.031	<0.0025	<0.0025	<0.0025
	15.0	11/03/94		<1	0.0053	<0.0025	0.0033	0.007
	20.0	11/03/94		<1	<0.0025	<0.0025	0.0077	0.015

— Table 1 continues on next page —

Table 1. Analytic Results for Soil - Shell Service Station WIC #204-5510-0600, 4255 MacArthur Boulevard, Oakland, California (continued)

Boring ID (Well ID)	Sample Depth (ft)	Date Sampled	Ground Water Depth (ft)	TPH-G	B	E	T	X
				← parts per million (mg/kg) →				
BH-F (MW-4)	5.0	11/03/94	NE	<1	<0.0025	<0.0025	<0.0025	<0.0025
	10.0	11/03/94		13	0.29	0.17	0.14	0.54
	15.0	11/03/94		<1	0.044	0.017	0.0033	0.032
	20.0	11/03/94		<1	<0.0025	<0.0025	<0.0025	<0.0025

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
<n = Not detected above method detection limit of n ppm
NE = Not encountered

Analytical Laboratory:

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

Table 2. Analytic Results for Ground Water, Shell Service Station WIC #204-5510-0600, 4255 MacArthur Boulevard., Oakland, California

Well ID	Date Sampled	Depth to Water (ft)	TPH-G	B	E	T	X
			← parts per billion (µg/L) →				
MW-1	11/17/93	8.59	410	21	7.9	11	47
	01/20/94	8.22	1,200	180	48	19	47
	04/25/94	7.63	3,100	610	130	<10	27
	07/07/94	8.31	2,400	1,000	250	10	20
	10/27/94	8.84	2,200	500	72	3.1	1.8
MW-2	11/17/93	12.31	31,000	9,400	1,000	4,600	3,900
	01/20/94	11.48	40,000	6,900	780	5,600	4,100
	01/20/94[dup]	11.48	41,000	7,200	900	6,200	4,800
	04/25/94	10.84	60,000	9,300	1,400	6,100	6,200
	07/07/94	11.89	280,000[a]	40,000	8,100	26,000	32,000
	07/07/94[dup]	11.89	53,000	13,000	2,000	6,600	8,400
	10/27/94	12.89	130,000	14,000	2,400	12,000	13,000
	10/27/94[dup]	12.89	390,000	8,800	1,700	7,000	11,000
MW-3	11/17/93	15.40	18,000	5,400	720	660	2,200
	01/20/94	14.61	55,000	13,000	2,200	2,600	6,500
	04/25/94	13.12	96,000	11,000	3,100	1,600	9,900
	04/25/94[dup]	13.12	78,000	12,000	2,600	1,900	7,300
	07/07/94[SPH]	14.54	---	---	---	---	---
	10/27/94[SPH]	15.62	---	---	---	---	---
MW-4	11/28/94	6.11	2,900	200	76	17	260
Trip Blank	01/20/94		<50	<0.5	<0.5	<0.5	<0.5
	04/25/94		<50	<0.5	<0.5	<0.5	<0.5
	07/07/94		<50	<0.5	<0.5	<0.5	<0.5
	10/27/94		<50	<0.5	<0.5	<0.5	<0.5
	11/28/94		<50	<0.5	<0.5	<0.5	<0.5

— Table 2 continues on next page —

Table 2. Analytic Results for Ground Water, Shell Service Station WIC #204-5510-0600, 4255 MacArthur Boulevard, Oakland, California (continued)

Well ID	Date Sampled	Depth to Water (ft)	TPH-G	B	E	T	X
			← parts per billion (µg/L) →				
DTSC MCLs			NE	1	680	100[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
SPH = Separate-phase hydrocarbons present, well not sampled
NE = Not established
DTSC MCLs = California Department of Toxic Substances Control maximum contaminant levels for drinking water
--- = Not analyzed
<n = Not detected at detection limits of n ppb
dup = Duplicate sample

Notes:

a = Ground water surface had a hydrocarbon sheen when sampled.
b = DTSC recommended action level; MCL not established

Table 3. Ground Water Elevations - Shell Service Station WIC #204-5510-0600, 4255 MacArthur Blvd., Oakland, California

Well ID	Date	Top-of-Casing Elevation (ft above msl)	Depth to Water (ft)	Separtate-phase Hydrocarbons	Ground Water Elevation (ft above msl)
MW-1	11/17/93	175.79	8.59	---	167.20
	01/20/94		8.22	---	167.57
	04/25/94		7.63	---	168.16
	07/07/94		8.31	---	167.48
	10/27/94		8.84	---	166.95
	11/17/94		7.60	---	168.19
	11/28/94		7.56	---	168.23
MW-2	11/17/93	170.91	12.31	---	158.60
	01/20/94		11.48	---	159.43
	04/25/94		10.84	---	160.07
	07/07/94		11.89	---	159.02
	10/27/94		12.89	---	158.02
	11/17/94		9.11	---	161.80
	11/28/94		9.22	---	161.69
MW-3	11/17/93	174.61	15.40	---	159.21
	01/20/94		14.61	---	160.00
	04/25/94		13.12	---	161.49
	07/07/94		14.54	0.02	160.07
	10/27/94		15.62	0.05	159.03
	11/17/94		13.83	---	160.78
	11/28/94		14.02	---	160.59
MW-4	11/17/94	164.06	6.62	---	157.44
	11/28/94		6.11	---	157.95

ATTACHMENT A

DRILLING PERMITS

ZONE 7 WATER AGENCY

5997 PARKSIDE DRIVE PLEASANTON, CALIFORNIA 94588 VOICE (510) 484-2600 FAX (510) 462-3914

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT Shell Oil Company
4255 MacArthur Blvd.
OAKLAND, CA

CLIENT
Name Shell Oil Company
Address P.O. Box 4023 Voice (510) 675-6165
City Concord, CA Zip 94524

APPLICANT
Name Weiss Associates
Faith Daverin Fax (510) 647-5843
Address 5500 Shellmound St. Voice (510) 450-6161
City Emeryville, CA Zip 94608

TYPE OF PROJECT

Well Construction		Geotechnical Investigation	
Cathodic Protection	___	General	___
Water Supply	___	Contamination	X
Monitoring	X	Well Destruction	___

PROPOSED WATER SUPPLY WELL USE
Domestic ___ Industrial ___ Other ___
Municipal ___ Irrigation ___

DRILLING METHOD:
Mud Rotary ___ Air Rotary ___ Auger X
Cable ___ Other ___

DRILLER'S LICENSE NO. C57-485165

WELL PROJECTS
Drill Hole Diameter 8 in. Maximum
Casing Diameter 2" in. Depth ~35 ft.
Surface Seal Depth 2 ft. Number 1

GEOTECHNICAL PROJECTS
Number of Borings 2 Maximum
Hole Diameter 10 in. Depth ~15 ft.

ESTIMATED STARTING DATE TH 11/3/94
ESTIMATED COMPLETION DATE TH 11/3/94

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE Faith Daverin Date 10/28/94

FOR OFFICE USE

PERMIT NUMBER 94708
LOCATION NUMBER ___

PERMIT CONDITIONS

Circled Permit Requirements Apply

(A.) GENERAL
1. A permit application should be submitted so as to arrive at the Zone 7 office five days prior to proposed starting date.
2. Submit to Zone 7 within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well Projects, or drilling logs and location sketch for geotechnical projects.
3. Permit is void if project not begun within 90 days of approval date.

(B.) WATER WELLS, INCLUDING PIEZOMETERS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

(C.) GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.

D. CATHODIC. Fill hole above anode zone with concrete placed by tremie.

E. WELL DESTRUCTION. See attached.

Approved Wyman Hong Date 3 Nov 94
Wyman Hong

91992

STATE OF CALIFORNIA · DEPARTMENT OF TRANSPORTATION

ENCROACHMENT PERMIT

TR-0120 (NEW 9/91)

Permit No.	0494-6SV-1215
Dist/Co/Rte/PM	04-Ala-580- 40.19
Date	October 6, 1994
Fee Paid	$ 420.00
Deposit	$
Performance Bond Amount (1)	2,000.00
Payment Bond Amount (2)	$
Bond Company	Aetna Life & Casualty
Bond Number (1)	5 S 100892789 BCA
Bond Number (2)	

In compliance with (check one):

x Your application of June 17, 1994

____ Utility Notice No. _____ of _____

____ Agreement No. _____ of _____

____ R/W Contract No. _____ of _____

TO:

Weiss Associates
5500 Shellmound Street
Emeryville, CA 94608

ATTN: Janet MacDonald
PHONE: (510) 450-6143

, PERMITTEE

and subject to the following, PERMISSION IS HEREBY GRANTED to:

install one ground water monitoring well on State Highway 04-Ala-580, Post Mile 40.19, at High Street in Oakland.

Two days before work is started under this permit, notice shall be given to, and approval of construction details, operations, public safety, and traffic control shall be obtained from State Representative N. Freitag, 600 Lewelling Blvd., San Leandro, 94579, 510-614-5951, weekdays, between 7:30 AM and 4:00 PM.

Immediately following completion of the work permitted herein, the permittee shall fill out and mail the Notice of completion attached to this permit.

All personnel shall wear hard hats and orange vests, shirts, or jackets as appropriate.

The following attachments are also included as part of this permit. (Check applicable):

X Yes	__ No	General Provisions
__ Yes	x No	Utility Maintenance Provisions
__ Yes	x No	Special Provisions
__ Yes	x No	A Cal-OSHA permit required prior to beginning work; # _____

In addition to fee the permittee will be billed actual costs for:

__ Yes	x No	Review
__ Yes	x No	Inspection
X Yes	_____	Field Work

(If any Caltrans effort expended)

__ Yes x No The information in the environmental documentation has been reviewed and considered prior to approval of this permit.

This permit is void unless the work is completed before December 31, 1994

This permit is to be strictly construed and no other work other than specifically mentioned is hereby authorized.

No project work shall be commenced until all other necessary permits and environmental clearances have been obtained.

APPROVED:

Joe Browne, District Director

BY:

G. J. Battaglini, District Permit Engineer

ATTACHMENT B

STANDARD FIELD PROCEDURES

STANDARD FIELD PROCEDURES

Weiss Associates (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

Soil borings 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 20 ft. Soil samples are normally 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 to five 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.

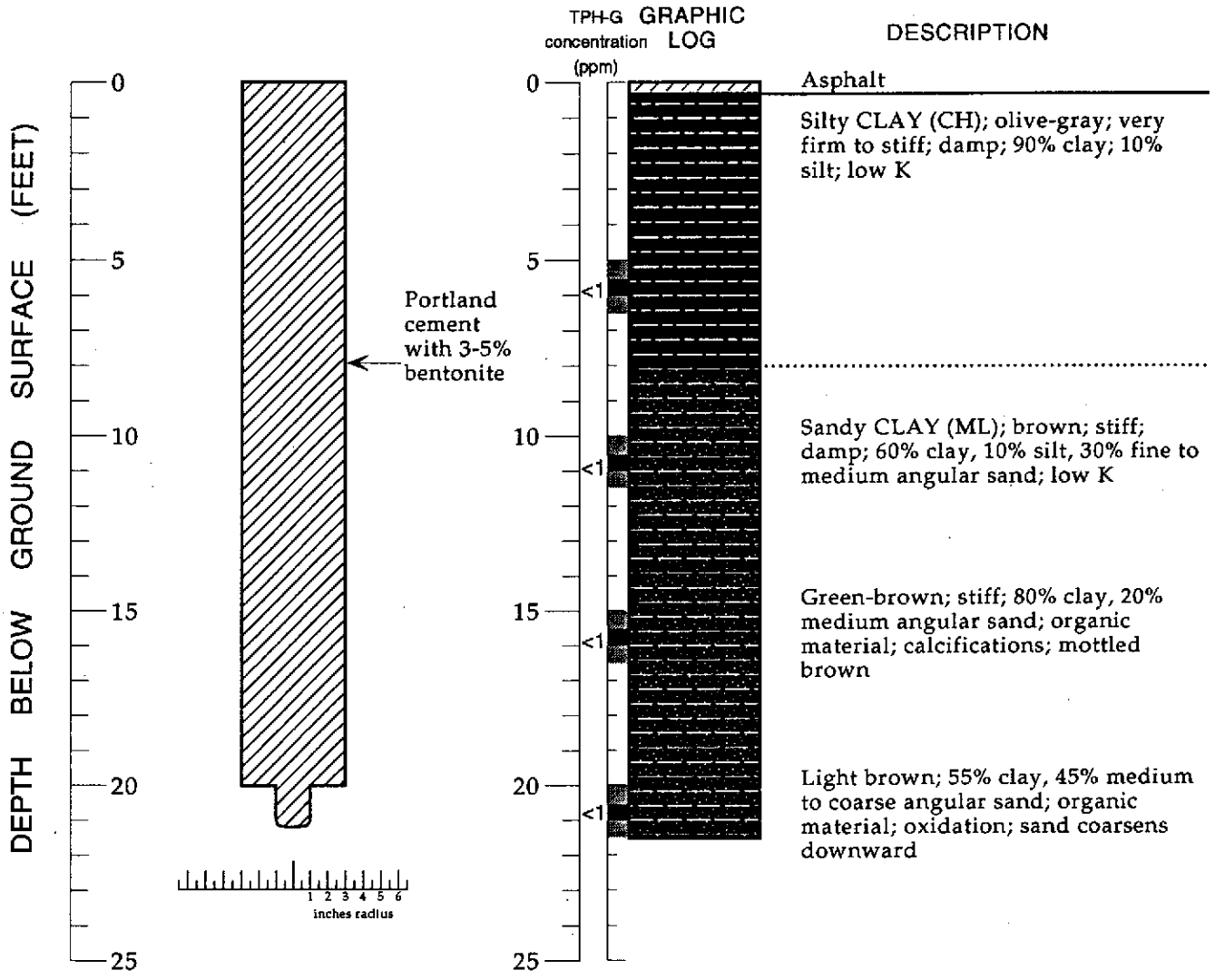
Ground Water Sampling

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 C

BORING LOGS

BORING BH-D



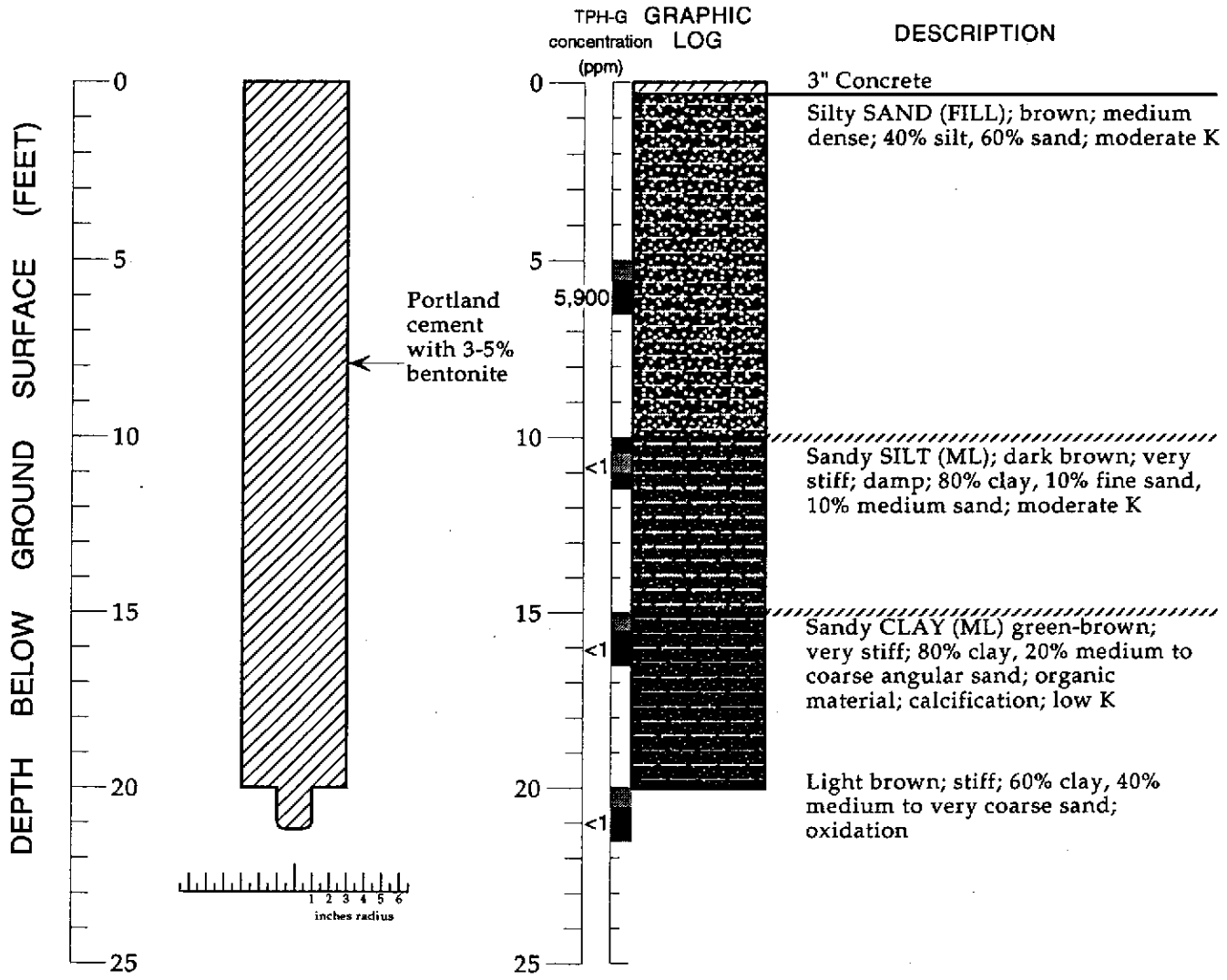
EXPLANATION

- 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: Faith Daverin
Supervisor: Jim Carmody; CEG 1576
Drilling Company: Gregg Drilling, San Rafael,CA
License Number: C57-485165
Driller: Chris St. Pierre
Drilling Method: Hollow-stem auger
Date Drilled: November 3, 1994
Type of Sampler: Split spoon (2" ID)
TPH-G: Total petroleum hydrocarbons as gasoline in soil by modified EPA Method 8015

Boring Log - Boring BH-D - Shell Service Station WIC #204-5510-0600, 4255 MacArthur Boulevard, Oakland, California

BORING BH-E



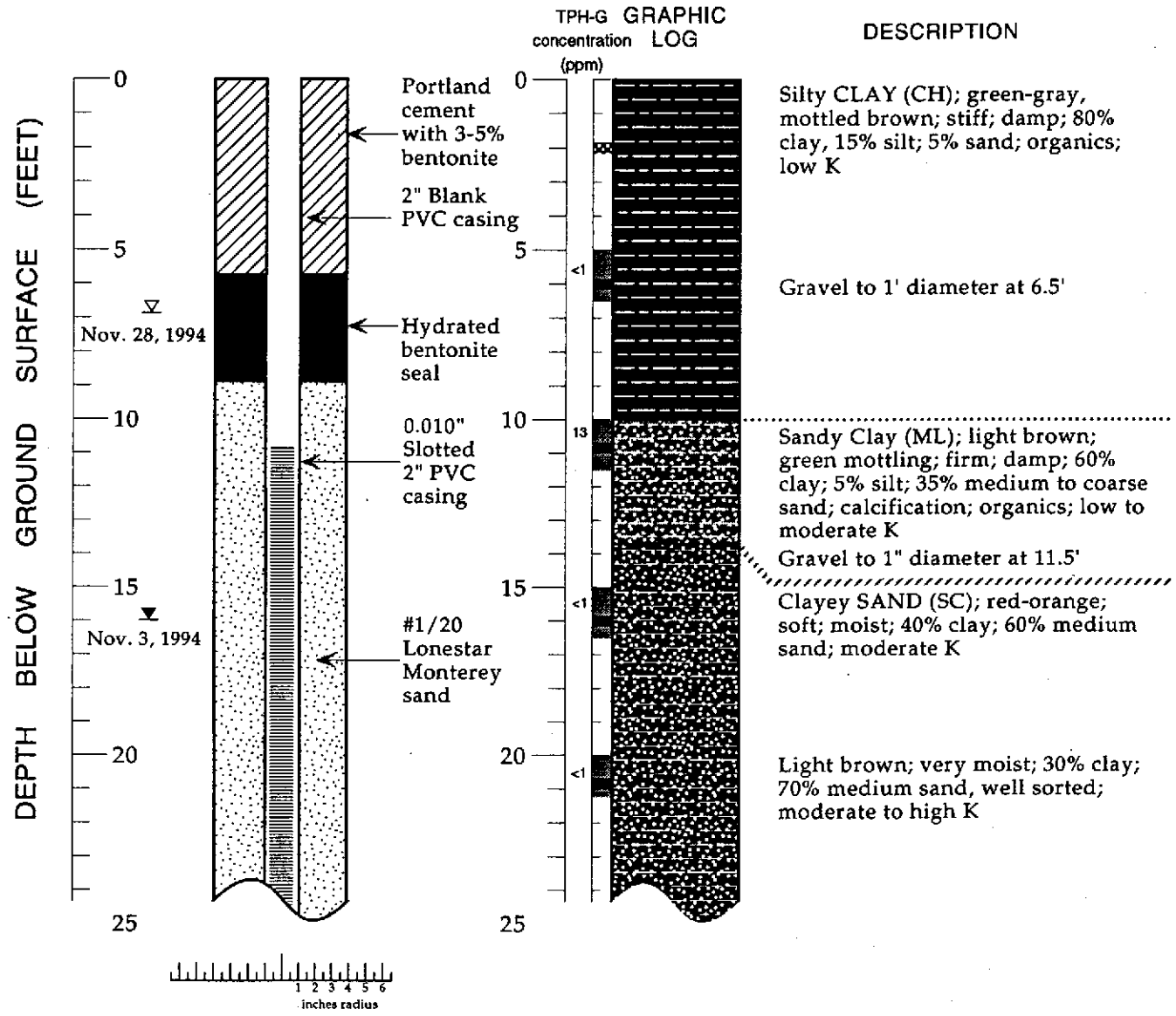
EXPLANATION

- 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: Faith Daverin
Supervisor: Jim Carmody; CEG 1576
Drilling Company: Gregg Drilling, Pacheco, CA
License Number: C57-485165
Driller: Chris St. Pierre
Drilling Method: Hollow-stem auger
Date Drilled: November 3, 1994
Type of Sampler: Split spoon (2" ID)
TPH-G: Total petroleum hydrocarbons as gasoline in soil by modified EPA Method 8015

Boring Log - Boring BH-E - Shell Service Station WIC #204-5510-0600, 4255 MacArthur Boulevard, Oakland, California

MONITORING WELL MW-4 (BH-F)



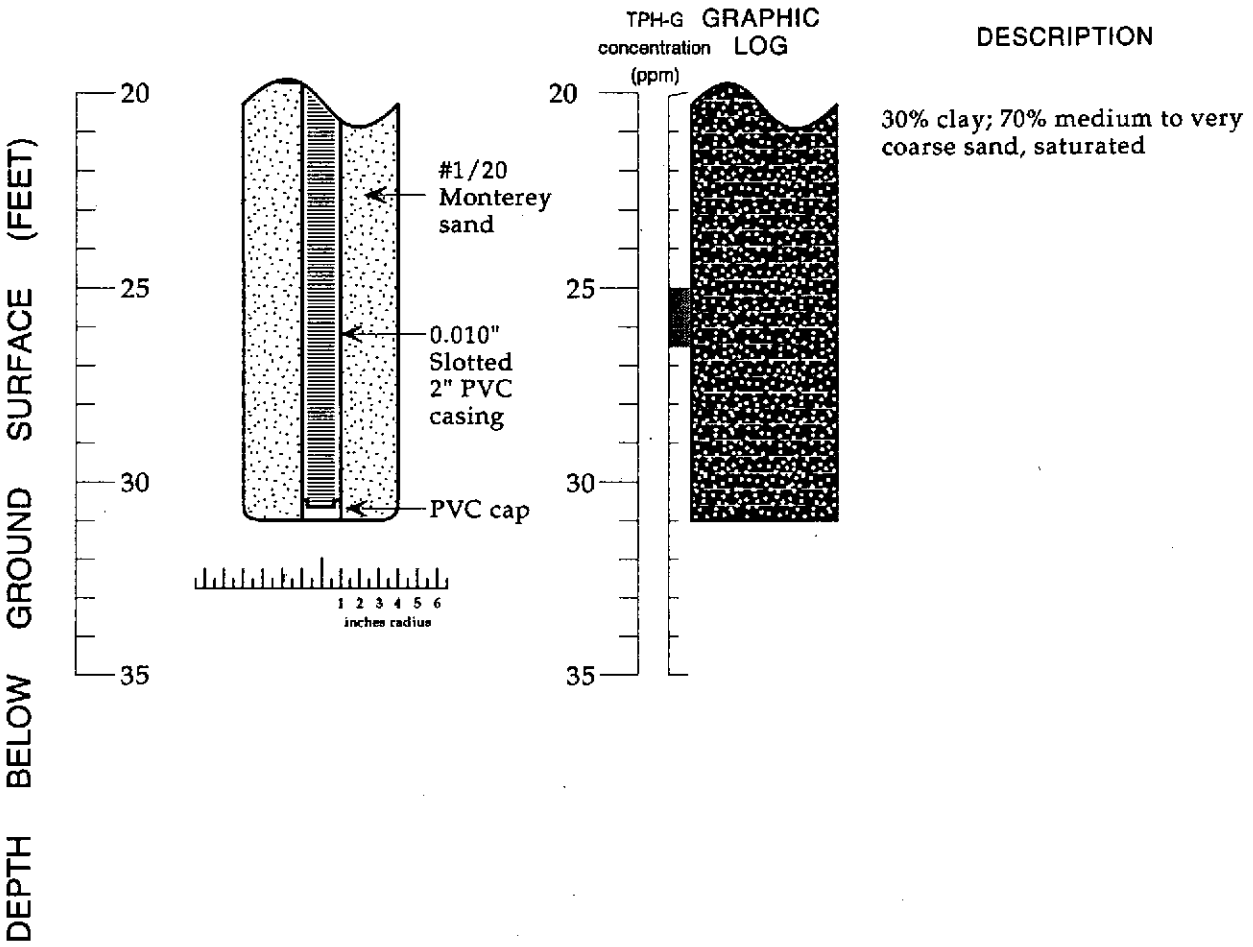
EXPLANATION

- 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: Faith Daverin
Supervisor: Jim Carmody; CEG 1576
Drilling Company: Gregg Drilling, Pacheco, CA
License Number: C57-485165
Driller: Chris St. Pierre
Drilling Method: Hollow-stem auger - 8" diameter
Date Drilled: November 3, 1994
Well Head Completion: 2" locking well-plug, traffic-rated vault
Type of Sampler: Split spoon (2" ID)
Ground Surface Elevation: feet above mean sea level
TPH-G: Total petroleum hydrocarbons as gasoline in soil by modified EPA Method 8015

Boring Log and Well Construction Details - Well MW-4 (BH-F) - Shell Service Station WIC #204-5510-0600, 4255 MacArthur Boulevard, Oakland, California

WELL MW-4 (BH-F) (cont.)



Boring Log and Well Construction Details - Well MW-4 (BH-F) - Shell Service Station WIC #204-5510-0600, 4255 MacArthur Boulevard, Oakland, California

ATTACHMENT D

ANALYTIC REPORTS AND CHAIN-OF-CUSTODY FORMS

NATIONAL ENVIRONMENTAL TESTING, INC.

Santa Rosa Division
435 Tesconi Circle
Santa Rosa, CA 95401
Tel: (707) 526-7200
Fax: (707) 526-9623

Jonathon Weingast
Weiss Associates
5500 Shellmound St.
Emeryville, CA 94608

Date: 11/11/1994
NET Client Acct. No: 1809
NET Pacific Job No: 94.05274
Received: 11/05/1994

Client Reference Information

Shell, 4255 MacArthur Blvd. Oakland/81-757-16

Sample analysis in support of the project referenced above has been completed and results are presented on following pages. Results apply only to the samples analyzed. Reproduction of this report is permitted only in its entirety. 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:

Judy Ridley
Project Coordinator

Jim Hoch
Operations Manager

Enclosure(s)

Ref: Shell, 4255 MacArthur Blvd. Oakland/81-757-16

SAMPLE DESCRIPTION: BHD-5'
Date Taken: 11/03/1994
Time Taken:
NET Sample No: 221627

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
TPH (Gas/BTXE,Solid)								
METHOD 5030/M8015	--						11/08/1994	1519
DILUTION FACTOR*	1						11/08/1994	1519
as Gasoline	ND		1	mg/kg	5030		11/08/1994	1519
Carbon Range:	--						11/08/1994	1519
METHOD 8020 (GC,Solid)	ND						11/08/1994	1519
Benzene	ND		0.0025	mg/kg	8020		11/08/1994	1519
Toluene	ND		0.0025	mg/kg	8020		11/08/1994	1519
Ethylbenzene	ND		0.0025	mg/kg	8020		11/08/1994	1519
Xylenes (Total)	ND		0.0025	mg/kg	8020		11/08/1994	1519
SURROGATE RESULTS	--						11/08/1994	1519
Bromofluorobenzene (SURR)	88			% Rec.	5030		11/08/1994	1519

Ref: Shell, 4255 MacArthur Blvd. Oakland/81-757-16

SAMPLE DESCRIPTION: BHD-10'
Date Taken: 11/03/1994
Time Taken:
NET Sample No: 221628

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
TPH (Gas/BTXE,Solid)								
METHOD 5030/M8015	--						11/08/1994	1519
DILUTION FACTOR*	1						11/08/1994	1519
as Gasoline	ND		1	mg/kg	5030		11/08/1994	1519
Carbon Range:	--						11/08/1994	1519
METHOD 8020 (GC,Solid)	--						11/08/1994	1519
Benzene	0.13	C	0.0025	mg/kg	8020		11/08/1994	1519
Toluene	ND		0.0025	mg/kg	8020		11/08/1994	1519
Ethylbenzene	0.011	C	0.0025	mg/kg	8020		11/08/1994	1519
Xylenes (Total)	0.01	C	0.0025	mg/kg	8020		11/08/1994	1519
SURROGATE RESULTS	--						11/08/1994	1519
Bromofluorobenzene (SURR)	101			% Rec.	5030		11/08/1994	1519

C : Positive result confirmed by secondary column or GC/MS analysis.

Ref: Shell, 4255 MacArthur Blvd. Oakland/81-757-16

SAMPLE DESCRIPTION: BHD-15'
Date Taken: 11/03/1994
Time Taken:
NET Sample No: 221629

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
TPH (Gas/BTXE,Solid)								
METHOD 5030/M8015	--						11/07/1994	1520
DILUTION FACTOR*	1						11/07/1994	1520
as Gasoline	ND		1	mg/kg	5030		11/07/1994	1520
Carbon Range:	--						11/07/1994	1520
METHOD 8020 (GC,Solid)	--						11/07/1994	1520
Benzene	ND		0.0025	mg/kg	8020		11/07/1994	1520
Toluene	ND		0.0025	mg/kg	8020		11/07/1994	1520
Ethylbenzene	ND		0.0025	mg/kg	8020		11/07/1994	1520
Xylenes (Total)	ND		0.0025	mg/kg	8020		11/07/1994	1520
SURROGATE RESULTS	--						11/07/1994	1520
Bromofluorobenzene (SURR)	87			% Rec.	5030		11/07/1994	1520

Ref: Shell, 4255 MacArthur Blvd. Oakland/81-757-16

SAMPLE DESCRIPTION: BHD-20'
Date Taken: 11/03/1994
Time Taken:
NET Sample No: 221630

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
TPH (Gas/BTXE,Solid)								
METHOD 5030/M8015	--						11/07/1994	1520
DILUTION FACTOR*	1						11/07/1994	1520
as Gasoline	ND		1	mg/kg	5030		11/07/1994	1520
Carbon Range:	--						11/07/1994	1520
METHOD 8020 (GC,Solid)	--						11/07/1994	1520
Benzene	ND		0.0025	mg/kg	8020		11/07/1994	1520
Toluene	ND		0.0025	mg/kg	8020		11/07/1994	1520
Ethylbenzene	ND		0.0025	mg/kg	8020		11/07/1994	1520
Xylenes (Total)	0.015	C	0.0025	mg/kg	8020		11/07/1994	1520
SURROGATE RESULTS	--						11/07/1994	1520
Bromofluorobenzene (SURR)	80			% Rec.	5030		11/07/1994	1520

C : Positive result confirmed by secondary column or GC/MS analysis.

Ref: Shell, 4255 MacArthur Blvd. Oakland/81-757-16

SAMPLE DESCRIPTION: BHE-5'
Date Taken: 11/03/1994
Time Taken:
NET Sample No: 221631

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
TPH (Gas/BTXE,Solid)								
METHOD 5030/M8015	--						11/08/1994	1519
DILUTION FACTOR*	1,000						11/08/1994	1519
as Gasoline	5,900		1,000	mg/kg	5030		11/08/1994	1519
Carbon Range:	C5-C14						11/08/1994	1519
METHOD 8020 (GC,Solid)	--						11/08/1994	1519
Benzene	23.		2.5	mg/kg	8020		11/08/1994	1519
Toluene	160		2.5	mg/kg	8020		11/08/1994	1519
Ethylbenzene	120		2.5	mg/kg	8020		11/08/1994	1519
Xylenes (Total)	430		2.5	mg/kg	8020		11/08/1994	1519
SURROGATE RESULTS	--						11/08/1994	1519
Bromofluorobenzene (SURR)	110			% Rec.	5030		11/08/1994	1519

Ref: Shell, 4255 MacArthur Blvd. Oakland/81-757-16

SAMPLE DESCRIPTION: BHE-10'
Date Taken: 11/03/1994
Time Taken:
NET Sample No: 221632

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
TPH (Gas/BTXE,Solid)								
METHOD 5030/M8015	--						11/08/1994	1519
DILUTION FACTOR*	1						11/08/1994	1519
as Gasoline	ND		1	mg/kg	5030		11/08/1994	1519
Carbon Range:	--						11/08/1994	1519
METHOD 8020 (GC,Solid)	--						11/08/1994	1519
Benzene	0.031	C	0.0025	mg/kg	8020		11/08/1994	1519
Toluene	ND		0.0025	mg/kg	8020		11/08/1994	1519
Ethylbenzene	ND		0.0025	mg/kg	8020		11/08/1994	1519
Xylenes (Total)	ND		0.0025	mg/kg	8020		11/08/1994	1519
SURROGATE RESULTS	--						11/08/1994	1519
Bromofluorobenzene (SURR)	90			% Rec.	5030		11/08/1994	1519

C : Positive result confirmed by secondary column or GC/MS analysis.

Ref: Shell, 4255 MacArthur Blvd. Oakland/81-757-16

SAMPLE DESCRIPTION: BHE-15'
Date Taken: 11/03/1994
Time Taken:
NET Sample No: 221633

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
TPH (Gas/BTXE,Solid)								
METHOD 5030/M8015	--						11/07/1994	1520
DILUTION FACTOR*	1						11/07/1994	1520
as Gasoline	ND		1	mg/kg	5030		11/07/1994	1520
Carbon Range:	--						11/07/1994	1520
METHOD 8020 (GC,Solid)	--						11/07/1994	1520
Benzene	0.0053	C	0.0025	mg/kg	8020		11/07/1994	1520
Toluene	0.0033	C	0.0025	mg/kg	8020		11/07/1994	1520
Ethylbenzene	ND		0.0025	mg/kg	8020		11/07/1994	1520
Xylenes (Total)	0.007	C	0.0025	mg/kg	8020		11/07/1994	1520
SURROGATE RESULTS	--						11/07/1994	1520
Bromofluorobenzene (SURR)	75			% Rec.	5030		11/07/1994	1520

C : Positive result confirmed by secondary column or GC/MS analysis.

Ref: Shell, 4255 MacArthur Blvd. Oakland/81-757-16

SAMPLE DESCRIPTION: BHE-20'
Date Taken: 11/03/1994
Time Taken:
NET Sample No: 221634

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
TPH (Gas/BTXE,Solid)								
METHOD 5030/M8015	--						11/07/1994	1520
DILUTION FACTOR*	1						11/07/1994	1520
as Gasoline	ND		1	mg/kg	5030		11/07/1994	1520
Carbon Range:	--						11/07/1994	1520
METHOD 8020 (GC,Solid)	--						11/07/1994	1520
Benzene	ND		0.0025	mg/kg	8020		11/07/1994	1520
Toluene	0.0077	C	0.0025	mg/kg	8020		11/07/1994	1520
Ethylbenzene	ND		0.0025	mg/kg	8020		11/07/1994	1520
Xylenes (Total)	0.015	C	0.0025	mg/kg	8020		11/07/1994	1520
SURROGATE RESULTS	--						11/07/1994	1520
Bromofluorobenzene (SURR)	90			% Rec.	5030		11/07/1994	1520

C : Positive result confirmed by secondary column or GC/MS analysis.

Ref: Shell, 4255 MacArthur Blvd. Oakland/81-757-16

SAMPLE DESCRIPTION: BHF-5'
Date Taken: 11/03/1994
Time Taken:
NET Sample No: 221635

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
TPH (Gas/BTXE,Solid)								
METHOD 5030/M8015	--						11/07/1994	1520
DILUTION FACTOR*	1						11/07/1994	1520
as Gasoline	ND		1	mg/kg	5030		11/07/1994	1520
Carbon Range:	--						11/07/1994	1520
METHOD 8020 (GC,Solid)	--						11/07/1994	1520
Benzene	ND		0.0025	mg/kg	8020		11/07/1994	1520
Toluene	ND		0.0025	mg/kg	8020		11/07/1994	1520
Ethylbenzene	ND		0.0025	mg/kg	8020		11/07/1994	1520
Xylenes (Total)	ND		0.0025	mg/kg	8020		11/07/1994	1520
SURROGATE RESULTS	--						11/07/1994	1520
Bromofluorobenzene (SURR)	89			% Rec.	5030		11/07/1994	1520

Client Name: Weiss Associates
Client Acct: 1809
NET Job No: 94.05274

Date: 11/11/1994
ELAP Cert: 1386
Page: 11

Ref: Shell, 4255 MacArthur Blvd. Oakland/81-757-16

SAMPLE DESCRIPTION: BHF-10'
Date Taken: 11/03/1994
Time Taken:
NET Sample No: 221636

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
TPH (Gas/BTXE,Solid)								
METHOD 5030/M8015	--						11/07/1994	1520
DILUTION FACTOR*	10						11/07/1994	1520
as Gasoline	13		10	mg/kg	5030		11/07/1994	1520
Carbon Range:	C5-C14						11/07/1994	1520
METHOD 8020 (GC,Solid)	--						11/07/1994	1520
Benzene	0.29		0.025	mg/kg	8020		11/07/1994	1520
Toluene	0.14		0.025	mg/kg	8020		11/07/1994	1520
Ethylbenzene	0.17		0.025	mg/kg	8020		11/07/1994	1520
Xylenes (Total)	0.54		0.025	mg/kg	8020		11/07/1994	1520
SURROGATE RESULTS	--						11/07/1994	1520
Bromofluorobenzene (SURR)	98			% Rec.	5030		11/07/1994	1520

Ref: Shell, 4255 MacArthur Blvd. Oakland/81-757-16

SAMPLE DESCRIPTION: BHF-15'
Date Taken: 11/03/1994
Time Taken:
NET Sample No: 221637

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
TPH (Gas/BTXE,Solid)								
METHOD 5030/M8015	--						11/07/1994	1520
DILUTION FACTOR*	1						11/07/1994	1520
as Gasoline	ND		1	mg/kg	5030		11/07/1994	1520
Carbon Range:	--						11/07/1994	1520
METHOD 8020 (GC,Solid)	--						11/07/1994	1520
Benzene	0.044	C	0.0025	mg/kg	8020		11/07/1994	1520
Toluene	0.0033	C	0.0025	mg/kg	8020		11/07/1994	1520
Ethylbenzene	0.017	C	0.0025	mg/kg	8020		11/07/1994	1520
Xylenes (Total)	0.032	C	0.0025	mg/kg	8020		11/07/1994	1520
SURROGATE RESULTS	--						11/07/1994	1520
Bromofluorobenzene (SURR)	96			% Rec.	5030		11/07/1994	1520

C : Positive result confirmed by secondary column or GC/MS analysis.

Ref: Shell, 4255 MacArthur Blvd. Oakland/81-757-16

SAMPLE DESCRIPTION: BHF-20'
Date Taken: 11/03/1994
Time Taken:
NET Sample No: 221638

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
TPH (Gas/BTXE,Solid)								
METHOD 5030/M8015	--						11/07/1994	1520
DILUTION FACTOR*	1						11/07/1994	1520
as Gasoline	ND		1	mg/kg	5030		11/07/1994	1520
Carbon Range:	--						11/07/1994	1520
METHOD 8020 (GC,Solid)	--						11/07/1994	1520
Benzene	ND		0.0025	mg/kg	8020		11/07/1994	1520
Toluene	ND		0.0025	mg/kg	8020		11/07/1994	1520
Ethylbenzene	ND		0.0025	mg/kg	8020		11/07/1994	1520
Xylenes (Total)	ND		0.0025	mg/kg	8020		11/07/1994	1520
SURROGATE RESULTS	--						11/07/1994	1520
Bromofluorobenzene (SURR)	79			% Rec.	5030		11/07/1994	1520

Ref: Shell, 4255 MacArthur Blvd. Oakland/81-757-16

SAMPLE DESCRIPTION: COMP-A
Date Taken: 11/03/1994
Time Taken:
NET Sample No: 221639

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed	Run Batch No.
Org. Lead (FLAA)	ND		5.0	mg/kg	DOHS-LUFT	11/09/1994	11/09/1994	222
TPH (Gas/BTXE,Solid)								
METHOD 5030/M8015	--						11/07/1994	1519
DILUTION FACTOR*	10						11/07/1994	1519
as Gasoline	100		10	mg/kg	5030		11/08/1994	1519
Carbon Range:	C5-C14						11/07/1994	1519
METHOD 8020 (GC,Solid)	--						11/07/1994	1519
Benzene	0.091		0.025	mg/kg	8020		11/07/1994	1519
Toluene	0.40		0.025	mg/kg	8020		11/07/1994	1519
Ethylbenzene	0.64		0.025	mg/kg	8020		11/08/1994	1519
Xylenes (Total)	2.0		0.025	mg/kg	8020		11/07/1994	1519
SURROGATE RESULTS	--						11/07/1994	1519
Bromofluorobenzene (SURR)	118			% Rec.	5030		11/07/1994	1519

Ref: Shell, 4255 MacArthur Blvd. Oakland/81-757-16

CONTINUING CALIBRATION VERIFICATION STANDARD REPORT

Parameter	CCV Standard % Recovery	CCV Standard Amount Found	CCV Standard Amount Expected	Units	Date Analyzed	Analyst Initials
Org. Lead (FLAA)	101.8	63.65	62.5	mg/kg	11/09/1994	ket
TPH (Gas/BTXE,Solid)						
as Gasoline	112.6	5.63	5.00	mg/kg	11/07/1994	pbg
Benzene	106.4	26.6	25.0	ug/kg	11/07/1994	pbg
Toluene	100.8	25.2	25.0	ug/kg	11/07/1994	pbg
Ethylbenzene	106.8	26.7	25.0	ug/kg	11/07/1994	pbg
Xylenes (Total)	98.0	73.5	75.0	ug/kg	11/07/1994	pbg
Bromofluorobenzene (SURR)	92.4	92.4	100	% Rec.	11/07/1994	pbg
TPH (Gas/BTXE,Solid)						
as Gasoline	92.6	4.63	5.00	mg/kg	11/08/1994	aal
Benzene	105.2	26.3	25.0	ug/kg	11/08/1994	aal
Toluene	98.0	24.5	25.0	ug/kg	11/08/1994	aal
Ethylbenzene	113.6	28.4	25.0	ug/kg	11/08/1994	aal
Xylenes (Total)	99.3	74.5	75.0	ug/kg	11/08/1994	aal
Bromofluorobenzene (SURR)	99.0	99	100	% Rec.	11/08/1994	aal
TPH (Gas/BTXE,Solid)						
as Gasoline	102.6	5.13	5.00	mg/kg	11/09/1994	pbg
Benzene	100.8	25.2	25.0	ug/kg	11/09/1994	pbg
Toluene	99.2	24.8	25.0	ug/kg	11/09/1994	pbg
Ethylbenzene	104.0	26.0	25.0	ug/kg	11/09/1994	pbg
Xylenes (Total)	98.7	74.0	75.0	ug/kg	11/09/1994	pbg
Bromofluorobenzene (SURR)	92.9	92.9	100	% Rec.	11/09/1994	pbg

Ref: Shell, 4255 MacArthur Blvd. Oakland/81-757-16

METHOD BLANK REPORT

Parameter	Method Blank Amount Found	Reporting Limit	Units	Date Analyzed	Analyst Initials
Org. Lead (FLAA)	ND	5.0	mg/kg	11/09/1994	ket
TPH (Gas/BTXE,Solid)					
as Gasoline	ND	1	mg/kg	11/07/1994	pbg
Benzene	ND	2.5	ug/kg	11/07/1994	pbg
Toluene	ND	2.5	ug/kg	11/07/1994	pbg
Ethylbenzene	ND	2.5	ug/kg	11/07/1994	pbg
Xylenes (Total)	ND	2.5	ug/kg	11/07/1994	pbg
Bromofluorobenzene (SURR)	83		% Rec.	11/07/1994	pbg
TPH (Gas/BTXE,Solid)					
as Gasoline	ND	1	mg/kg	11/08/1994	aal
Benzene	ND	2.5	ug/kg	11/08/1994	aal
Toluene	ND	2.5	ug/kg	11/08/1994	aal
Ethylbenzene	ND	2.5	ug/kg	11/08/1994	aal
Xylenes (Total)	ND	2.5	ug/kg	11/08/1994	aal
Bromofluorobenzene (SURR)	104		% Rec.	11/08/1994	aal
TPH (Gas/BTXE,Solid)					
as Gasoline	ND	1	mg/kg	11/09/1994	pbg
Benzene	ND	2.5	ug/kg	11/09/1994	pbg
Toluene	ND	2.5	ug/kg	11/09/1994	pbg
Ethylbenzene	ND	2.5	ug/kg	11/09/1994	pbg
Xylenes (Total)	ND	2.5	ug/kg	11/09/1994	pbg
Bromofluorobenzene (SURR)	80		% Rec.	11/09/1994	pbg

Ref: Shell, 4255 MacArthur Blvd. Oakland/81-757-16

MATRIX SPIKE / MATRIX SPIKE DUPLICATE

Parameter	Matrix Spike % Rec.	Matrix Spike Dup % Rec.	RPD	Spike Amount	Sample Conc.	Matrix Spike Conc.	Matrix Spike Dup. Conc.	Units	Date Analyzed	Analyst Initials
Org. Lead (FLAA)	0	0	0	97.61	ND	ND	ND	mg/kg	11/09/1994	ket
TPH (Gas/BTXE,Solid)										
as Gasoline	82.0	85.0	3.6	5.00	ND	4.10	4.25	mg/kg dw	11/08/1994	aal
Benzene	99.5	98.2	1.3	96.8	ND	96.3	95.1	ug/kg dw	11/08/1994	aal
Toluene	98.1	97.9	0.2	275.2	ND	269.9	269.5	ug/kg dw	11/08/1994	aal
TPH (Gas/BTXE,Solid)										
TPH (Gas/BTXE,Solid)										
as Gasoline	90.0	96.2	6.7	5.00	ND	4.5	4.81	mg/kg	11/09/1994	pbg
Benzene	89.1	97.3	8.8	110	ND	98	107	ug/kg	11/09/1994	pbg
Toluene	92.9	98.9	6.3	378	ND	351	374	ug/kg	11/09/1994	pbg

Client Name: Weiss Associates
Client Acct: 1809
NET Job No: 94.05274

Date: 11/11/1994
ELAP Cert: 1386
Page: 18

Ref: Shell, 4255 MacArthur Blvd. Oakland/81-757-16

LABORATORY CONTROL SAMPLE REPORT

Parameter	LCS % Recovery	RPD	LCS Amount Found	LCS Amount Expected	Units	Date Analyzed	Analyst Initials
Org. Lead (FLAA)	78.7		78.72	100	mg/kg	11/09/1994	ket

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. Actual reporting limits and results have been multiplied by the listed dilution factor. Do not multiply the reporting limits or reported values by the dilution factor.
dw	:	Result expressed as dry weight.
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 the 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., Rev. 1, December 1987.

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

Revised September, 1993
abb.93

COOLER RECEIPT FORM

Project: 204-5510-0600 Log No: 3626
Cooler received on: 11/3/94 and checked on 11/5/95 by Philip Jansen
(signature)

Were custody papers present?.....(YES) NO
Were custody papers properly filled out?.....(YES) NO
Were the custody papers signed?.....(YES) NO
Was sufficient ice used?.....(YES) NO TEMP.: 3.3°C.
Did all bottles arrive in good condition (unbroken)?.....(YES) NO
Did bottle labels match COC?.....(YES) NO
Were proper bottles used for analysis indicated?.....(YES) NO
Correct preservatives used?.....(YES) NO
VOA vials checked for headspace bubbles?.....YES NO N/A
Note which voas (if any) had bubbles:*

Sample descriptor:	Number of vials:

*All VOAs with headspace bubbles have been set aside so they will not be used for analysis.....YES NO

List here all other jobs received in the same cooler:

Client Job #	NET log #

(coolerrec)

3626

SHELL OIL COMPANY
RETAIL ENVIRONMENTAL ENGINEERING - WEST

CHAIN OF CUSTODY RECORD
Serial No: _____

Date: 11/3/94
Page 1 of 2

Site Address: 4255 MacArthur Blvd, Oakland

WIC#: 204-5510-0600

Shell Engineer: Dan Kirk
Phone No.: (510) 675-6168
Fax #: 675-6162

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

Consultant Contact: Faith Daverin
Phone No.: (510) 547-5420
Fax #: 547-5043
WA JOB # 81-757-16

Comments:

Sampled by: Faith Morris Daverin

Printed Name: Faith Morris Daverin

LAB: _____

CHECK ONE (1) BOX ONLY	CT/DT	TURN AROUND TIME
G.W. Monitoring	☐ 4461	24 hours ☐
Site Investigation	☒ 4441	48 hours ☐
Soil Classify/Disposal	☐ 4442	15 days ☒ (Normal)
Water Classify/Disposal	☐ 4443	Other ☐ ____
Soil/Air Rem. or Sys. O & M	☐ 4452	NOTE: Notify Lab as soon as Possible of 24/48 hrs. TAT.
Water Rem. or Sys. O & M	☐ 4453	
Other	☐	

UST AGENCY: ACEHS

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			Asbestos	Container Size	Preparation Used	Composite Y/N	MATERIAL DESCRIPTION	SAMPLE CONDITION/ COMMENTS
BHD-5'	11/3/94		X			1	X		X							Brass Sleeve		N		
BHD-10'	11/3/94		X			1	X		X									N		
BHD-15'	11/3/94		X			1	X		X									N		
BHD-20'	11/3/94		X			1	X		X									N		
BHE-5'	11/3/94		X			1	X		X									N		
BHE-10'	11/3/94		X			1	X		X									N		
BHE-15'	11/3/94		X			1	X		X									N		
BHE-20'	11/3/94		X			1	X		X									N		

CUSTODY SEALED 11/4/94 GT Lumble

Data Intact GT

Relinquished By (signature): Faith Morris-Daverin	Printed Name: Faith Morris-Daverin	Date: 11/4/94 Time: 1647	Received (signature): GT Lumble
Relinquished By (signature): GT Lumble	Printed Name: GT LAMBLE	Date: 11/4/94 Time: 17:00	Received (signature):
Relinquished By (signature):	Printed Name:	Date: Time:	Received (signature): Paula Prosser

Printed Name: GT Lumble	Date: 11/4/94 Time: 1645	
Printed Name:	Date: Time:	
Printed Name: Paula Prosser	Date: 11/5/94 Time: 0902	

THE LABORATORY MUST PROVIDE A COPY OF THIS CHAIN-OF-CUSTODY WITH INVOICE AND RESULTS VOA: NCS. TEMP.: 3.3°C

Rev. 7/12/93

Blue = Dist Chm. of Custody

#3626

SHELL OIL COMPANY
RETAIL ENVIRONMENTAL ENGINEERING - WEST

CHAIN OF CUSTODY RECORD
Serial No: _____

Date: 11/3/94
Page 2 of 2

Site Address: 4255 MacArthur Blvd, Oakland

WIC#: 204-5510-0600

Shell Engineer: Dan Kirk — Phone No.: (510) 675-6168 Fax #: 675-6162

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

Consultant Contact: Faith Daverin — Phone No.: (510) 547-5420 Fax #: 547-5043
WA JOB # 81-757-16

Comments:

Sampled by: Faith Morris Daverin

Printed Name: Faith Morris DAVERIN

LAB: _____

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	Organic Lead (DOHS LUFT METHOD)	Asbestos	Container Size	Preparation Used	Composite Y/N	MATERIAL DESCRIPTION	SAMPLE CONDITION/ COMMENTS
BHF-5'	11/3/94		X			1	X		X						Brass sleeve		N		HOLD
BHF-10	11/3/94		X			1	X		X								N		
BHF-15	11/3/94		X			1	X		X								N		
BHF-20	11/3/94		X			1	X		X								N		
COMP A	11/3/94		X			3	X		X				X				Y		

CHECK ONE (1) BOX ONLY | CT/DT | TURN AROUND TIME

- G.W. Monitoring ☐ 4461 — 24 hours ☐
- Site Investigation ☒ 4441 — 48 hours ☐
- Soil Classify/Disposal ☐ 4442 — 15 days ☒ (Normal)
- Water Classify/Disposal ☐ 4443 — Other ☐ _____
- Soil/Air Rem. or Sys. O & M ☐ 4452
- Water Rem. or Sys. O & M ☐ 4453
- Other ☐

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

UST AGENCY: ACEHS

	Printed Name	Date / Time		Printed Name	Date / Time
Relinquished By (signature): Faith Morris Daverin	Faith Morris Daverin	Date: 11/4/94 Time: 1047	Received (signature):	GP Lumbre	Date: 11/4/94 Time: 1047
Relinquished By (signature): GP Lumbre	GP LUMBRE	Date: 11/4 Time: 1400	Received (signature):	Printed Name:	Date: Time:
Relinquished By (signature):	Printed Name:	Date: Time:	Received (signature):	Printed Name: THAD TROSPER	Date: 11/5/94 Time: 0902

THE LABORATORY MUST PROVIDE A COPY OF THIS CHAIN-OF-CUSTODY WITH INVOICE AND RESULTS VIA: NCS. TEMP.: 3.3°C

Rev. 1/17/91 — Brief Oil Co. of Custody

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
1900 Bates Avenue, Suite L, Concord, CA 94520, (510) 686-9600, FAX (510) 686-9689
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Weiss Associates
5500 Shellmound
Emeryville, CA 94608
Attention: Faith Daverin

Project: Shell, 4255 Macarthur, Oaklnd

Enclosed are the results from samples received at Sequoia Analytical on November 28, 1994. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE COLLECTED	TEST METHOD
9411G86 -01	LIQUID, MW-4	11/28/94	TPHGBW Purgeable TPH/BTEX
9411G86 -02	LIQUID, TB-LB	11/28/94	TPHGBW Purgeable TPH/BTEX

Please contact me if you have any questions. In the meantime, thank you for the opportunity to work with you on this project.

Very truly yours,

SEQUOIA ANALYTICAL

Todd Olive
Project Manager

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
1900 Bates Avenue, Suite L, Concord, CA 94520, (510) 686-9600, FAX (510) 686-9689
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Weiss Associates	Client Proj. ID: Shell, 4255 Macarthur, Oaklnd	Sampled: 11/28/94
5500 Shellmound	Sample Descript: MW-4	Received: 11/28/94
Emeryville, CA 94608	Matrix: LIQUID	
	Analysis Method: 8015Mod/8020	Analyzed: 12/01/94
Attention: Faith Daverin	Lab Number: 9411G86-01	Reported: 12/08/94

QC Batch Number: GC113094BTEX02A
Instrument ID: GCHP-02

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX

Analyte	Detection Limit ug/L	Sample Results ug/L
TPPH as Gas	**500**	**2900**
Benzene	**5.0**	**200**
Toluene	**5.0**	**17**
Ethyl Benzene	**5.0**	**76**
Xylenes (Total)	**5.0**	**260**
Chromatogram Pattern:		**C6-C12**

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	96

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Todd Olive
Project Manager

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
1900 Bates Avenue, Suite L, Concord, CA 94520, (510) 686-9600, FAX (510) 686-9689
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Weiss Associates	Client Proj. ID: Shell, 4255 Macarthur, Oakind	Sampled: 11/28/94
5500 Shellmound	Sample Descript: TB-LB	Received: 11/28/94
Emeryville, CA 94608	Matrix: LIQUID	
	Analysis Method: 8015Mod/8020	Analyzed: 12/01/94
Attention: Faith Daverin	Lab Number: 9411G86-02	Reported: 12/08/94

QC Batch Number: GC113094BTEX02A
Instrument ID: GCHP-02

Total Purgeable Petroleum Hydrocarbons (TPPH) with BTEX

Analyte	Detection Limit ug/L	Sample Results ug/L
TPPH as Gas	50	N.D.
Benzene	0.50	N.D.
Toluene	0.50	N.D.
Ethyl Benzene	0.50	N.D.
Xylenes (Total)	0.50	N.D.
Chromatogram Pattern:		

Surrogates	Control Limits %		% Recovery
Trifluorotoluene	70	130	91

Analytes reported as N.D. were not present above the stated limit of detection.

SEQUOIA ANALYTICAL - ELAP #1210

Todd Olive
Project Manager

Sequoia Analytical

680 Chesapeake Drive, Redwood City, CA 94063, (415) 364-9600, FAX (415) 364-9233
1900 Bates Avenue, Suite L, Concord, CA 94520, (510) 686-9600, FAX (510) 686-9689
819 Striker Avenue, Suite 8, Sacramento, CA 95834, (916) 921-9600, FAX (916) 921-0100

Weiss & Associates	Client Project ID:	Shell, 4255 MacArthur Blvd.	
5500 Shellmound	Matrix:	Liquid	
Emeryville, CA 94608			
Attention: Faith Daverin	Work Order #:	9411G86 -01 - 02	Reported: Dec 8, 1994

QUALITY CONTROL DATA REPORT

Analyte:	Benzene	Toluene	Ethyl Benzene	Xylenes
QC Batch#:	GC113094BTEX02A	GC113094BTEX02A	GC113094BTEX02A	GC113094BTEX02A
Analy. Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Prep. Method:	N.A.	N.A.	N.A.	N.A.
Analyst:	J.Minkel	J.Minkel	J.Minkel	J.Minkel
MS/MSD #:	G9411C26-03D	G9411C26-03D	G9411C26-03D	G9411C26-03D
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Prepared Date:	N.A.	N.A.	N.A.	N.A.
Analyzed Date:	11/30/94	11/30/94	11/30/94	11/30/94
Instrument I.D.#:	GCHP2	GCHP2	GCHP2	GCHP2
Conc. Spiked:	10 ug/L	10 ug/L	10 ug/L	30 ug/L
Result:	10	10	9.9	30
MS % Recovery:	100	100	99	100
Dup. Result:	10	10	9.6	29
MSD % Recov.:	100	100	96	97
RPD:	0.0	0.0	3.1	3.4
RPD Limit:	0-50	0-50	0-50	0-50

LCS #:				
Prepared Date:				
Analyzed Date:				
Instrument I.D.#:				
Conc. Spiked:				
LCS Result:				
LCS % Recov.:				

MS/MSD LCS Control Limits	71-133	72-128	72-130	71-120

SEQUOIA ANALYTICAL

Todd Olive
Project Manager

Please Note:
The LCS is a control sample of known, interferent-free matrix that is analyzed using the same reagents, preparation, and analytical methods employed for the samples. The matrix spike is an aliquot of sample fortified with known quantities of specific compounds and subjected to the entire analytical procedure. If the recovery of analytes from the matrix spike does not fall within specified control limits due to matrix interference, the LCS recovery is to be used to validate the batch.

** MS = Matrix Spike, MSD = MS Duplicate, RPD = Relative % Difference

SHELL OIL COMPANY
RETAIL ENVIRONMENTAL ENGINEERING - WEST

CHAIN OF CUSTODY RECORD
Serial No: _____

Date: 11/28/94
Page 1 of 1

Site Address: 4255 MACARTHUR BLVD. OAKLAND

WIC#: 204-5510-0600

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

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

Consultant Contact: FAITH DAVERIN
WA JOB # 81-0757-16
Phone No.: (510) 547-5420
Fax #: 547-5043

Comments:

Sampled by: R.R.M.

Printed Name: RUDY R. MARQUEZ

LAB: SEQUOIA

CHECK ONE (1) BOX ONLY	CT/DT	TURN AROUND TIME
G.W. Monitoring	☐ 4461	24 hours ☐
Site Investigation	☐ 4441	48 hours ☐
Soil Classify/Disposal	☐ 4442	15 days ☒ (Normal)
Water Classify/Disposal	☐ 4443	Other ☐ ____
Soil/Air Rem. or Sys. O & M	☐ 4452	NOTE: Notify Lab as soon as Possible of 24/48 hrs. TAT.
Water Rem. or Sys. O & M	☐ 4453	
Other	☐	

UST AGENCY: _____

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			Asbestos	Container Size	Preparation Used	Composite Y/N	MATERIAL DESCRIPTION	SAMPLE CONDITION/ COMMENTS
MW-4	11/28			X		3						X				40 ML	HCL		941168	G-01
TB-LB	↓			↓		2						↓				↓	↓			-02
																				6°C

Relinquished By (signature): Rudy R. Marquez	Printed Name: RUDY R. MARQUEZ	Date: 11/28/94 Time: 1011	Received (signature):	Printed Name: C. Westwater	Date: 11/28/94 Time: 1011
Relinquished By (signature):	Printed Name: C. Westwater	Date: 11/28/94 Time: 2:00	Received (signature):	Printed Name:	Date: Time:
Relinquished By (signature):	Printed Name:	Date: Time:	Received (signature):	Printed Name: David Lawrence	Date: 11/28/94 Time: 1400

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

2nd Of One of Custody

ATTACHMENT E

SURVEY REPORT

PLS Surveys, Inc.

2415 Mariner Square Drive, Suite 8
Alameda, California 94501
510-522-1790 FAX 510-522-6207

November 18, 1994

Ms. Faith Daverin
Weiss Associates
5500 Shellmound Street
Emeryville, CA 94608-2411

Re: Job #94041
4255 MacArthur Blvd., Oakland

Dear Ms. Daverin:

The following is the elevation as found for the well at the above referenced site. Per your instructions, the Benchmark elevations used are the elevations on the existing wells at the site, from a previous site visit (by others).

Structure	Previous Elevation	11-18-94 Elevation (in feet)
MW-1, Casing	175.79	175.79
MW-2, Casing	170.91	170.91
MW-3, Casing	174.61	174.61
MW-4, Casing		164.06
MW-4, Vault		164.82

Elevations were taken on the northerly side of the casing and vault, and were marked with a felt tip pen indicating the exact location. If you have any questions, please feel free to call.

Sincerely,

Julia E. Terry

Julia E. Terry, PLS
President