



March 18, 1994

Jennifer Eberle  
Alameda County Department  
of Environmental Health  
Hazardous Materials Division  
80 Swan Way, Room 200  
Oakland, CA 94621-1426

1107

Re: ACDEH STID #1107  
Shell Service Station  
WIC #204-6001-0109  
29 Wildwood Avenue  
Piedmont, California  
WA Job #81-463-104

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 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) 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 biodegradation. BTS will continue to be measure dissolved oxygen concentrations.

Anticipated Second Quarter 1994 Activities:

94 MAR 23 PM 1:59

- WA will submit a report presenting the results of ~~second quarter~~ second quarter 1994 ground water sampling and ground water depth measurements. The report will include tabulated ground

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water elevation and analytic data, dissolved oxygen concentrations and a ground water elevation contour map.

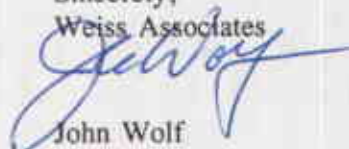
### Conclusions and Recommendations

The dissolved oxygen concentrations appear adequate for biochemical oxidation. According to Barker et al,<sup>1</sup> approximately 20  $\mu\text{g}$  of dissolved oxygen are required for complete biochemical oxidization of 1  $\mu\text{g}$  BETX in naturally occurring ground water. Based on the 3,200 to 4,400  $\mu\text{g}/\ell$  dissolved oxygen measured in ground water beneath the site, biochemical oxidation of about 150 to 220  $\mu\text{g}/\ell$  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.**

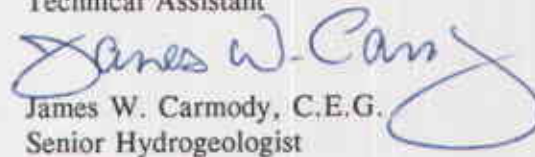
Please call if you have any questions.



Sincerely,  
Weiss Associates



John Wolf  
Technical Assistant



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

JAW/JWC:jaw

J:\SHELL\450\QMRPTS\463QMFE4.WP

Attachments: A - BTS' Ground Water Monitoring Report

cc: Dan Kirk, Shell Oil Company, P.O. Box 5278, Concord, California 94520-9998  
John Jang, Regional Water Quality Control Board - San Francisco Bay, 2101  
Webster Street, Suite 500, Oakland, California 94612

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

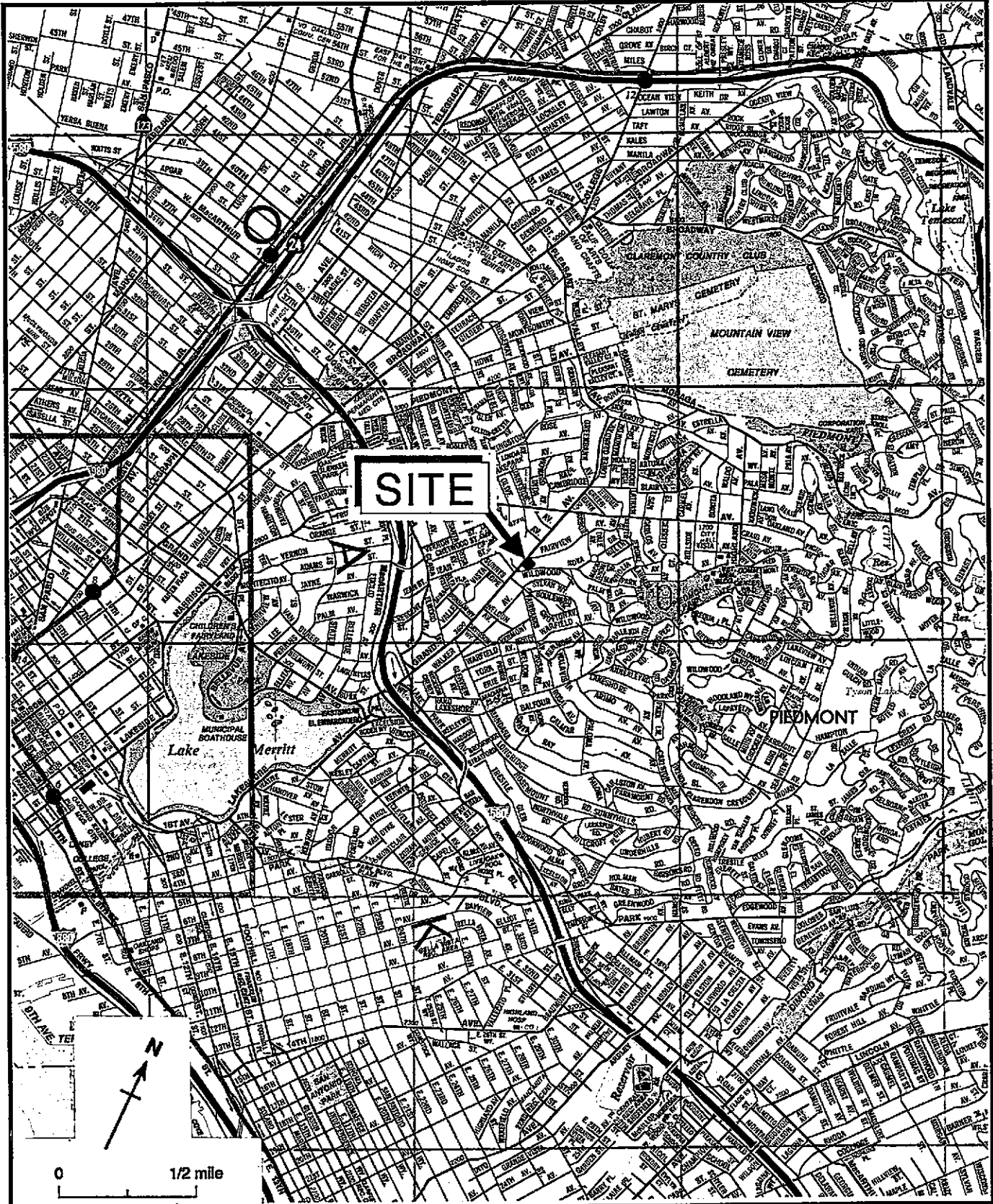


Figure 1. Site Location Map - Shell Service Station WIC #204-6001-0109, 29 Wildwood Avenue, Piedmont, California

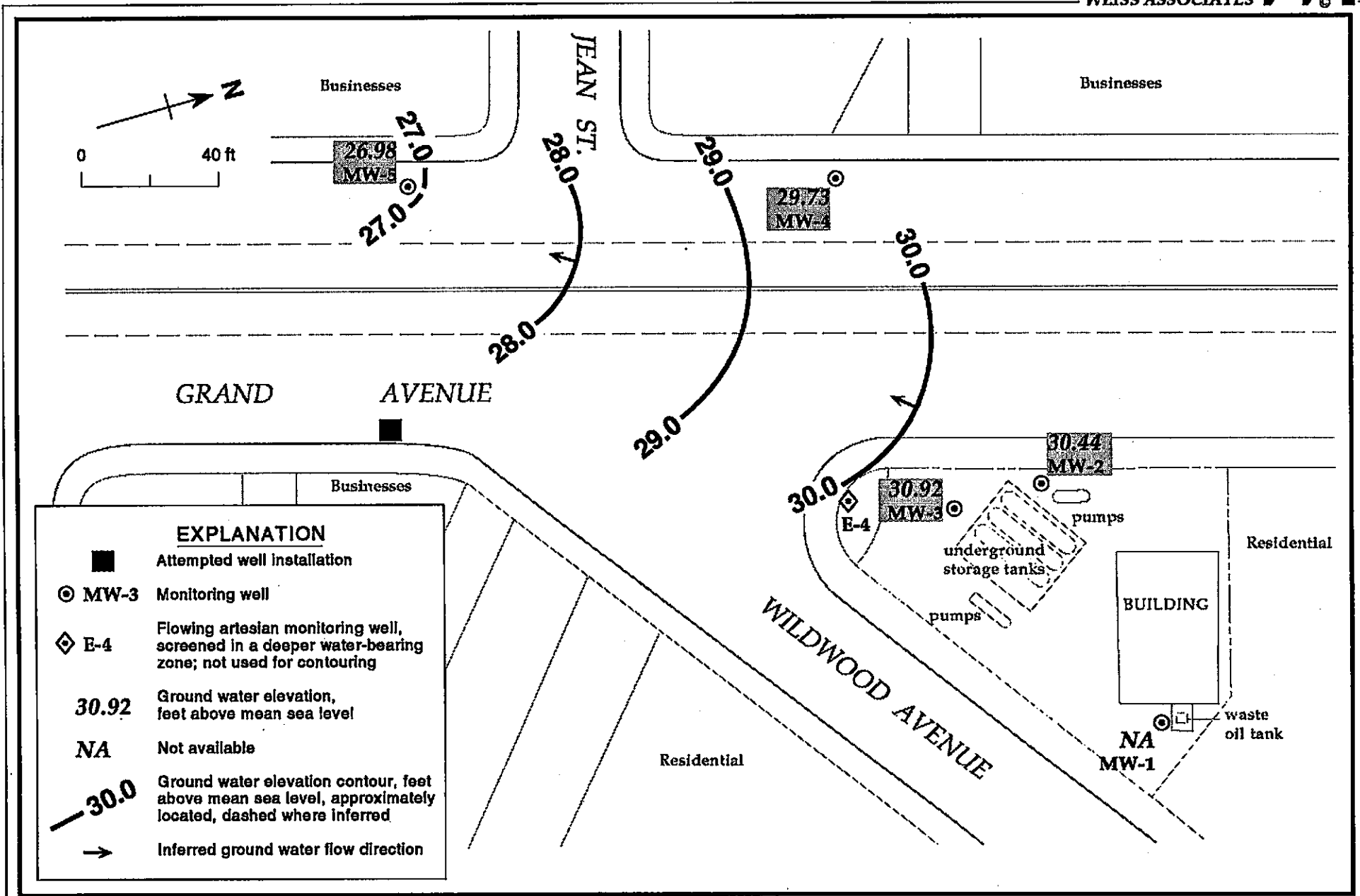


Figure 2. Monitoring Well Locations and Ground Water Elevation Contours - January 20, 1994 - Shell Service Station, WIC #204-6001-0109  
29 Wildwood Avenue, Piedmont, California

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		---	---
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
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

-- Table 2 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)
	07/31/90		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
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
	01/20/94		4.00	29.73
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

-- Table 2 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)
	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
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
	06/28/93		b	>34.63
	07/21/93		b	>34.63
	10/19/93		b	>34.63
	01/20/94		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	HVOCs	Dissolved Oxygen <sup>†</sup>
MW-1	07/12/89	2.76	<50	<0.5	<1	<1	<3	b	---
	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	<0.5	<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	
<i>inaccessible; NS</i>	01/20/94	---	---	---	---	---	---	---	---
MW-2	07/12/89	3.66	60	2.7	<1	<1	<3	b	---
	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	---	---
	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 <sup>d</sup>	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	
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	---	---	

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

Well ID	Date Sampled	Depth to Water (ft)	TPH-G	B	E	T	X	HVOCs	Dissolved Oxygen <sup>a</sup>
	10/29/91	4.00	1,000	35	29	28	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	---	---
	01/20/93	2.20	4,200	360	32	15	26	---	---
	01/20/93 <sup>dup</sup>	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 <sup>dup</sup>	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 <sup>dic</sup>	4.08	3,800	250	<10	<10	<10	---	4,100
MW-4	01/31/90	4.50	<50	<0.5	<0.5	<0.5	<0.5	---	---
	04/27/90	3.62	130 <sup>d</sup>	<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 <sup>d</sup>	<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
	07/21/93	3.81	<50	0.56	<0.50	<0.50	<0.50	---	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
MW-5	01/31/90	7.12	<50	<0.5	<0.5	<0.5	<0.5	---	---
	04/27/90	4.19	210 <sup>d</sup>	<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	80 <sup>d</sup>	<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	<50 <sup>d</sup>	<0.5	<0.5	<0.5	<0.5	---	---
	07/21/92	4.13	74 <sup>d</sup>	<0.5	<0.5	<0.5	<0.5	---	---
	10/02/92	4.30	76 <sup>d</sup>	<0.5	<0.5	<0.5	<0.5	---	---
	01/20/93	3.12	72 <sup>d</sup>	<0.5	<0.5	<0.5	<0.5	---	---
	05/04/93	4.07	70 <sup>d</sup>	<0.5	<0.5	<0.5	<0.5	---	1620

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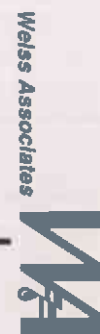


Table 2. Analytic Results for Ground Water, Shell Service Station WIC #204-6001-0109, 29 Wildwood Avenue, Piedmont, California (continued)

Well ID	Date Sampled	Depth to Water (ft)	TPH-G	B	E	T	X	HVOCs	Dissolved Oxygen <sup>a</sup>
E-4	05/04/93 <sup>de</sup>	4.07	80 <sup>b</sup>	△△△	△△△	△△.5	△△.5	---	---
	07/21/93	4.05	<50	△△△	△△△	△△.5	△△.5	---	3,460
	10/19/93	4.20	51	△△△	△△△	△△.5	△△.5	---	3,820
	01/20/94	4.40	90	△△.5	△△.5	<0.5	<0.5	---	4,200
	07/12/89	10	<50	△△△	△△△	<1	△△△	---	---
	01/31/90	10	<50	△△△	△△△	△△.5	△△△	---	---
	04/27/90	10	120 <sup>c</sup>	△△△	△△△	△△.5	△△△	---	---
	07/31/90	10	<50	△△△	△△△	△△.5	△△△	---	---
	10/30/90	10	<50	△△△	△△△	△△.5	△△△	---	---
	01/31/91	10	<50	△△△	△△△	△△.5	△△△	---	---
	04/30/91	10	<50	△△△	△△△	△△.5	△△△	---	---
	07/30/91	10	<50	△△△	△△△	△△.5	△△△	---	---
	10/29/91	10	<50	△△△	△△△	△△.5	△△△	---	---
	01/20/92	10	<50	△△△	△△△	△△.5	△△△	---	---
	04/14/92	10	<50	△△△	△△△	△△.5	△△△	---	---
	07/21/92	10	<50	△△△	△△△	△△.5	△△△	---	---
	10/02/92	10	<50	△△△	△△△	△△.5	△△△	---	---
01/20/93	10	<50	△△△	△△△	△△.5	△△△	---	---	
05/04/93	10	<50	△△△	△△△	△△.5	△△△	---	630	
07/21/93	10	<50	△△△	△△△	△△.5	△△△	---	5,440	
10/19/93	10	<50	△△△	△△△	△△.5	△△△	---	630	
01/20/94	10	<50	△△△	△△△	△△.5	△△△	---	---	
Trip Blank	07/12/89	10	<50	△△△	<1	△△.5	△△△	---	---
	01/31/90	10	<50	△△△	△△.5	△△.5	△△△	---	---
	04/27/90	10	<50	△△△	△△.5	△△.5	△△△	---	---
	07/31/90	10	<50	△△△	△△.5	△△.5	△△△	---	---
	10/30/90	10	<50	△△△	△△.5	△△.5	△△△	---	---
	01/31/91	10	<50	△△△	△△.5	△△.5	△△△	---	---
	04/30/91	10	<50	△△△	△△.5	△△.5	△△△	---	---
	07/30/91	10	<50	△△△	△△.5	△△.5	△△△	---	---
	10/29/91	10	<50	△△△	△△.5	△△.5	△△△	---	---
	01/20/92	10	<50	△△△	△△.5	△△.5	△△△	---	---
	01/20/93	10	<50	△△△	△△.5	△△.5	△△△	---	---
05/03/93	10	<50	△△△	△△.5	△△.5	△△△	---	---	
07/21/93	10	<50	△△△	△△.5	△△.5	△△△	---	---	
10/19/93	10	<50	△△△	△△.5	△△.5	△△△	---	---	
01/20/94	10	<50	△△△	△△.5	△△.5	△△△	---	---	
Bailer Blank	04/27/90	10	110 <sup>d</sup>	△△.5	△△.5	△△.5	<0.5	---	---
	01/31/91	10	<50	△△.5	△△.5	△△.5	<0.5	---	---
	10/02/92	10	ND	ND	ND	ND	ND	---	---
DTSC MCLs			NE	1	680	100 <sup>e</sup>	1750	J	NA

Abbreviations:

TPH-G - Total Petroleum Hydrocarbons as Gasoline by Modified EPA Method 8015



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

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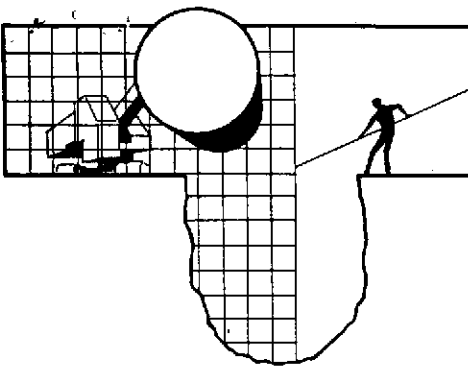
B = Benzene by EPA Method 602 or 8020  
E = Ethylbenzene by EPA Method 602 or 8020  
T = Toluene by EPA Method 602 or 8020  
X = Xylenes by EPA Method 602 or 8020  
HVOCs = Halogenated volatile organic compounds by EPA Method 601 or 624  
--- = Not analyzed  
NE = Not established  
DTSC MCLs = California 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 - No HVOCs detected
  - c - Well inaccessible, not sampled
  - d - Chromatogram contained discrete peaks; not representative of gasoline
  - e - BETX detected at 410, 97, 36 and 300 ppb, respectively, by EPA Method 624
  - f - 15 ppb tetrachloroethene (PCE), 4.1 ppb trichloroethene (TCE) and 3.4 ppb trans-1,2-dichloroethene (DCE) detected
  - g - 220 ppb PCE, 22 ppb TCE and 17 ppb DCE detected
  - h - Artesian well; potentiometric surface above top-of-casing elevation
  - i - DTSC recommended action level for drinking water; MCL not established
  - j - DTSC MCLs for PCE = 5 ppb; TCE = 5 ppb; DCE = 10 ppb.
-

**ATTACHMENT A**

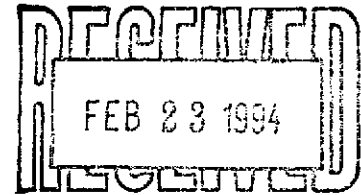
**BLAINE TECH'S GROUND WATER MONITORING REPORT**



February 14, 1994

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

Attn: Daniel T. Kirk



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

QUARTER:  
1st Quarter of 1994

## QUARTERLY GROUNDWATER SAMPLING REPORT 940120-G-1

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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 dewateres 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 Sequoia Analytical Laboratory in Redwood City, California. Sequoia Analytical Laboratory is a California Department of Health Services certified Hazardous Materials Testing Laboratory and is listed as DOHS HMTL #1210.

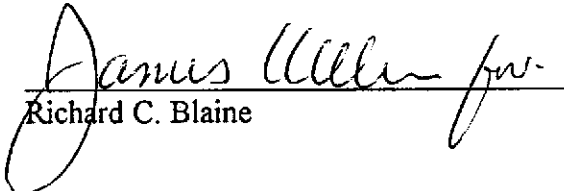
## Objective Information Collection

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	1/20/94	INACCESSIBLE						
MW-2	1/20/94	TOC	--	NONE	--	--	4.45	11.52
MW-3 *	1/20/94	TOC	--	NONE	--	--	4.08	8.97
MW-4	1/20/94	TOC	--	NONE	--	--	4.00	12.66
MW-5	1/20/94	TOC	--	NONE	--	--	4.40	16.00
E-4	1/20/94	TOC	--	NONE	--	--	0.00	34.16

\* Sample DUP was a duplicate sample taken from well MW-3.



**SHELL OIL COMPANY**  
RETAIL ENVIRONMENTAL ENGINEERING - WEST

**CHAIN OF CUSTODY RECORD**

Serial No: 9401B12

Date: \_\_\_\_\_  
Page ( of ) \_\_\_\_\_

Silo 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

**Analysis Required**

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

LAB: Sequoia

CHECK ONE (1) BOX ONLY	CY/DI	TURF AROUND TIME
Quantity Monitoring <input checked="" type="checkbox"/> 6441		24 hours <input type="checkbox"/>
Site Investigation <input type="checkbox"/> 6441		48 hours <input type="checkbox"/>
Soil Classfy/Disposal <input type="checkbox"/> 6443		16 days <input checked="" type="checkbox"/> (Normal)
Water Classfy/Disposal <input type="checkbox"/> 6443		Other <input type="checkbox"/>
Soil/Air Rem. of Sys. O & M <input type="checkbox"/> 6442		
Water Rem. of Sys. O & M <input type="checkbox"/> 6443		
Other <input type="checkbox"/>		

NOTE: Holdy Lab as soon as Possible of 24/11 Am. 1AM.

Comments:  
Sampled by:  
Printed Name: Gregg Friedrich

Sample ID	Date	Sludge	Soil	Water	Air	No. of conls.	Analysis Required										MATERIAL DESCRIPTION	SAMPLE CONDITION/ COMMENTS
							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		
MW2	1-20			X		3											01A-C	
MW3																	02A-C	
MW4																	03A-C	
MW5																	04A-C	
E4																	05A-C	
EB																	06A-C	
DUP																	07A-C	
TB						2											08 AB	

Relinquished By (Signature): <u>[Signature]</u>	Printed Name: <u>Gregg Friedrich</u>	Date: <u>1/21</u>	Time: <u>0945</u>	Received (Signature): <u>[Signature]</u>	Printed Name: <u>C. Hirotsu</u>	Date: <u>1/21</u>	Time: <u>0945</u>
Relinquished By (Signature): <u>[Signature]</u>	Printed Name: <u>C. Hirotsu</u>	Date: <u>1/21</u>	Time: <u>1134</u>	Received (Signature): <u>[Signature]</u>	Printed Name: <u>[Signature]</u>	Date: _____	Time: _____
Relinquished By (Signature): <u>[Signature]</u>	Printed Name: _____	Date: _____	Time: _____	Received (Signature): <u>[Signature]</u>	Printed Name: <u>L Stenstrom</u>	Date: <u>1-21-94</u>	Time: <u>1134</u>

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



# SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063  
(415) 364-9600 • FAX (415) 364-9233

Blaine Tech Services, Inc.  
985 Timothy Drive  
San Jose, CA 95133  
Attention: Jim Keller

Project: Shell, 29 Wildwood Ave, Piedmont

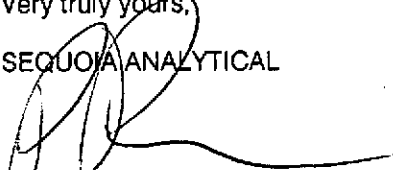
Enclosed are the results from 8 water samples received at Sequoia Analytical on January 21, 1994. The requested analyses are listed below:

SAMPLE #	SAMPLE DESCRIPTION	DATE OF COLLECTION	TEST METHOD
4AB1201	Water, MW2	1/20/94	EPA 5030/8015 Mod./8020
4AB1202	Water, MW3	1/20/94	EPA 5030/8015 Mod./8020
4AB1203	Water, MW4	1/20/94	EPA 5030/8015 Mod./8020
4AB1204	Water, MW5	1/20/94	EPA 5030/8015 Mod./8020
4AB1205	Water, E4	1/20/94	EPA 5030/8015 Mod./8020
4AB1206	Water, EB	1/20/94	EPA 5030/8015 Mod./8020
4AB1207	Water, Dup	1/20/94	EPA 5030/8015 Mod./8020
4AB1208	Water, TB	1/20/94	EPA 5030/8015 Mod./8020

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

Very truly yours,

SEQUOIA ANALYTICAL

  
Peggy A. Penner  
Project Manager



# SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063  
(415) 364-9600 • FAX (415) 364-9233

Blaine Tech Services, Inc. 985 Timothy Drive San Jose, CA 95133 Attention: Jim Keller	Client Project ID: Shell, 29 Wildwood Ave, Piedmont Sample Matrix: Water Analysis Method: EPA 5030/8015 Mod./8020 First Sample #: 4AB1201	Sampled: Jan 20, 1994 Received: Jan 21, 1994 Reported: Feb 1, 1994
--	--	--

## TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

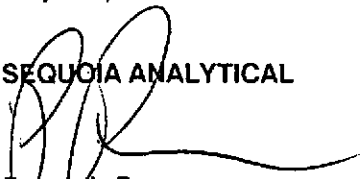
Analyte	Reporting Limit µg/L	Sample I.D. 4AB1201 MW2	Sample I.D. 4AB1202 MW3	Sample I.D. 4AB1203 MW4	Sample I.D. 4AB1204 MW5	Sample I.D. 4AB1205 E4	Sample I.D. 4AB1206 EB
Purgeable Hydrocarbons	50	N.D.	4,200	N.D.	90	N.D.	N.D.
Benzene	0.50	1.5	280	0.71	N.D.	N.D.	N.D.
Toluene	0.50	N.D.	N.D.	N.D.	1.0	N.D.	N.D.
Ethyl Benzene	0.50	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Total Xylenes	0.50	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
Chromatogram Pattern:		--	Gas	--	Discrete Peak	--	--

### Quality Control Data

Report Limit Multiplication Factor:	1.0	20	1.0	1.0	1.0	1.0
Date Analyzed:	1/25/94	1/24/94	1/24/94	1/24/94	1/24/94	1/24/94
Instrument Identification:	GCHP-3	GCHP-17	GCHP-17	GCHP-17	GCHP-17	GCHP-17
Surrogate Recovery, %: (QC Limits = 70-130%)	99	107	90	110	103	101

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.  
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL



Peggy A. Penner  
Project Manager



# SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063  
(415) 364-9600 • FAX (415) 364-9233

Blaine Tech Services, Inc. 985 Timothy Drive San Jose, CA 95133 Attention: Jim Keller	Client Project ID: Shell, 29 Wildwood Ave, Piedmont Sample Matrix: Water Analysis Method: EPA 5030/8015 Mod./8020 First Sample #: 4AB1207	Sampled: Jan 20, 1994 Received: Jan 21, 1994 Reported: Feb 1, 1994
--	--	--

## TOTAL PURGEABLE PETROLEUM HYDROCARBONS with BTEX DISTINCTION

Analyte	Reporting Limit µg/L	Sample I.D. 4AB1207 Dup	Sample I.D. 4AB1208 TB
Purgeable Hydrocarbons	50	3,800	N.D.
Benzene	0.50	250	N.D.
Toluene	0.50	N.D.	N.D.
Ethyl Benzene	0.50	N.D.	N.D.
Total Xylenes	0.50	N.D.	N.D.
Chromatogram Pattern:		Gas	--

### Quality Control Data

Report Limit Multiplication Factor:	20	1.0
Date Analyzed:	1/24/94	1/24/94
Instrument Identification:	GCHP-17	GCHP-17
Surrogate Recovery, %: (QC Limits = 70-130%)	92	83

Purgeable Hydrocarbons are quantitated against a fresh gasoline standard.  
Analytes reported as N.D. were not detected above the stated reporting limit.

SEQUOIA ANALYTICAL

  
Peggy A. Penner  
Project Manager

4AB1201.BLA <2>



# SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063  
(415) 364-9600 • FAX (415) 364-9233

Blaine Tech Services, Inc.  
985 Timothy Drive  
San Jose, CA 95133  
Attention: Jim Keller

Client Project ID: Shell, 29 Wildwood Ave, Piedmont  
Matrix: Water

QC Sample Group: 4AB1201

Reported: Feb 1, 1994

## QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Method:	EPA 8020	EPA 8020	EPA 8020	EPA 8020
Analyst:	M. Nipp	M. Nipp	M. Nipp	M. Nipp

### MS/MSD

Batch#: 4A68902      4A68902      4A68902      4A68902

Date Prepared:	-	-	-	-
Date Analyzed:	1/25/94	1/25/94	1/25/94	1/25/94
Instrument I.D.#:	GCHP-3	GCHP-3	GCHP-3	GCHP-3
Conc. Spiked:	10 µg/L	10 µg/L	10 µg/L	30 µg/L

### Matrix Spike

% Recovery: 99      100      100      107

### Matrix Spike

Duplicate % Recovery: 100      100      100      107

### Relative %

Difference: 1.0      0.0      0.0      0.0

LCS Batch#: -      -      -      -

Date Prepared:	-	-	-	-
Date Analyzed:	-	-	-	-
Instrument I.D.#:	-	-	-	-

### LCS %

Recovery: -      -      -      -

% Recovery Control Limits:	71-133	72-128	72-130	71-120
----------------------------	--------	--------	--------	--------

SEQUOIA ANALYTICAL

  
Peggy A. Penner  
Project Manager

### Please Note:

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



# SEQUOIA ANALYTICAL

680 Chesapeake Drive • Redwood City, CA 94063  
(415) 364-9600 • FAX (415) 364-9233

Blaine Tech Services, Inc.  
985 Timothy Drive  
San Jose, CA 95133  
Attention: Jim Keller

Client Project ID: Shell, 29 Wildwood Ave, Piedmont  
Matrix: Water

QC Sample Group: 4AB1202-08

Reported: Feb 1, 1994

## QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
<b>Method:</b>	EPA 8020	EPA 8020	EPA 8020	EPA 8020
<b>Analyst:</b>	M. Nipp	M. Nipp	M. Nipp	M. Nipp

### MS/MSD

**Batch#:** 4A68901      4A68901      4A68901      4A68901

<b>Date Prepared:</b>	-	-	-	-
<b>Date Analyzed:</b>	1/24/94	1/24/94	1/24/94	1/24/94
<b>Instrument I.D.#:</b>	GCHP-17	GCHP-17	GCHP-17	GCHP-17
<b>Conc. Spiked:</b>	10 µg/L	10 µg/L	10 µg/L	30 µg/L

<b>Matrix Spike % Recovery:</b>	97	97	97	100
---------------------------------	----	----	----	-----

<b>Matrix Spike Duplicate % Recovery:</b>	95	95	95	97
---	----	----	----	----

<b>Relative % Difference:</b>	2.1	2.1	2.1	3.0
-------------------------------	-----	-----	-----	-----

**LCS Batch#:** -      -      -      -

<b>Date Prepared:</b>	-	-	-	-
<b>Date Analyzed:</b>	-	-	-	-
<b>Instrument I.D.#:</b>	-	-	-	-

**LCS % Recovery:** -      -      -      -

% Recovery Control Limits:	71-133	72-128	72-130	71-120

SEQUOIA ANALYTICAL

Feggy A. Penner  
Project Manager

### Please Note:

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