Weiss Associates *Environmental and Geologic Services*

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

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April 27, 1994

Barney Chan
Alameda County Department
of Environmental Health
80 Swan Way, Room 200
Oakland, CA 94621

3737

Re: Shell Service Station
WIC #204-5508-5801
630 High Street
Oakland, California
ACDEH STID #3737
WA Job #81-602-104

Dear Mr. Chan:

This letter describes recently completed and anticipated activities at the Shell service station referenced above (Figure 1). This status report satisfies the quarterly reporting requirements prescribed by California Administrative code title 23 Waters, Chapter 3, Subchapter 16, Article 5, Section 265.d. Included below are descriptions and results of activities performed in the first quarter 1994 and proposed work for the second quarter 1994.

First Quarter 1994 Activities:

- Blaine Tech Services, Inc. (BTS) of San Jose, California measured depths to ground water and collected ground water samples from the site wells. BTS' report describing these activities and the analytic report for the ground water samples are included as Attachment A.
- Weiss Associates (WA) compiled the ground water elevation and analytic data (Tables 1, 2 and 3) and prepared a ground water elevation contour map (Figure 2) and benzene distribution map (Figure 3).

Anticipated Second Quarter 1994 Activities:

- WA will submit a report presenting the results of the second quarter 1994 ground water sampling and ground water depth measurements. The report will include tabulated chemical analytic results, a ground water elevation contour map and a benzene concentration map.

Discussion

- BTS did not take CO_2 field measurements this quarter, but this task will be performed next quarter.
- As indicated in Table 3, dissolved oxygen concentrations appear sufficient for natural hydrocarbon biodegradation, especially in the downgradient wells.

WA has received your comments regarding the investigation status at this site.[1] You expressed concern over the possible increasing hydrocarbon concentrations in MW-5, and requested additional groundwater characterization. This quarter benzene concentrations in well MW-5 decreased to slightly above the maximum contaminated level (MCL) for drinking water. Review of the apparent hydraulic gradient indicates that in the southeastern area of the site the gradient is consistently to the west at approximately 0.05 ft/ft. But in the center of the site the gradient becomes flatter, and varies in direction from northerly (August 24, 1993) to westerly (July 7, 1992). Thus MW-5 is not consistently downgradient of the source area, and concentrations in this well may fluctuate slightly as the gradient shifts.

Since hydrocarbon concentrations in well MW-5 are generally decreasing, and since the nearest available offsite location is at least 80 feet from the site, on the northern side of High street, we do not feel that the additional characterization as requested is possible. WA recommends that quarterly sampling of wells MW-1, MW-3, MW-4, MW-5, and MW-6 continue. If, in the future, benzene concentrations in these wells do not show an increasing trend, we will request an Alternate Compliance Points closure.

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[1] Barney Chan of the Alameda County of Environmental Health, March 4, 1994 letter to Dan Kirk of Shell Oil Company.

No benzene has ever been detected in MW-2, MW-7, MW-8, or MW-10, and has only been detected once in MW-9, and total petroleum hydrocarbons as gasoline (TPH-G) levels in these wells have consistently been low or non-detectable. As outlined in WA's sampling frequency modification criteria (attachment B), WA recommends bi-annual ground water sampling of wells in which contaminant levels have consistently been near or below Department of Toxic Substance Control maximum contaminant levels for drinking water for a substantial period of time. Unless you request, within 60 days, that we continue quarterly sampling of these wells, WA will sample MW-2, MW-7, MW-8, MW-9 and MW-10 semi-annually during the second and fourth quarters.

Please call if you have any questions.

Sincerely,
Weiss Associates

REGISTERED GEOLOGIST
JAMES W. CARMODY
No. EG 1576
CERTIFIED
ENGINEERING
GEOLOGIST
STATE OF CALIFORNIA

John Wolf
Technical Assistant

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

JAW/JWC:jaw

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Attachments: A - BTS' Ground Water Monitoring Report
B - Sampling Frequency Modification Criteria

cc: Dan Kirk, Shell Oil Company, P.O. Box 5278, Concord, CA 94520
Paul McAllister, Shell Oil Company, P.O. Box 1380, Houston, TX 77251
Richard Hiett, Water Quality Control Board - San Francisco Bay Region, 2101 Webster Street, Suite 500, Oakland, CA 94612

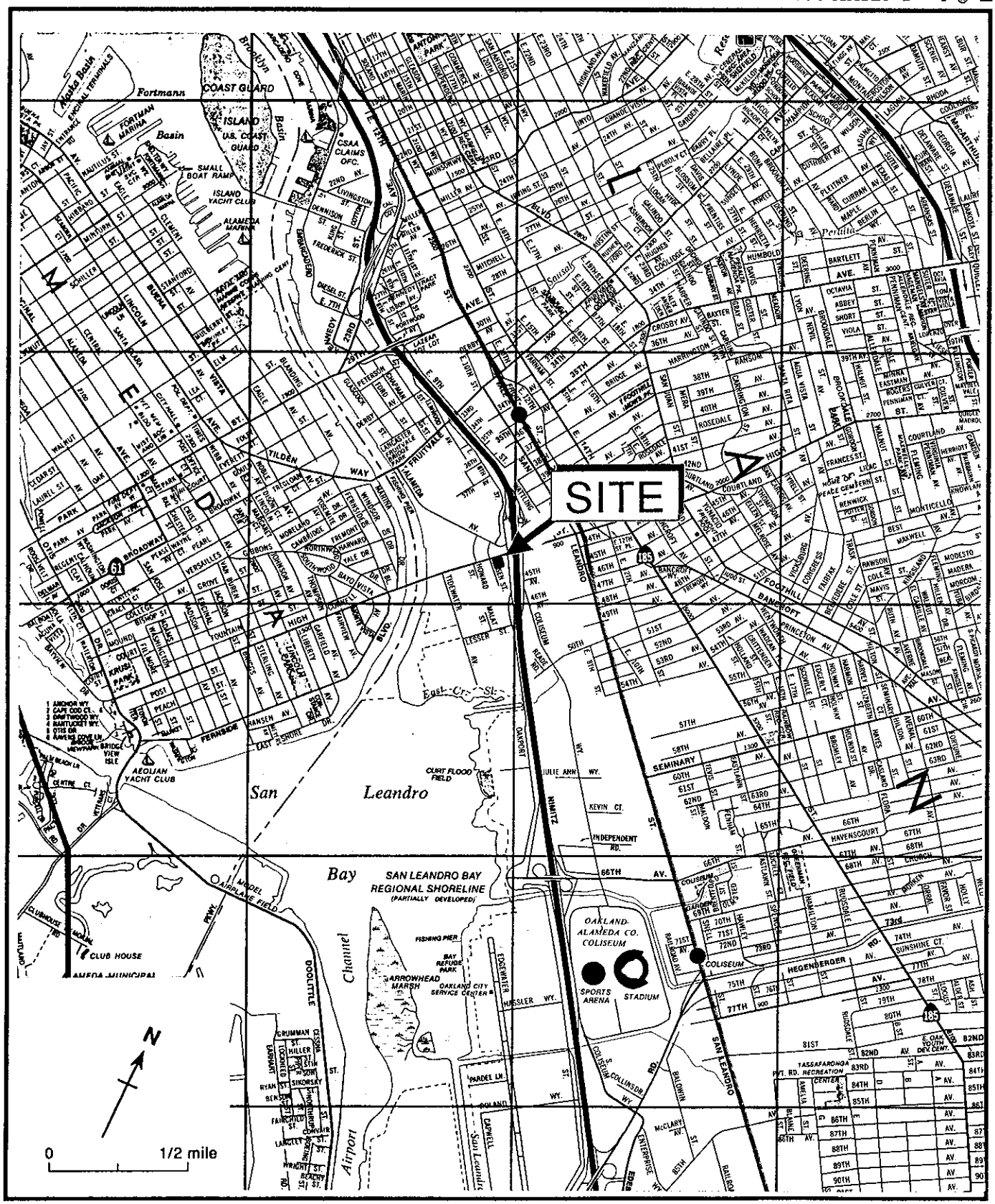

Figure 1. Site Location Map - Shell Service Station WIC #204-5508-5801, 630 High Street, Oakland, California

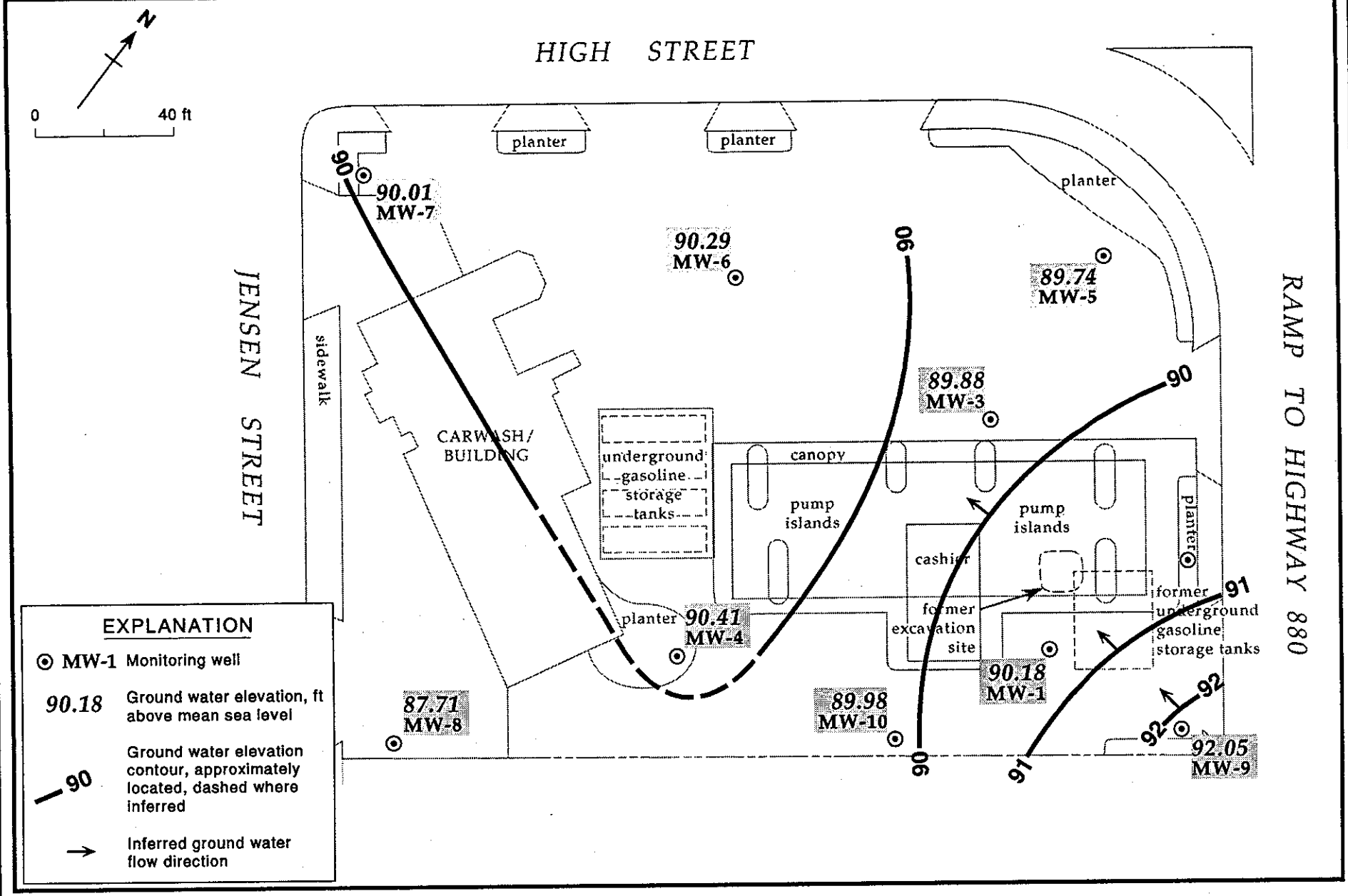

Figure 2. Monitoring Well Locations and Ground Water Elevation Contours - February 14, 1994 - Shell Service Station WIC #204-5508-5801, 630 High Street, Oakland, California

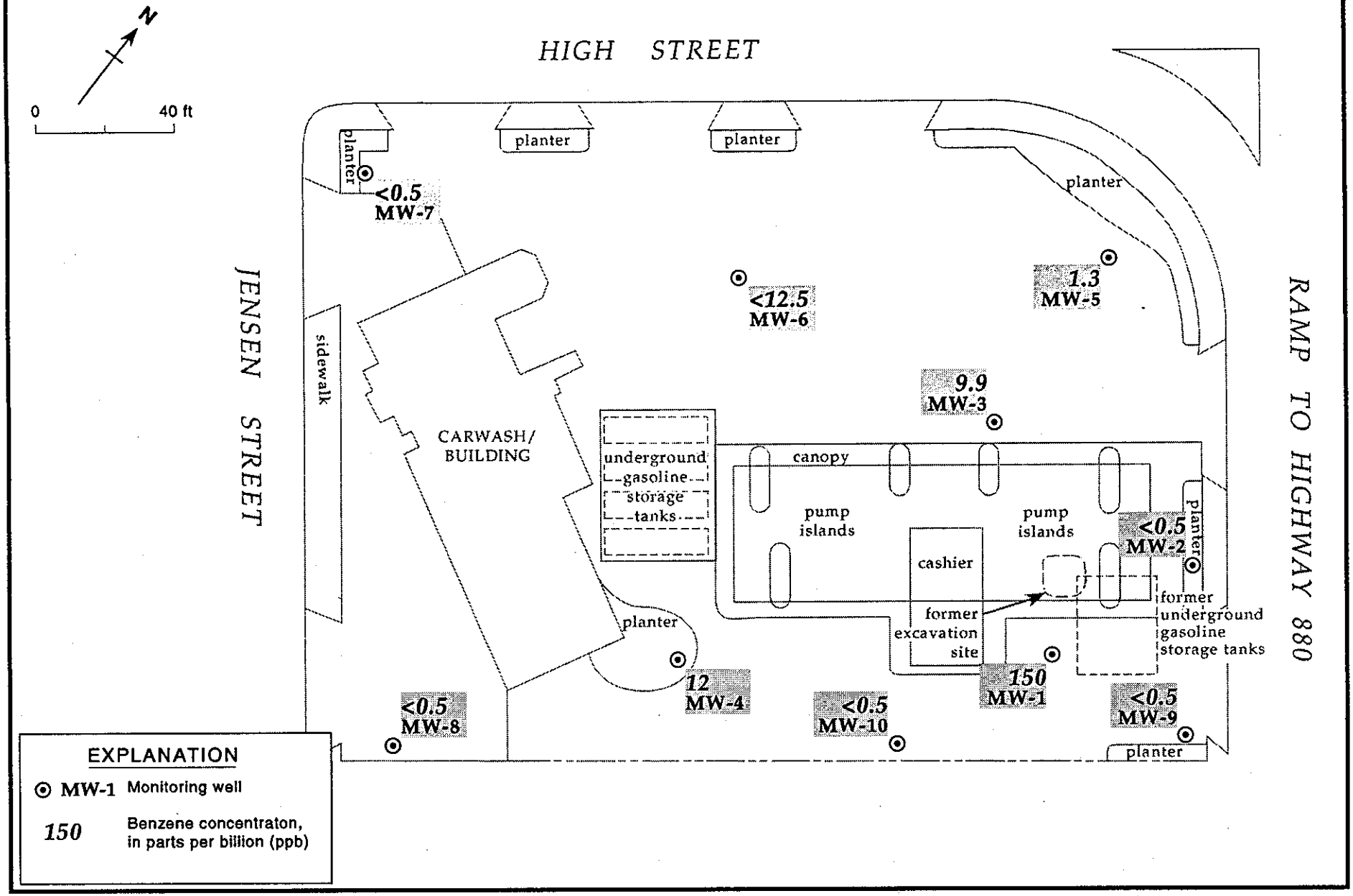

Figure 3. Benzene Concentrations in Ground Water - February 14, 1994 - Shell Service Station WIC #204-5508-5801, 630 High Street, Oakland, California

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04/14/94

Table 1. Ground Water Elevations - Shell Service Station WIC #204-5508-5801, 630 High Street, Oakland, California

Well ID	Date	Top-of-Casing Elevation (ft above msl)	Depth to Water (ft)	Ground Water Elevation (ft above msl)
MW-1	02/21/92	99.35	8.31	91.04
	05/22/92		10.02	89.33
	07/07/92		10.06	89.29
	08/20/92		10.32	89.03
	11/18/92		10.64	88.71
	02/09/93		8.71	90.64
	06/16/93		9.71	89.64
	08/24/93		10.23	89.12
	11/23/93		10.48	88.87
	02/14/94		**9.17**	**90.18**
MW-2	02/21/92	101.15	10.08	91.07
	05/22/92		11.52	89.63
	07/07/92		11.50	89.65
	08/20/92		11.72	89.43
	11/18/92		13.06	88.09
	02/09/93		10.06	91.09
	06/16/93		11.60	89.55
	08/24/93		12.16	88.99
	11/23/93		12.74	88.41
	02/14/94		**10.91**	**90.24**
MW-3	02/21/92	99.49	8.97	90.52
	05/22/92		9.32	90.17
	07/07/92		10.22	89.27
	08/20/92		10.44	89.05
	11/18/92		10.79	88.70
	02/09/93		9.35	90.14
	06/16/93		9.56	89.93
	08/24/93		10.51	88.98
	11/23/93		10.77	88.72
	02/14/94		**9.61**	**89.88**
MW-4	02/21/92	99.24	7.60	91.64
	05/22/92		9.90	89.34
	07/07/92		10.02	89.22
	08/20/92		10.32	88.92
	11/18/92		10.51	88.73
	02/09/93		8.13	91.11
	06/16/93		9.60	89.64

-- Table 1 continues on next page --

Table 1. Ground Water Elevations - Shell Service Station WIC #204-5508-5801, 630 High Street, Oakland, California (continued)

Well ID	Date	Top-of-Casing Elevation (ft above msl)	Depth to Water (ft)	Ground Water Elevation (ft above msl)
	08/24/93		10.05	89.19
	11/23/93		10.25	89.99
	02/14/94		**8.83**	**90.41**
MW-5	02/21/92	100.08	9.24	90.84
	05/22/92		10.97	89.11
	07/07/92		10.98	89.10
	08/20/92		11.14	88.94
	11/18/92		11.21	88.87
	02/09/93		10.01	90.07
	06/16/93		11.05	89.03
	08/24/93		11.32	88.76
	11/23/93		11.35	88.73
	02/14/94		**10.34**	**89.74**
MW-6	02/21/92	98.56	7.15	91.41
	05/22/92		9.55	89.01
	07/07/92		9.53	89.03
	08/20/92		9.84	88.72
	11/18/92		10.03	88.53
	02/09/93		7.91	90.65
	06/16/93		8.74	89.82
	08/24/93		9.66	88.90
	11/23/93		9.86	88.70
	02/14/94		**8.27**	**90.29**
MW-7	02/21/92	97.53	6.87	90.66
	05/22/92		8.08	89.45
	07/07/92		8.82	88.71
	08/20/92		8.89	88.64
	11/18/92		9.54	87.99
	02/09/93		7.84	89.69
	06/16/93		7.80	89.73
	08/24/93		8.51	89.02
	11/23/93		8.70	88.83
	02/14/94		**7.52**	**90.01**
MW-8	02/21/92	97.13	6.54	90.59
	05/22/92		7.68	89.45
	07/07/92		8.16	88.97

-- Table 1 continues on next page --

Table 1. Ground Water Elevations - Shell Service Station WIC #204-5508-5801, 630 High Street, Oakland, California (continued)

Well ID	Date	Top-of-Casing Elevation (ft above msl)	Depth to Water (ft)	Ground Water Elevation (ft above msl)
	08/20/92		8.25	88.88
	11/18/92		8.32	88.81
	02/09/93		5.58	91.55
	06/16/93		7.19	89.94
	08/24/93		7.98	89.15
	11/23/93		8.09	89.04
	02/14/94		**9.42**	**87.71**
MW-9	02/21/92	99.72	6.91	92.81
	05/22/92		8.64	91.08
	07/07/92		7.55	92.17
	08/20/92		7.38	92.34
	11/18/92		10.17	89.55
	02/09/93		6.89	92.83
	06/16/93		8.74	90.98
	08/24/93		8.32	91.40
	11/23/93		8.17	91.55
	02/14/94		**7.67**	**92.05**
MW-10	02/21/92	98.99	9.11	89.88
	05/22/92		9.14	89.85
	07/07/92		9.87	89.12
	08/20/92		9.30	89.69
	11/18/92		10.21	88.78
	02/09/93		7.63	91.36
	06/16/93		8.57	90.42
	08/24/93		9.61	89.38
	11/23/93		10.10	88.89
	02/14/94		**9.01**	**89.98**

Table 2. Analytical Results for Ground Water Shell Service Station WIC #204-5508-5801, 630 High Street, Oakland, California

Well ID	Date Sampled	Depth to Water (ft)	TPH-G	TPH-D	TPH-MO	B	E	T	X	VOCs
			<----------parts per billion (ug/L)---------->							
MW-1	02/24/92	8.31	7,300	8,900[a]	800	200	340	36	270	---
	05/22/92	10.02	7,600	18,000[ab]	---	140	300	<50	140	---
	07/07/92	10.06	---	---	---	---	---	---	---	---
	08/20/92	10.32	9,100	5,200[a]	---	530	860	340	540	---
	11/18/92	10.64	15,000	4,100[a]	---	220	790	50	340	---
	02/09/93	8.71	7,000	1,200		130	220	23	160	---
	06/16/93	9.71	4,800	---	---	150	320	31	130	---
	08/24/93	10.23	10,000	---	---	170	610	27	170	---
	11/23/93	10.48	7,600	---	---	190	430	<12	140	---
	11/23/93[dup]	10.48	4,800	---	---	190	430	15	130	---
	02/14/94	9.17	8,000	---	---	150	210	47	68	---
	02/14/94[dup]	9.17	8,900	---	---	160	230	45	76	---
MW-2	02/23/92	10.08	<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	05/22/92	11.52	<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	07/07/92	11.50	---	---	---	---	---	---	---	---
	08/20/92	11.72	<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	11/18/92	13.06	<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	02/09/93	10.046	95	---	---	<0.5	<0.5	<0.5	<0.5	---
	06/16/93	11.60	<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	08/24/93	12.16	<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	11/23/93	12.74	<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	02/14/94	10.91	<50	---	---	<0.5	<0.5	<0.5	<0.5	---
MW-3	02/24/92	8.97	2,800	640[c]	---	15	<2.5	2.8	12	---
	05/22/92	9.32	3,700	220[ab]	---	27	20	11	110	---
	07/07/92	10.22	---	---	---	---	---	---	---	---
	08/20/92	10.44	13,000	340[a]	---	72	71	85	140	---
	11/18/92	10.79	2,100	430[a]	---	21	11	3.6	13	---
	02/09/93	9.35	3,300	83	---	21	6.1	5.6	<0.5	---
	02/02/93[dup]	9.35	3,500	130	---	18	7.2	8.8	<0.5	---
	06/16/93	9.56	3,500[d]	---	---	66	<0.5	6	<0.5	---
	08/24/93	10.51	3,400[d]	---	---	110	<5	<5	<5	---
	11/23/93	10.77	3,000	---	---	36	6.9	44	23	e
	02/14/94	9.61	4,700[f]	---	---	9.9	8.8	5.2	<5.0	---
MW-4	02/24/92	7.60	2,000	8,300[a]	---	31	3.5	6.3	6.6	---
	05/22/92	9.90	3,600	3,400[ab]	---	55	3	5	10	---
	07/07/92	10.02	---	---	---	---	---	---	---	---
	08/20/92	10.32	3,100	3,400	---	100	14	45	45	---
	11/18/92	10.51	2,200	1,400	---	32	4.2	12	24	---
	02/09/93	8.13	1,500	180	---	1.1	<0.5	<0.5	<0.5	---
	06/16/93	9.60	1,100	---	---	120	5.1	47	19	---
	08/24/93	10.05	2,700	---	---	46	25	11	0.97	---
	11/23/93	10.25	2,500	---	---	23	3.7	5.7	16	---

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Table 2. Analytical Results for Ground Water Shell Service Station WIC #204-5508-5801, 630 High Street, Oakland, California (continued)

Well ID	Date Sampled	Depth to Water (ft)	TPH-G	TPH-D	TPH-MO	B	E	T	X	VOCs
			<-----parts per billion (ug/L)----->							
	02/14/94	8.83	1,500	---	---	12	<2.5	7.8	<2.5	---
MW-5	02/23/92	9.24	240	180[g]	<0.5	1	<0.5	<0.5	1	---
	05/22/92	10.97	6,200	7,100[ab]	---	6	56	95	99	---
	07/07/92	10.98	---	NA	---	---	---	---	---	---
	08/20/92	11.14	7,400	120[a]	---	56	91	95	150	---
	11/18/92	11.21	3,300	320[a]	---	27	20	<12.5	470	---
	02/09/93	10.01	160	<50	---	<0.5	<0.5	<0.5	<0.5	---
	06/16/93	11.05	140	---	---	0.8	<0.5	<0.5	<0.5	---
	08/24/93	11.32	1,000	---	---	7.9	2.2	<1	<1.5	---
	11/23/93	11.35	2,000	---	---	67	11	15	33	---
	02/14/94	10.34	660	---	---	1.3	0.5	<0.5	0.7	---
MW-6	02/23/92	7.15	<50	60[c]	---	<0.5	<0.5	<0.5	<0.5	---
	05/22/92	9.55	<50	650[b]	---	<0.5	<0.5	<0.5	<0.5	---
	07/07/92	9.53	---	NA	---	---	---	---	---	---
	08/20/92	9.84	140[d]	510[b]	---	<0.5	<0.5	<0.5	<0.5	---
	11/18/92	10.03	200[d]	350	---	<0.5	<0.5	<0.5	<0.5	---
	02/09/93	7.91	14,000	---	---	<0.5	<0.5	<0.5	<0.5	---
	06/16/93	8.74	5,700[d]	---	---	<0.5	<0.5	22	34	---
	06/16/93[dup]	8.74	5,600	---	---	<0.5	<0.5	<0.5	<0.5	---
	08/24/93	9.66	4,300[d]	---	---	<12.5	<12.5	<12.5	<12.5	---
	08/24/93[dup]	9.66	3,800[d]	---	---	<12.5	<12.5	<12.5	<12.5	---
	11/23/93	9.86	3,300[d]	---	---	<12	<12	<12	<12	nd
	02/14/94	8.27	14,000[h]	---	---	<12.5	<12.5	<12.5	<12.5	---
MW-7	02/23/92	6.87	<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	05/22/92	8.08	<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	07/07/92	8.82	---	---	---	---	---	---	---	---
	08/20/92	8.89	<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	11/18/92	9.54	<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	02/09/93	7.84	72	---	---	<0.5	<0.5	<0.5	<0.5	---
	06/16/93	7.80	<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	08/24/93	8.51	<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	11/23/93	8.70	<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	02/14/94	7.52	<50	---	---	<0.5	<0.5	<0.5	<0.5	---
MW-8	02/23/92	6.54	<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	05/22/92	7.68	<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	07/07/92	8.16	---	---	---	---	---	---	---	---
	08/20/92	8.25	<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	11/18/92	8.32	<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	02/09/93	5.58	63	---	---	<0.5	<0.5	<0.5	<0.5	---
	06/16/93	7.19	<50	---	---	<0.5	<0.5	<0.5	<0.5	---

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Table 2. Analytical Results for Ground Water Shell Service Station WIC #204-5508-5801, 630 High Street, Oakland, California (continued)

Well ID	Date Sampled	Depth to Water (ft)	TPH-G	TPH-D	TPH-MO	B	E	T	X	VOCs
			<----------parts per billion (ug/L)---------->							
	08/24/93	7.98	<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	11/23/93	8.09	<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	02/14/94	9.42	<50	---	---	<0.5	<0.5	<0.5	<0.5	---
MW-9	02/23/902	6.91	<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	05/22/92	8.64	<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	07/07/92	7.55	---	---	---	---	---	---	---	---
	08/20/92	7.38	<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	08/20/92[dup]	7.38	<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	11/18/92	10.17	<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	11/18/92[dup]	10.17	<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	02/09/93	6.89	290	110	---	6	<0.5	<0.5	<0.5	---
	06/16/93	8.74	90[d]	---	---	<0.5	<0.5	<0.5	<0.5	---
	08/24/93	8.32	50[d]	---	---	<0.5	<0.5	<0.5	<0.5	---
	11/23/93	8.17	<50	---	---	<0.5	<0.5	<0.5	<0.5	nd
	02/14/94	7.67	<50	---	---	<0.5	<0.5	<0.5	<0.5	---
MW-10	02/23/92	9.11	<50	120	---	<0.5	<0.5	<0.5	<0.5	---
	05/22/92	9.14	<50	310	---	<0.5	<0.5	<0.5	<0.5	---
	07/07/92	9.87	---	---	---	---	---	---	---	---
	08/20/92	9.30	<50	460	---	<0.5	<0.5	<0.5	<0.5	---
	11/18/92	10.21	<50	470	---	<0.5	<0.5	<0.5	<0.5	---
	02/09/93	7.63	<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	06/16/93	8.57	<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	08/24/93	9.61	<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	11/23/93	10.10	<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	02/11/94	9.01	<50	---	---	<0.5	<0.5	<0.5	<0.5	---
Travel Blank	02/24/92		<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	05/22/92		<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	08/20/92		<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	11/18/92		<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	02/09/93		<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	06/16/93		<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	08/24/93		<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	11/23/93		<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	02/14/94		<50	---	---	<0.5	<0.5	<0.5	<0.5	---
Bailer Blank	08/20/92		<50	---	---	<0.5	<0.5	<0.5	<0.5	---
	11/18/92		<50	---	---	<0.5	<0.5	<0.5	<0.5	---
DTSC MCLs			NE	NE	NE	1	680	100[1]	1,750	---

-- Table 2 continues on next page --

Table 2. Analytical Results for Ground Water Shell Service Station WIC #204-5508-5801, 630 High Street, 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
TPH-MO = Total petroleum hydrocarbons as motor oil by EPA Method 8015
B = Benzene by EPA Method
E = Ethylbenzene by EPA Method
T = Toluene by EPA Method
X = Xylenes by EPA Method
VOC = Volatile organic compounds by EPA Method 8240
NE = Not established
--- = Not analyzed
<n = Not detected at detection limits of n ppb
DTSC MCLs = California Department of Toxic Substances Control maximum contaminant levels for drinking water
nd = not detected at or above the reporting limit for the analysis as performed
dup = Duplicate sample

Notes:

a = Concentration reported as diesel is primarily due to the presence of a lighter petroleum product, possible gasoline or kerosene
b = Concentration reported as diesel is primarily due to a heavier petroleum product, possible motor oil or aged diesel fuel
c = Compounds detected within the diesel range are not characteristics of the standard diesel chromatographic pattern
d = Concentration reported as gasoline is partially or primarily due to the presence of a discrete hydrocarbon peak not indicative of gasoline
e = 26 ppb benzene detected using EPA Method 8240
f = The concentration reported as gasoline for MW-3 is due to the presence of a combination of gasoline and a discrete peak not indicative of gasoline
g = Compounds detected and calculated as diesel appear to be the less volatile constituents of gasoline
h = The concentration reported as gasoline for sample MW-6 is primarily due to the presence of a discrete peak not indicative of gasoline
i = DTSC recommended action level; MCL not established

Table 3. Analytical Results for Nutrients, Hydrocarbon Utilizing Bacteria and Dissolved Oxygen for Shell Service Station WIC #204-5508-5801, 630 High Street, Oakland, California

Well	Date Sampled	Potassium (mg/L)	Phosphorous (mg/L)	Phosphate (mg/L)	Kjeldahl Nitrogen (mg/L)	Heterotrophic Bacteria Plate Count (CFU/ml)	Hydrocarbon Utilizing Bacteria (CFU/ml)	Dissolved Oxygen[a] (mg/L)
MW-1	06/17/93	12.0	0.80	2.4	5.4	80,000	310	1.73/1.58
	08/24/93							1.49/1.70
	11/23/93							1.77/2.80
	02/14/94							6.2/2.5
MW-4	06/17/93	1.5	3.50	11.0	4.2	8,200	200	1.86/4.82
	08/24/93							1.46/1.27
	11/23/93							5.29/6.59
	02/14/94							2.1/1.9
MW-5	06/17/93	8.8	0.07	0.21	1.0	3,200	490	1.53/2.72
	08/24/93							2.69/1.41
	11/23/93							8.20/3.09
	02/14/94							2.0/1.9
MW-6	06/17/93	0.8	0.06	0.19	1.1	2,000	450	8.46/9.73
	08/24/93							2.15/1.52
	11/23/93							3.86/6.75
	02/14/94							2.3/5.2
MW-9	06/17/93	14.0	0.22	0.66	0.8	9,200	2,300	1.51/2.17
	08/24/93							2.86/2.74
	11/23/93							3.41/3.78
	02/14/94							4.6/5.2

Abbreviations and Notes:

CFU/ml = Colony forming units per milliliter
a = Field measurement of dissolved oxygen concentrations before and after well purging

ATTACHMENT A

BTS' GROUND WATER MONITORING REPORT AND ANALYTIC REPORT

BLAINE
TECH SERVICES INC.

985 TIMOTHY DRIVE
SAN JOSE, CA 95133
(408) 995-5535
FAX (408) 293-8773

March 8, 1994

Shell Oil Company
P.O. Box 5278
Concord, CA 94520-9998

Attn: Daniel T. Kirk

SITE:
Shell WIC #204-5508-5801
630 High Street
Oakland, California

QUARTER:
1st quarter of 1994

QUARTERLY GROUNDWATER SAMPLING REPORT 940214-Z-1

This report contains data collected during routine inspection, gauging and sampling of groundwater monitoring wells performed by Blaine Tech Services, Inc. in response to the request of the consultant who is overseeing work at this site on behalf of our mutual client, Shell Oil Company. Data collected in the course of our field work is presented in a TABLE OF WELL GAUGING DATA. The field information was collected during our preliminary gauging and inspection of the wells, the subsequent evacuation of each well prior to sampling, and at the time of sampling.

Measurements taken include the total depth of the well and the depth to water. The surface of water was further inspected for the presence of immiscibles which may be present as a thin film (a sheen on the surface of the water) or as a measurable free product zone (FPZ). At intervals during the evacuation phase, the purge water was monitored with instruments that measure electrical conductivity (EC), potential hydrogen (pH), temperature (degrees Fahrenheit), and turbidity (NTU). In the interest of simplicity, fundamental information is tabulated here, while the bulk of the information is turned over directly to the consultant who is making professional interpretations and evaluations of the conditions at the site.

STANDARD PROCEDURES

Evacuation

Groundwater wells are thoroughly purged before sampling to insure that the sample is collected from water that has been newly drawn into the well from the surrounding geologic formation. The selection of equipment to evacuate each well is based on the physical characteristics of the well and what is known about the performance of the formation in which the well has been installed. There are several suitable devices which can be used for evacuation. The most commonly employed devices are air or gas actuated pumps, electric submersible pumps, and hand or mechanically actuated bailers. Our personnel frequently employ USGS/Middleburg positive displacement pumps or similar air actuated pumps which do not agitate the water standing in the well.

Normal evacuation removes three case volumes of water from the well. More than three case volumes of water are removed in cases where more evacuation is needed to achieve stabilization of water parameters and when requested by the local implementing agency. Less water may be removed in cases where the well dewaters and does not recharge to 80% of its original volume within two hours and any additional time our personnel have reason to remain at the site. In such cases, our personnel return to the site within twenty four hours and collect sample material from the water which has recharged into the well case.

Decontamination

All apparatus is brought to the site in clean and serviceable condition. The equipment is decontaminated after each use and before leaving the site. Effluent water from purging and on-site equipment cleaning is collected and transported to Shell's Martinez Manufacturing Complex in Martinez, California.

Free Product Skimmer

The column headed, VOLUME OF IMMISCIBLES REMOVED (ml) is included in the TABLE OF WELL GAUGING DATA to cover situations where a free product skimming device must be removed from the well prior to gauging. Skimmers are installed in wells with a free product zone on the surface of the water. The skimmer is a free product recovery device which often prevents normal well gauging and free product zone measurements. The 2.0" and 3.0" PetroTraps fall into the category of devices that obstruct normal gauging. In cases where the consultant elects to have our personnel pull the skimmers out of the well and gauge the well, our personnel perform the additional task of draining the accumulated free product out of the PetroTrap before putting it back in the well. This

recovered free product is measured and logged in the VOLUME OF IMMISCIBLES REMOVED column. Gauging at such sites is performed in accordance with specific directions from the professional consulting firm overseeing work at the site on Shell's behalf.

Sample Containers

Sample material is collected in specially prepared containers which are provided by the laboratory that performs the analyses.

Sampling

Sample material is collected in stainless steel bailer type devices normally fitted with both a top and a bottom check valve. Water is promptly decanted into new sample containers in a manner which reduces the loss of volatile constituents and follows the applicable EPA standard for handling volatile organic and semi-volatile compounds.

Following collection, samples are promptly placed in an ice chest containing prefrozen blocks of an inert ice substitute such as Blue Ice or Super Ice. The samples are maintained in either an ice chest or a refrigerator until delivered into the custody of the laboratory.

Sample Designations

All sample containers are identified with a site designation and a discrete sample identification number specific to that particular groundwater well. Additional standard notations (e.g. time, date, sampler) are also made on the label.

Chain of Custody

Samples are continuously maintained in an appropriate cooled container while in our custody and until delivered to the laboratory under a standard Shell Oil Company chain of custody. If the samples are taken charge of by a different party (such as another person from our office, a courier, etc.) prior to being delivered to the laboratory, appropriate release and acceptance records are made on the chain of custody (time, date, and signature of the person releasing the samples followed by the time, date and signature of the person accepting custody of the samples).

Hazardous Materials Testing Laboratory

The samples obtained at this site were delivered to Anametrix, Inc. in San Jose, California. Anametrix, Inc. is a California Department of Health Services certified Hazardous Materials Testing Laboratory and is listed as DOHS HMTL #1234.

Objective Information Collection

Blaine Tech Services, Inc. performs specialized environmental sampling and documentation as an independent third party. In order to avoid compromising the objectivity necessary for the proper and disinterested performance of this work, Blaine Tech Services, Inc. performs no consulting and does not become involved in the marketing or installation of remedial systems of any kind. Blaine Tech Services, Inc. is concerned only with the generation of objective information, not with the use of that information to support evaluations and recommendations concerning the environmental condition of the site. Even the straightforward interpretation of objective analytical data is better performed by interested regulatory agencies, and those engineers and geologists who are engaged in the work of providing professional opinions about the site and proposals to perform additional investigation or design remedial systems.

Reportage

Submission of this report and the attached laboratory report to interested regulatory agencies is handled by the consultant in charge of the project. Any professional evaluations or recommendations will be made by the consultant under separate cover.

Please call if we can be of any further assistance.

Richard C. Blaine

RCB/lp

attachments: table of well gauging data
chain of custody
certified analytical report

cc: Weiss Associates
5500 Shellmound Street
Emeryville, CA 94608-2411
ATTN: Michael Asport

TABLE OF WELL GAUGING DATA

WELL I.D.	DATA COLLECTION DATE	MEASUREMENT REFERENCED TO	QUALITATIVE OBSERVATIONS (sheen)	DEPTH TO FIRST IMMISCIBLES LIQUID (FPZ) (feet)	THICKNESS OF IMMISCIBLES LIQUID ZONE (feet)	VOLUME OF IMMISCIBLES REMOVED (ml)	DEPTH TO WATER (feet)	DEPTH TO WELL BOTTOM (feet)
MW-1 *	2/14/94	TOC	--	NONE	--	--	9.17	13.83
MW-2	2/14/94	TOC	--	NONE	--	--	10.91	19.08
MW-3	2/14/94	TOC	ODOR	NONE	--	--	9.61	17.26
MW-4	2/14/94	TOC	ODOR	NONE	--	--	8.83	18.23
MW-5	2/14/94	TOC	ODOR	NONE	--	--	10.34	17.76
MW-6	2/14/94	TOC	--	NONE	--	--	8.27	19.34
MW-7	2/14/94	TOC	--	NONE	--	--	7.52	19.38
MW-8	2/14/94	TOC	--	NONE	--	--	9.42	20.53
MW-9	2/14/94	TOC	--	NONE	--	--	7.67	11.45
MW-10	2/14/94	TOC	--	NONE	--	--	9.01	12.50

* Sample DUP was a duplicate sample taken from well MW-1.

1243

9402157 (18) Cn 10:35

SHELL OIL COMPANY
RETAIL ENVIRONMENTAL ENGINEERING - WEST

CHAIN OF CUSTODY RECORD
Serial No: 940214-Z1

Date: 2/14/94
Page 1 of 2

Site Address: 630 HIGH STREET, OAKLAND

WIC#: 204-5508-5801

Shell Engineer: DANIEL KIRK — Phone No.: 510 675-6168 Fax #675-6160

Consultant Name & Address: BLAINE TECH SERVICES INC 985 TIMOTHY DRIVE

Consultant Contact: JIM KELLER — Phone No.: 408 995-5535 Fax #: 293-8773

Comments:

Sampled by: [signature]

Printed Name: Brett Blean

LAB: ANAMETRIX

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
(1) MW-1	2/14/94			X		3						X								ALL SAMPLES CAME IN PROPER CONTAINER NO BUBBLES
(2) MW-2	"			X		3						X								
(3) MW-3	"			X		3						X								
(4) MW-4	"			X		3						X								
(5) MW-5	"			X		3						X								
(6) MW-6	"			X		3						X								
(7) MW-7	"			X		3						X								
(8) MW-8	"			X		3						X								

Relinquished By (signature)	Printed Name	Date	Time	Received (signature)	Printed Name	Date	Time
[signature]	Brett Blean	2-15-94	0820	Benny S. Carrizosa	BENNY S. CARRIZOSA	2-15-94	0820
Benny S. Carrizosa	BENNY S. CARRIZOSA	2-15-94	0837	Calvin Robinson	CALVIN ROBINSON	2-15-94	8:37
Relinquished By (signature):	Printed Name:	Date:	Time:	Received (signature):	Printed Name:	Date:	Time:

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

CHECK ONE (1) BOX ONLY — CT/DT

		CT/DT
Quarterly Monitoring	☒	5441
Site Investigation	☐	5441
Soil Closure/Disposal	☐	5442
Water Closure/Disposal	☐	5443
Soil/Air Rem. or Sys. O & M	☐	5462
Water Rem. or Sys. O & M	☐	5463
Other	☐	

TURN AROUND TIME

- 24 hours ☐
- 48 hours ☐
- 15 days ☒ (Normal)
- Other ☐ _____

NOTE: Notify Lab as soon as possible of 24/48 hr. TAT.

9402157 (18) cn 10:35

SHELL OIL COMPANY
RETAIL ENVIRONMENTAL ENGINEERING - WEST

CHAIN OF CUSTODY RECORD
Serial No: 940214 Z1

Date: 2/14/94
Page 2 of 2

Site Address: 6630 HIGH STREET, OAKLAND

WIC#: 204-5508-5801

Shell Engineer: DANIEL KIRK — Phone No.: 510 675-6168 Fax #675-6160

Consultant Name & Address: BLAINE TECH SERVICES INC 985 TIMOTHY DRIVE

Consultant Contact: JIM KELLER — Phone No.: 408 ~~745~~-5535 Fax #: 293-8773

Comments:

Sampled by: [signature]

Printed Name: Brett Blean

LAB: ANA METRIX

CHECK ONE (1) BOX ONLY	C1/DT	TURN AROUND TIME
Quarterly Monitoring	☒ 8441	24 hours ☐
Site Investigation	☐ 8441	48 hours ☐
Soil Cleanup/Disposal	☐ 8442	15 days ☒ (Normal)
Water Cleanup/Disposal	☐ 8443	Other ☐ ___
Soil/Air Rem. or Sys. O & M	☐ 8442	NOTE: Notify Lab as soon as possible of 24/48 hrs. TAT.
Water Rem. or Sys. O & M	☐ 8443	
Other	☐	

Analysis Required

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
(9) MW-9	2/14/94			X		3						X						ALL SAMPLES COLD PROPER CONTAINERS NO BUBBLES
(10) MW-10	"			"		3						X						
(11) TB	"			"		2						X						
(12) DUP	"			"		3						X						

Relinquished By (signature)	Printed Name	Date	Time	Received (signature)	Printed Name	Date	Time
[signature]	Brett Blean	2-15-94	0820	Kenny S. Garrizosa	KENNY S. GARRIZOSA	2-15-94	0820
Kenny S. Garrizosa	KENNY S. GARRIZOSA	2-15-94	0937	[signature]	ANA-WEST-SAC	2-15-94	0937
Relinquished By (signature)	Printed Name	Date	Time	Received (signature)	Printed Name	Date	Time

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

Inchcape Testing Services
Anametrix Laboratories

1961 Concourse Drive
Suite E
San Jose, CA 95131
Tel: 408-432-8192
Fax: 408-432-8198

MR. JIM KELLER
BLAINE TECH
985 TIMOTHY DRIVE
SAN JOSE, CA 95133

Workorder # : 9402157
Date Received : 02/15/94
Project ID : 204-5508-5801
Purchase Order: MOH-B813

The following samples were received at Anametrix for analysis :

ANAMETRIX ID	CLIENT SAMPLE ID
9402157- 1	MW-1
9402157- 2	MW-2
9402157- 3	MW-3
9402157- 4	MW-4
9402157- 5	MW-5
9402157- 6	MW-6
9402157- 7	MW-7
9402157- 8	MW-8
9402157- 9	MW-9
9402157-10	MW-10
9402157-11	TB
9402157-12	DUP

This report consists of 11 pages not including the cover letter, and is organized in sections according to the specific Anametrix laboratory group which performed the analysis(es) and generated the data.

The results contained within this report relate to only the sample(s) tested. Additionally, these data should be considered in their entirety and Anametrix cannot be responsible for the detachment, separation, or otherwise partial use of this report.

Anametrix is certified by the California Department of Health Services (DHS) to perform environmental testing under Certificate Number 1234.

If you have any further questions or comments on this report, please call us as soon as possible. Thank you for using Anametrix.

Doug Robbins
Laboratory Director

2-25-94
Date

REPORT SUMMARY
ANAMETRIX, INC. (408)432-8192

MR. JIM KELLER
BLAINE TECH
985 TIMOTHY DRIVE
SAN JOSE, CA 95133

Workorder # : 9402157
Date Received : 02/15/94
Project ID : 204-5508-5801
Purchase Order: MOH-B813
Department : GC
Sub-Department: TPH

SAMPLE INFORMATION:

ANAMETRIX SAMPLE ID	CLIENT SAMPLE ID	MATRIX	DATE SAMPLED	METHOD
9402157- 1	MW-1	WATER	02/14/94	TPHgBTEX
9402157- 2	MW-2	WATER	02/14/94	TPHgBTEX
9402157- 3	MW-3	WATER	02/14/94	TPHgBTEX
9402157- 4	MW-4	WATER	02/14/94	TPHgBTEX
9402157- 5	MW-5	WATER	02/14/94	TPHgBTEX
9402157- 6	MW-6	WATER	02/14/94	TPHgBTEX
9402157- 7	MW-7	WATER	02/14/94	TPHgBTEX
9402157- 8	MW-8	WATER	02/14/94	TPHgBTEX
9402157- 9	MW-9	WATER	02/14/94	TPHgBTEX
9402157-10	MW-10	WATER	02/14/94	TPHgBTEX
9402157-11	TB	WATER	02/14/94	TPHgBTEX
9402157-12	DUP	WATER	02/14/94	TPHgBTEX

REPORT SUMMARY
ANAMETRIX, INC. (408)432-8192

MR. JIM KELLER
BLAINE TECH
985 TIMOTHY DRIVE
SAN JOSE, CA 95133

Workorder # : 9402157
Date Received : 02/15/94
Project ID : 204-5508-5801
Purchase Order: MOH-B813
Department : GC
Sub-Department: TPH

QA/QC SUMMARY :

- The concentration reported as gasoline for sample MW-3 is due to the presence of a combination of gasoline and a discrete peak not indicative of gasoline.
- The concentration reported as gasoline for sample MW-6 is primarily due to the presence of a discrete peak not indicative of gasoline.

Cheryl Balmer 2/22/94
Department Supervisor Date

Chemist 02/22/94
Date

Organic Analysis Data Sheet
Total Petroleum Hydrocarbons as Gasoline with BTEX
ITS - Anametrix Laboratories - (408)432-8192

Lab Workorder : 9402157 | Client Project ID : 204-5508-5801

Matrix : WATER | Units : ug/L

Compound Name	Method Reporting Limit*	Client ID MW-1 Lab ID 9402157-01	Client ID MW-2 Lab ID 9402157-02	Client ID MW-3 Lab ID 9402157-03	Client ID MW-4 Lab ID 9402157-04	Client ID MW-5 Lab ID 9402157-05
Benzene	0.50	150	ND	9.9	12	1.3
Toluene	0.50	47	ND	5.2	7.8	ND
Ethylbenzene	0.50	210	ND	8.8	<2.5	0.50
Total Xylenes	0.50	68	ND	<5.0	<2.5	0.70
TPH as Gasoline	50	8000	ND	4700	1500	660
Surrogate Recovery		137%	124%	136%	127%	106%
Instrument ID		HP12	HP12	HP12	HP12	HP12
Date Sampled		02/14/94	02/14/94	02/14/94	02/14/94	02/14/94
Date Analyzed		02/17/94	02/17/94	02/17/94	02/17/94	02/18/94
RLMF		25	1	10	5	1
Filename Reference		FPF15701.D	FPF15702.D	FPF15703.D	FPF15704.D	FRF15705.D

* The Method Reporting Limit must be multiplied by the Reporting Limit Multiplication Factor (RLMF) to achieve the compound's reporting limit in the analysis.

ND : Not detected at or above the reporting limit for the analysis as performed.
TPHg : Determined by GC/FID following sample purge & trap by EPA Method 5030.
BTEX : Determined by modified EPA Method 8020 following sample purge & trap by EPA Method 5030.

Lab Control Limits for surrogate compound p-Bromofluorobenzene are 61-139%.

All testing procedures follow California Department of Health Services (Cal-DHS) approved methods.

02/22/94
Analyst Date

Cheryl Balmer 2/22/94
Supervisor Date

Issued on 2/22/94 @ 2:31 PM

Organic Analysis Data Sheet
Total Petroleum Hydrocarbons as Gasoline with BTEX
ITS - Anametrix Laboratories - (408)432-8192

Lab Workorder : 9402157 | Client Project ID : 204-5508-5801

Matrix : WATER | Units : ug/L

Compound Name	Method Reporting Limit*	Client ID MW-6 Lab ID 9402157-06	Client ID MW-7 Lab ID 9402157-07	Client ID MW-8 Lab ID 9402157-08	Client ID MW-9 Lab ID 9402157-09	Client ID MW-10 Lab ID 9402157-10
Benzene	0.50	<12.5	ND	ND	ND	ND
Toluene	0.50	<12.5	ND	ND	ND	ND
Ethylbenzene	0.50	<12.5	ND	ND	ND	ND
Total Xylenes	0.50	<12.5	ND	ND	ND	ND
TPH as Gasoline	50	14000	ND	ND	ND	ND
Surrogate Recovery		139%	125%	127%	109%	125%
Instrument ID		HP12	HP12	HP12	HP12	HP12
Date Sampled		02/14/94	02/14/94	02/14/94	02/14/94	02/14/94
Date Analyzed		02/17/94	02/17/94	02/17/94	02/18/94	02/17/94
RLMF		25	1	1	1	1
Filename Reference		FPF15706.D	FPF15707.D	FPF15708.D	FRF15709.D	FPF15710.D

* The Method Reporting Limit must be multiplied by the Reporting Limit Multiplication Factor (RLMF) to achieve the compound's reporting limit in the analysis.

ND : Not detected at or above the reporting limit for the analysis as performed.
TPHg : Determined by GC/FID following sample purge & trap by EPA Method 5030.
BTEX : Determined by modified EPA Method 8020 following sample purge & trap by EPA Method 5030.

Lab Control Limits for surrogate compound p-Bromofluorobenzene are 61-139%.

All testing procedures follow California Department of Health Services (Cal-DHS) approved methods.

Analyst 02/22/94 Date

Supervisor Cheryl Beckman 2/22/94 Date

Issued on 2/22/94 @ 2:32 PM

Organic Analysis Data Sheet
Total Petroleum Hydrocarbons as Gasoline with BTEX
ITS - Anametrix Laboratories - (408)432-8192

Lab Workorder : 9402157
Matrix : WATER

Client Project ID : 204-5508-5801
Units : ug/L

Compound Name	Method Reporting Limit*	Client ID TB Lab ID 9402157-11	Client ID DUP Lab ID 9402157-12	Client ID Lab ID Method Blank	Client ID Lab ID Method Blank	Client ID Lab ID
Benzene	0.50	ND	160	ND	ND	
Toluene	0.50	ND	45	ND	ND	
Ethylbenzene	0.50	ND	230	ND	ND	
Total Xylenes	0.50	ND	76	ND	ND	
TPH as Gasoline	50	ND	8900	ND	ND	
Surrogate Recovery		121%	136%	124%	124%	
Instrument ID		HP12	HP12	HP12	HP12	
Date Sampled		02/14/94	02/14/94	N/A	N/A	
Date Analyzed		02/17/94	02/17/94	02/17/94	02/18/94	
RLMF		1	25	1	1	
Filename Reference		FPF15711.D	FPF15712.D	BF1701E1.D	BF1801E1.D	

* The Method Reporting Limit must be multiplied by the Reporting Limit Multiplication Factor (RLMF) to achieve the compound's reporting limit in the analysis.

ND : Not detected at or above the reporting limit for the analysis as performed.
TPHg : Determined by GC/FID following sample purge & trap by EPA Method 5030.
BTEX : Determined by modified EPA Method 8020 following sample purge & trap by EPA Method 5030.

Lab Control Limits for surrogate compound p-Bromofluorobenzene are 61-139%.

All testing procedures follow California Department of Health Services (Cal-DHS) approved methods.

Analyst 02/22/94 Date

Supervisor Cheryl Palmer 2/22/94 Date

Issued on 2/22/94 @ 10:57 AM

Matrix Spike Report
Total Petroleum Hydrocarbons as BTEX
ITS - Anametrix Laboratories - (408)432-8192

Project ID : 204-5508-5801
Sample ID : MW-2
Matrix : WATER
Date Sampled : 02/14/94

Laboratory ID : 9402157-02
Analyst : NS
Supervisor : G
Instrument ID : HP12
Units : ug/L

COMPOUND NAME	SPIKE AMOUNT	SAMPLE RESULTS	MS RECOVERY	MSD RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS
Benzene	20	ND	95%	95%	45-139	0%	30
Toluene	20	ND	100%	100%	51-138	0%	30
Ethylbenzene	20	ND	105%	110%	48-146	-5%	30
Total Xylenes	20	ND	105%	105%	50-139	0%	30
Surrogate Recovery		124%	111%	132%			
Date Analyzed		02/17/94	02/17/94	02/17/94			
Multiplier		1	1	1			
Filename Reference		FPF15702.D	FMF15702.D	FDF15702.D			

* Limits established by Inchcape Testing Services, Anametrix Laboratories.

Matrix Spike Report
Total Petroleum Hydrocarbons as Gasoline
ITS - Anametrix Laboratories - (408)432-8192

Project ID : 204-5508-5801
Sample ID : MW-7
Matrix : WATER
Date Sampled : 02/14/94

Laboratory ID : 9402157-07
Analyst :
Supervisor :
Instrument ID : HP12
Units : ug/L

COMPOUND NAME	SPIKE AMOUNT	SAMPLE RESULTS	MS RECOVERY	MSD RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS
Gasoline	500	ND	94%	78%	50-139	19%	30
Surrogate Recovery		125%	110%	129%			
Date Analyzed		02/17/94	02/17/94	02/17/94			
Multiplier		1	1	1			
Filename Reference		FPF15707.D	FMF15707.D	FDF15707.D			

* Limits established by Inchcape Testing Services, Anametrix Laboratories.

Matrix Spike Report
Total Petroleum Hydrocarbons as BTEX
ITS - Anametrix Laboratories - (408)432-8192

Project ID : 204-5508-5801
Sample ID : MW-9
Matrix : WATER
Date Sampled : 02/14/94

Laboratory ID : 9402157-09
Analyst : AP
Supervisor : GJ
Instrument ID : HP12
Units : ug/L

COMPOUND NAME	SPIKE AMOUNT	SAMPLE RESULTS	MS RECOVERY	MSD RECOVERY	RECOVERY LIMITS	RPD	RPD LIMITS
Benzene	20	ND	80%	90%	45-139	-12%	30
Toluene	20	ND	80%	90%	51-138	-12%	30
Ethylbenzene	20	ND	90%	90%	48-146	0%	30
Total Xylenes	20	ND	80%	95%	50-139	-17%	30
Surrogate Recovery		109%	103%	107%			
Date Analyzed		02/18/94	02/18/94	02/18/94			
Multiplier		1	1	1			
Filename Reference		FRF15709.D	FMF15709.D	FDF15709.D			

* Limits established by Inchcape Testing Services, Anametrix Laboratories.

Laboratory Control Spike Report
Total Petroleum Hydrocarbons as Gasoline
ITS - Anametrix Laboratories - (408)432-8192

Instrument ID : HP12
Matrix : LIQUID

Analyst : AP
Supervisor : [illegible]
Units : ug/L

COMPOUND NAME	SPIKE AMOUNT	LCS RECOVERY	RECOVERY LIMITS
Gasoline	500	90%	56-141
Surrogate Recovery		113%	61-139
Date Analyzed		02/17/94	
Multiplier		1	
Filename Reference		MF1702E1.D	

* Limits established by Inchcape Testing Services, Anametrix Laboratories.

Laboratory Control Spike Report
Total Petroleum Hydrocarbons as BTEX
ITS - Anametrix Laboratories - (408)432-8192

Instrument ID : HP12
Matrix : LIQUID

Analyst : AP
Supervisor : [illegible]
Units : ug/L

COMPOUND NAME	SPIKE AMOUNT	LCS RECOVERY	RECOVERY LIMITS
Benzene	20	100%	52-133
Toluene	20	105%	57-136
Ethylbenzene	20	110%	56-139
Total Xylenes	20	110%	56-141
Surrogate Recovery		113%	61-139
Date Analyzed		02/17/94	
Multiplier		1	
Filename Reference		MF1701E1.D	

* Limits established by Inchcape Testing Services, Anametrix Laboratories.

Laboratory Control Spike Report
Total Petroleum Hydrocarbons as BTEX
ITS - Anametrix Laboratories - (408)432-8192

Instrument ID : HP12
Matrix : LIQUID

Analyst : AP
Supervisor : [illegible]
Units : ug/L

COMPOUND NAME	SPIKE AMOUNT	LCS RECOVERY	RECOVERY LIMITS
Benzene	20	80%	52-133
Toluene	20	80%	57-136
Ethylbenzene	20	85%	56-139
Total Xylenes	20	85%	56-141
Surrogate Recovery		104%	61-139
Date Analyzed		02/18/94	
Multiplier		1	
Filename Reference		MF1801E1.D	

* Limits established by Inchcape Testing Services, Anametrix Laboratories.

ATTACHMENT B

SAMPLING FREQUENCY MODIFICATION CRITERIA

SAMPLING FREQUENCY CRITERIA

Weiss Associates (WA) has developed a technical approach for determining appropriate ground water monitoring well sampling frequencies for service station monitoring programs. Ground water monitoring wells are typically sampled quarterly at service stations to monitor the concentration and extent of hydrocarbons and/or volatile organic compounds (VOCs) in ground water. This satisfies California Regional Water Quality Control Board (RWQCB) ground water monitoring guidelines which state: "Quarterly (ground water) monitoring is the maximum sampling interval typically allowed when ground water contamination is present unless other arrangements are made with Regional (Water Quality Control) Board staff"[1]. San Francisco Bay RWQCB personnel have indicated that the RWQCB will allow well sampling frequency reductions on a site specific basis if the frequency reductions are justified by site conditions. Presented below are generalized criteria we have developed for determining the appropriate well sampling frequencies based on specific site conditions.

CRITERIA FOR REDUCING SAMPLING FREQUENCY

The generalized criteria we have developed for determining whether sampling frequency should be modified for a given well includes:

- The reliability of the ground water analytic data,
- The trend of the dissolved hydrocarbon and/or VOCs concentrations in the well, and
- The location of the well in relation to the hydrocarbon and/or VOCs source.

Each of these factors is discussed below.

Reliability of Ground Water Analytic Data

The reproducibility of ground water analytic data is highly sensitive to geologic conditions, ground water elevations, field sampling procedures and laboratory analytic procedures. Of these controlling factors, ground water fluctuations usually have the greatest impact on data reproducibility. Since ground water elevations at most sites fluctuate during

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[1] North Coast, San Francisco Bay, Central Valley Regional Water Quality Control Boards, June 2, 1988 (revised May 18, 1989), "Regional Board Staff Recommendations for Initial Evaluation and Investigation of Underground Tanks; pg. 12

the course of a year, ground water should be monitored for at least one year to assess the impact of ground water fluctuations on data reproducibility. RWQCB guidelines also stipulate sampling all monitoring wells at least quarterly for one year when hydrocarbons are detected in the well. Therefore, WA recommends reducing the sampling frequency only for wells which:

- Have been sampled at least four times over a period of one year, and
- Have consistent historic analytic results allowing a reliable assessment of the representative hydrocarbon concentrations in the ground water.

Although it may be possible to statistically quantify the reliability of the analytic data, this effort may not produce useful results. Therefore, we will evaluate the reliability of the data subjectively. If the variability of the analytic data prevents a reliable assessment of concentrations then we recommend sampling the well(s) quarterly until a reliable assessment can be made.

Concentration Trends

Sampling frequency should be reduced only for wells showing stable or decreasing concentration trends. Wells showing increasing concentration trends should be sampled quarterly to monitor the trends and determine whether the hydrocarbon concentration in a particular well is approaching a threshold, such as the saturation concentration, maximum contaminant level (MCL) or the recommended action level.

Well Location

For most sites, four to ten ground water monitoring wells are typically required to fully define the extent of hydrocarbons in ground water. These wells generally fall into one of four classifications relative to the hydrocarbon source:

1) Clean upgradient and crossgradient wells,
2) Source-area wells with high hydrocarbon concentrations,
3) Intermediate wells with low to high hydrocarbon concentrations located between the source-area wells and clean crossgradient and downgradient wells, and
4) Clean downgradient wells.

WA's recommended sampling frequency for each of these classifications is as follows:

1) If no hydrocarbons are detected in the upgradient and crossgradient wells, and if no offsite sources are suspected upgradient or crossgradient of the site, WA recommends sampling these wells annually.

2) Source-area wells are used to monitor concentrations from source-area releases and determine effectiveness of natural biodegradation and/or site remediation. To ensure that increasing source-area concentration trends are detected, WA recommends sampling these wells biannually.

3) Intermediate wells are used to track dissolved hydrocarbon concentrations and the rates of natural biodegradation or the effectiveness of site remediation. Therefore, WA recommends sampling these wells biannually. However, if there are more than four intermediate wells, we recommend sampling each of the intermediate wells annually during different quarters.

4) Since clean downgradient wells define the "leading edge" of dissolved hydrocarbons in ground water and are used to determine hydrocarbon breakthrough, WA recommends sampling these wells quarterly.

Other Considerations

If hydrocarbon concentrations in ground water from all site wells are near or below MCLs, we recommend sampling all site wells biannually or annually, depending on the number of wells, well locations with respect to potential source areas, and ground water depth fluctuations. Annual sampling should be sufficient for sites with:

- Large numbers of wells,
- Wells located immediately downgradient of potential source areas, and
- Stable ground water depths.

Sites without these characteristics may need biannual sampling.

Upgradient and/or crossgradient wells that contain hydrocarbons or other contaminants from offsite sources should be sampled biannually to monitor offsite contributions of contaminants to the site.

A decision flow chart graphically presenting the recommended sampling frequency based on these criteria is included as Figure 1. Although there may be wells that do not fall into the location and concentration classifications listed in the flow chart, the generalized criteria may be used to evaluate the appropriate sampling frequency on a case by case basis.

SUMMARY

In summary, WA recommends reducing sampling frequencies for all ground water monitoring wells with:

- Ground water samples collected for four consecutive quarters,
- Reliable ground water analytic results, and
- No significantly increasing concentration trends.

The sampling frequency for individual wells should be modified based on the well location relative to the contaminant source, as follows:

- Annually for clean upgradient and crossgradient wells,
- Biannually for upgradient and crossgradient wells containing hydrocarbons or other contaminants from an offsite, upgradient source,
- Biannually for high concentration source-area wells,
- Biannually or annually for intermediate wells, depending on the total number of intermediate wells, and
- Quarterly for clean downgradient wells.

Sampling frequency in all site wells should also be reduced to biannual or annual if contaminant concentrations in all site wells are near or below MCLs.

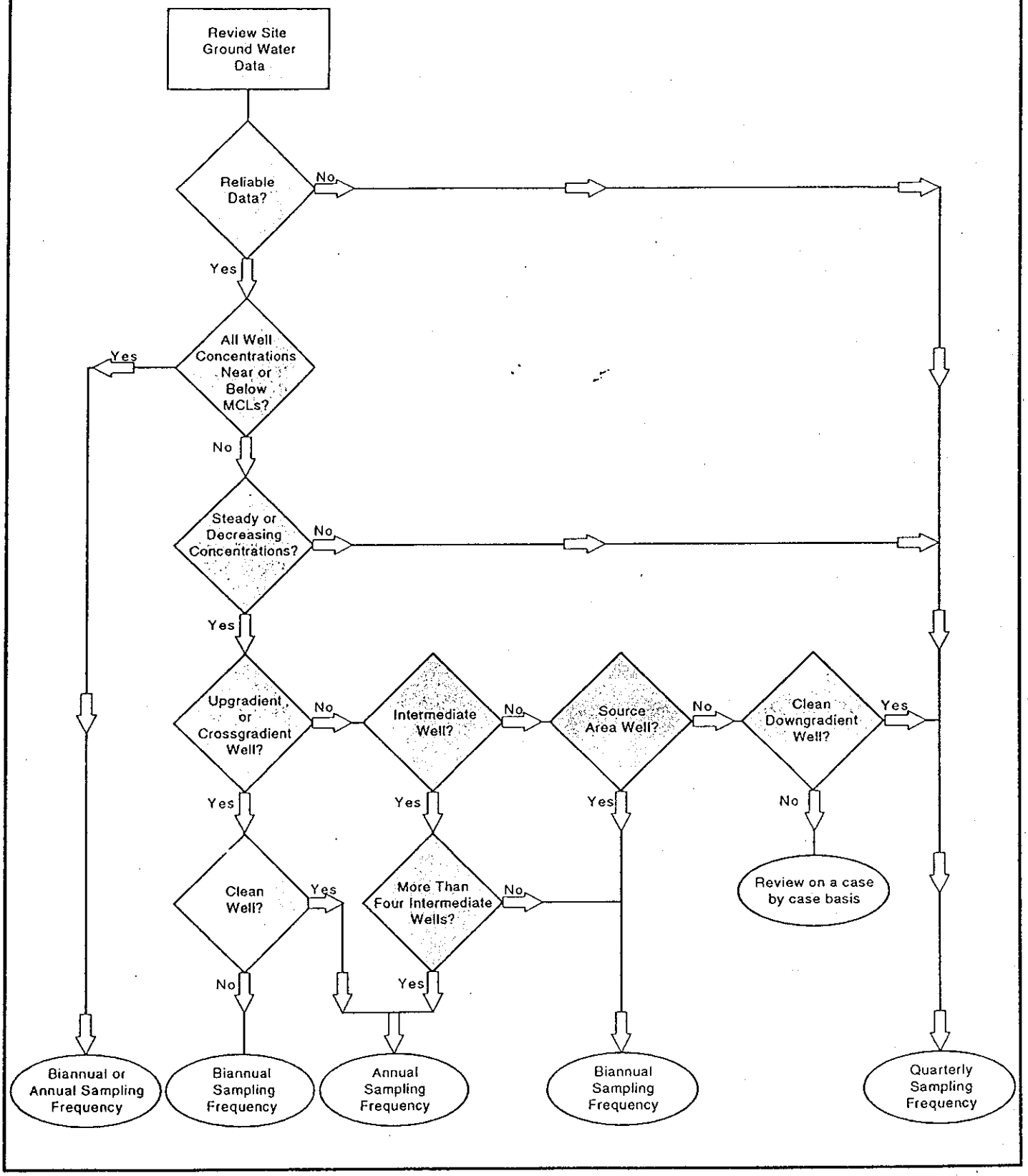

Figure 1. Ground Water Sampling Frequency Determination Chart

Chevron

Chevron U.S.A. Products Company
2410 Camino Ramon
San Ramon, CA 94583
P.O. Box 5004
San Ramon, CA 94583-0804

Marketing Department
Phone 510 842 9500

December 31, 1993

Mr. Forrest Craig
San Rafael Fire Department
Hazardous Materials Division
1039 'C' Street
San Rafael, California 94901

Re: Former Chevron Station #9-4553
1722 Fourth Street, San Rafael, California

Dear Mr. Craig:

Enclosed is the latest quarterly groundwater monitoring dated December 20, 1993 prepared by Sierra Environmental Services.

The off-site well No. 8 had a decrease in both TPH-G and BTEX, Monitoring Wells Nos. 9, 10 and 12 remained ND for TPH-G, but showed a trace of BTEX. The remaining off-site wells, Nos. 7 and 11, remained ND for both TPH-G and BTEX.

We will continue to monitor this site on a quarterly basis. Please call (510) 842-9525 if you have any questions.

Very truly yours,

Richard Soennichsen
Project Manager

cc: Mr. John Jang, San Francisco RWQCB
Mr. Michael Cooke, Weiss Associates
Ms. Jane Husman, Planned Parenthood, 20 'H' Street, San Rafael, CA 94901
Ms. Kareen Kawkins, Forsher & Guthrie, 10 "H" Street, San Rafael, CA 94901

Superior Precision Analytical, Inc.
825 Arnold Drive, Suite 114 • Martinez, California 94553 • (510) 229-1512 / fax (510) 229-1526

C E R T I F I C A T E O F A N A L Y S I S

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS

QA/QC INFORMATION
SET: 30057

NA = ANALYSIS NOT REQUESTED
ND = ANALYSIS NOT DETECTED ABOVE QUANTITATION LIMIT
ug/L = parts per billion (ppb)

OIL AND GREASE ANALYSIS By Standard Methods Method 5520F:
Minimum Detection Limit in Water: 5000ug/L

Modified EPA SW-846 Method 8015 for Extractable Hydrocarbons:
Minimum Quantitation Limit for Diesel in Water: 50ug/L

EPA SW-846 Method 8015/5030 Total Purgable Petroleum Hydrocarbons:
Minimum Quantitation Limit for Gasoline in Water: 50ug/L

EPA SW-846 Method 8020/BTXE
Minimum Quantitation Limit in Water: 0.5ug/L

ANALYTE	MS/MSD RECOVERY	RPD	CONTROL LIMIT
Gasoline:	107/120	11%	70-130
Benzene:	112/103	8%	70-130
Toluene:	107/104	3%	70-130
Ethyl Benzene:	95/92	3%	70-130
Total Xylenes:	105/103	2%	70-130

11/23/93

Senior Chemist

Superior Precision Analytical, Inc.
825 Arnold Drive, Suite 114 ▪ Martinez, California 94553 ▪ (510) 229-1512 / fax (510) 229-1526

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11/23/95

Senior Chemist