Weiss Associates *Environmental and Geologic Services*

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

February 8, 1995

Jennifer Eberle
Alameda County Department of Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502

Re: Shell Service Station
WIC #204-5510-0204
350 Grand Avenue
Oakland, California
WA Job #81-0701-04

Dear Ms. Eberle:

On behalf of Shell Oil Company (Shell), Weiss Associates (WA) has prepared this workplan to better assess the ground water flow direction and investigate whether hydrocarbons are in ground water south and northwest of the Shell site referenced above (Figure 1). Currently the ground water flow direction appears variable because well S-3 is screened in more permeable sediments than wells S-1 and S-2. The more permeable sands occurring in S-3 cause the ground water elevation to fluctuate in response to ground water elevation changes considerably faster than wells S-1 and S-2 which are screened in less permeable silts and clays. To achieve the investigation objectives, we propose installing one ground water monitoring well across Grand Avenue and collecting one ground water sample from an open boring drilled across Perkins Street (Figure 2). The proposed monitoring well will allow us to collect additional ground water elevation data while sampling and analyzing ground water from the well and the boring will further define the extent of hydrocarbons in ground water in the site vicinity. A brief site summary, discussion of other hydrocarbon sources and a description of the specific tasks to meet this objective are presented below.

SITE SUMMARY

1990 Soil Borings: In May 1990, Geostrategies, Incorporated of Hayward, California drilled and sampled soil borings S-A through S-E (Figure 2). Up to 2,900 parts per million (ppm) total petroleum hydrocarbons as gasoline (TPH-G) and 13 ppm benzene were detected in the 9.5 ft soil sample collected from boring S-A (Table 1).[1]

1991 Well Installations: In January 1991, Geostrategies installed ground water monitoring wells S-1, S-2 and S-3 (Figure 2). Up to 440 ppm TPH-G, and 4.5 ppm benzene were detected in the 8.5 ft depth soil sample from boring S-2 (Table 1).[2]

1993 Hydropunch Ground Water Survey: In January 1993, Geostrategies collected Hydropunch ground water samples from temporary borings drilled in Grand Avenue and Perkins Street (Figure 2). Hydropunch sampling is commonly used as a screening method to evaluate whether hydrocarbons are *present* in ground water and is not intended for comparison to ground water samples collected from monitoring wells. Although **22,000 parts per billion (ppb) TPH-G and 2,500 ppb benzene were detected in ground water sample HP-1**, no TPH-G or benzene were detected in ground water samples HP-2 or HP-3 (Table 2, Figure 2).[3]

1994 Overspill Containment Upgrade: In August, 1994, Shell installed new overfill containment boxes on the fill pipes of the three gasoline underground storage tanks (USTs) and the diesel UST.

Quarterly Ground Water Monitoring: Ground water samples have been collected quarterly from the three onsite monitoring wells since January, 1991. During four years of monitoring, the ground water flow direction has shifted as much as 180 degrees from northerly to southerly from one quarter to the next (Figure 3, Table 3).

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1 Geostrategies, July 5, 1990, Consultants letter-report regarding soil boring soil sampling at the Shell service station located at 350 Grand Avenue, Oakland, California, 11 pages, 3 attachments.

2 Geostrategies, March 18, 1991, Consultants letter-report regarding monitoring well installation at the Shell service station located at 350 Grand Avenue, Oakland, California, 17 pages, 5 attachments.

3 Geostrategies, April 9, 1993, Consultants letter-report regarding quarterly ground water monitoring and Hydropunch ground water sampling at the Shell service station located at 350 Grand Avenue, Oakland, California, 15 pages, 3 attachments.

OTHER HYDROCARBON SOURCES

Another identified hydrocarbon source in the vicinity of the Shell site is the Quik Stop market located at 363 Grand Avenue, approximately 100 feet southeast. Quik Stop formerly dispensed gasoline from underground storage tanks at this site. The USTs were removed on June 15, 1988. Strong hydrocarbon odors were noted by Alameda County Department of Environmental Health inspector D. Byrne during the UST removal. Currently there are 3 onsite and 5 offsite monitoring wells, one recovery well and an active ground water and soil vapor extraction and treatment system at this site. **Both dissolved and separate phase hydrocarbons have been detected beneath the site.**[4] Ground water beneath the Quik Stop site flows towards the southwest except where influenced by the recovery well.

PROPOSED SCOPE OF WORK

To assess whether hydrocarbons are in the subsurface south and northwest of the Shell service station, WA proposes installing one monitoring well and drilling one boring to collect a ground water sample in the areas denoted on Figure 2. The ground water monitoring well will be located to confirm the south to southwest ground water flow direction, as observed at the nearby Quik Stop site, and will be screened to monitor the first water bearing zone and similar to the existing monitoring wells. Our standard field procedures are included as Attachment A.

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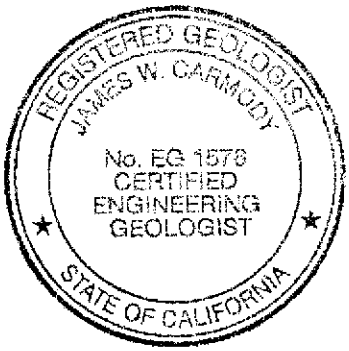
[4] Alton Geoscience, October 28, 1994, Quarterly Progress Report, July Through September 1994, Quick Stop Market No. 46, 363 Grand Avenue, Oakland, California, 8 pages.

TASKS

The tasks to be performed for this project include the following:

- Obtaining the necessary well construction permit from Zone 7 of the Alameda County Flood Control and Water Conservation District and encroachment permits from the City of Oakland;
- Drilling two offsite soil borings, collecting soil samples for geologic description and possible chemical analyses and collecting one grab water sample from the Perkins Street boring for hydrocarbon analysis;
- Analyzing selected soil samples for TPH-G and benzene, ethylbenzene, toluene and xylenes (BETX), by EPA methods 8015 and 8020, respectively;
- Completing the Grand Avenue boring as a two-inch diameter ground water monitoring well;
- Developing and sampling the well, and analyzing the ground water samples for TPH-G and BETX;
- Surveying the well top-of-casing elevation and calculating the ground water elevations, flow direction and gradient beneath the site;
- Arranging for the disposal of drill cuttings, steam cleaning rinsate and well purge water; and
- Preparing a subsurface investigation report including site background, topographic and geologic setting, a site location map, a site map with previous and current structures and well locations, tabulated soil and ground water analytic results, tabulated ground water elevation data, conclusions, the boring logs, and laboratory analytic reports and chain-of-custody forms.

We thank you for your consideration in this matter. Please call Jonathan Weingast at (510) 450-6155 if you have any questions or comments.



Sincerely,
Weiss Associates

Jonathan Weingast
Senior Staff Geologist

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

Attachments: A - Standard Field Procedures

cc: Mr. Dan Kirk, Shell Oil Company, P.O. Box 4023, Concord, California, 94524
Mr. Kevin Graves, Regional Water Quality Control Board - San Francisco Bay Region, 2101 Webster Street, 5th Floor, Oakland, California 94612

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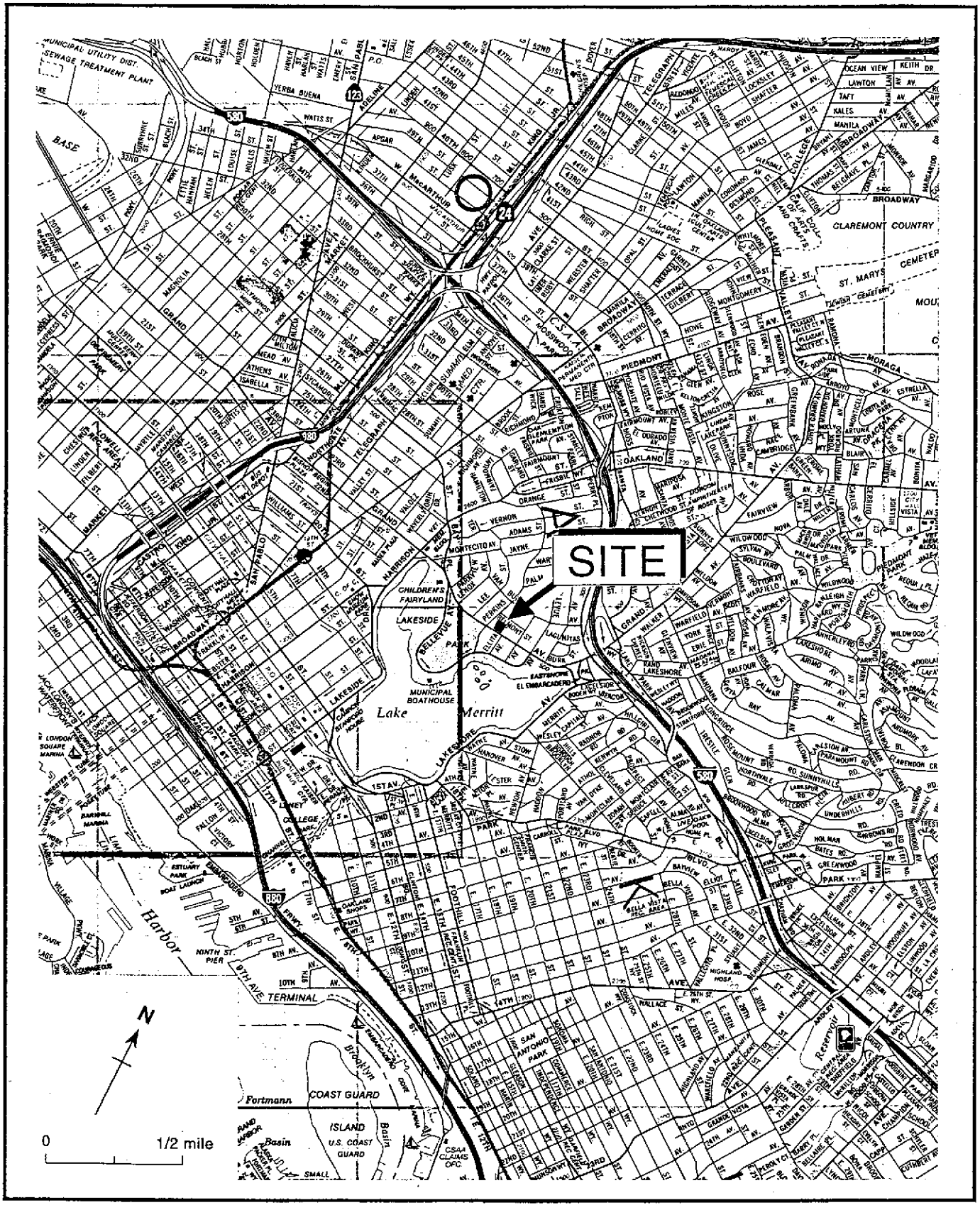

Figure 1. Site Location Map - Shell Service Station WIC #204-5510-0204, 350 Grand Avenue, Oakland, California

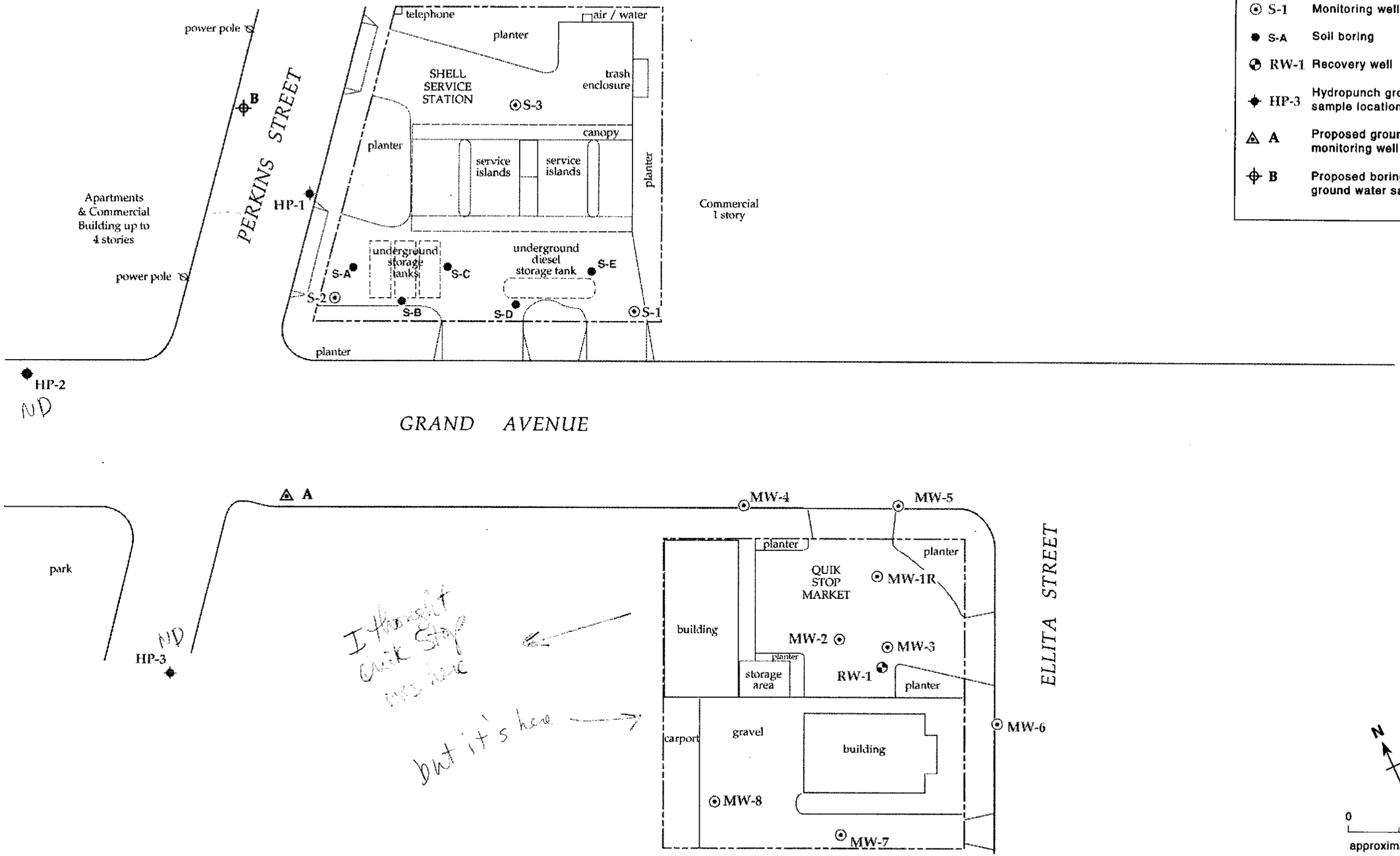

Figure 2. Monitoring Well Locations - Shell Service Station WIC #204-5510-0204, 350 Grand Avenue, Oakland, California

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2/9/95

Table 1. Analytic Results for Soil, Former Shell Service Station, WIC #204-5510-0204, 350 Grand Avenue, Oakland, California

Sample ID	Date	Sample Depth (ft)	TPH-D	TPH-G	B	E	T	X	Pb
			← parts per million (mg/kg) →						
S-A	05/11/90	4.5	<5	<2.5	0.045	<0.025	<0.025	<0.05	5.3
	05/11/90	9.5	2,400[a]	2,900	13	44	7	210	8.7
	05/11/90	13.5	<5	<2.5	<0.025	<0.025	<0.025	<0.05	5.7
S-B	05/11/90	6.5	42[a]	21	0.082	0.24	<0.025	0.91	38
	05/11/90	9.0	1,300[a]	1,400	7	31	3	130	6.3
	05/11/90	13.5	<5	2.5	0.30	0.027	<0.025	0.09	9.3
S-C	05/11/90	9.5	20[a]	22	0.30	0.57	0.052	1.3	3.5
S-D	05/11/90	4.5	<5	<2.5	<0.025	<0.025	<0.025	<0.05	7.6
	05/11/90	9.0	36	<2.5	<0.025	<0.025	<0.025	<0.05	9.2
	05/11/90	15.0	<5	<2.5	<0.025	<0.025	<0.025	<0.05	6.8
S-E	05/11/90	9.5	<5	<2.5	0.10	<0.025	<0.025	0.21	2.6
	05/11/90	13.5	<5	<2.5	<0.025	<0.025	<0.025	<0.05	8.1
S-1	01/07/91	4.5	<1.0	<1.0	<0.005	<0.005	0.005	<0.005	---
	01/07/91	9.5	<1.0	<1.0	<0.005	<0.005	<0.005	<0.005	---
S-2	01/07/91	4.5	2.9[a]	<1.0	0.031	<0.005	0.006	0.007	---
	01/07/91	8.5	360[a]	440	4.5	11	1.6	12	---
	01/07/91	14.5	<1.0	<1.0	<0.005	<0.005	<0.005	<0.005	---
	01/07/91	17.5	<1.0	<1.0	<0.005	<0.005	<0.005	<0.005	---
S-3	01/07/91	4.5	23[a]	20	0.33	0.50	0.17	2.0	---
	01/07/91	9.0	<1.0	<1.0	<0.005	<0.005	<0.005	<0.005	---

— Table 1 continues on next page —

Table 1. Analytic Results for Soil, Former Shell Service Station, WIC #204-5510-0204, 350 Grand Avenue, Oakland, California (continued)

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 8020
E = Ethylbenzene by EPA Method 8020
T = Toluene by EPA Method 8020
X = Xylenes by EPA Method 8020
--- = Not analyzed
< n = Not detected at detection limits of n ppm

Notes:

a = Compounds detected and calculated as diesel appear to be the less volatile constituents of gasoline.

Weiss Associates

Table 2. Analytic Results for Ground Water, Former Shell Service Station, WIC #204-5510-0204, 350 Grand Avenue, Oakland, California

Sample ID	Date	Depth to Water (ft)	TPH-D	TPH-G	B	E	T	X
			← parts per billion (µg/L) →					
WELLS								
S-1	01/23/91	---	<50	<50	<0.5	<0.5	<0.5	<0.5
	04/25/91	7.37	<50	<50	<0.5	<0.5	<0.5	<0.5
	07/19/91	8.92	<50	<50	6.8	<0.5	<0.5	<0.5
	10/09/91	9.62	260[a]	120	10	<0.5	<0.5	<0.5
	01/23/92	8.94	<50	<50	<0.5	<0.5	<0.5	<0.5
	04/27/92	7.06	70[b]	<50	1.2	<0.5	<0.5	<0.5
	07/10/92	8.31	930	<50	13	<0.5	<0.5	<0.5
	10/06/92	9.55	110	62	<0.5	<0.5	<0.5	<0.5
	01/06/93	9.86	81	85	1.1	<0.5	<0.5	<0.5
	04/26/93	6.30	53[c]	<50	<0.5	<0.5	<0.5	<0.5
	04/26/93[dup]	6.30	53[c]	<50	<0.5	<0.5	<0.5	<0.5
	07/20/93	8.78	140	<50	<0.5	<0.5	<0.5	<0.5
	10/18/93	9.20	210	<50	<0.5	<0.5	<0.5	<0.5
	01/07/94	9.53	<50	<50	1.4	0.55	1.5	2.8
	01/07/94[dup]	9.53	53	<50	1.2	<0.5	1.5	2.7
	04/11/94	8.50	320	<50	2.8	<0.5	<0.5	<0.5
	04/11/94[dup]	8.50	220	<50	2.6	<0.5	<0.5	<0.5
	07/19/94	**9.07**	**110**	**<50**	**<0.5**	**<0.5**	**<0.5**	**<0.5**
S-2	01/23/91	---	1,200	2,500	550	33	15	42
	04/25/91	8.24	20,000[b]	32,000	2,900	1,400	480	2,300
	07/19/91	9.55	30,000[b]	21,000	4,700	1,200	430	2,400
	10/09/91	10.26	32,000[b]	29,000	6,300	1,700	510	2,400
	01/23/92	9.51	36,000[b]	31,000	5,800	2,000	480	2,700
	04/27/92	7.83	12,000[b]	21,000[d]	4,800	1,600	320	1,400
	07/10/92	8.57	3,700[e]	31,000	7,500	3,400	940	3,500
	10/06/92	9.49	4,500[e]	57,000	9,300	4,000	1,200	4,900
	01/06/93	8.56	5,600	55,000	5,600	3,000	360	3,000
	04/26/93	6.84	9,400[e]	32,000	10,000	4,400	500	3,600

— Table 2 continues on next page —

Table 2. Analytic Results for Ground Water, Former Shell Service Station, WIC #204-5510-0204, 350 Grand Avenue, Oakland, California

Sample ID	Date	Depth to Water (ft)	TPH-D	TPH-G	B	E	T	X
			← parts per billion (µg/L) →					
	07/20/93	8.52	8,400[e]	25,000	5,800	2,700	300	1,400
	07/20/93[dup]	8.52	8,900[e]	25,000	5,900	2,800	310	1,400
	10/18/93	9.36	18,000[e]	23,000	3,700	2,100	200	1,600
	10/18/93[dup]	9.36	14,000[e]	28,000	3,700	2,100	210	1,600
	01/07/94	8.37	22,000[e]	120,000	6,900	3,100	400	2,600
	04/11/94	6.96	17,000[e]	34,000	4,800	1,900	170	880
	07/19/94	**8.02**	---	**23,000**	**4,300**	**1,100**	**210**	**1,000**
	07/19/94[dup]	**8.02**	---	**29,000**	**4,700**	**1,200**	**270**	**1,200**
S-3	01/23/91	---	---	<50	<0.5	<0.5	<0.5	<0.5
	04/25/91	12.96	---	<50	<0.5	<0.5	<0.5	<0.5
	07/19/91	12.45	---	<50	<0.5	<0.5	<0.5	<0.5
	10/09/91	12.98	---	<50	<0.5	<0.5	<0.5	<0.5
	01/23/92	13.06	---	<50	<0.5	<0.5	<0.5	<0.5
	04/27/92	7.25	100	<50	<0.5	<0.5	<0.5	<0.5
	07/10/92	8.46	68	<50	<0.5	<0.5	<0.5	<0.5
	10/06/92	11.77	<10	<50	<0.5	<0.5	<0.5	<0.5
	01/06/93	12.53	<10	<50	<0.5	<0.5	<0.5	<0.5
	04/26/93	4.28	69	<50	<0.5	<0.5	<0.5	<0.5
	07/20/93	5.70	120	<50	<0.5	<0.5	0.6	<0.5
	10/18/93	10.30	160	<50	<0.5	<0.5	<0.5	<0.5
	01/07/94	12.40	58	160	59	4.9	26	22
	04/11/94	10.94	<50	<50	<0.52	<0.5	<0.5	<0.5
	07/19/94	**8.12**	**110[a]**	**<50**	**<0.5**	**<0.5**	**<0.5**	**<0.5**
HP-1	01/27/93		14,000	22,000	2,500	1,400	130	140
HP-2	01/27/93		---	<50	<0.5	<0.5	4.4	<0.5
HP-3	01/27/93		---	<50	<0.5	<0.5	<0.5	<0.5

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Table 2. Analytic Results for Ground Water, Former Shell Service Station, WIC #204-5510-0204, 350 Grand Avenue, Oakland, California

Sample ID	Date	Depth to Water (ft)	TPH-D	TPH-G	B	E	T	X
			← parts per billion (µg/L) →					
Trip Blank	01/23/91		---	<50	<0.5	<0.5	<0.5	<0.5
	04/25/91		---	---	---	---	---	---
	07/19/91		---	<50	<0.5	<0.5	<0.5	<0.5
	10/09/91		---	---	---	---	---	---
	01/23/92		<50	<50	<0.5	<0.5	<0.5	<0.5
	04/26/93		<50	<50	<0.5	<0.5	<0.5	<0.5
	07/20/93		---	<50	<0.5	<0.5	<0.5	<0.5
	10/18/93		<50	<50	<0.5	<0.5	<0.5	<0.5
	01/07/94		<50	<50	<0.5	<0.5	<0.5	<0.5
	04/11/94		<50	<50	<0.5	<0.5	<0.5	<0.5
	07/19/94		**<50**	**<50**	**<0.5**	**<0.5**	**<0.5**	**<0.5**
DTSC MCLs				NE	1	680	100[f]	1,750

– Table 2 continues on next page —

Table 2. Analytic Results for Ground Water, Former Shell Service Station, WIC #204-5510-0204, 350 Grand Avenue, Oakland, 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 8020
E = Ethylbenzene by EPA Method 8020
T = Toluene by EPA Method 8020
X = Xylenes by EPA Method 8020
--- = Not analyzed
DTSC MCLs = California Department of Toxic Substances Control maximum contaminant levels for drinking water
NE = Not established
< n = Not detected at detection limits of n ppb
dup = Duplicate sample
HP = Hydropunch ground water sample

Notes:

a = compounds detected and calculated as diesel are not characteristic of the standard diesel chromatographic pattern
b = Compounds detected and calculated as diesel appear to be the less volatile constituents of gasoline
c = Concentration reported as diesel primarily due to the presence of a heavier petroleum product, possibly motor oil
d = Compounds detected and calculated as gasoline are not characteristic of the standard gasoline chromatographic pattern
e = Concentration reported as diesel is primarily due to the presence of lighter petroleum product, possibly gasoline
f = DTSC recommended action level for drinking water; MCL not established

Table 3. Ground Water Elevations - Shell Service Station WIC #204-5510-0204, 350 Grand Avenue, Oakland, California

Well ID	Date	Top-of-Casing Elevation	Depth to Water (ft)	Ground Water Elevation (ft above msl)
S-1	04/25/91	20.84	7.37	13.47
	07/19/91		8.92	11.92
	10/09/91		9.62	11.22
	01/23/92		8.94	11.90
	04/27/92		7.06	13.78
	07/10/92		8.31	12.53
	10/06/92		9.55	11.29
	01/06/93		9.86	10.98
	04/26/93		6.30	14.54
	07/20/93		8.78	12.06
	10/18/93		9.20	11.64
	01/07/94		9.53	11.31
	04/11/94		8.50	12.34
	07/14/94		**8.45**	**12.39**
	07/19/94		**9.07**	**11.77**
S-2	04/25/91	21.24	8.24	13.00
	07/19/91		9.55	11.69
	10/09/91		10.26	10.98
	01/23/92		9.51	11.73
	04/27/92		7.83	13.41
	07/10/92		8.57	12.67
	10/06/92		9.49	11.75
	01/06/93		8.56	12.68
	04/26/93		6.84	14.40
	07/20/93		8.52	12.72
	10/18/93		9.36	11.88
	01/07/94		8.37	12.87
	04/11/94		6.96	14.28
	07/14/94		**7.49**	**13.75**
	07/19/94		**8.02**	**13.22**
S-3	04/25/91	22.70	12.96	9.74
	07/19/91		12.45	10.25
	10/09/91		12.98	9.72
	01/23/92		13.06	9.64
	04/27/92		7.25	15.45
	07/10/92		8.46	14.24
	10/06/92		11.77	10.93
	01/06/93		12.53	10.17
	04/26/93		4.28	18.42
	07/20/93		5.70	17.00

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Table 3. Ground Water Elevations - Shell Service Station WIC #204-5510-0204, 350 Grand Avenue, Oakland, California (continued)

Well ID	Date	Top-of-Casing Elevation	Depth to Water (ft)	Ground Water Elevation (ft above msl)
	10/18/93		10.30	12.40
	01/07/94		12.40	10.30
	04/11/94		10.94	11.76
	07/14/94		**7.90**	**14.80**
	07/19/94		**8.12**	**14.58**

ATTACHMENT A

STANDARD FIELD 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 labeled, stored in crushed ice at or below 4°C, and transported under chain-of-custody to a State-certified analytic laboratory.

field screening
Screening ~~PID~~

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 72 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 72 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 labeled, 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.