Weiss Associates Environmental and Geologic Services

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December 28, 1994

Jennifer Eberle
Alameda County Department
of Environmental Health
Hazardous Materials Division
1131 Harbor Bay Parkway
Alameda, CA 94502-6577

Re: Fourth Quarter 1994
ACDEH STID #1107
Shell Service Station
WIC #204-6001-0109
29 Wildwood Avenue
Piedmont, California
WA Job #81-0463-104

Dear Ms. Eberle:

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 2652.d. Included below are descriptions and results of activities performed in the fourth quarter 1994 and proposed work for the first quarter 1995.

Fourth Quarter 1994 Activities:

- Blaine Tech Services, Inc. (BTS) San Jose, California measured ground water depths and collected 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 and 2, respectively) and prepared a ground water elevation contour map (Figure 2).

- BTS measured dissolved oxygen concentrations in ground water in all site wells (Table 2). The dissolved oxygen concentrations are similar to last quarter and are more than sufficient to support natural hydrocarbon biodegradion. BTS will continue to measure dissolved oxygen concentrations.

Anticipated First Quarter 1995 Activities:

- WA will submit a report presenting the results of first quarter 1995 ground water sampling and ground water depth measurements. The report will include tabulated ground water elevation and analytic data, dissolved oxygen concentrations and a ground water elevation contour map.

How is O_2 measured? Presented concentrations historically are all over the map!!

Conclusions and Recommendations

The dissolved oxygen concentrations appear adequate for biochemical oxidation. According to Barker et al,[1] approximately 20 µg of dissolved oxygen are required for complete biochemical oxidization of 1 µg BETX in naturally occurring ground water. Based on the 2,100 to 5,000 µg/l dissolved oxygen measured in ground water beneath the site, biochemical oxidation of about 100 to 250 µg/l BETX is possible. Since BETX concentrations in ground water from all site wells fall within this range, there appears to be more than sufficient dissolved oxygen for biochemical oxidation of the hydrocarbons. Therefore, as we discussed in previous reports, WA recommends continued measurement of dissolved oxygen concentrations in ground water to monitor the progress of hydrocarbon biodegradation by naturally occurring microorganisms.

California Regional Water Quality Control Board (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. WA reviewed historic ground water data for this site to determine the appropriate well sampling frequencies. Our criteria used to determine sampling frequencies is described in detail in Attachment B. Our specific recommendations for this site are presented in Table 3. WA will implement these new well sampling frequencies unless we are notified otherwise within 60 days from the date of this letter.

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1 Barker, J.F., et al, 1987, Natural Attenuation of Aromation Hydrocarbons in a Shallow Sand Aquifer, Ground Water Monitoring Review, 7(1):64-71.

Please call if you have any questions.

Sincerely,
Weiss Associates

J. Michael Asport
Staff Scientist I

Michael P. Maley, C.E.G.
Project Hydrogeologist

REGISTERED GEOLOGIST
MICHAEL PAUL MALEY
No. EG-1869
CERTIFIED
ENGINEERING
GEOLOGIST
STATE OF CALIFORNIA

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

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

JMA/MPM:jma
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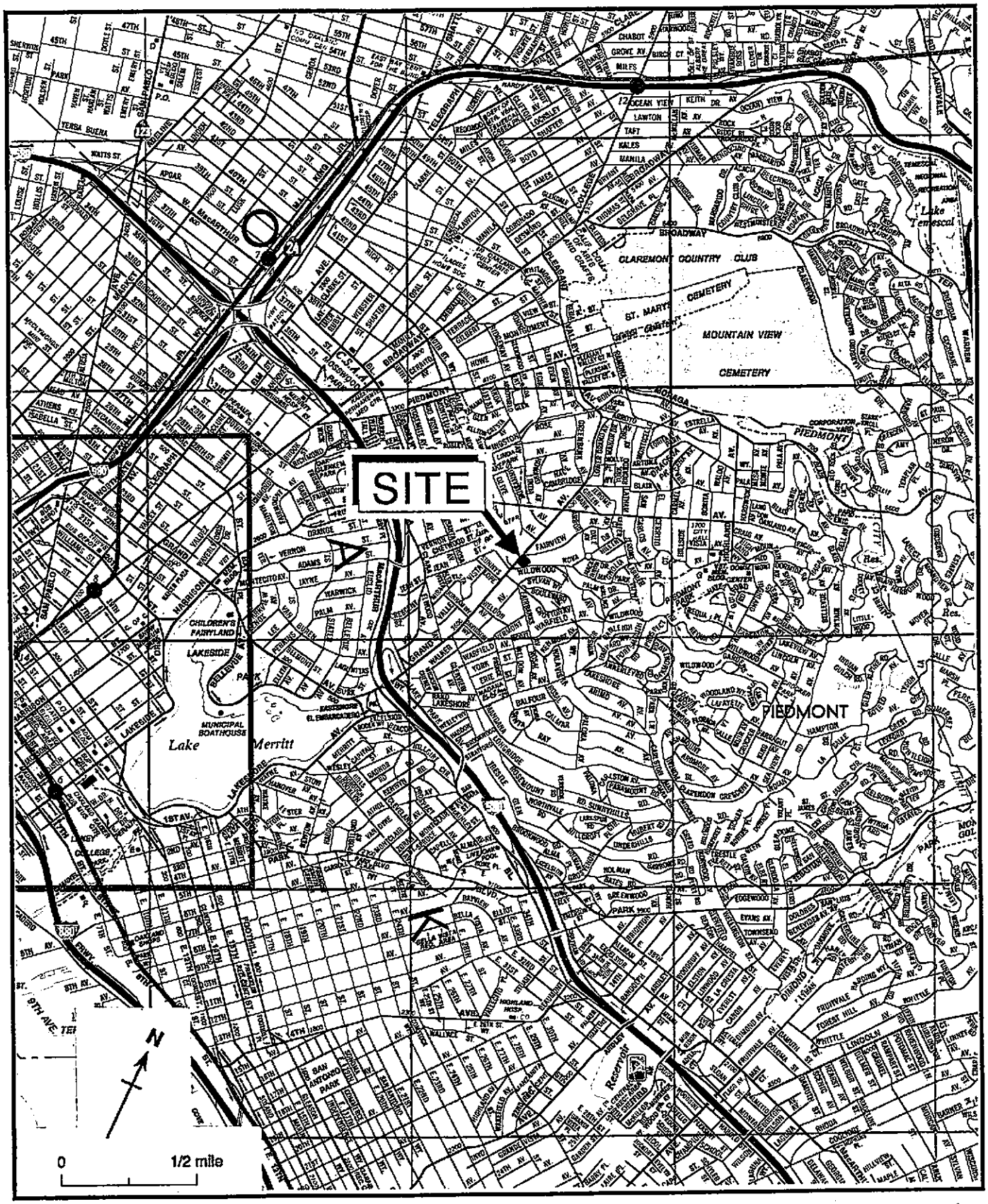

Figure 1. Site Location Map - Shell Service Station WIC #204-6001-0109, 29 Wildwood Avenue, Piedmont, California

6/6/90

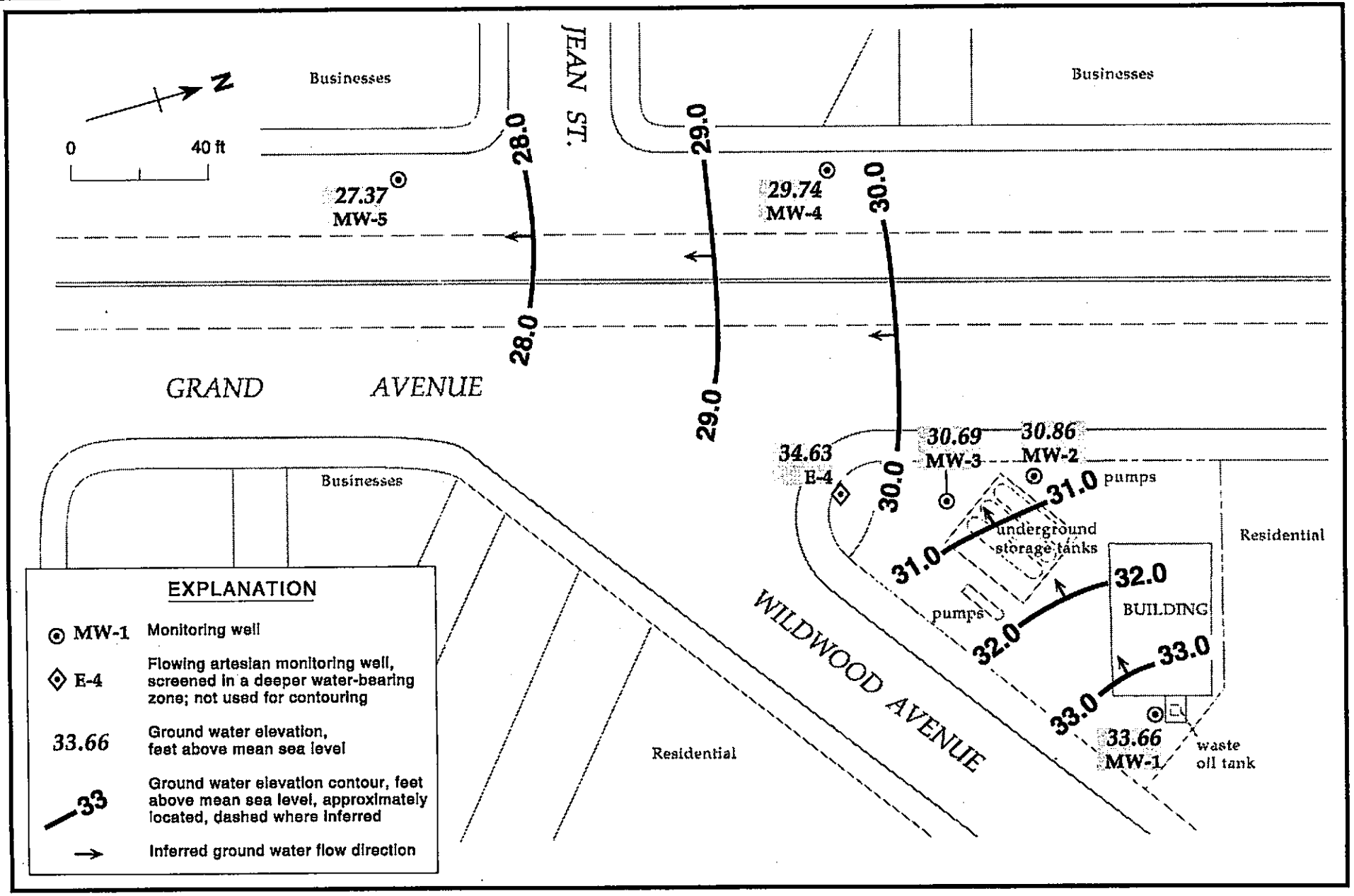

Figure 2. Monitoring Well Locations and Ground Water Elevation Contours - October 6, 1994 - Shell Service Station, WIC #204-6001-0109, 29 Wildwood Avenue, Piedmont, California

Table 1. Ground Water Elevations - Shell Service Station WIC #204-6001-0109, 29 Wildwood Avenue, Piedmont, California

Well ID	Date	Top-of-Casing Elevation (ft above msl)	Depth to Water (ft)	Ground Water Elevation (ft above msl)
MW-1	07/12/89	37.96	2.76	35.20
	01/30/90		3.10	34.86
	04/27/90		3.24	34.72
	07/31/90		4.26	33.70
	10/30/90		4.25	33.71
	01/31/91		3.66	34.30
	04/30/91		3.46	34.50
	07/30/91		4.14	33.82
	10/29/91		3.96	34.00
	01/20/92		3.59	34.37
	04/14/92		3.18	31.71
	07/21/92		4.17	33.79
	10/02/92		4.29	33.67
	01/20/93		2.32	35.64
	05/03/93		3.50	34.46
	06/28/93		3.76	34.20
	07/21/93		4.09	33.87
	10/19/93		3.58	34.38
	01/20/94		---	---
	04/12/94		3.60	34.36
	07/20/94		4.10	33.86
	10/06/94		**4.30**	**33.66**
MW-2	07/12/89	34.89	3.66	31.23
	01/30/90		3.49	31.40
	04/27/90		3.79	31.10
	07/31/90		4.03	30.86
	10/30/90		4.21	30.68
	01/31/91		4.09	30.80
	04/30/91		3.95	30.94
	07/30/91		4.07	30.82
	10/29/91		4.11	30.78
	01/20/92		3.86	31.03
	04/14/92		3.66	34.30
	07/21/92		3.92	30.97
	10/02/92		4.45	30.44
	01/20/93		3.74	31.15
	05/03/93		3.77	31.12
	06/28/93		3.96	30.93
	07/21/93		4.39	30.50
	10/19/93		3.92	30.97
	01/20/94		4.45	30.44
	04/12/94		4.72	30.17

-- Table 1 continues on next page --

Table 1. Ground Water Elevations - Shell Service Station WIC #204-6001-0109, 29 Wildwood Avenue, Piedmont, California (continued)

Well ID	Date	Top-of-Casing Elevation (ft above msl)	Depth to Water (ft)	Ground Water Elevation (ft above msl)
	07/20/94		5.32	29.57
	10/06/94		**4.03**	**30.86**
MW-3	07/12/89	35.00	3.83	31.17
	01/30/90		3.24	31.76
	04/27/90		4.02	30.98
	07/31/90		4.31	30.69
	10/30/90		4.52	30.48
	01/31/91		4.33	30.67
	04/30/91		3.79	31.21
	07/30/91		4.37	30.63
	10/29/91		4.00	31.00
	01/20/92		3.87	31.13
	04/14/92		3.15	31.85
	07/21/92		4.17	30.83
	10/02/92		4.43	30.57
	01/20/93		2.20	32.80
	05/03/93		3.50	31.50
	06/28/93		4.08	30.92
	07/21/93		4.12	30.88
	10/19/93		4.20	30.80
	01/20/94		4.08	30.92
	04/12/94		3.70	31.30
	07/20/94		4.26	30.74
	10/06/94		**4.31**	**30.69**
MW-4	01/30/90	33.73	4.50	29.23
	04/27/90		3.62	30.11
	07/31/90		4.19	29.54
	10/30/90		4.19	29.54
	01/31/91		4.49	29.24
	04/30/91		4.02	29.71
	07/30/91		4.39	29.34
	10/29/91		3.75	29.98
	01/20/92		3.94	29.79
	04/14/92		3.71	30.02
	07/21/92		4.02	29.71
	10/02/92		4.13	29.60
	01/20/93		3.10	30.63
	05/03/93		3.70	30.03
	06/28/93		3.81	29.92
	07/21/93		3.81	29.92
	10/19/93		3.94	29.79

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Table 1. Ground Water Elevations - Shell Service Station WIC #204-6001-0109, 29 Wildwood Avenue, Piedmont, California (continued)

Well ID	Date	Top-of-Casing Elevation (ft above msl)	Depth to Water (ft)	Ground Water Elevation (ft above msl)
	01/20/94		4.00	29.73
	04/12/94		4.01	29.72
	07/20/94		3.91	29.82
	10/06/94		**3.99**	**29.74**
MW-5	01/30/90	31.38	7.12	24.26
	04/27/90		4.19	27.19
	07/31/90		4.09	27.29
	10/30/90		4.39	26.99
	01/31/91		4.49	26.89
	04/30/91		4.27	27.11
	07/30/91		4.32	27.06
	10/29/91		3.79	27.59
	01/20/92		4.09	27.29
	04/14/92		4.12	27.26
	07/21/92		4.13	27.25
	10/02/92		4.30	27.08
	01/20/93		3.12	28.26
	05/03/93		4.07	27.31
	06/28/93		4.08	27.30
	07/21/93		4.05	27.33
	10/19/93		4.20	27.18
	01/20/94		4.40	26.98
	04/12/94		4.18	27.20
	07/20/94		4.06	27.32
	10/06/94		**4.01**	**27.37**
E-4	07/12/89	34.63	a	>39.13
	01/30/90		b	>34.63
	04/27/90		b	>34.63
	07/31/90		b	>34.63
	10/30/90		b	>34.63
	01/31/91		b	>34.63
	04/30/91		b	>34.63
	07/30/91		b	>34.63
	10/29/91		b	>34.63
	01/20/92		b	>34.63
	04/14/92		b	>34.63
	07/21/92		b	>34.63
	10/02/92		b	>34.63
	01/20/93		b	>34.63
	05/03/93		b	>34.63

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Table 1. Ground Water Elevations - Shell Service Station WIC #204-6001-0109, 29 Wildwood Avenue, Piedmont, California (continued)

Well ID	Date	Top-of-Casing Elevation (ft above msl)	Depth to Water (ft)	Ground Water Elevation (ft above msl)
	06/28/93		b	>34.63
	07/21/93		b	>34.63
	10/19/93		b	>34.63
	01/20/94		b	>34.63
	04/12/94		b	>34.63
	07/20/94		b	>34.63
	10/06/94		**b**	**>34.63**

a = Well E-4 is a flowing artesian well. The potentiometric surface was greater than 4.5 ft above the top of the well casing.

b = Well E-4 potentiometric surface was higher than the top of the well casing.

Table 2. Analytic Results for Ground Water, Shell Service Station WIC #204-6001-0109, 29 Wildwood Avenue, Piedmont, California

Well ID	Date Sampled	Depth to Water (ft)	TPH-G	B	E	T	X	Dissolved Oxygen[a]
			<----------parts per billion (µg/L)---------->					
MW-1	07/12/89	2.76	<50	<0.5	<1	<1	<3	---
	01/30/90	3.10	<50	<0.5	<0.5	<0.5	<0.5	---
	04/27/90	3.24	<50	<0.5	<0.5	<0.5	<0.5	---
	07/31/90	4.26	<50	<0.5	<0.5	<0.5	<0.5	---
	10/30/90	4.25	<50	<0.5	<0.5	<0.5	<0.5	---
	01/31/91	3.66	<50	<0.5	<0.5	<0.5	<0.5	---
	04/30/91	3.46	<50	0.8	0.6	<0.5	1.2	---
	07/30/91	4.14	<50	<0.5	<0.5	<0.5	<0.5	---
	10/29/91	3.96	<50	<0.5	<0.5	<0.5	<0.5	---
	01/20/92	3.59	<30	<0.3	<0.3	<0.3	<0.3	---
	04/14/92	3.18	<50	<0.5	<0.5	<0.5	<0.5	---
	07/21/92	4.17	<50	<0.5	<0.5	<0.5	<0.5	---
	10/02/92	4.29	<50	<0.5	<0.5	<0.5	<0.5	---
	01/20/93	2.32	<50	<0.5	<0.5	<0.5	<0.5	---
	05/04/93	3.50	<50	<0.5	<0.5	<0.5	<0.5	1,930
	07/21/93	4.09	<50	<0.5	<0.5	<0.5	<0.5	4,640
	10/19/93	3.58	50	<0.5	<0.5	<0.5	<0.5	4,310
	01/20/94[b]	---	---	---	---	---	---	---
	04/12/94	3.60	<50	<0.5	<0.5	<0.5	<0.5	7,460
	07/20/94	4.10	<50	<0.5	<0.5	<0.5	<0.5	3,200
	10/06/94	**4.30**	**<50**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**3,200**
MW-2	07/12/89	3.66	60	2.7	<1	<1	<3	---
	01/30/90	3.49	<50	6.6	0.54	<0.5	0.93	---
	04/27/90	3.79	60	2.1	<0.5	<0.5	<0.5	---
	07/31/90	4.03	70	1.5	<0.5	<0.5	<0.5	---
	10/30/90	4.21	70	<0.5	<0.5	0.7	1.6	---
	01/31/91	4.09	80	<0.5	0.9	<0.5	1.9	---
	04/30/91	3.95	100	5.9	0.7	0.6	2.0	---

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Table 2. Analytic Results for Ground Water, Shell Service Station WIC #204-6001-0109, 29 Wildwood Avenue, Piedmont, California

Well ID	Date Sampled	Depth to Water (ft)	TPH-G	B	E	T	X	Dissolved Oxygen[a]
			<----------parts per billion (µg/L)---------->					
	07/30/91	4.07	<50	<0.5	<0.5	<0.7	<0.5	---
	10/29/91	4.11	<50	<0.5	<0.5	<0.5	<0.5	---
	01/20/92	3.86	<30	0.84	<0.41	<0.3	<0.48	---
	04/14/92	3.66	70	16	3.1	<0.5	2.1	---
	07/21/92	3.92	<50	<0.5	<0.5	<0.5	<0.5	---
	10/02/92	4.45	<50	<0.5	<0.5	<0.5	<0.5	---
	01/20/93	3.74	<50	3.8	0.52	<0.5	<0.5	---
	05/04/93	3.77	680[d]	2.8	<0.5	<0.5	<0.5	900
	07/21/93	4.39	<50	8.0	1.8	1.2	7.9	5,880
	10/19/93	3.92	<50	<0.5	<0.5	<0.5	<0.5	5,700
	01/20/94	4.45	<50	1.5	<0.5	<0.5	<0.5	3,200
	04/12/94	4.72	<50	2.9	<0.5	<0.5	<0.5	11,380
	07/20/94	5.32	<50	<0.5	<0.5	<0.5	<0.5	2,400
	10/06/94	**4.03**	**<50**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**2,900**
MW-3	07/12/89	3.83	3,900	380	99	41	30	---
	01/30/90	3.24	5,500	440	79	35	130	---
	04/27/90	4.02	4,500	310	37	26	110	---
	07/31/90	4.31	3,500	210	8.4	17	62	---
	10/30/90	4.52	2,300	610	<0.5	<0.5	28	---
	01/31/91	4.33	4,100	300	19	20	81	---
	04/30/91	3.79	3,800	370	8.6	19	60	---
	07/30/91	4.37	3,300	160	15	13	87	---
	10/29/91	4.00	1,000	35	2.9	2.8	8.1	---
	01/20/92	3.87	6,900	380	47	18	48	---
	04/14/92	3.15	6,000	480	41	38	55	---
	07/21/92	4.17	3,700	330	30	13	23	---
	10/02/92	4.43	4,200	260	13	10	12	---

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Table 2. Analytic Results for Ground Water, Shell Service Station WIC #204-6001-0109, 29 Wildwood Avenue, Piedmont, California

Well ID	Date Sampled	Depth to Water (ft)	TPH-G	B	E	T	X	Dissolved Oxygen[a]
			<----------parts per billion (µg/L)---------->					
	01/20/93	2.20	4,200	360	32	15	26	---
	01/20/93[dup]	2.20	3,900	370	32	15	26	---
	05/04/93	3.50	12,000	290	120	520	620	630
	07/21/93	4.12	2,000	170	<10	12	11	4,340
	07/21/93[dup]	4.12	2,000	170	<10	10	14	---
	10/19/93	4.20	2,000	240	<0.5	<0.5	<0.5	5,740
	01/20/94	4.08	4,200	280	<10	<10	<10	4,100
	01/20/94[dup]	4.08	3,800	250	<10	<10	<10	4,100
	04/12/94	3.70	4,700	380	<10	<10	<10	10,620
	04/12/94[dup]	3.70	3,400	370	<25	<25	<25	---
	07/20/94	4.26	5,100	320	15	77	34	2,300
	07/20/94[dup]	4.26	4,400	250	13	14	32	---
	10/06/94	**4.31**	**4,300**	**280**	**4.0**	**9.7**	**15**	**2,300**
MW-4	01/31/90	4.50	<50	<0.5	<0.5	<0.5	<0.5	---
	04/27/90	3.62	130[c]	<0.5	<0.5	<0.5	<0.5	---
	07/31/90	4.19	<50	<0.5	<0.5	<0.5	<0.5	---
	10/30/90	4.19	<50	<0.5	<0.5	<0.5	<0.5	---
	01/31/91	4.49	50[c]	<0.5	<0.5	<0.5	<0.5	---
	04/30/91	4.02	<50	<0.5	<0.5	<0.5	<0.5	---
	07/30/91	4.39	<50	<0.5	<0.5	<0.5	<0.5	---
	10/29/91	3.75	<50	<0.5	<0.5	<0.5	<0.5	---
	01/20/92	3.94	<30	<0.3	<0.3	<0.3	<0.3	---
	04/14/92	3.71	<50	<0.5	<0.5	<0.5	<0.5	---
	07/21/92	4.02	<50	<0.5	<0.5	<0.5	<0.5	---
	10/02/92	4.13	<50	<0.5	<0.5	<0.5	<0.5	---
	01/20/93	3.10	<50	<0.5	<0.5	<0.5	<0.5	---
	05/04/93	3.70	<50	<0.5	<0.5	<0.5	<0.5	1,740

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Table 2. Analytic Results for Ground Water, Shell Service Station WIC #204-6001-0109, 29 Wildwood Avenue, Piedmont, California

Well ID	Date Sampled	Depth to Water (ft)	TPH-G	B	E	T	X	Dissolved Oxygen[a]
			<----------parts per billion (µg/L)---------->					
	07/21/93	3.81	<50	0.56	<0.5	<0.5	<0.5	4,510
	10/10/93	3.94	<50	<0.5	<0.5	<0.5	<0.5	5,750
	01/20/94	4.00	<50	0.71	<0.5	<0.5	<0.5	4,400
	04/12/94	4.01	<50	<0.5	<0.5	<0.5	<0.5	7,290
	07/20/94	3.91	160	<0.5	<0.5	<0.5	<0.5	6,400
	10/11/94	**3.99**	**410**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**5,000**
MW-5	01/31/90	7.12	<50	<0.5	<0.5	<0.5	<0.5	---
	04/27/90	4.19	210c	<0.5	<0.5	<0.5	<0.5	---
	07/31/90	4.09	90	<0.5	<0.5	<0.5	<0.5	---
	10/30/90	4.39	100	0.8	0.6	0.7	1.4	---
	01/31/91	4.49	80c	<0.5	<0.5	<0.5	<0.5	---
	04/30/91	4.27	90	<0.5	<0.5	<0.5	<0.5	---
	07/30/91	4.37	90	<0.5	<0.5	<0.5	<0.5	---
	10/29/91	3.79	<50	<0.5	<0.5	<0.5	<0.5	---
	01/20/92	4.09	<30	<0.3	<0.3	<0.3	<0.3	---
	04/14/92	4.12	<50c	<0.5	<0.5	<0.5	<0.5	---
	07/21/92	4.13	74c	<0.5	<0.5	<0.5	<0.5	---
	10/02/92	4.30	76c	<0.5	<0.5	<0.5	<0.5	---
	01/20/93	3.12	72c	<0.5	<0.5	<0.5	<0.5	---
	05/04/93	4.07	70c	<0.5	<0.5	<0.5	<0.5	1,620
	05/04/93[dup]	4.07	80c	<0.5	<0.5	<0.5	<0.5	---
	07/21/93	4.05	<50	<0.5	<0.5	<0.5	<0.5	3,460
	10/19/93	4.20	51	<0.5	<0.5	<0.5	<0.5	3,820
	01/20/94	4.40	90	<0.5	<0.5	<0.5	<0.5	4,200
	04/12/94	4.18	67	<0.5	<0.5	<0.5	<0.5	---
	07/20/94	4.06	<50	<0.5	<0.5	<0.5	<0.5	3,200
	10/06/94	**4.01**	80	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**2,100**

-- Table 2 continues on next page --

Table 2. Analytic Results for Ground Water, Shell Service Station WIC #204-6001-0109, 29 Wildwood Avenue, Piedmont, California

Well ID	Date Sampled	Depth to Water (ft)	TPH-G	B	E	T	X	Dissolved Oxygen[a]
			<----------parts per billion (µg/L)---------->					
	10/06/94[dup]	**4.01**	**60**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**---**
E-4	07/12/89	d	<50	<0.5	<1	<1	<3	---
	01/31/90	d	<50	<0.5	<0.5	<0.5	<0.5	---
	04/27/90	d	120[c]	<0.5	<0.5	<0.5	<0.5	---
	07/31/90	d	<50	<0.5	<0.5	<0.5	<0.5	---
	10/30/90	d	<50	<0.5	<0.5	<0.5	<0.5	---
	01/31/91	d	<50	<0.5	<0.5	<0.5	<0.5	---
	04/30/91	d	<50	<0.5	<0.5	<0.5	<0.5	---
	07/30/91	d	<50	<0.5	<0.5	0.6	<0.5	---
	10/29/91	d	<50	<0.5	<0.5	<0.5	<0.5	---
	01/20/92	d	<30	<0.3	<0.3	<0.3	<0.3	---
	04/14/92	d	<50	<0.5	<0.5	<0.5	<0.5	---
	07/21/92	d	<50	<0.5	<0.5	<0.5	<0.5	---
	10/02/92	d	<50	<0.5	<0.5	<0.5	<0.5	---
	01/20/93	d	<50	<0.5	<0.5	<0.5	<0.5	---
	05/04/93	d	<50	<0.5	<0.5	<0.5	<0.5	630
	07/21/93	d	<50	5.4	1.0	0.72	4.4	5,440
	10/19/93	d	<50	<0.5	<0.5	<0.5	<0.5	5,630
	01/20/94	d	<50	<0.5	<0.5	<0.5	<0.5	---
	04/12/94	d	<50	<0.5	<0.5	<0.5	<0.5	9,410
	07/20/94	d	<50	<0.5	<0.5	<0.5	<0.5	2,000
	10/06/94	**d**	**<50**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**1,300**
Trip Blank	07/12/89		<50	<0.5	<1	<1	<3	---
	01/31/90		<50	<0.5	<.5	<0.5	<0.5	---
	04/27/90		<50	<0.5	<0.5	<0.5	<0.5	---
	07/31/90		<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 #204-6001-0109, 29 Wildwood Avenue, Piedmont, California

Well ID	Date Sampled	Depth to Water (ft)	TPH-G	B	E	T	X	Dissolved Oxygen[a]
			<----------parts per billion (µg/L)---------->					
	10/30/90		<50	<0.5	<0.5	<0.5	<0.5	---
	01/31/91		<50	<0.5	<0.5	<0.5	<0.5	---
	04/30/91		<50	<0.5	<0.5	<0.5	<0.5	---
	07/30/91		<50	<0.5	<0.5	<0.5	<0.5	---
	10/29/91		<50	<0.5	<0.5	<0.5	<0.5	---
	10/02/92		<50	<0.5	<0.5	<0.5	<0.5	---
	01/20/93		<50	<0.5	<0.5	<0.5	<0.5	---
	05/03/93		<50	<0.5	<0.5	<0.5	<0.5	---
	07/21/93		<50	<0.5	<0.5	<0.5	<0.5	---
	10/19/93		<50	<0.5	<0.5	<0.5	<0.5	---
	01/20/94		<50	<0.5	<0.5	<0.5	<0.5	---
	04/12/94		<50	<0.5	<0.5	0.71	<0.5	---
	07/20/94		<50	<0.5	<0.5	<0.5	<0.5	---
	10/06/94		**<50**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**---**
Bailer Blank	04/27/90		110[e]	<0.5	<0.5	<0.5	<0.5	---
	01/31/91		<5	<0.5	<0.5	<0.5	<0.5	---
	10/02/92		ND	ND	ND	ND	ND	---
DTSC MCLs			NE	1	680	100[f]	1,750	NA

-- Table 2 continues on next page --

Table 2. Analytic Results for Ground Water, Shell Service Station WIC #204-6001-0109, 29 Wildwood Avenue, Piedmont, California

Abbreviations:

TPH-G	=	Total Petroleum Hydrocarbons as Gasoline by Modified EPA Method 8015
B	=	Benzene by EPA Method 602 or 8020
E	=	Ethylbenzene by EPA Method 602 or 8020
T	=	Toluene by EPA Method 602 or 8020
X	=	Xylenes by EPA Method 602 or 8020
HVOCs	=	Halogenated volatile organic compounds by EPA Method 601 or 624
---	=	Not analyzed
NE	=	Not established
DTSC MCLs	=	California Department of Toxic Substances Control Maximum Contaminant Levels for drinking water
<n	=	Not detected above detection limit of n ppb

Notes:

a	=	Field measurement of dissolved oxygen concentration (ppb)
b	=	Well inaccessible, not sampled
c	=	Chromatogram contained discrete peaks; not representative of gasoline
d	=	Artesian well; potentiometric surface above top-of-casing elevation
e	=	Researched on later date due to inaccessibility from parked car
f	=	DTSC recommended action level for drinking water; MCL not established.

Table 3. Recommended Sampling Frequencies for Ground Water Monitoring Wells - Shell Service Station WIC #204-0463-104, 29 Piedmont Ave, Piedmont, California

Well	Current Sampling Frequency	Recommended Sampling Frequency	Rationale for Recommended Sampling Frequency
MW-1	Quarterly	Annual 1st Quarter	Upgradient well; no hydrocarbon concentrations for at least ten consecutive quarters.
MW-2	Quarterly	Semi-Annual 1st & 3rd Quarters	Source area well; no hydrocarbons or low hydrocarbon concentrations for at least six quarters.
MW-3	Quarterly	Semi-Annual 1st & 3rd Quarters	Source area well; stable hydrocarbon concentrations for at least six quarters.
MW-4	Quarterly	Semi-Annual 1st & 3rd Quarters	Down gradient well; no hydrocarbons or low hydrocarbon concentrations for at least six quarters.
MW-5	Quarterly	Semi-Annual 1st & 3rd Quarters	Down gradient well; no hydrocarbons or low hydrocarbon concentrations for at least six quarters.
E-4	Quarterly	Discontinue 1st	Well completed in deeper water bearing zone with significant upward gradient as observed by flowing artesian conditions; based on these hydrogeologic conditions, it is not expected to be impacted by the site; no hydrocarbon concentrations for at least five quarters.

ATTACHMENT A

BLAINE TECH'S GROUND WATER MONITORING REPORT

BLAINE
TECH SERVICES INC.

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

October 26, 1994

Shell Oil Company
P.O. Box 4023
Concord, CA 94524

Attn: Daniel T. Kirk

SITE:
Shell WIC #204-6001-0109
29 Wildwood Avenue
Piedmont, California

QUARTER:
4th quarter of 1994

QUARTERLY GROUNDWATER SAMPLING REPORT 941006-F-2

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 REMOVE 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 pre-frozen 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 National Environmental Testing, Inc. in Santa Rosa, California. NET is a California Department of Health Services certified Hazardous Materials Testing Laboratory and is listed as DOHS HMTL #178.

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 guauging 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	10/6/94	TOC	--	NONE	--	--	4.30	13.14
MW-2	10/6/94	TOC	--	NONE	--	--	4.03	11.50
MW-3	10/6/94	TOC	ODOR	NONE	--	--	4.31	9.01
MW-4	10/6/94	TOC	--	NONE	--	--	3.99	12.65
MW-5 *	10/6/94	TOC	--	NONE	--	--	4.01	15.95
E-4	10/6/94	TOC	--	NONE	--	--	0.00	34.08

* Sample DUP was a duplicate sample taken from well MW-5.

3101

SHELL OIL COMPANY
RETAIL ENVIRONMENTAL ENGINEERING - WEST

CHAIN OF CUSTODY RECORD
Serial No: 941006-F2

Date:
Page 1 of 1

Site Address: 29 Wildwood Avenue, Piedmont

WIC#: 204-6001-0109

Shell Engineer: Dan Kirk — Phone No.: (510) 675-6168 Fax #: 675-6160

Consultant Name & Address: Blaine Tech Services, Inc. 985 Timothy Drive San Jose, CA 95133

Consultant Contact: Jim Keller — Phone No.: (408) 995-5535 Fax #: 293-8773

Comments:

Sampled by: [signature]

Printed Name: Tom Flory

LAB: NET

CHECK ONE (1) BOX ONLY / CT/DT:
- Quarterly Monitoring [X] 5461
- Site Investigation [ ] 5441
- Soil Classify/Disposal [ ] 5442
- Water Classify/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 [X] (Normal)
- Other [ ]

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

Analysis Required

Sample ID	Time	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 (40 ml VOA)	Preparation Used (HCl)	Composite Y/N	Material Description	Sample Condition/Comments
MW-1	1350	10/6/94			X		3						X				X	X			
MW-2	1408	↓			↓		↓						X				X	X			
MW-3	1531												X				X	X			
MW-5	1511												X				X	X			
E-4	1425												X				X	X			CUSTODY SEALED 10/7/94 [signature] seals intact
DUP	—												X				X	X			
EB	1410												X				X	X			
TB							2						X				X	X			

Relinquished By (signature)	Printed Name	Date/Time	Received (signature)	Printed Name	Date/Time
[signature]	Tom Flory	Date: 10/7/94 Time: 1100	[signature]	G PLUMBRE	Date: 10/7 Time: 11:00
[signature]	G PLUMBRE	Date: 10/7 Time: 17:00	A Lope via NCS	Andy Lope	Date: 10/9/94 Time: 09:30
		Date: Time:			Date: Time:

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

NATIONAL ENVIRONMENTAL TESTING, INC.

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

Jim Keller
Blaine Tech Services
985 Timothy Dr.
San Jose, CA 95133

Date: 10/19/1994
NET Client Acct. No: 1821
NET Pacific Job No: 94.04748
Received: 10/08/1994

Client Reference Information

SHELL, 29 Wildwood Avenue, Piedmont, Job No. 941006-F2

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, 29 Wildwood Avenue, Piedmont, Job No. 941006-F2

SAMPLE DESCRIPTION: MW-1
Date Taken: 10/06/1994
Time Taken: 13:50
NET Sample No: 219280

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed
TPH (Gas/BTXE,Liquid)							
METHOD 5030/M8015	--						10/14/1994
DILUTION FACTOR*	1						10/14/1994
as Gasoline	ND		50	ug/L	5030		10/14/1994
Carbon Range:	--						10/14/1994
METHOD 8020 (GC,Liquid)	--						10/14/1994
Benzene	ND		0.5	ug/L	8020		10/14/1994
Toluene	ND		0.5	ug/L	8020		10/14/1994
Ethylbenzene	ND		0.5	ug/L	8020		10/14/1994
Xylenes (Total)	ND		0.5	ug/L	8020		10/14/1994
SURROGATE RESULTS	--						10/14/1994
Bromofluorobenzene (SURR)	101			% Rec.	5030		10/14/1994

Ref: SHELL, 29 Wildwood Avenue, Piedmont, Job No. 941006-F2

SAMPLE DESCRIPTION: MW-2
Date Taken: 10/06/1994
Time Taken: 14:08
NET Sample No: 219281

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed
TPH (Gas/BTXE,Liquid)							
METHOD 5030/M8015	--						10/14/1994
DILUTION FACTOR*	1						10/14/1994
as Gasoline	ND		50	ug/L	5030		10/14/1994
Carbon Range:	--						10/14/1994
METHOD 8020 (GC,Liquid)	--						10/14/1994
Benzene	ND		0.5	ug/L	8020		10/14/1994
Toluene	ND		0.5	ug/L	8020		10/14/1994
Ethylbenzene	ND		0.5	ug/L	8020		10/14/1994
Xylenes (Total)	ND		0.5	ug/L	8020		10/14/1994
SURROGATE RESULTS	--						10/14/1994
Bromofluorobenzene (SURR)	105			% Rec.	5030		10/14/1994

Ref: SHELL, 29 Wildwood Avenue, Piedmont, Job No. 941006-F2

SAMPLE DESCRIPTION: MW-3
Date Taken: 10/06/1994
Time Taken: 15:31
NET Sample No: 219282

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed
TPH (Gas/BTXE,Liquid)							
METHOD 5030/M8015	--						10/14/1994
DILUTION FACTOR*	1						10/15/1994
as Gasoline	4,300	FC	50	ug/L	5030		10/14/1994
Carbon Range:	C5-C14						10/14/1994
METHOD 8020 (GC,Liquid)	--						10/14/1994
Benzene	280	FC	0.5	ug/L	8020		10/14/1994
Toluene	9.7		0.5	ug/L	8020		10/15/1994
Ethylbenzene	4.0		0.5	ug/L	8020		10/15/1994
Xylenes (Total)	15		0.5	ug/L	8020		10/15/1994
SURROGATE RESULTS	--						10/14/1994
Bromofluorobenzene (SURR)	102			% Rec.	5030		10/14/1994

FC : Compound quantitated at a 10X dilution factor.

Ref: SHELL, 29 Wildwood Avenue, Piedmont, Job No. 941006-F2

SAMPLE DESCRIPTION: MW-5
Date Taken: 10/06/1994
Time Taken: 15:11
NET Sample No: 219283

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed
TPH (Gas/BTXE,Liquid)							
METHOD 5030/M8015	--						10/14/1994
DILUTION FACTOR*	1						10/14/1994
as Gasoline	80		50	ug/L	5030		10/14/1994
Carbon Range:	C5-C14						10/14/1994
METHOD 8020 (GC,Liquid)	--						10/14/1994
Benzene	ND		0.5	ug/L	8020		10/14/1994
Toluene	ND		0.5	ug/L	8020		10/14/1994
Ethylbenzene	ND		0.5	ug/L	8020		10/14/1994
Xylenes (Total)	ND		0.5	ug/L	8020		10/14/1994
SURROGATE RESULTS	--						10/14/1994
Bromofluorobenzene (SURR)	104			% Rec.	5030		10/14/1994

Ref: SHELL, 29 Wildwood Avenue, Piedmont, Job No. 941006-F2

SAMPLE DESCRIPTION: E-4
Date Taken: 10/06/1994
Time Taken: 14:25
NET Sample No: 219284

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed
TPH (Gas/BTXE,Liquid)							
METHOD 5030/M8015	--						10/14/1994
DILUTION FACTOR*	1						10/14/1994
as Gasoline	ND		50	ug/L	5030		10/14/1994
Carbon Range:	--						10/14/1994
METHOD 8020 (GC,Liquid)	--						10/14/1994
Benzene	ND		0.5	ug/L	8020		10/14/1994
Toluene	ND		0.5	ug/L	8020		10/14/1994
Ethylbenzene	ND		0.5	ug/L	8020		10/14/1994
Xylenes (Total)	ND		0.5	ug/L	8020		10/14/1994
SURROGATE RESULTS	--						10/14/1994
Bromofluorobenzene (SURR)	100			% Rec.	5030		10/14/1994

Ref: SHELL, 29 Wildwood Avenue, Piedmont, Job No. 941006-F2

SAMPLE DESCRIPTION: DUP
Date Taken: 10/06/1994
Time Taken:
NET Sample No: 219285

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed
TPH (Gas/BTXE,Liquid)							
METHOD 5030/M8015	--						10/14/1994
DILUTION FACTOR*	1						10/14/1994
as Gasoline	60		50	ug/L	5030		10/14/1994
Carbon Range:	C5-C14						10/14/1994
METHOD 8020 (GC,Liquid)	--						10/14/1994
Benzene	ND		0.5	ug/L	8020		10/14/1994
Toluene	ND		0.5	ug/L	8020		10/14/1994
Ethylbenzene	ND		0.5	ug/L	8020		10/14/1994
Xylenes (Total)	ND		0.5	ug/L	8020		10/14/1994
SURROGATE RESULTS	--						10/14/1994
Bromofluorobenzene (SURR)	100			% Rec.	5030		10/14/1994

Ref: SHELL, 29 Wildwood Avenue, Piedmont, Job No. 941006-F2

SAMPLE DESCRIPTION: EB
Date Taken: 10/06/1994
Time Taken: 14:10
NET Sample No: 219286

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed
TPH (Gas/BTXE,Liquid)							
METHOD 5030/M8015	--						10/14/1994
DILUTION FACTOR*	1						10/14/1994
as Gasoline	ND		50	ug/L	5030		10/14/1994
Carbon Range:	--						10/14/1994
METHOD 8020 (GC,Liquid)	--						10/14/1994
Benzene	ND		0.5	ug/L	8020		10/14/1994
Toluene	ND		0.5	ug/L	8020		10/14/1994
Ethylbenzene	ND		0.5	ug/L	8020		10/14/1994
Xylenes (Total)	ND		0.5	ug/L	8020		10/14/1994
SURROGATE RESULTS	--						10/14/1994
Bromofluorobenzene (SURR)	98			% Rec.	5030		10/14/1994

Ref: SHELL, 29 Wildwood Avenue, Piedmont, Job No. 941006-F2

SAMPLE DESCRIPTION: TB
Date Taken: 10/06/1994
Time Taken:
NET Sample No: 219287

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed
TPH (Gas/BTXE,Liquid)							
METHOD 5030/M8015	--						10/14/1994
DILUTION FACTOR*	1						10/14/1994
as Gasoline	ND		50	ug/L	5030		10/14/1994
Carbon Range:	--						10/14/1994
METHOD 8020 (GC,Liquid)	--						10/14/1994
Benzene	ND		0.5	ug/L	8020		10/14/1994
Toluene	ND		0.5	ug/L	8020		10/14/1994
Ethylbenzene	ND		0.5	ug/L	8020		10/14/1994
Xylenes (Total)	ND		0.5	ug/L	8020		10/14/1994
SURROGATE RESULTS	--						10/14/1994
Bromofluorobenzene (SURR)	105			% Rec.	5030		10/14/1994

Ref: SHELL, 29 Wildwood Avenue, Piedmont, Job No. 941006-F2

CONTINUING CALIBRATION VERIFICATION STANDARD REPORT

Parameter	CCV Standard % Recovery	CCV Standard Amount Found	CCV Standard Amount Expected	Units	Date Analyzed	Analyst Initials
TPH (Gas/BTXE,Liquid)						
as Gasoline	99.0	0.99	1.00	mg/L	10/14/1994	lss
Benzene	105.6	5.28	5.00	ug/L	10/14/1994	lss
Toluene	97.6	4.88	5.00	ug/L	10/14/1994	lss
Ethylbenzene	91.6	4.58	5.00	ug/L	10/14/1994	lss
Xylenes (Total)	91.3	13.7	15.0	ug/L	10/14/1994	lss
Bromofluorobenzene (SURR)	98.0	98	100	% Rec.	10/14/1994	lss
TPH (Gas/BTXE,Liquid)						
as Gasoline	112.0	1.12	1.00	mg/L	10/15/1994	lss
Benzene	100.8	5.04	5.00	ug/L	10/15/1994	lss
Toluene	86.4	4.32	5.00	ug/L	10/15/1994	lss
Ethylbenzene	85.8	4.29	5.00	ug/L	10/15/1994	lss
Xylenes (Total)	85.3	12.8	15.0	ug/L	10/15/1994	lss
Bromofluorobenzene (SURR)	101.0	101	100	% Rec.	10/15/1994	lss

Ref: SHELL, 29 Wildwood Avenue, Piedmont, Job No. 941006-F2

METHOD BLANK REPORT

Parameter	Method Blank Amount Found	Reporting Limit	Units	Date Analyzed	Analyst Initials
TPH (Gas/BTXE,Liquid)					
as Gasoline	ND	0.05	mg/L	10/14/1994	lss
Benzene	ND	0.5	ug/L	10/14/1994	lss
Toluene	ND	0.5	ug/L	10/14/1994	lss
Ethylbenzene	ND	0.5	ug/L	10/14/1994	lss
Xylenes (Total)	ND	0.5	ug/L	10/14/1994	lss
Bromofluorobenzene (SURR)	103		% Rec.	10/14/1994	lss
TPH (Gas/BTXE,Liquid)					
as Gasoline	ND	0.05	mg/L	10/15/1994	lss
Benzene	ND	0.5	ug/L	10/15/1994	lss
Toluene	ND	0.5	ug/L	10/15/1994	lss
Ethylbenzene	ND	0.5	ug/L	10/15/1994	lss
Xylenes (Total)	ND	0.5	ug/L	10/15/1994	lss
Bromofluorobenzene (SURR)	96		% Rec.	10/15/1994	lss

Ref: SHELL, 29 Wildwood Avenue, Piedmont, Job No. 941006-F2

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
TPH (Gas/BTXE,Liquid)										
as Gasoline	113.0	107.0	5.5	1.00	ND	1.13	1.07	mg/L	10/14/1994	lss
Benzene	114.0	116.0	2.0	26.3	ND	30.0	30.6	ug/L	10/14/1994	lss
Toluene	107.0	106.0	0.6	83.1	ND	88.6	88.1	ug/L	10/14/1994	lss
TPH (Gas/BTXE,Liquid)										
as Gasoline	115.0	113.0	1.8	1.00	ND	1.15	1.13	mg/L	10/15/1994	lss
Benzene	98.7	96.8	1.9	31.0	ND	30.6	30.0	ug/L	10/15/1994	lss
Toluene	101.6	100.2	1.4	89.0	ND	90.4	89.2	ug/L	10/15/1994	lss

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: Shell, 29 Wildwood Ave, Piedmont Log No: 3101
Cooler received on: 10/8/94 and checked on 10/8/94 by A Lopez
A Lopez
(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 -0.7°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
Note which voas (if any) had bubbles:*

Sample descriptor:	Number of vials:
MW-3	1 of 3

*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)

SHELL OIL COMPANY
RETAIL ENVIRONMENTAL ENGINEERING - WEST

CHAIN OF CUSTODY RECORD 3165
Serial No: 9410 11 J 2

Date: 10/11/94
Page 1 of 1

Site Address: 29 Wildwood Avenue, Piedmont

WIC#: 204-6001-0109

Shell Engineer: Dan Kirk
Phone No.: (510) 675-6168
Fax #: 675-6160

Consultant Name & Address: Blaine Tech Services, Inc. 985 Timothy Drive San Jose, CA 95133

Consultant Contact: Jim Keller
Phone No.: (408) 995-5535
Fax #: 293-8773

Comments:

Sampled by:

Printed Name: JEAN GATINEAU

LAB: NET

CHECK ONE (1) BOX ONLY	CT/DT
Quarterly Monitoring [X]	5461
Site Investigation [ ]	5441
Soil Classify/Disposal [ ]	5442
Water Classify/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 [ ]
16 days [X] (Normal)
Other [ ] ____

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

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
MW-4	10/11			X		3						X								
																				10/12/94 seals intact

Relinquished By (signature):	Printed Name:	Date/Time:	Received (signature):	Printed Name:	Date/Time:
[signature]	JEAN GATINEAU	Date: 10/12 Time: 9:30	[signature]	G P Lumbre	Date: 10/12 Time: 9:30
[signature]	G P Lumbre	Date: 10/12 Time: 16:00	A Lope via NCS	Anny Lope	Date: 10/13/94 Time: 08:10
		Date: Time:			Date: Time:

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

NATIONAL ENVIRONMENTAL TESTING, INC.

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

Jim Keller
Blaine Tech Services
985 Timothy Dr.
San Jose, CA 95133

Date: 10/20/1994
NET Client Acct. No: 1821
NET Pacific Job No: 94.04815
Received: 10/13/1994

Client Reference Information

SHELL, 29 Wildwood Avenue, Piedmont, Job No. 941011-J2

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, 29 Wildwood Avenue, Piedmont, Job No. 941011-J2

SAMPLE DESCRIPTION: MW-4
Date Taken: 10/11/1994
Time Taken:
NET Sample No: 219508

Parameter	Results	Flags	Reporting Limit	Units	Method	Date Extracted	Date Analyzed
TPH (Gas/BTXE,Liquid)							
METHOD 5030/M8015	--						10/17/1994
DILUTION FACTOR*	1						10/17/1994
as Gasoline	410	G-	50	ug/L	5030		10/17/1994
Carbon Range:	C5-C10						10/17/1994
METHOD 8020 (GC,Liquid)	--						10/17/1994
Benzene	ND		0.5	ug/L	8020		10/17/1994
Toluene	ND		0.5	ug/L	8020		10/17/1994
Ethylbenzene	ND		0.5	ug/L	8020		10/17/1994
Xylenes (Total)	ND		0.5	ug/L	8020		10/17/1994
SURROGATE RESULTS	--						10/17/1994
Bromofluorobenzene (SURR)	98			% Rec.	5030		10/17/1994

G- : The positive result has an atypical pattern for Gasoline analysis.

Ref: SHELL, 29 Wildwood Avenue, Piedmont, Job No. 941011-J2

CONTINUING CALIBRATION VERIFICATION STANDARD REPORT

Parameter	CCV Standard % Recovery	CCV Standard Amount Found	CCV Standard Amount Expected	Units	Date Analyzed	Analyst Initials
TPH (Gas/BTXE,Liquid)						
as Gasoline	98.0	0.98	1.00	mg/L	10/17/1994	dfw
Benzene	108.0	5.40	5.00	ug/L	10/17/1994	dfw
Toluene	110.8	5.54	5.00	ug/L	10/17/1994	dfw
Ethylbenzene	111.4	5.57	5.00	ug/L	10/17/1994	dfw
Xylenes (Total)	102.7	15.41	15.0	ug/L	10/17/1994	dfw
Bromofluorobenzene (SURR)	99.0	99	100	% Rec.	10/17/1994	dfw

Ref: SHELL, 29 Wildwood Avenue, Piedmont, Job No. 941011-J2

METHOD BLANK REPORT

Parameter	Method Blank Amount Found	Reporting Limit	Units	Date Analyzed	Analyst Initials
TPH (Gas/BTXE,Liquid)					
as Gasoline	ND	0.05	mg/L	10/17/1994	dfw
Benzene	ND	0.5	ug/L	10/17/1994	dfw
Toluene	ND	0.5	ug/L	10/17/1994	dfw
Ethylbenzene	ND	0.5	ug/L	10/17/1994	dfw
Xylenes (Total)	ND	0.5	ug/L	10/17/1994	dfw
Bromofluorobenzene (SURR)	101		% Rec.	10/17/1994	dfw

Ref: SHELL, 29 Wildwood Avenue, Piedmont, Job No. 941011-J2

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
TPH (Gas/BTXE,Liquid)										
as Gasoline	94.0	96.0	2.1	1.00	ND	0.94	0.96	mg/L	10/17/1994	dfw
Benzene	82.2	85.5	3.9	35.9	ND	29.5	30.7	ug/L	10/17/1994	dfw
Toluene	94.5	95.5	1.1	110	ND	104	105	ug/L	10/17/1994	dfw

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: Shell, 29 Wildwood Ave. Piedmont Log No: 3165
Cooler received on: 10/13/94 and checked on 10/13/94 by A-Lopez
A-Lopez
(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 0.7°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
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)

ATTACHMENT B

SAMPLING FREQUENCY MODIFICATIONS

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

Sampling frequency modifications may be modified either uniformly across a site, based on how site-specific data satisfies our site criteria, or by each individual well, based on how data from each well satisfies our well criteria. The criteria are presented below.

---

[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

Site Criteria

The following technical site criteria are assessed to determine if site-wide sampling frequency modifications are appropriate:

- Reliability of previous ground water analytic data from all site wells;
- Spatial definition of the contaminant plume and the extent to which natural or engineered processes have controlled contaminant migration; and
- The magnitude of contaminant concentrations in ground water from all the site wells.

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 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 historical analytic results allowing a reliable assessment of the representative hydrocarbon concentrations in the ground water.

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.

Plume Definition and Migration Control

The extent of contaminants in the subsurface must be assessed and migration control of these contaminants must be attained before site-wide sampling frequency modifications can be justified. A number of natural and engineered phenomena may control the migration of contaminants in the subsurface:

- Soils with low permeabilities;
- Natural or enhanced contaminant biodegradation; and
- Remedial measures such as ground water extraction and subsurface containment walls.

If the plume is sufficiently assessed and controlled, we recommend annual sampling for all site wells, preferably in the winter or spring months when water levels are typically high and therefore dissolved contaminant concentrations may be at their maximum.

Overall Dissolved Contaminant Concentrations

If dissolved contaminant concentrations for all site wells have consistently been near or below California Department of Toxic Substances Control (DTSC) maximum contaminant levels (MCLs) for drinking water, then there probably is no significant risk to ground water quality. Therefore, we recommend annual sampling in the winter or spring for all site wells until any detectable contaminants biodegrade to concentrations acceptable for regulatory case closure.

Well Criteria

The generalized criteria we have developed for determining the sampling frequency for a given well include:

- The reliability of the ground water analytic data;
- The trend of the dissolved contaminant concentrations in samples from the well; and
- The location of the well in relation to the contaminant source.

These criteria are discussed below, expect for the reliability of the ground water analytic data, which was discussed previously.

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, DTSC 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 contaminants in ground water. These wells generally fall into one of four classifications relative to the contaminant source:

1) Clean upgradient and crossgradient wells;

2) Source-area wells with high contaminant concentrations;

3) Intermediate wells with low to high contaminant 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 the effectiveness of natural biodegradation and/or site remediation. To ensure that increasing source area concentration trends are detected, WA recommends sampling these wells semiannually.

3) Intermediate wells are used to track dissolved hydrocarbon concentrations and the rates of natural biodegradation or the effectiveness of site remediation. However, because the number of intermediate wells and their proximity to other wells may determine the usefulness of data from these wells, WA will recommend sampling frequencies for these wells on a case by case basis.

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. If a downgradient well is not clean, we will assess the appropriate sampling frequency on a case by case basis.

Other Considerations

Several other factors may influence our sampling frequency recommendations:

- Wells located near each other often produce redundant data and therefore we may recommend staggering samplings among these wells or ceasing sampling from some wells altogether.

- Large fluctuations in ground water depths or an inconsistent ground water flow gradient or direction may not allow us to confidently predict contaminant concentration trends. Therefore, quarterly sampling may be necessary.

- Upgradient and/or crossgradient wells may contain detectable contaminant concentrations. These wells should be sampled semiannually to assess if an offsite source is contributing contaminants to the site.

A decision flow chart graphically presenting the recommended sampling frequency based on these criteria is included. 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 site-wide sampling modifications for sites with reliable ground water analytic data from all ground water monitoring wells and that have:

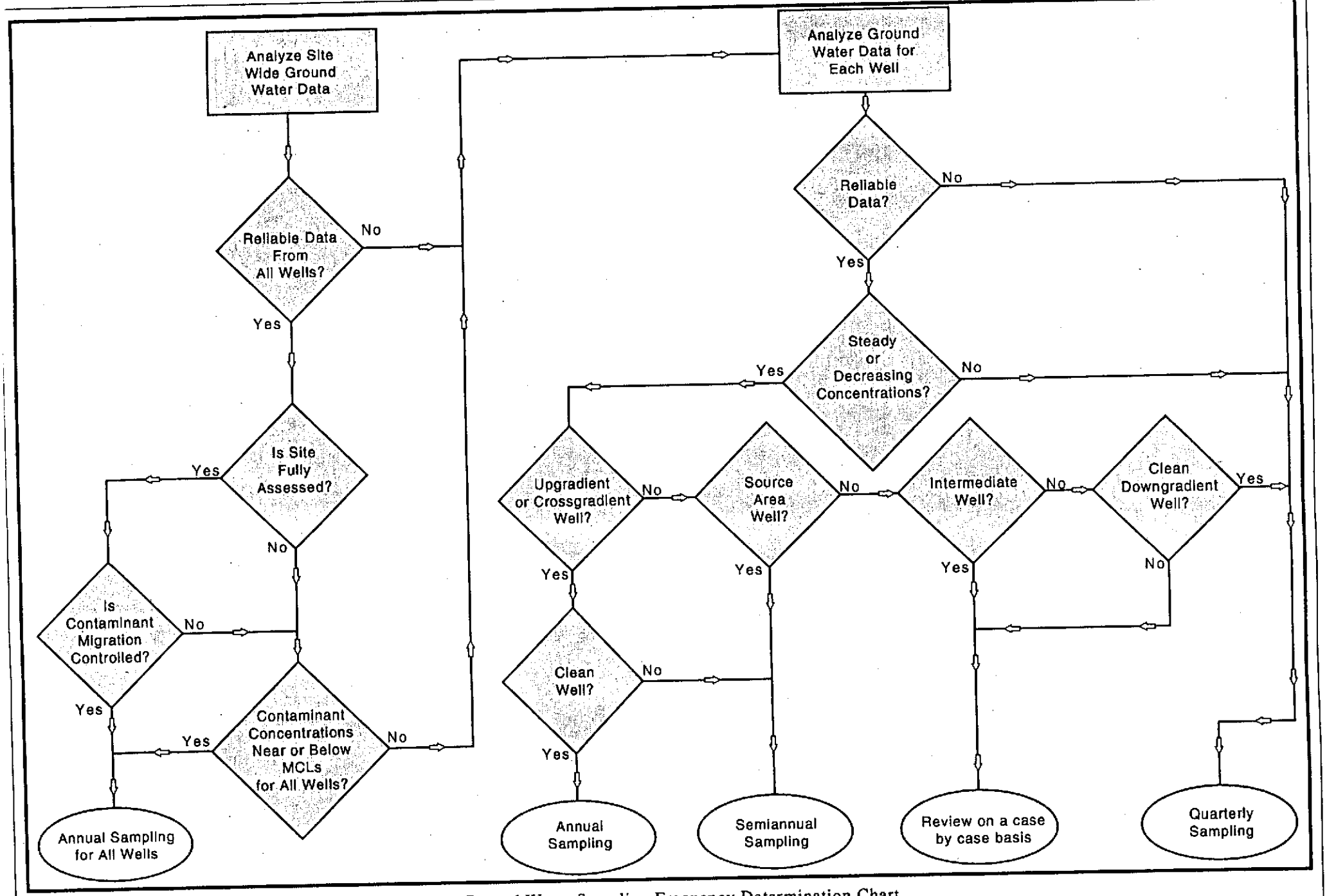
- Fully defined plumes and contaminant migration control; or
- Contaminant concentrations near or below DTSC MCLs in all site wells.

Sampling frequency modifications are appropriate for an individual site well if:

- Ground water analytic data from the well is reliable;
- Data from the well shows that contaminant concentrations in ground water from the well are stable and decreasing.

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,



Ground Water Sampling Frequency Determination Chart

Flwcht01.ai

- Semiannually for upgradient and crossgradient wells containing hydrocarbons or other contaminants from an offsite, upgradient source,
- Semiannually for high concentration source-area wells,
- On a case by case basis for intermediate wells, and
- Quarterly for clean downgradient wells.