Chevron U.S.A. Inc.
2410 Camino Ramon, San Ramon, California • Phone (415) 842-9500
Mail Address: P.O. Box 5004, San Ramon, CA 94583-0804

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Marketing Operations

D. Moller
Manager, Operations
S. L. Patterson
Area Manager, Operations
C. G. Trimbach
Manager, Engineering

December 30, 1990

Mr. Rafat Shahid
Alameda County
Environmental Health
80 Swan Way, Room 200
Oakland, California 94621

Re: Former Chevron Service Station #9-0020
17th and Harrison
Oakland, CA

Dear Mr. Shahid:

Enclosed we are forwarding the Quarterly Groundwater Sampling Report dated December 14, 1990, conducted by our consultant, Western Geologic Resources, Inc., for the above referenced site. As indicated in the report, levels of hydrocarbon concentrations remain consistent with previous samplings.

Chevron is in the process of permitting and installing an additional off-site groundwater monitoring well to delineate the extent of the hydrocarbon contamination. A formal report documenting this work will be forwarded to your office.

If you have any questions or comments please do not hesitate to call Nancy Vukelich at (415) 842-9581.

Very truly yours,
C. G. Trimbach

By Nancy Vukelich
Nancy Vukelich

NLV/jmr
Enclosure

cc: Mr. Lester Feldman
RWQCB-Bay Area
1800 Harrison Street
Suite # 700
Oakland, CA 94612

Mr. W.T. Scudder
Chevron Property Management Specialist

WESTERN GEOLOGIC RESOURCES INC.

2169 E. FRANCISCO BLVD., SUITE B / SAN RAFAEL
CALIFORNIA 94901 / FAX 415.457.8521
TELE 415.457.7595

14 December 1990

Ms. Nancy Vukelich
Chevron USA
2410 Camino Ramon
San Ramon, California 94583-0804

Re: Quarterly Groundwater Monitoring
Sampled 13 November 1990
Former Chevron Service Station #90020
17th and Harrison Streets
Oakland, California
WGR Project #1-012.05

Dear Ms. Vukelich:

This letter report presents the results of the quarterly groundwater monitoring performed on 13 November 1990 by Western Geologic Resources, Inc. (WGR) at the subject site (Figures 1 and 2).

GROUNDWATER SAMPLING

On 13 November 1990, WGR staff measured depth to water and purged monitor wells MW-1 through MW-8 with dedicated systems, and wells MW-9 through MW-12 with PVC bailers. Three well-casing volumes of groundwater were evacuated from monitor wells MW-1 through MW-4, MW-6, and MW-8 through MW-12 and the wells were sampled. Monitor wells MW-5 and MW-7 were purged dry before three well-casing volumes could be evacuated. These wells were sampled after recovering to 91% and 53% of their original static water levels, respectively. All groundwater samples were collected according to the WGR standard operating procedure for groundwater sampling included as Attachment A; field sampling and monitoring forms are included as Attachment B.

All purged groundwater was temporarily stored on-site in 55-gallon drums pending analytic results. The groundwater samples and a laboratory-supplied travel blank, consisting of deionized water, were shipped under chain-of-custody to Superior Analytical Laboratory, Inc. of San Francisco, California.

GROUNDWATER FLOW

Figure 3 shows the potentiometric surface of shallow groundwater, based on depth-to-water measurements taken on 13 November 1990. Groundwater-elevation data are presented in Table 1. The estimated direction of groundwater flow on 13 November 1990 was to the northeast at an

average gradient of about 0.7% with the gradient being steeper on the northeast end of the site at about 1.3% and less steep on the southwest end of the site at about 0.42%.

ANALYTIC RESULTS

Groundwater samples from monitor wells MW-1 through MW-12 were analyzed for total purgeable petroleum hydrocarbons (TPPH), for benzene, toluene, ethylbenzene and total xylenes (BTEX), and for selected halocarbons by EPA Methods 8015, 8020 and 8010, respectively.

Analytic results for past sampling events and this round of sampling are presented in Table 2. The chain-of-custody form and laboratory reports with quality assurance/quality control documents are included as Attachments C and D, respectively. Distribution maps showing concentrations of TPPH, benzene, and tetrachloroethene (PCE) for the 13 November 1990 sampling of shallow groundwater are included as Figures 4, 5 and 6, respectively.

COMMENTS

Groundwater flow direction and gradient are similar to those reported for previous sampling events. Analytic results were generally similar to those reported in the last sampling round. However, TPPH and BTEX were detected for the first time in the groundwater sample from well MW-11. An unidentified compound at a concentration of 51 parts-per-billion (ppb) was detected in the gasoline range, but not identified as gasoline, for the sample for MW-3. BTEX was detected for the first time in the sample from well MW-6. Toluene and total xylenes were detected for the first time in samples from wells MW-2, MW-4, MW-5, MW-8 and MW-10. Ethylbenzene was detected for the first time in the sample from well MW-10. Carbon tetrachloride and chloroform were not detected in samples from wells MW-11 and MW-12; these halocarbons were detected in the previous sampling event. The halocarbon 1,1,1-trichloroethane (TCA) was detected for the first time in a sample from well MW-11.

According to Rose Condit of GTEL Environmental Laboratories, Inc. (GTEL), GTEL did not speciate between trans-1,2-dichloroethene (t-1,2-DCE) and cis-1,2-dichloroethene (c-1,2-DCE) in previous analyses of quarterly groundwater samples collected from October 1989 to August 1990. These GTEL analytical reports incorrectly stated concentrations of t-1,2-DCE when in reality they were a combination of t-1,2-DCE and c-1,2-DCE.

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Western Geologic Resources, Inc. is pleased to provide geologic and environmental consulting services and trusts that this report meets your needs. Please call us at (415) 457-7595 if you have any questions.

Sincerely,
Western Geologic Resources, Inc.

Leonard P. Niles

Leonard P. Niles
Senior Staff Geologist

LPN:vw

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FIGURES

TABLES

ATTACHMENTS

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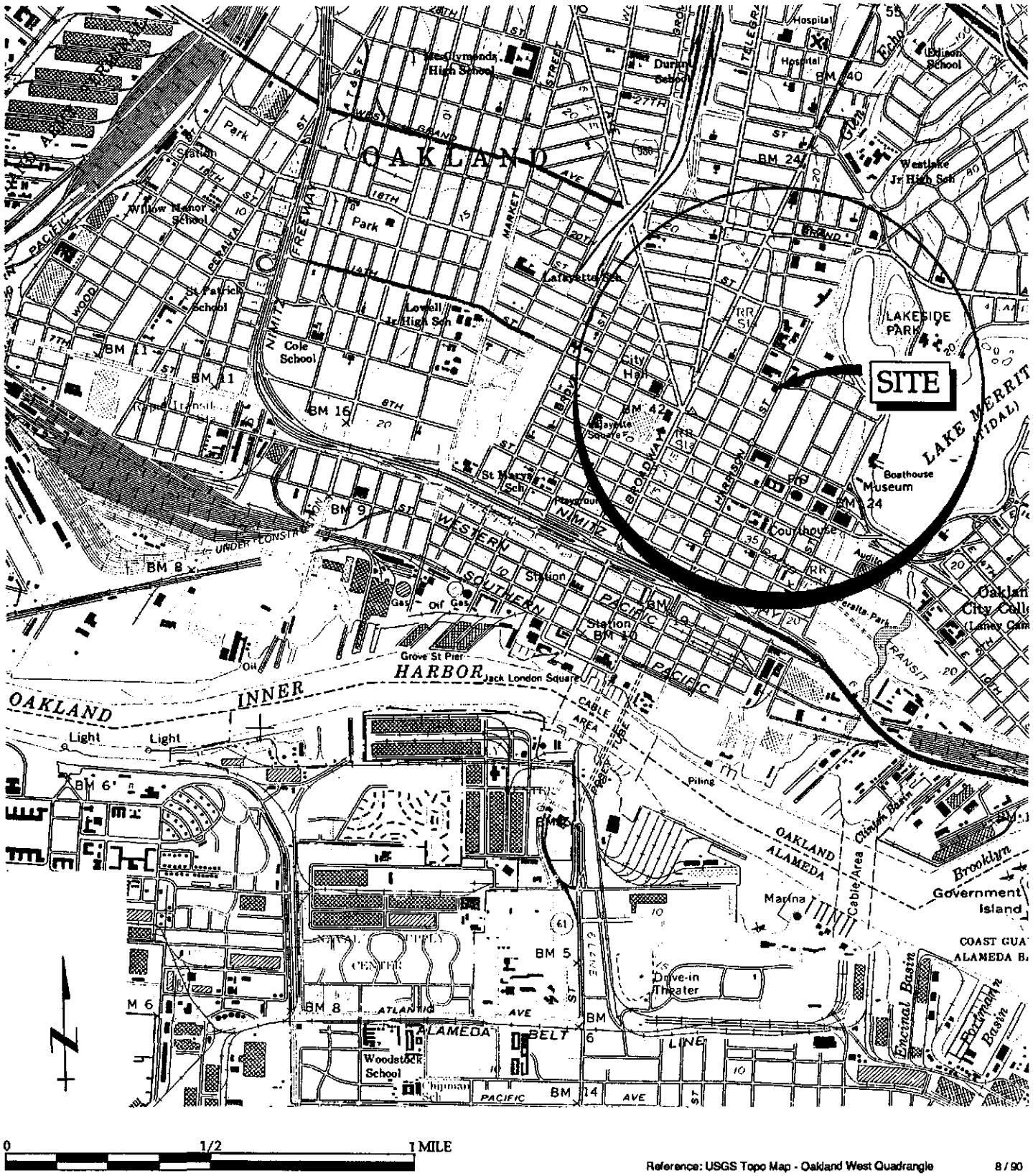
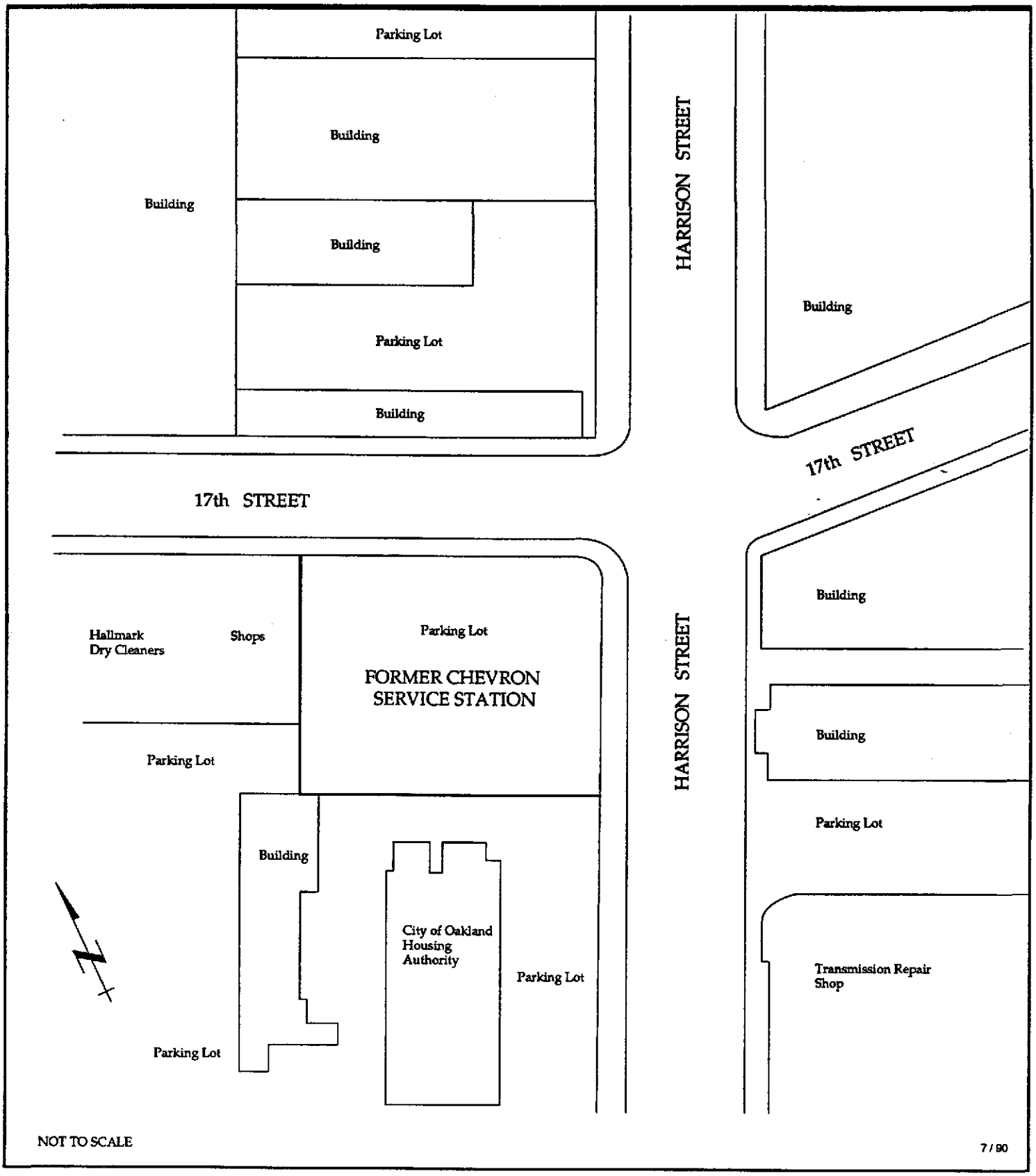
FIGURES



Site Location Map
Former Chevron Service Statin #90020
1633 Harrison Street
Oakland, California

FIGURE
1

WESTERN GEOLOGIC RESOURCES, INC.
1-012.04

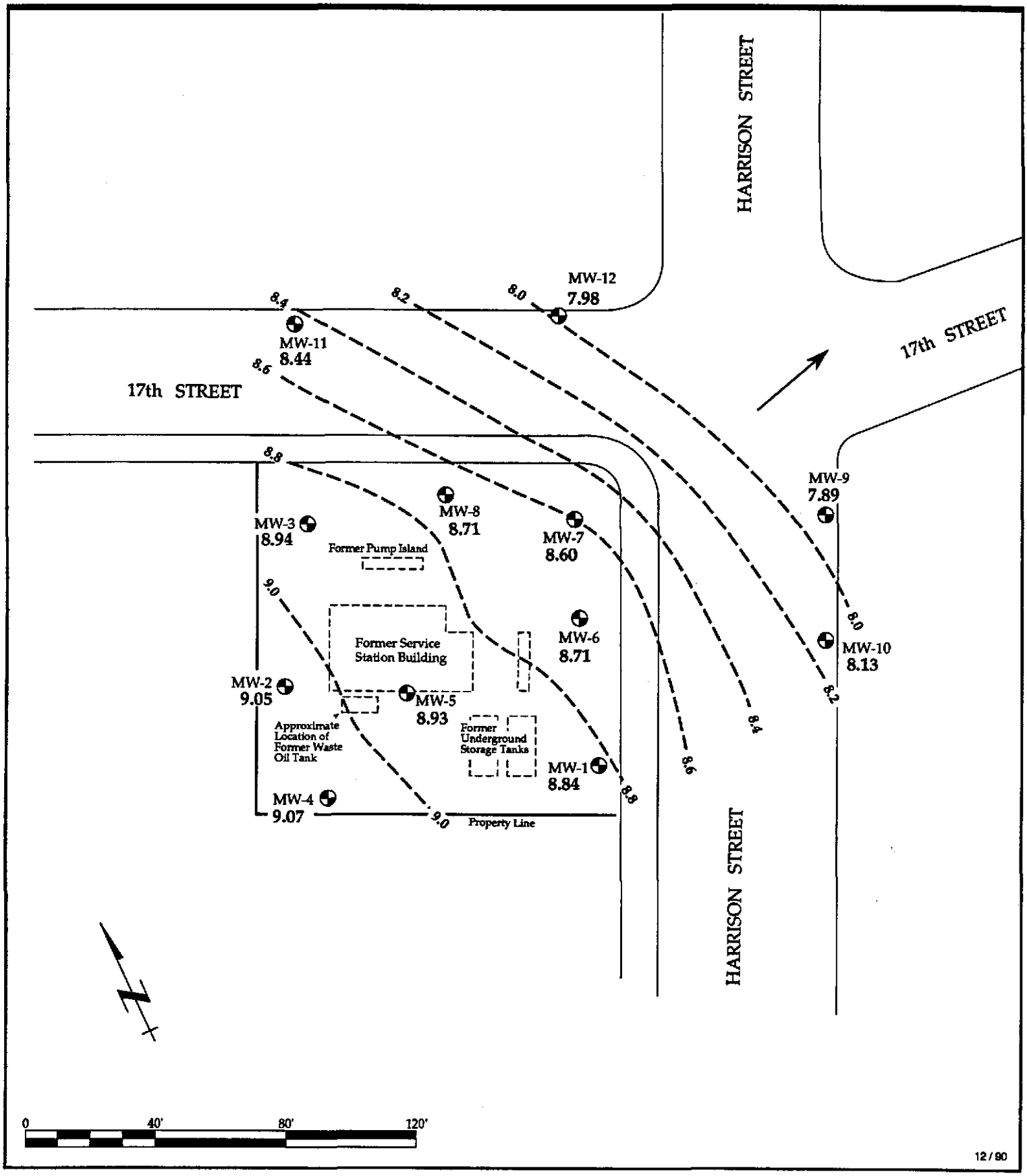


Vicinity Map
Former Chevron Service Station #90020
1633 Harrison Street,
Oakland, California

FIGURE
2

WESTERN GEOLOGIC RESOURCES, INC.

1-012.04



EXPLANATION

MW-1 8.84 — Monitor Well location and groundwater elevation, feet above mean sea level (MSL)

8.0 — — — ? — Potentiometric surface contour, feet above MSL, dashed where inferred

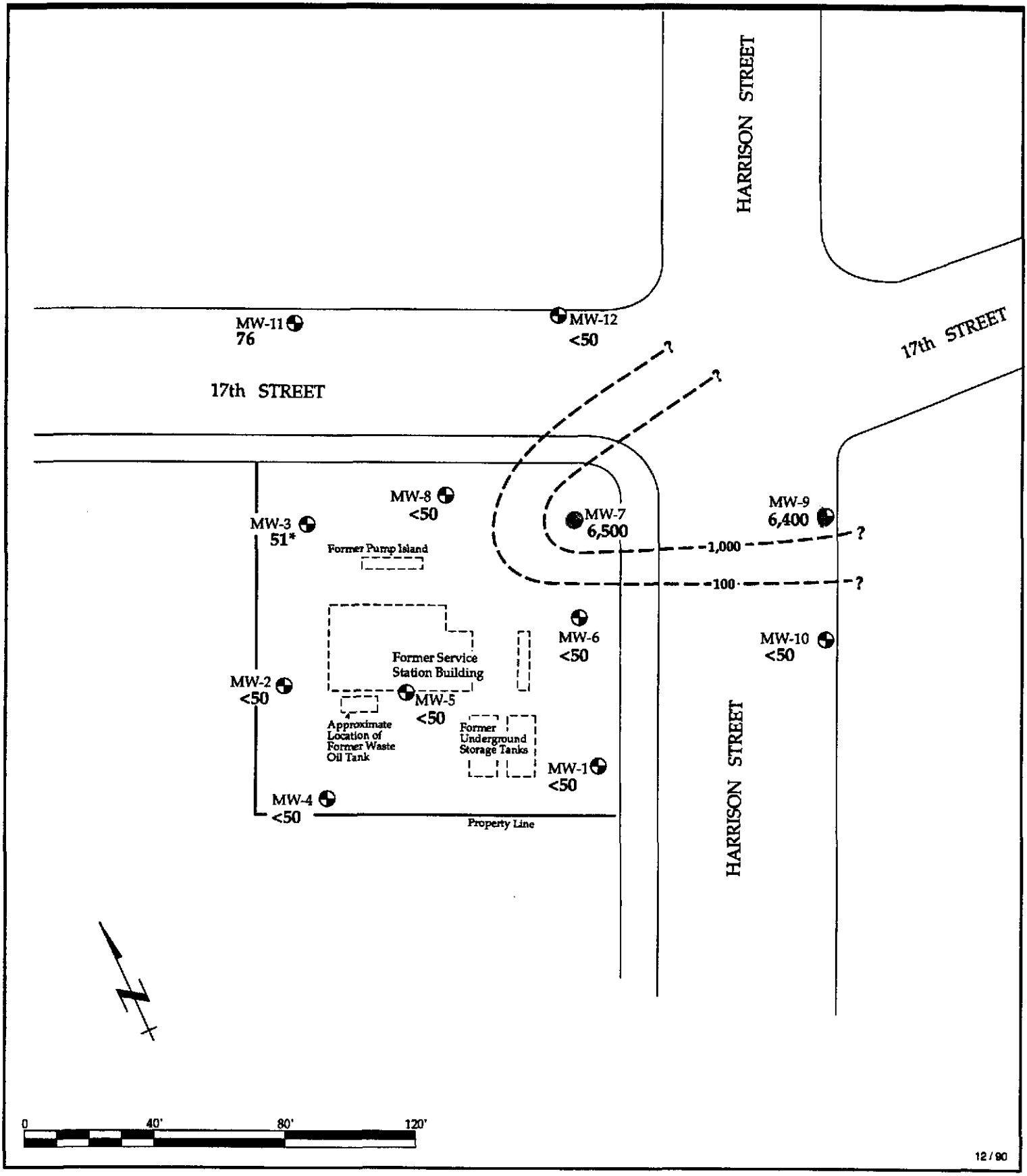
← — Estimated direction of groundwater flow

Potentiometric Surface of Shallow Groundwater
13 November 1990
Former Chevron Service Station #90020
1633 Harrison Street, Oakland, California

FIGURE 3

WESTERN GEOLOGIC RESOURCES, INC.

1-012.05



EXPLANATION

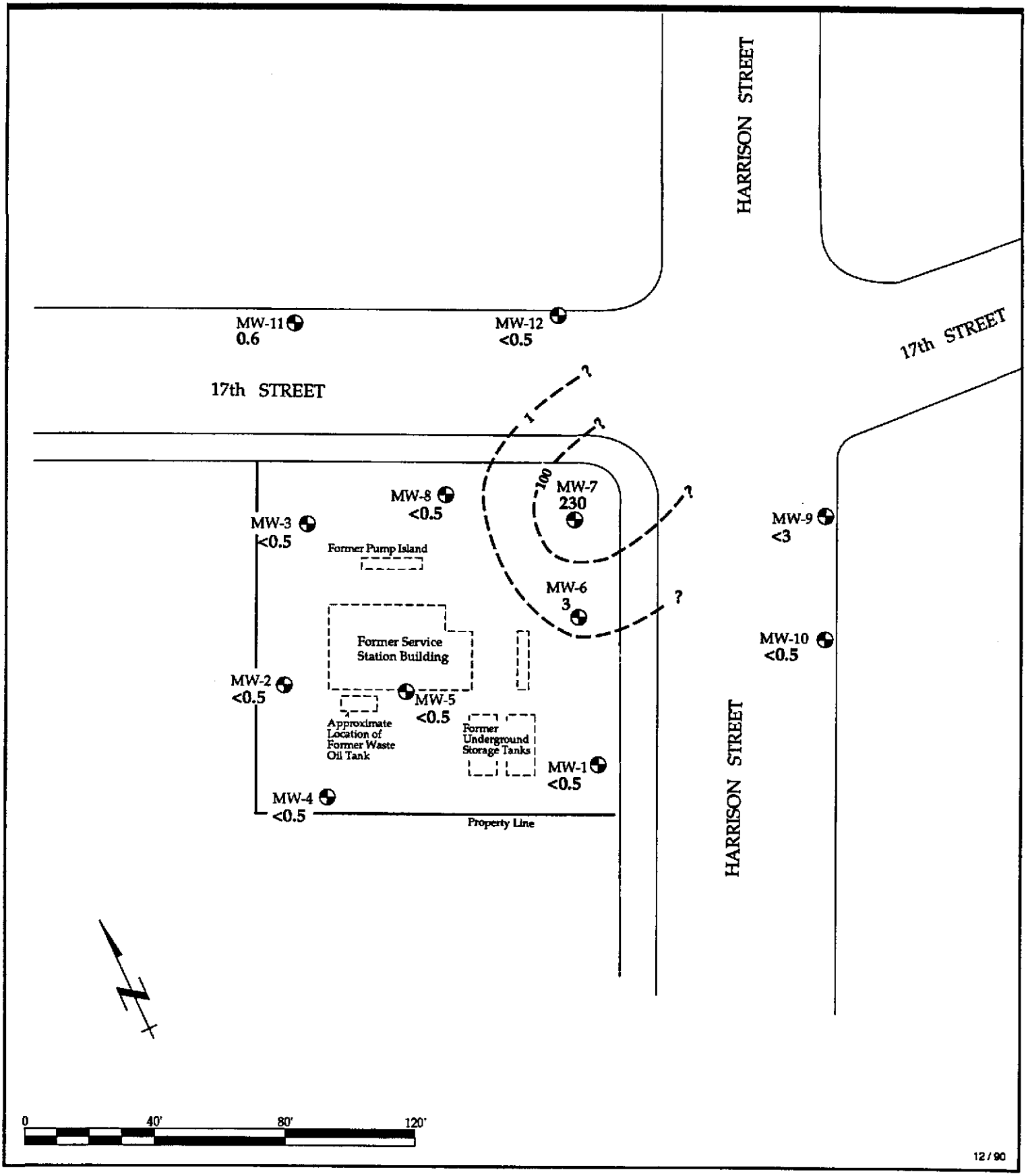
- MW-1 <50 — Monitor Well location and TPPH concentration in parts-per-billion (ppb)
- * — Single peak TPPH; not characterized as gasoline
- 100 — — — ? — Isoconcentration contour for TPPH in ppb, dashed where inferred, queried where uncertain

Distribution of Total Purgeable Petroleum Hydrocarbons (TPPH) in Shallow Groundwater, 13 November 1990
Former Chevron Service Station #90020
1633 Harrison Street,
Oakland, California

FIGURE 4

WESTERN GEOLOGIC RESOURCES, INC.

1-012.05



EXPLANATION

MW-1 <0.5 — Monitor Well location and benzene concentration in parts-per-billion (ppb)

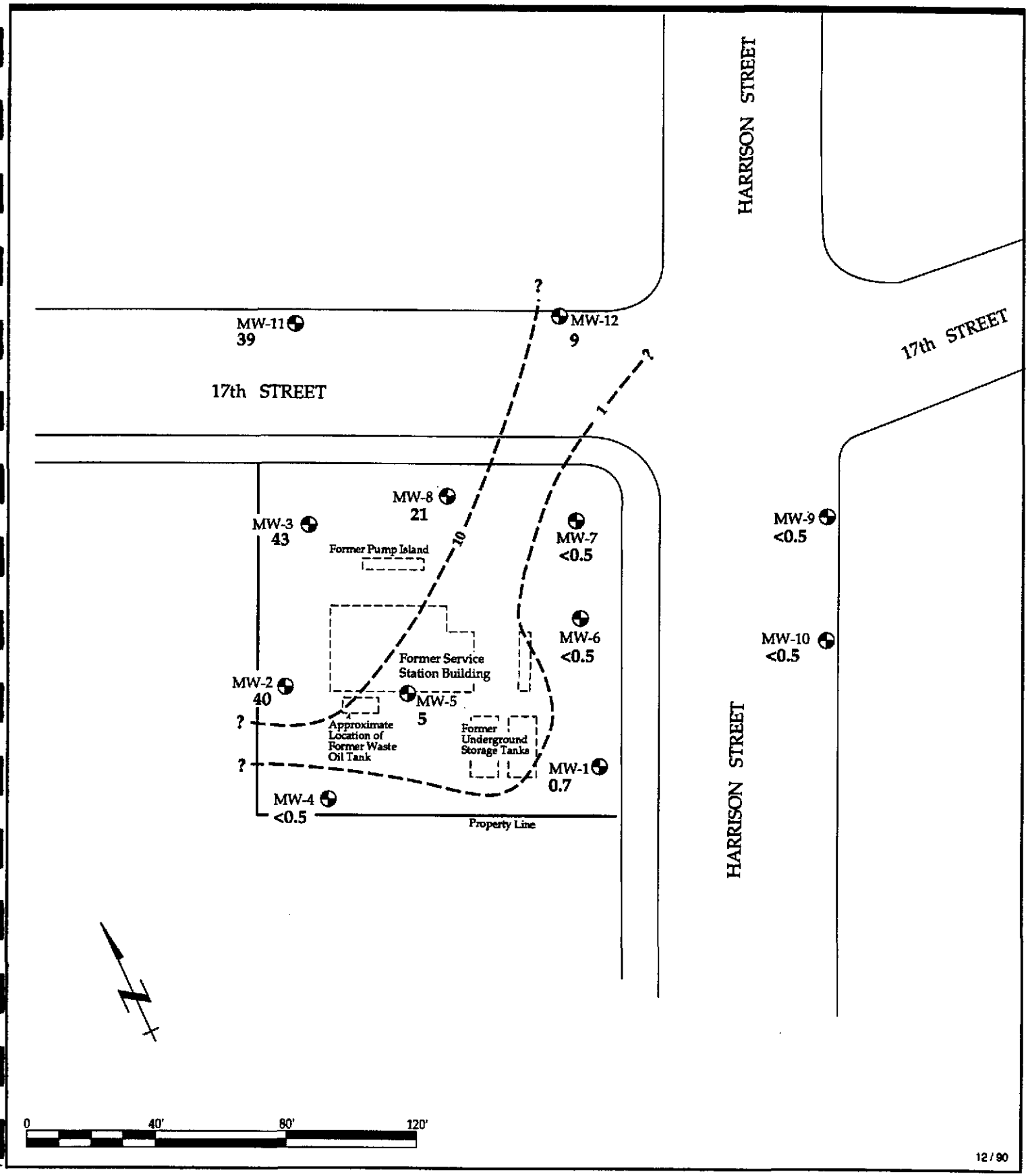
100 — — ? — Isoconcentration contour for benzene in ppb, dashed where inferred, queried where uncertain

Distribution of Benzene in Shallow Groundwater
13 November 1990
Former Chevron Service Station #90020
1633 Harrison Street,
Oakland, California

FIGURE 5

WESTERN GEOLOGIC RESOURCES, INC.

1-012.05



EXPLANATION

MW-1 0.7 — Monitor Well location and PCE concentration in parts-per-billion (ppb)

10 — Isoconcentration contour for PCE in ppb, dashed where inferred, queried where uncertain

Distribution of Tetrachloroethylene (PCE) in Shallow Groundwater, 13 November 1990
Former Chevron Service Station #90020
1633 Harrison Street,
Oakland, California

FIGURE 6

WESTERN GEOLOGIC RESOURCES, INC.

1-012.05

TABLES

Table 1. Groundwater-Elevation Data
Former Chevron Service Station #90020
1633 Harrison Street
Oakland, California

Well ID #	Date	TOC	DTW	Elev.-W
		<----------ft---------->		
MW-1	3 Nov 88	29.82	20.40	9.42
MW-1	2 Feb 89	29.82	20.71	9.11
MW-1	23 Apr 89	29.82	20.34	9.48
MW-1	28 Jul 89	29.82	20.58	9.24
MW-1	30 Oct 89	29.82	20.52	9.30
MW-1	9 Jan 90	29.82	20.77	9.05
MW-1	18 Apr 90	29.82	20.95	8.87
MW-1	22 Jun 90	29.82	21.00	8.82
MW-1	9 Aug 90	29.82	20.94	8.88
MW-1	13 Nov 90	29.82	20.98	8.84
MW-2	3 Nov 88	30.59	20.89	9.70
MW-2	2 Feb 89	30.59	21.21	9.38
MW-2	23 Apr 89	30.59	20.82	9.77
MW-2	28 Jul 89	30.59	21.02	9.57
MW-2	30 Oct 89	30.59	20.96	9.63
MW-2	9 Jan 90	30.59	21.25	9.34
MW-2	18 Apr 90	30.59	21.53	9.06
MW-2	22 Jun 90	30.59	21.57	9.02
MW-2	9 Aug 90	30.59	21.55	9.04
MW-2	13 Nov 90	30.59	21.54	9.05
MW-3	3 Nov 89	30.09	20.54	9.55
MW-3	2 Feb 89	30.09	20.85	9.24
MW-3	23 Apr 89	30.09	20.43	9.66
MW-3	28 Jul 89	30.09	20.64	9.45
MW-3	30 Oct 89	30.09	20.61	9.48
MW-3	9 Jan 90	30.09	20.88	9.21
MW-3	18 Apr 90	30.09	21.15	8.94
MW-3	22 Jun 90	30.09	21.20	8.89
MW-3	9 Aug 90	30.09	21.18	8.91
MW-3	13 Nov 90	30.09	21.15	8.94

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Table 1. Groundwater-Elevation Data (continued)
Former Chevron Service Station #90020
1633 Harrison Street
Oakland, California

Well ID #	Date	TOC	DTW	Elev.-W
		<----------ft---------->		
MW-4	23 Apr 89	31.17	21.33	9.84
MW-4	28 Jul 89	31.17	21.58	9.59
MW-4	30 Oct 89	31.17	21.54	9.63
MW-4	9 Jan 90	31.17	21.82	9.35
MW-4	18 Apr 90	31.17	22.09	9.08
MW-4	22 Jun 90	31.17	22.12	9.05
MW-4	9 Aug 90	31.17	22.11	9.06
MW-4	13 Nov 90	31.17	22.10	9.07
MW-5	23 Apr 89	30.28	20.62	9.66
MW-5	28 Jul 89	30.28	20.86	9.42
MW-5	30 Oct 89	30.28	20.82	9.46
MW-5	9 Jan 90	30.28	21.07	9.21
MW-5	18 Apr 90	30.28	21.35	8.93
MW-5	22 Jun 90	30.28	21.38	8.90
MW-5	9 Aug 90	30.28	21.36	8.92
MW-5	13 Nov 90	30.28	21.35	8.93
MW-6	23 Apr 89	29.46	20.05	9.41
MW-6	28 Jul 89	29.46	20.30	9.16
MW-6	30 Oct 89	29.46	20.32	9.14
MW-6	9 Jan 90	29.46	20.51	8.95
MW-6	18 Apr 90	29.46	20.72	8.74
MW-6	22 Jun 90	29.46	20.77	8.69
MW-6	9 Aug 90	29.46	20.74	8.72
MW-6	13 Nov 90	29.46	20.75	8.71
MW-7	23 Apr 89	29.01	18.99	10.02
MW-7	28 Jul 89	29.01	19.94	9.07
MW-7	30 Oct 89	29.01	19.97	9.04
MW-7	9 Jan 90	29.01	20.15	8.86
MW-7	18 Apr 90	29.01	20.37	8.64
MW-7	22 Jun 90	29.01	20.40	8.61
MW-7	9 Aug 90	29.01	20.38	8.63
MW-7	13 Nov 90	29.01	20.41	8.60

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Table 1. Groundwater-Elevation Data (continued)
Former Chevron Service Station #90020
1633 Harrison Street
Oakland, California

Well ID #	Date	TOC	DTW	Elev.-W
		<----------ft---------->		
MW-8	23 Apr 89	29.57	20.14	9.43
MW-8	28 Jul 89	29.57	20.37	9.20
MW-8	30 Oct 89	29.57	20.32	9.25
MW-8	9 Jan 90	29.57	20.60	8.97
MW-8	18 Apr 90	29.57	20.87	8.70
MW-8	22 Jun 90	29.57	20.34*	9.23*
MW-8	9 Aug 90	29.57	20.89	8.68
MW-8	13 Nov 90	29.57	20.86	8.71
MW-9	22 Jun 90	28.67	20.80	7.87
MW-9	9 Aug 90	28.67	20.74	7.93
MW-9	13 Nov 90	28.67	20.78	7.89
MW-10	22 Jun 90	28.60	20.48	8.12
MW-10	9 Aug 90	28.60	20.45	8.15
MW-10	13 Nov 90	28.60	20.47	8.13
MW-11	22 Jun 90	29.37	21.03	8.34
MW-11	9 Aug 90	29.37	21.02	8.35
MW-11	13 Nov 90	29.37	20.93	8.44
MW-12	22 Jun 90	28.43	20.45	7.98
MW-12	9 Aug 90	28.43	20.43	8.00
MW-12	13 Nov 90	28.43	20.45	7.98

NOTES:

TOC = Top of Casing elevation, in feet above mean sea level
DTW = Depth to Water
Elev.-W = Elevation of Water, in feet above mean sea level
* = Anolmalous data
ft = feet

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TABLE 2. Analytic Results: Groundwater Samples - Petroleum Hydrocarbons
Former Chevron Service Station 90020
1633 Harrison Street
Oakland, California

Well ID #	Date	EPA Method	Lab	FC	TFH	TPH/TPPH	Benzene	Toluene	E-Benzene	Xylenes	O&G
					<-------------------------------ppb------------------------------->						<-ppm->
MW-1	3 Nov 88	624/8015	BC	---	<1,000	---	<1.0	<1.0	<1.0	<1.0	---
MW-1	10 Feb 89	524.2/8240	CCAS	---	---	<100	<0.2	<0.2	<0.2	<0.4	---
MW-1	24 Apr 89	524.2/8260	CCAS	---	---	<50	<0.5	<1.0	<1.0	<1.0	<3
MW-1	28 Jul 89	8260	CCAS	---	---	<50	<0.1	<0.5	<0.2	<0.5	<3
MW-1	30 Oct 89	8015/8020	GTEL	---	---	<500	<0.3	<0.3	<0.3	<0.6	---
MW-1	9 Jan 90	8015/8020	GTEL	---	---	<50	<0.3	<0.3	<0.3	<0.6	---
MW-1	18 Apr 90	8015/8020	GTEL	---	---	<50	<0.3	<0.3	<0.3	<0.6	---
MW-1	9 Aug 90	8015/8020	GTEL	---	---	<50	<0.3	<0.3	<0.3	<0.6	---
MW-1	13 Nov 90	8015/8020	SAL	---	---	<50	<0.5	<0.5	<0.5	<0.5	---
MW-2	3 Nov 88	624/8015	BC	---	<1,000	---	<1.0	<1.0	<1.0	<1.0	---
MW-2	10 Feb 89	524.2/8240	CCAS	---	---	<100	<0.2	<0.2	<0.2	<0.4	---
MW-2	24 Apr 89	524.2/8260	CCAS	---	---	<50	<0.5	<1.0	<1.0	<1.0	<3
MW-2	28 Jul 89	8260	CCAS	---	---	<100	<0.2	<1.0	<0.2	<0.4	<3
MW-2	30 Oct 89	8015/8020	GTEL	---	---	<500	<0.3	<0.3	<0.3	<0.6	---
MW-2	9 Jan 90	8015/8020	GTEL	---	---	<50	<0.3	<0.3	<0.3	<0.6	---
MW-2	18 Apr 90	8015/8020	GTEL	---	---	<50	<0.3	<0.3	<0.3	<0.6	---
MW-2	9 Aug 90	8015/8020	GTEL	---	---	<50	<0.3	<0.3	<0.3	<0.6	---
MW-2	13 Nov 90	8015/8020	SAL	---	---	<50	<0.5	0.8	<0.5	0.9	---

TABLE 2. Analytic Results: Groundwater Samples - Petroleum Hydrocarbons (continued)
Former Chevron Service Station 90020
1633 Harrison Street
Oakland, California

Well ID #	Date	EPA Method	Lab	FC	TFH	TPH/TPPH	Benzene	Toluene	E-Benzene	Xylenes	O&G
					<----------ppb---------->						<-ppm->
MW-3	3 Nov 88	624/8015	BC	---	<1,000	---	<1.0	<1.0	<1.0	<1.0	---
MW-3	10 Feb 89	524.2/8240	CCAS	---	---	<100	<0.2	<0.2	<0.2	<0.4	---
MW-3	24 Apr 89	524.2/8260	CCAS	---	---	<50	<0.5	<1.0	<1.0	<1.0	<3
MW-3	28 Jul 89	8260	CCAS	---	---	<100	<0.2	<1.0	<0.2	<0.4	<3
MW-3	30 Oct 89	8015/8020	GTEL	---	---	<500	<0.3	<0.3	<0.3	<0.6	---
MW-3	9 Jan 90	8015/8020	GTEL	---	---	<50	<0.3	<0.3	<0.3	<0.6	---
MW-3	18 Apr 90	8015/8020	GTEL	---	---	<50	<0.3	<0.3	<0.3	<0.6	---
MW-3	9 Aug 90	8015/8020	GTEL	---	---	<50	<0.3	<0.3	<0.3	<0.6	---
MW-3	13 Nov 90	8015/8020	SAL	---	---	51*	<0.5	<0.5	<0.5	<0.5	---
MW-4	24 Apr 89	524.2/8260	CCAS	---	---	<50	<0.5	<1.0	<1.0	<1.0	<3
MW-4	28 Jul 89	8260	CCAS	---	---	<50	<0.1	<0.5	<0.1	<0.2	<3
MW-4	30 Oct 89	8015/8020	GTEL	---	---	<500	<0.3	<0.3	<0.3	<0.6	---
MW-4	9 Jan 90	8015/8020	GTEL	---	---	<50	<0.3	<0.3	<0.3	<0.6	---
MW-4	18 Apr 90	8015/8020	GTEL	---	---	<50	<0.3	<0.3	<0.3	<0.6	---
MW-4	9 Aug 90	8015/8020	GTEL	---	---	<50	<0.3	<0.3	<0.3	<0.6	---
MW-4	13 Nov 90	8015/8020	SAL	---	---	<50	<0.5	1	0.5	1	---
MW-5	24 Apr 89	524.2/8260	CCAS	---	---	<50	<0.5	<1.0	<1.0	<1.0	<3
MW-5	28 Jul 89	8260	CCAS	---	---	<100	<0.2	<1.0	<0.2	<0.4	<3
MW-5	30 Oct 89	8015/8020	GTEL	---	---	<500	<0.3	<0.3	<0.3	<0.6	---
MW-5	9 Jan 90	8015/8020	GTEL	---	---	<50	<0.3	<0.3	<0.3	<0.6	---
MW-5	18 Apr 90	8015/8020	GTEL	---	---	<50	<0.3	<0.3	<0.3	<0.6	---
MW-5	9 Aug 90	8015/8020	GTEL	---	---	<50	<0.3	<0.3	<0.3	<0.6	---
MW-5	13 Nov 90	8015/8020	SAL	---	---	<50	<0.5	1	<0.5	1	---

TABLE 2. Analytic Results: Groundwater Samples - Petroleum Hydrocarbons (continued)
Former Chevron Service Station 90020
1633 Harrison Street
Oakland, California

Well ID #	Date	EPA Method	Lab	FC	TFH	TPH/TPPH	Benzene	Toluene	E-Benzene	Xylenes	O&G
					<-------------------------------ppb------------------------------->						<-ppm->
MW-6	24 Apr 89	524.2/8260	CCAS	---	---	<50	<0.5	<1.0	<1.0	<1.0	<3
MW-6	28 Jul 89	8260	CCAS	---	---	<100	<0.2	<1.0	<0.2	<0.4	<3
MW-6	30 Oct 89	8015/8020	GTEL	---	---	<500	<0.3	<0.3	<0.3	<0.6	---
MW-6	9 Jan 90	8015/8020	GTEL	---	---	<50	<0.3	<0.3	<0.3	<0.6	---
MW-6	18 Apr 90	8015/8020	GTEL	---	---	<50	<0.3	<0.3	<0.3	<0.6	---
MW-6	9 Aug 90	8015/8020	GTEL	---	---	<50	<0.3	<0.3	<0.3	<0.6	---
MW-6	13 Nov 90	8015/8020	SAL	---	---	<50	3	5	0.5	2	---
MW-7	24 Apr 89	524.2/8260	CCAS	Gas	---	8,400	100	260	160	1,300	3**
MW-7	28 Jul 89	8260	CCAS	Gas	---	7,000	230	90	70	440	<3
MW-7D	28 Jul 89	8260	CCAS	Gas	---	6,000	280	180	58	430	---
MW-7	30 Oct 89	8015/8020	GTEL	Gas	---	10,000	570	55	160	400	---
MW-7D	30 Oct 89	8015/8020	GTEL	Gas	---	9,900	520	82	180	410	---
MW-7	9 Jan 90	8015/8020	GTEL	Gas	---	3,400	290	72	9	200	---
MW-7	18 Apr 90	8015/8020	GTEL	Gas	---	6,800	350	140	110	400	---
MW-7	9 Aug 90	8015/8020	GTEL	Gas	---	11,000	360	130	14	660	---
MW-7	13 Nov 90	8015/8020	SAL	---	---	6,500	230	110	97	460	---
MW-8	24 Apr 89	524.2/8260	CCAS	---	---	<50	<0.5	<1.0	<1.0	<1.0	3
MW-8D	24 Apr 89	524.2/8260	CCAS	---	---	<50	<0.5	<1.0	<1.0	<1.0	---
MW-8	28 Jul 89	8260	CCAS	---	---	<100	<0.2	<1.0	<0.2	<0.4	<3
MW-8	30 Oct 89	8015/8020	GTEL	---	---	<500	<0.3	<0.3	<0.3	<0.6	---
MW-8	9 Jan 90	8015/8020	GTEL	---	---	<50	<0.3	<0.3	<0.3	<0.6	---
MW-8	18 Apr 90	8015/8020	GTEL	---	---	<50	<0.3	<0.3	<0.3	<0.6	---
MW-8	9 Aug 90	8015/8020	GTEL	---	---	<50	<0.3	<0.3	<0.3	<0.6	---
MW-8	13 Nov 90	8015/8020	SAL	---	---	<50	<0.5	0.8	<0.5	2	---

TABLE 2. Analytic Results: Groundwater Samples - Petroleum Hydrocarbons (continued)
Former Chevron Service Station 90020
1633 Harrison Street
Oakland, California

Well ID #	Date	EPA Method	Lab	FC	TFH	TPH/TPPH	Benzene	Toluene	E-Benzene	Xylenes	O&G
					<------	------	------	ppb	------	------>	<-ppm->
MW-9	22 Jun 90	8015/8020	PACE	Gas	---	5,700	47	31	280	530	<1
MW-9	9 Aug 90	8015/8020	GTEL	Gas	---	8,000	<0.3	17	210	480	---
MW-9	13 Nov 90	8015/8020	SAL	---	---	6,400	<3	20	240	450	---
MW-10	22 Jun 90	8015/8020	PACE	Gas	---	<50	<0.5	<0.5	<0.5	<0.5	<1
MW-10	9 Aug 90	8015/8020	GTEL	---	---	<50	<0.3	<0.3	<0.3	<0.6	---
MW-10	13 Nov 90	8015/8020	SAL	---	---	<50	<0.5	2	0.5	2	---
MW-11	22 Jun 90	8015/8020	PACE	Gas	---	<50	<0.5	<0.5	<0.5	<0.5	<1
MW-11	9 Aug 90	8015/8020	GTEL	---	---	<50	<0.3	<0.3	<0.3	<0.6	---
MW-11	13 Nov 90	8015/8020	SAL	---	---	76	0.6	1	0.9	4	---
MW-12	22 Jun 90	8015/8020	PACE	Gas	---	<50	<0.5	<0.5	<0.5	<0.5	<1
MW-12	9 Aug 90	8015/8020	GTEL	---	---	<50	<0.3	<0.3	<0.3	<0.6	---
MW-12	13 Nov 90	8015/8020	SAL	---	---	<50	<0.5	<0.5	<0.5	<0.5	---
TB	3 Nov 88	624/8015	BC	---	---	---	<1.0	<1.0	<1.0	<1.0	---
TB	10 Feb 89	524.2/8240	CCAS	---	---	<50	<0.1	<0.1	<0.1	<0.2	---
TB	24 Apr 89	524.2/8260	CCAS	---	---	<50	<0.5	<1.0	<1.0	<1.0	---
TB	28 Jul 89	8260	CCAS	---	---	<50	<0.1	<0.5	<0.1	<0.2	---
TB	30 Oct 89	8015/8020	GTEL	---	---	<500	<0.3	<0.3	<0.3	<0.6	---
TB	9 Jan 90	8015/8020	GTEL	---	---	<50	<0.3	<0.3	<0.3	<0.6	---
TB	18 Apr 90	8015/8020	GTEL	---	---	<50	<0.3	<0.3	<0.3	<0.6	---
TB	22 Jun 90	8015/8020	PACE	---	---	<50	<0.5	<0.5	<0.5	<0.5	---
TB	9 Aug 90	8015/8020	GTEL	---	---	<50	<0.3	<0.3	<0.3	<0.6	---
TB	13 Nov 90	8015/8020	SAL	---	---	<50	<0.5	<0.5	<0.5	<0.5	---

1-012.04/C2NVO.WK1

TABLE 2. Analytic Results: Groundwater Samples - Petroleum Hydrocarbons (continued)
Former Chevron Service Station 90020
1633 Harrison Street
Oakland, California

NOTES:

FC	= Fuel Characterization	TB	= Travel Blank
TFH	= Total Fuel Hydrocarbons	---	= Not analyzed or characterized
TPH/TPPH	= Total Petroleum Hydrocarbons/ Total Purgeable Petroleum Hydrocarbons	<	= Less than listed detection limit
		Gas	= Gasoline
E-Benzene	= Ethylbenzene	BC	= Brown Caldwell Laboratories
O&G	= Oil and Grease by California Standard Method 503E	CCAS	= Central Coast Analytical Services
ppb	= parts-per-billion	GTEL	= Groundwater Technology Environmental Laboratories
ppm	= parts-per-million	PACE	= Pace Laboratories, Inc.
D	= Duplicate analysis		
*	= Single peak in gasoline range; not gasoline		
**	= Acetone 50 ppb, 2-butanone 160 ppb		

TABLE 3. Analytic Results: Groundwater Samples - Selected Halocarbons
Former Chevron Service Station #90020
1633 Harrison Street
Oakland, California

Well ID #	Date	EPA Method	LAB	Carb Tet	Chlor	PCE	TCE	1,2-DCE*	t-1,2-DCE	c-1,2-DCE	TCA	1,2-DCA	1,2-DCP	M-C
				<--------				ppb						-------->
MW-1	3 Nov 88	624/8015	BC	18.0	7.0	<1.0	<1.0	---	<1.0	---	<1.0	<1.0	---	---
MW-1	10 Feb 89	524.2/8240	CCAS	17.0	6.0	<0.2	<0.2	---	<0.2	<0.2	<0.2	<0.2	---	---
MW-1	24 Apr 89	524.2/8260	CCAS	16.0	6.0	<1.0	<1.0	<1.0	---	---	<1.0	<1.0	---	---
MW-1	28 Jul 89	8260	CCAS	20.0	6.4	<0.1	<0.1	---	<0.1	<0.1	0.3	<0.1	---	---
MW-1	30 Oct 89	601	GTEL	11.0	4.9	<0.5	<0.5	<0.5	---	---	<0.5	<0.5	---	---
MW-1	9 Jan 90	601	GTEL	24.0	7.2	<0.5	<0.5	<0.5	---	---	<0.5	<0.5	---	---
MW-1	18 Apr 90	601	GTEL	23.0	5.5	<0.5	<0.5	<0.5	---	---	1.4	<0.5	<0.5	<0.5
MW-1	9 Aug 90	601	GTEL	32.0	11.0	0.76	<0.5	<0.5	---	---	<0.5	<0.5	<0.5	<0.5
MW-1	13 Nov 90	8010	SAL	24	7	0.7	<0.5	---	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MW-2	3 Nov 88	624/8015	BC	3.0	2.0	34.0	3.0	---	10.0	---	<1.0	<1.0	---	---
MW-2	10 Feb 89	524.2/8240	CCAS	1.4	1.0	17.2	<0.2	---	<0.2	6.3	<0.2	<0.2	---	---
MW-2	24 Apr 89	524.2/8260	CCAS	2.0	2.0	38.0	3.0	9.0	---	---	<1.0	<1.0	---	---
MW-2	28 Jul 89	8260	CCAS	3.7	2.0	46.0	2.6	---	<0.2	<0.2	<0.2	<0.2	---	---
MW-2	30 Oct 89	601	GTEL	1.4	2.6	53.0	1.1	14.0	---	---	<0.5	<0.5	---	---
MW-2	9 Jan 90	601	GTEL	3.6	3.9	78.0	5.3	16.0	---	---	<0.5	<0.5	---	---
MW-2	18 Apr 90	601	GTEL	1.5	2.7	130.0	3.9	19.0	---	---	<0.5	<0.5	<0.5	<0.5
MW-2	9 Aug 90	601	GTEL	2.1	2.1	74.0	6.1	15.0	---	---	<0.5	<0.5	<0.5	<0.5
MW-2	13 Nov 90	8010	SAL	<0.5	2	40	4	---	<0.5	10	<0.5	<0.5	<0.5	<0.5

TABLE 3. Analytic Results: Groundwater Samples - Selected Halocarbons (continued)
Former Chevron Service Station #90020
1633 Harrison Street
Oakland, California

Well ID #	Date	EPA Method	LAB	Carb Tet	Chlor	PCE	TCE	1,2-DCE*	t-1,2-DCE	c-1,2-DCE	TCA	1,2-DCA	1,2-DCP	M-C
				<----------ppb---------->										
MW-3	3 Nov 88	624/8015	BC	8.0	6.0	84.0	3.0	---	5.0	---	<1.0	<1.0	---	---
MW-3	10 Feb 89	524.2/8240	CCAS	5.8	4.0	53.0	1.9	---	<0.2	9.0	<0.2	<0.2	---	---
MW-3	24 Apr 89	524.2/8260	CCAS	7.0	6.0	110.0	3.0	11.0	---	---	<1.0	<1.0	---	---
MW-3	28 Jul 89	8260	CCAS	8.6	5.0	49.0	2.1	---	<0.2	11.0	<0.2	<0.1	---	---
MW-3	30 Oct 89	601	GTEL	5.6	5.3	62.0	0.77	8.2	---	---	<0.5	<0.5	---	---
MW-3	9 Jan 90	601	GTEL	8.6	6.1	81.0	3.8	8.7	---	---	<0.5	<0.5	---	---
MW-3	18 Apr 90	601	GTEL	7.6	5.8	120.0	2.4	11.0	---	---	<0.5	<0.5	<0.5	<0.5
MW-3	9 Aug 90	601	GTEL	11.0	6.7	81.0	5.1	11.0	---	---	<0.5	<0.5	<0.5	<0.5
MW-3	13 Nov 90	8010	SAL	7	5	43	4	---	<0.5	9	<0.5	<0.5	<0.5	<0.5
MW-4	24 Apr 89	524.2/8260	CCAS	35.0	11.0	<1.0	<1.0	<1.0	---	---	<1.0	<1.0	---	---
MW-4	28 Jul 89	8260	CCAS	32.0	9.3	<0.1	<0.1	---	<0.1	<0.1	<0.1	<0.1	---	---
MW-4	30 Oct 89	601	GTEL	32.0	8.5	<0.5	<0.5	<0.5	---	---	<0.5	<0.5	---	---
MW-4	9 Jan 90	601	GTEL	36.0	9.8	<0.5	<0.5	<0.5	---	---	<0.5	<0.5	---	---
MW-4	18 Apr 90	601	GTEL	41.0	9.5	<0.5	<0.5	<0.5	---	---	<0.5	<0.5	<0.5	<0.5
MW-4	9 Aug 90	601	GTEL	38.0	11.0	<0.5	<0.5	<0.5	---	---	<0.5	<0.5	<0.5	<0.5
MW-4	13 Nov 90	8010	SAL	40	11	<0.5	<0.5	---	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MW-5	24 Apr 89	524.2/8260	CCAS	4.0	5.0	4.0	<1.0	2.0	---	---	<1.0	<1.0	---	---
MW-5	28 Jul 89	8260	CCAS	5.6	4.0	5.3	0.3	---	0.2	2.3	0.5	<0.2	---	---
MW-5	30 Oct 89	601	GTEL	2.9	2.0	2.7	<0.5	0.86	---	---	<0.5	<0.5	---	---
MW-5	9 Jan 90	601	GTEL	8.2	4.6	7.8	0.6	3.1	---	---	<0.5	<0.5	---	---
MW-5	18 Apr 90	601	GTEL	6.3	2.8	2.6	<0.5	1.7	---	---	<0.5	<0.5	<0.5	<0.5
MW-5	9 Aug 90	601	GTEL	11.0	4.8	6.0	<0.5	2.3	---	---	<0.5	<0.5	<0.5	<0.5
MW-5	13 Nov 90	8010	SAL	7	3	5	<0.5	---	<0.5	1	<0.5	<0.5	<0.5	<0.5

TABLE 3. Analytic Results: Groundwater Samples - Selected Halocarbons (continued)
Former Chevron Service Station #90020
1633 Harrison Street
Oakland, California

Well ID #	Date	EPA Method	LAB	Carb Tet	Chlor	PCE	TCE	1,2-DCE*	t-1,2-DCE	c-1,2-DCE	TCA	1,2-DCA	1,2-DCP	M-C
				<----------ppb---------->										
MW-6	24 Apr 89	524.2/8260	CCAS	13.0	7.0	<1.0	<1.0	<1.0	---	---	<1.0	<1.0	---	---
MW-6	28 Jul 89	8260	CCAS	9.6	4.0	<0.2	<0.2	---	<0.2	<0.2	0.5	0.6	---	---
MW-6	30 Oct 89	601	GTEL	8.2	3.6	<0.5	<0.5	<0.5	---	---	<0.5	<0.5	---	---
MW-6	9 Jan 90	601	GTEL	10.0	4.2	<0.5	<0.5	<0.5	---	---	<0.5	1.8	---	---
MW-6	18 Apr 90	601	GTEL	11.0	3.8	<0.5	<0.5	<0.5	---	---	<0.5	<0.5	<0.5	<0.5
MW-6	9 Aug 90	601	GTEL	20.0	6.6	<0.5	<0.5	<0.5	---	---	<0.5	<0.5	<0.5	<0.5
MW-6	13 Nov 90	8010	SAL	15	5	<0.5	<0.5	---	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MW-7	24 Apr 89	524.2/8260	CCAS	3.0	9.0	<1.0	<1.0	<1.0	---	---	<1.0	<1.0	---	---
MW-7	28 Jul 89	8260	CCAS	<2.0	<10.0	<2.0	<2.0	---	<2.0	<2.0	<10.0	6.0	---	---
MW-7D	28 Jul 89	8260	CCAS	<5.0	<20.0	<5.0	<5.0	---	<5.0	<5.0	<5.0	<5.0	---	---
MW-7	30 Oct 89	601	GTEL	<1.0	3.9	<1.0	<1.0	<1.0	---	---	<1.0	6.4	---	---
MW-7D	30 Oct 89	601	GTEL	<1.0	3.1	<1.0	<1.0	<1.0	---	---	<1.0	6.2	---	---
MW-7	9 Jan 90	601	GTEL	<0.5	3.0	<0.5	<0.5	<0.5	---	---	<0.5	8.4	---	---
MW-7	18 Apr 90	601	GTEL	<0.5	3.2	<0.5	<0.5	<0.5	---	---	<0.5	7.7	0.6	0.6
MW-7	9 Aug 90	601	GTEL	3.3	7.7	<0.5	<0.5	<0.5	---	---	<0.5	8.4	<0.5	1.8
MW-7	13 Nov 90	8010	SAL	0.6	3	<0.5	<0.5	---	<0.5	<0.5	<0.5	4	<0.5	<0.5
MW-8	24 Apr 89	524.2/8260	CCAS	2.0	3.0	6.0	<1.0	4.0	---	---	<1.0	<1.0	---	---
MW-8D	24 Apr 89	524.2/8260	CCAS	2.0	2.0	6.0	<1.0	3.0	---	---	<1.0	<1.0	---	---
MW-8	28 Jul 89	8260	CCAS	2.3	2.0	5.6	<0.2	---	<0.2	3.8	<0.2	<0.2	---	---
MW-8	30 Oct 89	601	GTEL	2.5	2.6	8.0	<0.5	5.5	---	---	<0.5	<0.5	---	---
MW-8	9 Jan 90	601	GTEL	4.9	3.9	19.0	0.9	6.6	---	---	<0.5	<0.5	---	---
MW-8	18 Apr 90	601	GTEL	3.8	2.8	17.0	0.6	5.7	---	---	<0.5	<0.5	<0.5	<0.5
MW-8	9 Aug 90	601	GTEL	5.3	4.4	27.0	1.2	9.2	---	---	<0.5	<0.5	<0.5	<0.5
MW-8	13 Nov 90	8010	SAL	3	2	21	0.7	---	<0.5	6	<0.5	<0.5	<0.5	<0.5

TABLE 3. Analytic Results: Groundwater Samples - Selected Halocarbons (continued)
Former Chevron Service Station #90020
1633 Harrison Street
Oakland, California

Well ID #	Date	EPA Method	LAB	Carb Tet	Chlor	PCE	TCE	1,2-DCE*	t-1,2-DCE	c-1,2-DCE	TCA	1,2-DCA	1,2-DCP	M-C
				<----------ppb---------->										
MW-9	22 Jun 90	8010	PACE	<0.5	<0.5	<0.5	<0.5	---	<0.5	---	<0.5	<0.5	<0.5	<0.5
MW-9	9 Aug 90	601	GTEL	<0.5	<0.5	<0.5	<0.5	<0.5	---	---	<0.5	0.71	<0.5	<0.5
MW-9	13 Nov 90	9010	SAL	<0.5	<0.5	<0.5	<0.5	---	<0.5	<0.5	<0.5	1	<0.5	<0.5
MW-10	22 Jun 90	8010	PACE	9.6	8.9	<0.5	<0.5	---	<0.5	---	<0.5	<0.5	<0.5	<0.5
MW-10	9 Aug 90	601	GTEL	11.0	7.8	<0.5	<0.5	<0.5	---	---	<0.5	<0.5	<0.5	<0.5
MW-10	13 Nov 90	8010	SAL	5	4	<0.5	<0.5	---	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
MW-11	22 Jun 90	8010	PACE	4.6	6.5	73	1.3	---	<0.5	8.9	<0.5	<0.5	<0.5	<0.5
MW-11	9 Aug 90	601	GTEL	8.1	6.8	84	2.0	4.6	---	---	<0.5	<0.5	<0.5	<0.5
MW-11	13 Nov 90	8010	SAL	<0.5	<0.5	39	<0.5	---	<0.5	2	5	<0.5	<0.5	<0.5
MW-12	22 Jun 90	8010	PACE	6.0	7.3	7.4	<0.5	---	<0.5	13	<0.5	<0.5	<0.5	<0.5
MW-12	9 Aug 90	601	GTEL	8.0	7.0	6.7	<0.5	5.8	---	---	<0.5	<0.5	<0.5	<0.5
MW-12	13 Nov 90	8010	SAL	<0.5	<0.5	9	<0.5	---	<0.5	3	3	<0.5	<0.5	<0.5
TB	3 Nov 88	624/8015	BC	<1.0	<1.0	<1.0	<1.0	---	<1.0	---	<1.0	<1.0	---	---
TB	10 Feb 89	524.2/8240	CCAS	<0.1	<0.5	<0.1	<0.1	---	<0.1	<0.1	<0.1	<0.1	---	---
TB	24 Apr 89	524.2/8260	CCAS	<1.0	<1.0	<1.0	<1.0	<1.0	---	---	<1.0	<1.0	---	---
TB	28 Jul 89	8260	CCAS	<0.1	<0.5	<0.1	<0.1	<0.1	---	<0.1	<0.1	<0.1	---	---
TB	30 Oct 89	601	GTEL	<0.5	<0.5	<0.5	<0.5	<0.5	---	---	<0.5	<0.5	---	---
TB	9 Jan 90	601	GTEL	<0.5	<0.5	<0.5	<0.5	<0.5	---	---	<0.5	<0.5	---	---
TB	18 Apr 90	601	GTEL	<0.5	<0.5	<0.5	<0.5	<0.5	---	---	<0.5	<0.5	<0.5	<0.5
TB	22 Jun 90	8010	PACE	<0.5	<0.5	<0.5	<0.5	---	<0.5	---	<0.5	<0.5	<0.5	<0.5
TB	9 Aug 90	8010	GTEL	<0.5	<0.5	<0.5	<0.5	<0.5	---	---	<0.5	<0.5	<0.5	<0.5
TB	13 Nov 90	8010	SAL	<0.5	<0.5	<0.5	<0.5	---	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

TABLE 3. Analytic Results: Groundwater Samples - Selected Halocarbons (continued)
Former Chevron Service Station #90020
1633 Harrison Street
Oakland, California

NOTES:

Carb Tet	= Carbon tetrachloride	c-1,2-DCE	= cis-1,2-Dichloroethene	TB	= Travel blank
Chlor	= Chloroform	TCA	= 1,1,1-Trichloroethane	<	= Less than listed detection limit
PCE	= Tetrachloroethene	1,2-DCA	= 1,2-Dichloroethane	---	= Not analyzed or characterized
TCE	= Trichloroethene	1,2-DCP	= 1,2-Dichloropropane	BC	= Brown and Caldwell Laboratories
1,2-DCE	= 1,2-Dichloroethene	M-C	= Methylene Chloride	CCAS	= Central Coast Analytical Services
t-1,2-DCE	= trans-1,2-Dichloroethene	ppb	= parts-per-billion	GTEL	= Groundwater Technology Environmental Laboratories
		D	= Duplicate analysis	PACE	= Pace Laboratory, Inc.
				SAL	= Superior Analytical Laboratories, Inc.

*cis and trans isomers: GTEL does not speciate 1,2-dichloroethene; however, the analytical reports incorrectly state levels for trans-1,2-dichloroethene

ATTACHMENT A

SOP-4: GROUNDWATER PURGING AND SAMPLING

STANDARD OPERATING PROCEDURES
RE: GROUNDWATER PURGING AND SAMPLING
SOP-4

Prior to water sampling, each well is purged by evacuating a minimum of three well-casing volumes of groundwater or until the discharge water temperature, conductivity, and pH stabilize. The groundwater sample should be taken when the water level in the well recovers to 80% of its static level.

The sampling equipment used consists of either a teflon bailer or a stainless steel bladder pump with a teflon bladder. If the sampling system is dedicated to the well, then the bailer is made of teflon, but the bladder pump is PVC with a polypropylene bladder. Forty milliliter (ml) glass volatile-organic-analysis (VOA) vials, with teflon septa, are used as sample containers.

The groundwater sample is decanted into each VOA vial in such a manner that there is a meniscus at the top of the vial. The cap is quickly placed over the top of the vial and securely tightened. The VOA vial is then inverted and tapped to see if air bubbles are present. If none are present, the sample is labeled and refrigerated for delivery under chain-of-custody to the laboratory. Label information should include a sample identification number, job identification number, date, time, type of analysis requested, and the sampler's name.

For quality control purposes, a duplicate water sample is collected from each well. This sample is put on hold at the laboratory. A trip blank is prepared at the laboratory and placed in the transport cooler. It remains with the cooler and is analyzed by the laboratory along with the groundwater samples. A field blank is prepared in the field when sampling equipment is not dedicated. The field blank is prepared after a pump or bailer has been steam-cleaned, prior to use in a second well, and is analyzed along with the other samples. The field blank demonstrates the quality of in-field cleaning procedures to prevent cross-contamination.

To minimize the potential for cross-contamination between wells, all the well-development and water-sampling equipment that is not dedicated to a well is steam-cleaned between each well. As a second precautionary measure, wells will be sampled in order of least to highest concentrations as established by previous analyses.

ATTACHMENT B

FIELD SAMPLING AND MONITORING FORMS

LIQUID-LEVEL DATA SHEET

Project No.	Project Name	Date	Initials
1-012.05	17th & Harrison	Nov 13 1990	DO + AD

Well No.	HISTORIC DATA/DATE: DTLH	DTW	LHT	Sounded Depth	CURRENT DATA: DTLH	DTW	LHT	Sounded Depth	Method (WLP) / PB / IP *	Time	Comments
MW 1						20.98				7:49	
2						21.54				7:55	
3						21.15				7:57	
4						22.10				7:53	
5						21.35				7:51	
6						20.75				7:47	
7						20.41				7:45	
8						20.86				7:59	
9						20.78				8:03	
10						20.47				8:05	
11						20.93				9:00	
12						20.45				8:01	

* WLP = Water-Level Probe
PB = Product Bailer
IP = Interface Probe

WATER SAMPLING DATA

Project No.	Project Name	Well Name	Date	Time	Initials
1-012.05	17th + Harrison	MW1	11/13/90	12:05	DO

WELL DATA

Well Depth (ft.) 29	Sounded Depth (ft.)	Well Type: [X] Monitor Well [ ] Sampling Port [ ] Other (describe)
DTW (ft.) 20.98	Date/Time	
Well Diam. (in.) 4	LHC Present? [ ] Yes [X] No	LHC Thickness

CHEMICAL DATA

	Time	Ph Probe No.	Temp Probe No.	Cond Probe No.
1				umhos
2				
3				

EVACUATION

Initial Height of Water in Casing (ft): 0.02

Volume (gal): 5.23

Volume to be Evacuated: [X] x3 [ ] x4 — 15.71

Formulas and Conversions

r = well radius in ft.
h = ht. of water column in ft.
vol. of column = $\pi r^2 h$
7.48 gal / ft³

V_2 * casing = 0.163 gal / ft.
V_3 * casing = 0.367 gal / ft.
V_4 * casing = 0.653 gal / ft.
$V_{4.5}$ * casing = 0.826 gal / ft.
V_6 * casing = 1.470 gal / ft.
V_8 * casing = 2.610 gal / ft.
V_{10} * casing = 4.080 gal / ft.

Sampling Equipment

Dedicated System: [X] Bladder Pump [ ] Bailer
PVC Bailer: [ ] 1/2 in. [ ] 1 1/4 in. [ ] 3 in.

Sampling Port No.

Volume (gal) | Rate (gpm)

Evacuation

	Evacuated	Evacuated	Evacuated	Evacuated
Stop Time	12:30			
Start Time	12:10			
Minutes	20			
Amt Evac'd	16 gal	gal	gal	gal
Total Evac'd	16 gal	gal	gal	gal
Total Minutes	20 min	min	min	min
Evac Rate	.80 gpm	gpm	gpm	gpm

Pumped Dry? [ ] Yes [X] No — After (gal)

Depth to Water During Pumping (ft): 22.70 — Time: @ 12:25

Depth to Water for 80% Recovery — Recovery Rate (gpm)

Sampled After: [ ] 80% Rec. [ ] 2 hours — % Recovery at Time of Sampling

Recovery

	Time	DTW
1		
2		
3		
4		
5		

SAMPLING

Point of Collection: [X] PE Hose [ ] End of Bailer [ ] Other:

Time Samples Taken: 12:35 — Date: 11/13/90

Depth to Water (ft): 22.50 — Refrigerated? [X] Yes [ ] No

Sample Color: clear — Odor: none

Sediment / Foreign Matter: none

Sampling Sequence: 11

Sample ID No.	Volume (ml)	Container	Preservative	Analysis	Lab
11130-01A	40	V	HCl	EPA 602/8015	SAL
-01B			"	"	
-01C			None	EPA 601	
-01D			"	"	

Container Codes: P = Plastic Bottle; V = VOA; B = Brown Glass; C = Clear Glass; Other: Describe

COMMENTS

WATER SAMPLING DATA

Project No.	Project Name	Well Name	Date	Time	Initials
1-012.05	17th + Harrison	MW 2	11/13/90	12:20	AD

WELL DATA

Well Depth (ft.) 28.5	Sounded Depth (ft.)	Well Type ☒ Monitor Well ☐ Sampling Port ☐ Other (describe)
DTW (ft.) 21.54	Date/Time	
Well Diam. (in.) 4	LHC Present? ☐ Yes ☒ No	LHC Thickness

CHEMICAL DATA

	Time	Ph Probe No.	Temp Probe No.	Cond Probe No.
1				umhos
2				
3				

EVACUATION

Initial Height of Water in Casing (ft) 6.96	**Formulas and Conversions** r = well radius in ft. h = ht. of water column in ft. vol. of column = $\pi r^2 h$ 7.48 gal / ft³	**Sampling Equipment** Dedicated System ☒ Bladder Pump ☐ Bailer; PVC Bailer ☐ 1/2 in. ☐ 1 1/4 in. ☐ 3 in.
Volume (gal) 4.54	V_2 " casing = 0.163 gal / ft. V_3 " casing = 0.367 gal / ft. V_4 " casing = 0.653 gal / ft. $V_{4.5}$ " casing = 0.826 gal / ft. V_6 " casing = 1.470 gal / ft. V_8 " casing = 2.610 gal / ft. V_{10} " casing = 4.080 gal / ft.	Sampling Port No.
Volume to be Evacuated ☒ x3 ☐ x4 13.63		Volume (gal) / Rate (gpm)

Evacuation

	Evacuated	Evacuated	Evacuated	Evacuated
Stop Time	12:35			
Start Time	12:20			
Minutes	15			
Amt Evac'd	13.6 gal	gal	gal	gal
Total Evac'd	13.6 gal	gal	gal	gal
Total Minutes	15 min	min	min	min
Evac Rate	.91 gpm	gpm	gpm	gpm

Pumped Dry? ☐ Yes ☒ No	After (gal)
Depth to Water During Pumping (ft) 22.89	Time 12:28
Depth to Water for 80% Recovery	Recovery Rate (gpm)
Sampled After: ☐ 80% Rec. ☐ 2 hours	% Recovery at Time of Sampling

Recovery

	Time	DTW
1		
2		
3		
4		
5		

SAMPLING

Point of Collection ☒ PE Hose ☐ End of Bailer ☐ Other:	Time Samples Taken 12:36	Date 11/13/90
	Depth to Water (ft) 22.89	Refrigerated? ☒ Yes ☐ No

Sample Color: Clear — Odor: none

Sediment / Foreign Matter: none

Sampling Sequence: 10

Sample ID No.	Volume (ml)	Container	Preservative	Analysis	Lab
111390ZA	40	VOA	HCL	EPA 602/8015	SAL
B	↓	↓	↓	↓	↓
C	↓	↓	none	EPA 601	↓
D	↓	↓	↓	↓	↓

Container Codes: P = Plastic Bottle, V = VOA, B = Brown Glass, C = Clear Glass, Other: Describe

COMMENTS

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WATER SAMPLING DATA

Project No.	Project Name	Well Name	Date	Time	Initials
1-012.05	17th + Harrison	MW3	11/13/96	11:25	QD

WELL DATA

Well Depth (ft.)	Sounded Depth (ft.)	Well Type
32		☒ Monitor Well
DTW (ft.) 25.15	Date/Time	☐ Sampling Port
		☐ Other (describe)
Well Diam. (in.) 4	LHC Present? ☐ Yes ☒ No	LHC Thickness

CHEMICAL DATA

Time	Ph Probe No.	Temp Probe No.	Cond Probe No.
1			umhos
2			
3			

EVACUATION

Initial Height of Water in Casing (ft)	Formulas and Conversions	Sampling Equipment
6.85	r = well radius in ft. h = ht. of water column in ft. vol. of column = $\pi r^2 h$ 7.48 gal / ft³	Dedicated System: ☒ Bladder Pump ☐ Bailer
Volume (gal) 4.47	V_2 " casing = 0.163 gal / ft. V_3 " casing = 0.367 gal / ft.	PVC Bailer: ☐ 1/2 in. ☐ 1 1/4 in. ☐ 3 in.
Volume to be Evacuated ☒ x3 ☐ x4 13.41	V_4 " casing = 0.653 gal / ft. V_5 " casing = 0.826 gal / ft. V_6 " casing = 1.470 gal / ft. V_8 " casing = 2.610 gal / ft. V_{10} " casing = 4.080 gal / ft.	Sampling Port No.
		Volume (gal) / Rate (gpm)

Evacuation

	Evacuated	Evacuated	Evacuated	Evacuated
Stop Time	11:45			
Start Time	11:30			
Minutes	15			
Amt Evac'd	13.5 gal	gal	gal	gal
Total Evac'd	13.5 gal	gal	gal	gal
Total Minutes	15 min	min	min	min
Evac Rate	.09 gpm	gpm	gpm	gpm

Pumped Dry?	After (gal)	Recovery	
☐ Yes ☒ No		Time	DTW
Depth to Water During Pumping (ft) 21.85	Time 11:38	1	
Depth to Water for 80% Recovery	Recovery Rate (gpm)	2	
Sampled After: ☐ 80% Rec. ☐ 2 hours	% Recovery at Time of Sampling	3	
		4	
		5	

SAMPLING

Point of Collection	Time Samples Taken	Date
☒ PE Hose ☐ End of Bailer ☐ Other:	11:45	11/13/96
	Depth to Water (ft) 21.30	Refrigerated? ☒ Yes ☐ No

Sample Color: Clear — Odor: none

Sediment / Foreign Matter: none

Sampling Sequence: 7

Sample ID No.	Volume (ml)	Container	Preservative	Analysis	Lab
1113103A	40	VOA	HCL	EPA 602/8015	SAL
B			↓	↓	
C			none	EPA 601	
D			↓	↓	

Container Codes: P = Plastic Bottle, V = VOA, B = Brown Glass, C = Clear Glass, Other: Describe

COMMENTS

WESTERN GEOLOGIC RESOURCES, INC.

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WATER SAMPLING DATA

Project No.	Project Name	Well Name	Date	Time	Initials
1-012.05	17th + Harrison	MW4	11/13/90	10:55	DO

WELL DATA

Well Depth (ft.) 33.5	Sounded Depth (ft.)	Well Type: ☒ Monitor Well ☐ Sampling Port ☐ Other (describe)
DTW (ft.) 22.10	Date/Time	
Well Diam. (in.) 4	LHC Present? ☐ Yes ☒ No	LHC Thickness

CHEMICAL DATA

	Time	Ph Probe No.	Temp Probe No.	Cond Probe No.	
1					umhos
2					
3					

EVACUATION

Initial Height of Water in Casing (ft): 11.40

Volume (gal): 7.44

Volume to be Evacuated ☒ x3 ☐ x4: 22.33

Formulas and Conversions

r = well radius in ft.
h = ht. of water column in ft.
vol. of column = $\pi r^2 h$
7.48 gal / ft³

- V_2 * casing = 0.163 gal / ft.
- V_3 * casing = 0.367 gal / ft.
- V_4 * casing = 0.653 gal / ft.
- $V_{4.5}$ * casing = 0.826 gal / ft.
- V_5 * casing = 1.470 gal / ft.
- V_6 * casing = 2.610 gal / ft.
- V_{10} * casing = 4.080 gal / ft.

Sampling Equipment

Dedicated System: ☒ Bladder Pump ☐ Bailer

PVC Bailer: ☐ 1/2 in. ☐ 1 1/4 in. ☐ 3 in.

Sampling Port No.

Volume (gal) / Rate (gpm)

Evacuation

	Evacuated	Evacuated	Evacuated	Evacuated
Stop Time	11:25			
Start Time	11:00			
Minutes	25			
Amt Evac'd	23 gal	gal	gal	gal
Total Evac'd	gal	gal	gal	gal
Total Minutes	min	min	min	min
Evac Rate	gpm	gpm	gpm	gpm

Pumped Dry? ☐ Yes ☒ No — After (gal)

Depth to Water During Pumping (ft): 23.95 — Time: @ 11:20

Depth to Water for 80% Recovery — Recovery Rate (gpm)

Sampled After: ☐ 80% Rec. ☐ 2 hours — % Recovery at Time of Sampling

Recovery

	Time	DTW
1		
2		
3		
4		
5		

SAMPLING

Point of Collection: ☒ PE Hose ☐ End of Bailer ☐ Other:

Time Samples Taken: 11:30 — Date: 11/13/90

Depth to Water (ft): 23.22 — Refrigerated? ☒ Yes ☐ No

Sample Color: clear — Odor: none

Sediment / Foreign Matter: none

Sampling Sequence: 8

Sample ID No.	Volume (ml)	Container	Preservative	Analysis	Lab
11130-04A	40	V	HCl	EPA 602/8015	SAL
04B			"	"	
04C			NONE	EPA 601	
04D			"	"	

Container Codes: P = Plastic Bottle, V = VOA, B = Brown Glass, C = Clear Glass, Other: Describe

COMMENTS

WESTERN GEOLOGIC RESOURCES, INC

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WATER SAMPLING DATA

Project No.	Project Name	Well Name	Date	Time	Initials
1-012.05	IPT+ @ HARRISON	MW5	11/13/90	10:25	DO

WELL DATA

Well Depth (ft.) 32	Sounded Depth (ft.)	Well Type: ☒ Monitor Well ☐ Sampling Port ☐ Other (describe)
DTW (ft.) 21.35	Date/Time	
Well Diam. (in.) 4	LHC Present? ☐ Yes ☐ No	LHC Thickness

CHEMICAL DATA

	Time	Ph Probe No.	Temp Probe No.	Cond Probe No.
1				umhos
2				
3				

EVACUATION

Initial Height of Water in Casing (ft) 10.65

Volume (gal) 6.95

Volume to be Evacuated ☐ x3 ☐ x4 20.86

Formulas and Conversions

r = well radius in ft.
h = ht. of water column in ft.
vol. of column = $\pi r^2 h$
7.48 gal / ft³

V_{2} * casing = 0.163 gal / ft.
V_{3} * casing = 0.367 gal / ft.
V_{4} * casing = 0.653 gal / ft.
$V_{4.5}$ * casing = 0.826 gal / ft.
V_{6} * casing = 1.470 gal / ft.
V_{8} * casing = 2.610 gal / ft.
V_{10} * casing = 4.080 gal / ft.

Sampling Equipment

Dedicated System: ☒ Bladder Pump ☐ Bailer
PVC Bailer: ☐ 1/2 in. ☐ 1 1/4 in. ☐ 3 in.

Sampling Port No.

Volume (gal) / Rate (gpm)

Evacuation

	Evacuated	Evacuated	Evacuated	Evacuated
Stop Time	10:40			
Start Time	10:30			
Minutes	10			
Amt Evac'd	9 gal	gal	gal	gal
Total Evac'd	9 gal	gal	gal	gal
Total Minutes	10 min	min	min	min
Evac Rate	.90 gpm	gpm	gpm	gpm

Pumped Dry? ☒ Yes ☐ No — After (gal) 9

Depth to Water During Pumping (ft) NA — Time

Depth to Water for 80% Recovery 23.48

Recovery Rate (gpm) .06

Sampled After: ☒ 80% Rec. ☒ 2 hours

% Recovery at Time of Sampling 91.08

Recovery

	Time	DTW
1	10:40	31.35
2	10:45	30.90
3	12:50	22.30
4		
5		

SAMPLING

Point of Collection: ☒ PE Hose ☐ End of Bailer ☐ Other:

Time Samples Taken 12:55 — Date 11/13/90

Depth to Water (ft) ≈ 23.05 — Refrigerated? ☒ Yes ☐ No

Sample Color Cloudy — Odor none

Sediment / Foreign Matter SMALL TRACES OF SAND

Sampling Sequence 12

Sample ID No.	Volume (ml)	Container	Preservative	Analysis	Lab
11130-05A	40	V	HCl	EPA 602/8015	SAL
05B	↓	↓	"	"	↓
05C	↓	↓	None	EPA 601	↓
05D	↓	↓	"	"	↓

Container Codes: P = Plastic Bottle, V = VOA, B = Brown Glass, C = Clear Glass, Other: Describe

COMMENTS

WATER SAMPLING DATA

Project No.	Project Name	Well Name	Date	Time	Initials
1-012.05	17th / Harrison	MW6	11/13/90	9:20	DO

WELL DATA

Well Depth (ft.) 26	Sounded Depth (ft.)	Well Type: ☒ Monitor Well ☐ Sampling Port ☐ Other (describe)
DTW (ft.) 20.75	Date/Time	
Well Diam. (in.) 4	LHC Present? ☐ Yes ☒ No	LHC Thickness

CHEMICAL DATA

	Time	Ph Probe No.	Temp Probe No.	Cond Probe No.
1				umhos
2				
3				

EVACUATION

Initial Height of Water in Casing (ft): 5.25

Volume (gal): 3.43

Volume to be Evacuated: ☐ x3 ☐ x4 10 + 28

Formulas and Conversions

r = well radius in ft.
h = ht. of water column in ft.
vol. of column = $\pi r^2 h$
7.48 gal / ft³

- V_2 * casing = 0.163 gal / ft.
- V_3 * casing = 0.367 gal / ft.
- V_4 * casing = 0.653 gal / ft.
- $V_{4.5}$ * casing = 0.826 gal / ft.
- V_6 * casing = 1.470 gal / ft.
- V_8 * casing = 2.610 gal / ft.
- V_{10} * casing = 4.080 gal / ft.

Sampling Equipment

Dedicated System: ☒ Bladder Pump ☐ Bailer

PVC Bailer: ☐ 1/2 in. ☐ 1 1/4 in. ☐ 3 in.

Sampling Port No.

Volume (gal) / Rate (gpm)

Evacuation

	Evacuated	Evacuated	Evacuated	Evacuated
Stop Time	9:40			
Start Time	9:25			
Minutes	15			
Amt Evac'd	17 gal	gal	gal	gal
Total Evac'd	17 gal	gal	gal	gal
Total Minutes	15 min	min	min	min
Evac Rate	1.13 gpm	gpm	gpm	gpm

Pumped Dry? ☐ Yes ☐ No — After (gal)

Depth to Water During Pumping (ft): 21.95 — Time: 9:35

Depth to Water for 80% Recovery — Recovery Rate (gpm)

Sampled After: ☐ 80% Rec. ☐ 2 hours — % Recovery at Time of Sampling

Recovery

	Time	DTW
1		
2		
3		
4		
5		

SAMPLING

Point of Collection: ☒ PE Hose ☐ End of Bailer ☐ Other:

Time Samples Taken: 9:55 — Date: 11/13/90

Depth to Water (ft): 21.72 — Refrigerated? ☒ Yes ☐ No

Sample Color: Clear — Odor: NONE

Sediment / Foreign Matter: none

Sampling Sequence: 5

Sample ID No.	Volume (ml)	Container	Preservative	Analysis	Lab
111306A	40	V	HCl	EPA 602/8015	SAL
06B			"	"	
06C			None	EPA 601	
06D			"	"	

Container Codes: P = Plastic Bottle; V = VOA; B = Brown Glass; C = Clear Glass; Other: Describe

COMMENTS

WESTERN GEOLOGIC RESOURCES, INC

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WATER SAMPLING DATA

Project No.	Project Name	Well Name	Date	Time	Initials
1-012.05	17th / Harrison	MW7	11/13/90	9:30	DO

WELL DATA

Well Depth (ft.) 27	Sounded Depth (ft.)	Well Type: ☒ Monitor Well ☐ Sampling Port ☐ Other (describe)
DTW (ft.) 20.41	Date/Time	
Well Diam. (in.) 4	LHC Present? ☐ Yes ☒ No	LHC Thickness

CHEMICAL DATA

	Time	Ph Probe No.	Temp Probe No.	Cond Probe No.
1				umhos
2				
3				

EVACUATION

Initial Height of Water in Casing (ft): 6.59

Volume (gal): 4.3

Volume to be Evacuated: ☒ x3 ☐ x4 — 12.91

Formulas and Conversions

r = well radius in ft.
h = ht. of water column in ft.
vol. of column = π r² h
7.48 gal / ft³

V_{2} * casing = 0.163 gal / ft.
V_{3} * casing = 0.367 gal / ft.
V_{4} * casing = 0.653 gal / ft.
$V_{4.5}$ * casing = 0.826 gal / ft.
V_{5} * casing = 1.470 gal / ft.
V_{6} * casing = 2.610 gal / ft.
V_{10} * casing = 4.080 gal / ft.

Sampling Equipment

Dedicated System: ☒ Bladder Pump ☐ Bailer
PVC Bailer: ☐ 1/2 in. ☐ 1 1/4 in. ☐ 3 in.

Sampling Port No.

Volume (gal) / Rate (gpm)

Evacuation

	Evacuated	Evacuated	Evacuated	Evacuated
Stop Time	9:42			
Start Time	9:35			
Minutes	7			
Amt Evac'd	5 gal	gal	gal	gal
Total Evac'd	5 gal	gal	gal	gal
Total Minutes	7 min	min	min	min
Evac Rate	.71 gpm	gpm	gpm	gpm

Pumped Dry? ☒ Yes ☐ No — After (gal): 5

Depth to Water During Pumping (ft): NA — Time:

Depth to Water for 80% Recovery: 21.73

Recovery Rate (gpm): .05

Sampled After: ☐ Min. ☒ 2 hours

% Recovery at Time of Sampling: 53.11%

Recovery

	Time	DTW
1	9:12	26.05
2	9:47	25.65
3	11:50	23.50
4		
5		

SAMPLING

Point of Collection: ☒ PE Hose ☐ End of Bailer ☐ Other:

Time Samples Taken: 11:55 — Date: 11/13/90

Depth to Water (ft): 24.20 — Refrigerated? ☒ Yes ☐ No

Sample Color: clear — Odor: none

Sediment / Foreign Matter: none

Sampling Sequence: 9

Sample ID No.	Volume (ml)	Container	Preservative	Analysis	Lab
11130-07A	40	40	HCl	EPA 602/8015	SAL
-07B	↓	↓	"	"	↓
07C			None	EPA 401	
07D			"	"	

Container Codes: P = Plastic Bottle, V = VOA, B = Brown Glass, C = Clear Glass, Other: Describe

COMMENTS

WATER SAMPLING DATA

Project No.	Project Name	Well Name	Date	Time	Initials
1-012.05	17th + Harrison	MW8	11/13/90	10:25	GD

WELL DATA

Well Depth (ft.) 26	Sounded Depth (ft.)	Well Type: ☒ Monitor Well ☐ Sampling Port ☐ Other (describe)
DTW (ft.) 20.86	Date/Time	
Well Diam. (in.) 4	LHC Present? ☐ Yes ☒ No	LHC Thickness

CHEMICAL DATA

Time	Ph Probe No.	Temp Probe No.	Cond Probe No.
1			umhos
2			
3			

EVACUATION

Initial Height of Water in Casing (ft) 5.14	Formulas and Conversions: r = well radius in ft. h = ht. of water column in ft. vol. of column = π r² h. 7.48 gal / ft³	Sampling Equipment: Dedicated System ☒ Bladder Pump ☐ Bailer; PVC Bailer ☐ 1/2 in. ☐ 1 1/4 in. ☐ 3 in.
Volume (gal) 3.35	V_2 " casing = 0.163 gal / ft.	
Volume to be Evacuated ☒ x3 ☐ x4 10.06	V_3 " casing = 0.367 gal / ft.	
	V_4 " casing = 0.653 gal / ft.	
	$V_{4.5}$ " casing = 0.825 gal / ft.	
	V_6 " casing = 1.470 gal / ft.	
	V_8 " casing = 2.610 gal / ft.	
	V_{10} " casing = 4.080 gal / ft.	

Sampling Port No.

Volume (gal)	Rate (gpm)

Evacuation

	Evacuated	Evacuated	Evacuated	Evacuated
Stop Time	10:55			
Start Time	10:26			
Minutes	29			
Amt Evac'd	10.1 gal	gal	gal	gal
Total Evac'd	10.1 gal	gal	gal	gal
Total Minutes	29 min	min	min	min
Evac Rate	.34 gpm	gpm	gpm	gpm

Pumped Dry? ☐ Yes ☒ No	After (gal)	Recovery: Time / DTW
Depth to Water During Pumping (ft) 21.75	Time 16:40	1 / 2 / 3 / 4 / 5
Depth to Water for 80% Recovery	Recovery Rate (gpm)	
Sampled After: ☐ 80% Rec. ☐ 2 hours	% Recovery at Time of Sampling	

SAMPLING

Point of Collection: ☒ PE Hose ☐ End of Bailer ☐ Other:	Time Samples Taken 11:00	Date 11/13/90
	Depth to Water (ft) 21.57	Refrigerated? ☒ Yes ☐ No
Sample Color clear	Odor none	
Sediment / Foreign Matter none		
Sampling Sequence 6		

Sample ID No.	Volume (ml)	Container	Preservative	Analysis	Lab
1113 0.08 A	40	VOA	HCL	EPA 602/8015	SAL
B	↓	↓	↓	↓	↓
C			601	EPA 601	
D	↓	↓	↓	↓	

Container Codes: P = Plastic Bottle; V = VOA; B = Brown Glass; C = Clear Glass; Other: Describe

COMMENTS

WESTERN GEOLOGIC RESOURCES, INC.

WATER SAMPLING DATA

Project No.	Project Name	Well Name	Date	Time	Initials
1-012.05	17th & Harrison	MW9	11/13/96	8:15	DO

WELL DATA

Well Depth (ft.) 24.11	Sounded Depth (ft.)	Well Type: ☒ Monitor Well ☐ Sampling Port ☐ Other (describe)
DTW (ft.) 20.78	Date/Time	
Well Diam. (in.) 2	LHC Present? ☐ Yes ☒ No	LHC Thickness

CHEMICAL DATA

	Time	Ph Probe No.	Temp Probe No.	Cond Probe No.
1				umhos
2				
3				

EVACUATION

Initial Height of Water in Casing (ft): 3.33

Volume (gal): .54

Volume to be Evacuated: ☒ x3 ☐ x4 — 1.62

Formulas and Conversions

r = well radius in ft.
h = ht. of water column in ft.
vol. of column = $\pi r^2 h \times 7.48$ gal / ft³

- V_2 * casing = 0.163 gal / ft.
- V_3 * casing = 0.367 gal / ft.
- V_4 * casing = 0.653 gal / ft.
- $V_{4.5}$ * casing = 0.826 gal / ft.
- V_6 * casing = 1.470 gal / ft.
- V_8 * casing = 2.610 gal / ft.
- V_{10} * casing = 4.080 gal / ft.

Sampling Equipment

Dedicated System: ☒ Bladder Pump ☐ Bailer

PVC Bailer: ☐ 1/2 in. ☒ 1 1/4 in. ☐ 3 in.

Sampling Port No.:

Volume (gal): Rate (gpm):

Evacuation

	Evacuated	Evacuated	Evacuated	Evacuated
Stop Time	8:25			
Start Time	8:20			
Minutes	5			
Amt Evac'd	2.0 gal	gal	gal	gal
Total Evac'd	2.0 gal	gal	gal	gal
Total Minutes	5 min	min	min	min
Evac Rate	.40 gpm	gpm	gpm	gpm

Pumped Dry? ☐ Yes ☒ No — After (gal)

Depth to Water During Pumping (ft): 21.47 — Time: @ 8:23

Depth to Water for 80% Recovery — Recovery Rate (gpm)

Sampled After: ☐ 80% Rec. ☐ 2 hours — % Recovery at Time of Sampling

Recovery

	Time	DTW
1		
2		
3		
4		
5		

SAMPLING

Point of Collection: ☒ PE Hose ☒ End of Bailer ☐ Other:

Time Samples Taken: 8:50 — Date: 11/13/96

Depth to Water (ft): 21.27 — Refrigerated? ☒ Yes ☐ No

Sample Color: Cloudy — Odor: None

Sediment / Foreign Matter: SMALL AMOUNTS OF white particles

Sampling Sequence: 2

Sample ID No.	Volume (ml)	Container	Preservative	Analysis	Lab
11130-9A	40	V	HCl	EPA 602/8015	SAL
9B			"	"	
9C			NONE	EPA 601	
9D			"	"	

Container Codes: P = Plastic Bottle, V = VOA, B = Brown Glass, C = Clear Glass, Other: Describe

COMMENTS

WESTERN GEOLOGIC RESOURCES, INC.

WATER SAMPLING DATA

Project No.	Project Name	Well Name	Date	Time	Initials
1-012.05	17th / Harrison	MW 10	11/13/90	8:45	DO

WELL DATA

Well Depth (ft.)	Sounded Depth (ft.)	Well Type
23.45	Date/Time	☒ Monitor Well ☐ Sampling Port ☐ Other (describe)
DTW (ft.) 20.47		
Well Diam. (in.) 2	**LHC Present?** ☐ Yes ☒ No	**LHC Thickness**

CHEMICAL DATA

	Time	Ph Probe No.	Temp Probe No.	Cond Probe No.
1				umhos
2				
3				

EVACUATION

Initial Height of Water in Casing (ft) 2.98

Volume (gal) .48

Volume to be Evacuated ☒ x3 ☐ x4 1.45

Formulas and Conversions

r = well radius in ft.
h = ft. of water column in ft.
vol. of column = $\pi r^2 h$
7.48 gal / ft³

- V_2 * casing = 0.163 gal / ft.
- V_3 * casing = 0.367 gal / ft.
- V_4 * casing = 0.653 gal / ft.
- $V_{4.5}$ * casing = 0.826 gal / ft.
- V_6 * casing = 1.470 gal / ft.
- V_8 * casing = 2.610 gal / ft.
- V_{10} * casing = 4.080 gal / ft.

Sampling Equipment

Dedicated System ☐ Bladder Pump ☐ Bailer

PVC Bailer ☐ 1/2 in. ☒ 1 1/4 in. ☐ 3 in.

Sampling Port No.

Volume (gal)	Rate (gpm)

Evacuation

	Evacuated	Evacuated	Evacuated	Evacuated
Stop Time	9:00			
Start Time	8:55			
Minutes	5			
Amt Evac'd	1.5 gal	gal	gal	gal
Total Evac'd	1.5 gal	gal	gal	gal
Total Minutes	5 min	min	min	min
Evac Rate	.30 gpm	gpm	gpm	gpm

Pumped Dry? ☐ Yes ☒ No **After (gal)**

Depth to Water During Pumping (ft) 21.50 @ 9:00 **Time**

Depth to Water for 80% Recovery **Recovery Rate (gpm)**

Sampled After: ☐ 80% Rec. ☒ 2 hours **% Recovery at Time of Sampling**

Recovery

	Time	DTW
1		
2		
3		
4		
5		

SAMPLING

Point of Collection ☐ PE Hose ☒ End of Bailer ☐ Other:

Time Samples Taken 9:05 **Date** 11/13/90

Depth to Water (ft) 21.05 **Refrigerated?** ☒ Yes ☐ No

Sample Color Cloudy **Odor** None

Sediment / Foreign Matter Small amounts of brownish silt

Sampling Sequence 4

Sample ID No.	Volume (ml)	Container	Preservative	Analysis	Lab
11136-10A	40	V	HCl	EPA 602/8015	SAL
10B	"	"	"	"	"
10C	"	"	None	EPA 601	"
10D	"	"	"	"	"

Container Codes: P = Plastic Bottle; B = Brown Glass; V = VOA; C = Clear Glass; Other: Describe

COMMENTS

WESTERN GEOLOGIC RESOURCES, INC.

WATER SAMPLING DATA

Project No.	Project Name	Well Name	Date	Time	Initials
1-012.05	17th / Harrison	MW 11	11/13/90	9:00	GD

WELL DATA

Well Depth (ft.)	Sounded Depth (ft.)	Well Type
25.35		☒ Monitor Well
DTW (ft.)	Date/Time	☐ Sampling Port
20.93		☐ Other (describe)
Well Diam. (in.)	LHC Present?	LHC Thickness
2	☐ Yes ☒ No	

CHEMICAL DATA

Time	Ph Probe No.	Temp Probe No.	Cond Probe No.

1 _____ 2 _____ 3 _____ umhos

EVACUATION

Initial Height of Water in Casing (ft)	Formulas and Conversions	Sampling Equipment
4.42	r = well radius in ft. h = ht. of water column in ft. vol. of column = $\pi r^2 h$ 7.48 gal / ft³	Dedicated System ☐ Bladder Pump ☐ Bailer PVC Bailer ☐ 1/2 in. ☒ 1 1/4 in. ☐ 3 in.
Volume (gal)	V_1 " casing = 0.163 gal / ft.	
.72	V_2 " casing = 0.367 gal / ft.	
	V_3 " casing = 0.653 gal / ft.	
	V_4 " casing = 0.826 gal / ft.	
	$V_{4.5}$ " casing = 1.470 gal / ft.	
	V_5 " casing = 2.610 gal / ft.	
	V_{10} " casing = 4.080 gal / ft.	
Volume to be Evacuated ☒ x3 ☐ x4		Sampling Port No.
2.16		Volume (gal) / Rate (gpm)

Evacuation

	Evacuated	Evacuated	Evacuated	Evacuated
Stop Time	9:20			
Start Time	9:10			
Minutes	10			
Amt Evac'd	2.2 gal	gal	gal	gal
Total Evac'd	2.2 gal	gal	gal	gal
Total Minutes	10 min	min	min	min
Evac Rate	.22 gpm	gpm	gpm	gpm

Pumped Dry?	After (gal)
☐ Yes ☒ No	
Depth to Water During Pumping (ft) 21.75	Time 9:16
Depth to Water for 80% Recovery	Recovery Rate (gpm)
Sampled After: ☐ 80% Rec. ☐ 2 hours	% Recovery at Time of Sampling

Recovery

	Time	DTW
1		
2		
3		
4		
5		

SAMPLING

Point of Collection	Time Samples Taken	Date
☐ PE Hose ☒ End of Bailer ☐ Other:	9:25	11/13/90
	Depth to Water (ft) 21.19	Refrigerated? ☒ Yes ☐ No

Sample Color: brown Odor: none

Sediment / Foreign Matter: Sediment

Sampling Sequence: 3

Sample ID No.	Volume (ml)	Container	Preservative	Analysis	Lab
11130.11A	40	VOA	HCL	EPA 602/8015	SAL
B			↓	↓	
C			none	EPA 601	
D			↓	↓	

Container Codes: P = Plastic Bottle; V = VOA; B = Brown Glass; C = Clear Glass; Other: Describe

COMMENTS

WESTERN GEOLOGIC RESOURCES, INC.

WATER SAMPLING DATA

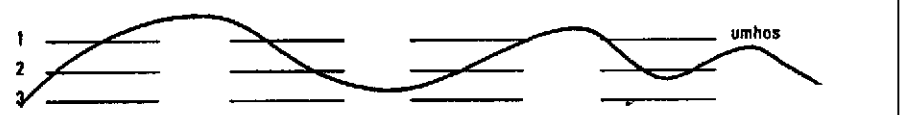
Project No.	Project Name	Well Name	Date	Time	Initials
1-012.05	17th + Harrison	MW-12	11/13/90	8:20	GO

WELL DATA

Well Depth (ft.)	Sounded Depth (ft.)	Well Type
25.38		☒ Monitor Well
DTW (ft.)	Date/Time	☐ Sampling Port
20.45		☐ Other (describe)
Well Diam. (in.)	LHC Present?	LHC Thickness
2	☐ Yes ☒ No	

CHEMICAL DATA

Time | Ph Probe No. | Temp Probe No. | Cond Probe No.



EVACUATION

Initial Height of Water in Casing (ft): 4.93

Volume (gal): 8

Volume to be Evacuated: ☒ x3 ☐ x4 — 2.4

Formulas and Conversions

r = well radius in ft.
h = ht. of water column in ft.
vol. of column = π r² h
7.48 gal / ft³

V_2 * casing = 0.163 gal / ft.
V_3 * casing = 0.367 gal / ft.
V_4 * casing = 0.653 gal / ft.
$V_{4.5}$ * casing = 0.826 gal / ft.
V_6 * casing = 1.470 gal / ft.
V_8 * casing = 2.610 gal / ft.
V_{10} * casing = 4.080 gal / ft.

Sampling Equipment

Dedicated System: ☐ Bladder Pump ☐ Bailer

PVC Bailer: ☐ 1/2 in. ☒ 1 1/4 in. ☐ 3 in.

Sampling Port No.

Volume (gal)	Rate (gpm)

Evacuation

	Evacuated	Evacuated	Evacuated	Evacuated
Stop Time	8:34			
Start Time	8:20			
Minutes	14			
Amt Evac'd	2.5 gal	gal	gal	gal
Total Evac'd	2.5 gal	gal	gal	gal
Total Minutes	14 min	min	min	min
Evac Rate	.18 gpm	gpm	gpm	gpm

Pumped Dry? ☐ Yes ☒ No — After (gal)

Depth to Water During Pumping (ft): 20.90 — Time: 8:30 ~~20.90~~

Depth to Water for 80% Recovery

Recovery Rate (gpm)

Sampled After: ☐ 80% Rec. ☐ 2 hours

% Recovery at Time of Sampling

Recovery

	Time	DTW
1		
2		
3		
4		
5		

SAMPLING

Point of Collection: ☐ PE Hose ☒ End of Bailer ☐ Other:

Time Samples Taken: 8:35 — Date: 11/13/90

Depth to Water (ft): 20.65 — Refrigerated? ☒ Yes ☐ No

Sample Color: brown — Odor: none

Sediment / Foreign Matter: sediment

Sampling Sequence: 1

Sample ID No.	Volume (ml)	Container	Preservative	Analysis	Lab
1130.12A	40	VOA	HCl	EPA 602/1805	SAL
B	↓	↓	↓	↓	↓
C			none	EPA 601	
D			↓	↓	

Container Codes: P = Plastic Bottle; V = VOA; B = Brown Glass; C = Clear Glass; Other: Describe

COMMENTS

WESTERN GEOLOGIC RESOURCES, INC.

ATTACHMENT C

CHAIN-OF-CUSTODY FORM

43

SF #11197

Chain-of-Custody Record

Chevron U.S.A. Inc.
P.O. Box 5004
San Ramon, CA 94583
FAX (415) 842-9591

Chevron Facility Number: 90020
Consultant Release Number: —
Consultant Project Number: 1-012.05
Consultant Name: Western Geologic Resources
Address: 2169 E Francisco Blvd San Rafael Ca.
Fax Number: 415-457-8521
Project Contact (Name): Len Niles
(Phone): 415-457-7595

Chevron Contact (Name): Nancy Vukelich
(Phone): 842-9581
Laboratory Name: Superior Analytical
Contract Number: 4368580
Samples Collected by (Name): Dean Osaki / Anne Douglas
Collection Date: 11/13/90 a.D.
Signature: Anne Douglas

Sample Number	Lab Number	Number of Containers	Matrix S = Soil A = Air W = Water C = Charcoal	Type G = Grab C = Composite	Time	Sample Preservation	Iced	Modified EPA 8015 Total Petro. Hydrocarb. as Gasoline	Modified EPA 8015 Total Petro. Hydrocarb. as Gasoline + Diesel	503 Oil and Grease	Arom. Volatiles - BTXE Soil: 8020/Wtr.: 602	Arom. Volatiles - BTXE Soil: 8240/Wtr.: 624	Total Lead DHS-Luft	EDB DHS-AB 1803	EPA 601 8010			Remarks
ABC 11130.01	ABCD	4	W		12:35		Yes	X			X				X			Samples A+B for
X -02	↓	↓	↓		12:36	See Remarks	↓	↓			↓				↓			EPA 602 / 8015
-03					11:45													HCL preserved
-04					11:30													
ABCD X -05					12:55													C, D Samples for
-06					9:55													EPA 601
-07					11:55													No preserv.
-08					11:00													Cancel Hold
-09					8:30													"Hold 601 Samples
-010					9:05													for MW 9-12"
-011					9:25													Hold & Do not Run
-012	↓	↓			8:35													
-013	AB	2	↓		—		↓	↓			↓				↓			

Relinquished By (Signature)	Organization	Date/Time	Received By (Signature)	Organization	Date/Time
Anne Douglas	WGR	11/14/90 9:40	Conrad #523 Express		11-14-90 9:35
Conrad #523	Express Unlimited	11-14-90 10:30	[signature]		
Relinquished By (Signature)	Organization	Date/Time	Received For Laboratory By (Signature): [signature] 11-14-90		10:30 AM

Turn Around Time (Circle Choice)
24 Hrs
48 Hrs
5 Days
(10 Days) — circled

ATTACHMENT D

LABORATORY REPORTS WITH QUALITY ASSURANCE/
QUALITY CONTROL DOCUMENTS

SUPERIOR ANALYTICAL LABORATORY, INC.
1555 BURKE, UNIT I • SAN FRANCISCO, CA 94124 • PHONE (415) 647-2081

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 11197
CLIENT: Western Geologic Resources
CLIENT JOB NO.: 1-012.05

DATE RECEIVED: 11/13/90
DATE REPORTED: 11/21/90

Lab Number	Customer Sample Identification	Date Sampled	Date Analyzed
11197- 1	11130.01	11/13/90	11/19/90
11197- 2	11130.02	11/13/90	11/19/90
11197- 3	11130.03	11/13/90	11/19/90
11197- 4	11130.04	11/13/90	11/19/90
11197- 5	11130.05	11/13/90	11/19/90
11197- 6	11130.06	11/13/90	11/19/90
11197- 7	11130.07	11/13/90	11/20/90
11197- 8	11130.08	11/13/90	11/19/90
11197- 9	11130.09	11/13/90	11/20/90
11197-10	11130.010	11/13/90	11/19/90

Laboratory Number:	11197 1	11197 2	11197 3	11197 4	11197 5
ANALYTE LIST	Amounts/Quantitation Limits (ug/l)				
OIL AND GREASE:	NA	NA	NA	NA	NA
TPH/GASOLINE RANGE:	ND<50	ND<50	51 *	ND<50	ND<50
TPH/DIESEL RANGE:	NA	NA	NA	NA	NA
BENZENE:	ND<0.5	ND<0.5	ND<0.5	ND<0.5	ND<0.5
TOLUENE:	ND<0.5	0.8	ND<0.5	1	1
ETHYL BENZENE:	ND<0.5	ND<0.5	ND<0.5	0.5	ND<0.5
XYLENES:	ND<0.5	0.9	ND<0.5	1	1

Laboratory Number:	11197 6	11197 7	11197 8	11197 9	11197 10
ANALYTE LIST	Amounts/Quantitation Limits (ug/l)				
OIL AND GREASE:	NA	NA	NA	NA	NA
TPH/GASOLINE RANGE:	ND<50	6500	ND<50	6400	ND<50
TPH/DIESEL RANGE:	NA	NA	NA	NA	NA
BENZENE:	3	230	ND<0.5	ND<3	ND<0.5
TOLUENE:	5	110	0.8	20	2
ETHYL BENZENE:	0.5	97	ND<0.5	240	0.5
XYLENES:	2	460	2	450	2

* single peak in gasoline range. Does not match gasoline pattern.

SUPERIOR ANALYTICAL LABORATORY, INC.
1555 BURKE, UNIT I • SAN FRANCISCO, CA 94124 • PHONE (415) 647-2081

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

LABORATORY NO.: 11197
CLIENT: Western Geologic Resources
CLIENT JOB NO.: 1-012.05

DATE RECEIVED: 11/13/90
DATE REPORTED: 11/21/90

Lab Number	Customer Sample Identification	Date Sampled	Date Analyzed
11197-11	11130.011	11/13/90	11/19/90
11197-12	11130.012	11/13/90	11/19/90
11197-13	11130.013	11/13/90	11/19/90

Laboratory Number:	11197 11	11197 12	11197 13
ANALYTE LIST	Amounts/Quantitation Limits (ug/l)		
OIL AND GREASE:	NA	NA	NA
TPH/GASOLINE RANGE:	76	ND<50	ND<50
TPH/DIESEL RANGE:	NA	NA	NA
BENZENE:	0.6	ND<0.5	ND<0.5
TOLUENE:	1	ND<0.5	ND<0.5
ETHYL BENZENE:	0.9	ND<0.5	ND<0.5
XYLENES:	4	ND<0.5	ND<0.5

SUPERIOR ANALYTICAL LABORATORY, INC.
1555 BURKE, UNIT I • SAN FRANCISCO, CA 94124 • PHONE (415) 647-2081

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

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS
Diesel by Modified EPA SW-846 Method 8015
Gasoline by Purge and Trap: EPA MEthod 8015/5030
ANALYSIS FOR BENZENE, TOLUENE, ETHYL BENZENE & XYLENES
by EPA SW-846 Methods 5030 and 8020

QA/QC INFORMATION
SET: 11197

NA = ANALYSIS NOT REQUESTED
ND = ANALYSIS NOT DETECTED ABOVE QUANTITATION LIMIT

ug/L = part per billion (ppb)

OIL AND GREASE ANALYSIS By Standard Methods Method 503E:
Duplicate RPD NA
Minimum Detection Limit in Water: 5000ug/L

Modified EPA Method 8015 for Extractable Hydrocarbons:
Minimum Quantitation Limit for Diesel in Water: 1000ug/L
Daily Standard run at 200mg/L; %Diff Diesel = NA
MS/MSD Average Recovery = NA: Duplicate RPD = NA

8015/5030 Total Purgable Petroleum Hydrocarbons:
Minimum Quantitation Limit for Gasoline in Water: 50ug/L
Daily Standard run at 2mg/L; %Diff Gasoline = <15%
MS/MSD Average Recovery = 89%: Duplicate RPD = 9%

8020/BTXE
Minimum Quantitation Limit in Water: 0.50ug/L
Daily Standard run at 20ug/L; %Diff = <15%
MS/MSD Average Recovery = 107%: Duplicate RPD = <9%

Richard Srna, Ph.D.
Laboratory Director

SUPERIOR ANALYTICAL LABORATORY, INC.
1555 BURKE, UNIT I • SAN FRANCISCO, CA 94124 • PHONE (415) 647-2081

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 11197-1
CLIENT: Western Geologic Resources
JOB NO.: 1-012.05

DATE SAMPLED: 11/13/90
DATE RECEIVED: 11/14/90
DATE ANALYZED: 11/19/90

EPA SW-846 METHOD 8010
HALOGENATED VOLATILE ORGANICS
SAMPLE: 11130.01

Compound	MDL (ug/L)	RESULTS (ug/l)
Chloromethane/Vinyl Chloride	1.0	ND
Bromomethane/Chloroethane	1.0	ND
Trichlorofluoromethane	2.5	ND
1,1-Dichloroethene	0.5	ND
Methylene Chloride	0.5	ND
trans-1,2-Dichloroethene	0.5	ND
1,1-Dichloroethane	0.5	ND
Chloroform	0.5	7
1,1,1-Trichloroethane	0.5	ND
Carbon tetrachloride	0.5	24
1,2-Dichloroethane	0.5	ND
Trichloroethylene	0.5	ND
1,2-Dichloropropane	0.5	ND
Bromodichloromethane	0.5	ND
Cis-1,3-Dichloropropene	0.5	ND
trans-1,3-Dichloropropene	0.5	ND
1,1,2-Trichloroethane	0.5	ND
Tetrachloroethene	0.5	0.7
Dibromochloromethane	0.5	ND
Chlorobenzene	0.5	ND
Bromoform	0.5	ND
1,1,2,2-Tetrachloroethane	0.5	ND
1,3-Dichlorobenzene	0.5	ND
1,2-Dichlorobenzene	0.5	ND
1,4-Dichlorobenzene	0.5	ND
Cis-1,2-Dichloroethene	0.5	ND

MDL = Method Detection Limit
ug/l = parts per billion (ppb)
QA/QC Summary: Daily Standard RPD = <15%
MS/MSD average recovery = 91% :MS/MSD RPD =< 2%

Richard Srna, Ph.D.

Laboratory Director

SUPERIOR ANALYTICAL LABORATORY, INC.
1555 BURKE, UNIT I • SAN FRANCISCO, CA 94124 • PHONE (415) 647-2081

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 11197-2
CLIENT: Western Geologic Resources
JOB NO.: 1-012.05

DATE SAMPLED: 11/13/90
DATE RECEIVED: 11/14/90
DATE ANALYZED: 11/19/90

EPA SW-846 METHOD 8010
HALOGENATED VOLATILE ORGANICS
SAMPLE: 11130.02

Compound	MDL (ug/L)	RESULTS (ug/l)
Chloromethane/Vinyl Chloride	1.0	ND
Bromomethane/Chloroethane	1.0	ND
Trichlorofluoromethane	2.5	ND
1,1-Dichloroethene	0.5	ND
Methylene Chloride	0.5	ND
trans-1,2-Dichloroethene	0.5	ND
1,1-Dichloroethane	0.5	ND
Chloroform	0.5	2
1,1,1-Trichloroethane	0.5	ND
Carbon tetrachloride	0.5	ND
1,2-Dichloroethane	0.5	ND
Trichloroethylene	0.5	4
1,2-Dichloropropane	0.5	ND
Bromodichloromethane	0.5	ND
Cis-1,3-Dichloropropene	0.5	ND
trans-1,3-Dichloropropene	0.5	ND
1,1,2-Trichloroethane	0.5	ND
Tetrachloroethene	0.5	40
Dibromochloromethane	0.5	ND
Chlorobenzene	0.5	ND
Bromoform	0.5	ND
1,1,2,2-Tetrachloroethane	0.5	ND
1,3-Dichlorobenzene	0.5	ND
1,2-Dichlorobenzene	0.5	ND
1,4-Dichlorobenzene	0.5	ND
Cis-1,2-Dichloroethene	0.5	10

MDL = Method Detection Limit
ug/l = parts per billion (ppb)
QA/QC Summary: Daily Standard RPD = <15%
MS/MSD average recovery = 91% :MS/MSD RPD =< 2%

Richard Srna, Ph.D.
Laboratory Director

SUPERIOR ANALYTICAL LABORATORY, INC.
1555 BURKE, UNIT I • SAN FRANCISCO, CA 94124 • PHONE (415) 647-2081

CERTIFICATE OF ANALYSIS

LABORATORY NO.: 11197-3
CLIENT: Western Geologic Resources
JOB NO.: 1-012.05

DATE SAMPLED: 11/13/90
DATE RECEIVED: 11/14/90
DATE ANALYZED: 11/19/90

EPA SW-846 METHOD 8010
HALOGENATED VOLATILE ORGANICS
SAMPLE: 11130.03

Compound	MDL (ug/L)	RESULTS (ug/l)
Chloromethane/Vinyl Chloride	1.0	ND
Bromomethane/Chloroethane	1.0	ND
Trichlorofluoromethane	2.5	ND
1,1-Dichloroethene	0.5	ND
Methylene Chloride	0.5	ND
trans-1,2-Dichloroethene	0.5	ND
1,1-Dichloroethane	0.5	ND
Chloroform	0.5	5
1,1,1-Trichloroethane	0.5	ND
Carbon tetrachloride	0.5	7
1,2-Dichloroethane	0.5	ND
Trichloroethylene	0.5	4
1,2-Dichloropropane	0.5	ND
Bromodichloromethane	0.5	ND
Cis-1,3-Dichloropropene	0.5	ND
trans-1,3-Dichloropropene	0.5	ND
1,1,2-Trichloroethane	0.5	ND
Tetrachloroethene	0.5	43
Dibromochloromethane	0.5	ND
Chlorobenzene	0.5	ND
Bromoform	0.5	ND
1,1,2,2-Tetrachloroethane	0.5	ND
1,3-Dichlorobenzene	0.5	ND
1,2-Dichlorobenzene	0.5	ND
1,4-Dichlorobenzene	0.5	ND
Cis-1,2-Dichloroethene	0.5	9

MDL = Method Detection Limit
ug/l = parts per billion (ppb)
QA/QC Summary: Daily Standard RPD = <15%
MS/MSD average recovery = 91% :MS/MSD RPD =< 2%

Richard Srna, Ph.D.
Laboratory Director

SUPERIOR ANALYTICAL LABORATORY, INC.
1555 BURKE, UNIT I • SAN FRANCISCO, CA 94124 • PHONE (415) 647-2081

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

LABORATORY NO.: 11197-4
CLIENT: Western Geologic Resources
JOB NO.: 1-012.05

DATE SAMPLED: 11/13/90
DATE RECEIVED: 11/14/90
DATE ANALYZED: 11/19/90

EPA SW-846 METHOD 8010
HALOGENATED VOLATILE ORGANICS
SAMPLE: 11130.04

Compound	MDL (ug/L)	RESULTS (ug/l)
Chloromethane/Vinyl Chloride	1.0	ND
Bromomethane/Chloroethane	1.0	ND
Trichlorofluoromethane	2.5	ND
1,1-Dichloroethene	0.5	ND
Methylene Chloride	0.5	ND
trans-1,2-Dichloroethene	0.5	ND
1,1-Dichloroethane	0.5	ND
Chloroform	0.5	11
1,1,1-Trichloroethane	0.5	ND
Carbon tetrachloride	0.5	40
1,2-Dichloroethane	0.5	ND
Trichloroethylene	0.5	ND
1,2-Dichloropropane	0.5	ND
Bromodichloromethane	0.5	ND
Cis-1,3-Dichloropropene	0.5	ND
trans-1,3-Dichloropropene	0.5	ND
1,1,2-Trichloroethane	0.5	ND
Tetrachloroethene	0.5	ND
Dibromochloromethane	0.5	ND
Chlorobenzene	0.5	ND
Bromoform	0.5	ND
1,1,2,2-Tetrachloroethane	0.5	ND
1,3-Dichlorobenzene	0.5	ND
1,2-Dichlorobenzene	0.5	ND
1,4-Dichlorobenzene	0.5	ND
Cis-1,2-Dichloroethene	0.5	ND

MDL = Method Detection Limit
ug/l = parts per billion (ppb)
QA/QC Summary: Daily Standard RPD = <15%
MS/MSD average recovery = 91% :MS/MSD RPD =< 2%

Richard Srna, Ph.D.

Laboratory Director

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CERTIFICATE OF ANALYSIS

LABORATORY NO.: 11197-5
CLIENT: Western Geologic Resources
JOB NO.: 1-012.05

DATE SAMPLED: 11/13/90
DATE RECEIVED: 11/14/90
DATE ANALYZED: 11/19/90

EPA SW-846 METHOD 8010
HALOGENATED VOLATILE ORGANICS
SAMPLE: 11130.05

Compound	MDL (ug/L)	RESULTS (ug/l)
Chloromethane/Vinyl Chloride	1.0	ND
Bromomethane/Chloroethane	1.0	ND
Trichlorofluoromethane	2.5	ND
1,1-Dichloroethene	0.5	ND
Methylene Chloride	0.5	ND
trans-1,2-Dichloroethene	0.5	ND
1,1-Dichloroethane	0.5	ND
Chloroform	0.5	3
1,1,1-Trichloroethane	0.5	ND
Carbon tetrachloride	0.5	7
1,2-Dichloroethane	0.5	ND
Trichloroethylene	0.5	ND
1,2-Dichloropropane	0.5	ND
Bromodichloromethane	0.5	ND
Cis-1,3-Dichloropropene	0.5	ND
trans-1,3-Dichloropropene	0.5	ND
1,1,2-Trichloroethane	0.5	ND
Tetrachloroethene	0.5	5
Dibromochloromethane	0.5	ND
Chlorobenzene	0.5	ND
Bromoform	0.5	ND
1,1,2,2-Tetrachloroethane	0.5	ND
1,3-Dichlorobenzene	0.5	ND
1,2-Dichlorobenzene	0.5	ND
1,4-Dichlorobenzene	0.5	ND
Cis-1,2-Dichloroethene	0.5	1

MDL = Method Detection Limit
ug/l = parts per billion (ppb)
QA/QC Summary: Daily Standard RPD = <15%
MS/MSD average recovery = 91% :MS/MSD RPD =< 2%

Richard Srna, Ph.D.
Laboratory Director

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CERTIFICATE OF ANALYSIS

LABORATORY NO.: 11197-6
CLIENT: Western Geologic Resources
JOB NO.: 1-012.05

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EPA SW-846 METHOD 8010
HALOGENATED VOLATILE ORGANICS
SAMPLE: 11130.06

Compound	MDL (ug/L)	RESULTS (ug/l)
Chloromethane/Vinyl Chloride	1.0	ND
Bromomethane/Chloroethane	1.0	ND
Trichlorofluoromethane	2.5	ND
1,1-Dichloroethene	0.5	ND
Methylene Chloride	0.5	ND
trans-1,2-Dichloroethene	0.5	ND
1,1-Dichloroethane	0.5	ND
Chloroform	0.5	5
1,1,1-Trichloroethane	0.5	ND
Carbon tetrachloride	0.5	15
1,2-Dichloroethane	0.5	ND
Trichloroethylene	0.5	ND
1,2-Dichloropropane	0.5	ND
Bromodichloromethane	0.5	ND
Cis-1,3-Dichloropropene	0.5	ND
trans-1,3-Dichloropropene	0.5	ND
1,1,2-Trichloroethane	0.5	ND
Tetrachloroethene	0.5	ND
Dibromochloromethane	0.5	ND
Chlorobenzene	0.5	ND
Bromoform	0.5	ND
1,1,2,2-Tetrachloroethane	0.5	ND
1,3-Dichlorobenzene	0.5	ND
1,2-Dichlorobenzene	0.5	ND
1,4-Dichlorobenzene	0.5	ND
Cis-1,2-Dichloroethene	0.5	ND

MDL = Method Detection Limit
ug/l = parts per billion (ppb)
QA/QC Summary: Daily Standard RPD = <15%
MS/MSD average recovery = 91% :MS/MSD RPD =< 2%

Richard Srna, Ph.D.
Laboratory Director

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CERTIFICATE OF ANALYSIS

LABORATORY NO.: 11197-7
CLIENT: Western Geologic Resources
JOB NO.: 1-012.05

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EPA SW-846 METHOD 8010
HALOGENATED VOLATILE ORGANICS
SAMPLE: 11130.07

Compound	MDL (ug/L)	RESULTS (ug/l)
Chloromethane/Vinyl Chloride	1.0	ND
Bromomethane/Chloroethane	1.0	ND
Trichlorofluoromethane	2.5	ND
1,1-Dichloroethene	0.5	ND
Methylene Chloride	0.5	ND
trans-1,2-Dichloroethene	0.5	ND
1,1-Dichloroethane	0.5	ND
Chloroform	0.5	3
1,1,1-Trichloroethane	0.5	ND
Carbon tetrachloride	0.5	0.6
1,2-Dichloroethane	0.5	4
Trichloroethylene	0.5	ND
1,2-Dichloropropane	0.5	ND
Bromodichloromethane	0.5	ND
Cis-1,3-Dichloropropene	0.5	ND
trans-1,3-Dichloropropene	0.5	ND
1,1,2-Trichloroethane	0.5	ND
Tetrachloroethene	0.5	ND
Dibromochloromethane	0.5	ND
Chlorobenzene	0.5	ND
Bromoform	0.5	ND
1,1,2,2-Tetrachloroethane	0.5	ND
1,3-Dichlorobenzene	0.5	ND
1,2-Dichlorobenzene	0.5	ND
1,4-Dichlorobenzene	0.5	ND
Cis-1,2-Dichloroethene	0.5	ND

MDL = Method Detection Limit
ug/l = parts per billion (ppb)
QA/QC Summary: Daily Standard RPD = <15%
MS/MSD average recovery = 91% :MS/MSD RPD =< 2%

Richard Srna, Ph.D.

(FOR)
Laboratory Director

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CERTIFICATE OF ANALYSIS

LABORATORY NO.: 11197-8
CLIENT: Western Geologic Resources
JOB NO.: 1-012.05

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EPA SW-846 METHOD 8010
HALOGENATED VOLATILE ORGANICS
SAMPLE: 11130.08

Compound	MDL (ug/L)	RESULTS (ug/l)
Chloromethane/Vinyl Chloride	1.0	ND
Bromomethane/Chloroethane	1.0	ND
Trichlorofluoromethane	2.5	ND
1,1-Dichloroethene	0.5	ND
Methylene Chloride	0.5	ND
trans-1,2-Dichloroethene	0.5	ND
1,1-Dichloroethane	0.5	ND
Chloroform	0.5	2
1,1,1-Trichloroethane	0.5	ND
Carbon tetrachloride	0.5	3
1,2-Dichloroethane	0.5	ND
Trichloroethylene	0.5	0.7
1,2-Dichloropropane	0.5	ND
Bromodichloromethane	0.5	ND
Cis-1,3-Dichloropropene	0.5	ND
trans-1,3-Dichloropropene	0.5	ND
1,1,2-Trichloroethane	0.5	ND
Tetrachloroethene	0.5	21
Dibromochloromethane	0.5	ND
Chlorobenzene	0.5	ND
Bromoform	0.5	ND
1,1,2,2-Tetrachloroethane	0.5	ND
1,3-Dichlorobenzene	0.5	ND
1,2-Dichlorobenzene	0.5	ND
1,4-Dichlorobenzene	0.5	ND
Cis-1,2-Dichloroethene	0.5	6

MDL = Method Detection Limit
ug/l = parts per billion (ppb)
QA/QC Summary: Daily Standard RPD = <15%
MS/MSD average recovery = 91% :MS/MSD RPD =< 2%

Richard Srna, Ph.D.
(FOR)
Laboratory Director

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CERTIFICATE OF ANALYSIS

LABORATORY NO.: 11197-9
CLIENT: Western Geologic Resources
JOB NO.: 1-012.05

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EPA SW-846 METHOD 8010
HALOGENATED VOLATILE ORGANICS
SAMPLE: 11130.09

Compound	MDL (ug/L)	RESULTS (ug/l)
Chloromethane/Vinyl Chloride	1.0	ND
Bromomethane/Chloroethane	1.0	ND
Trichlorofluoromethane	2.5	ND
1,1-Dichloroethene	0.5	ND
Methylene Chloride	0.5	ND
trans-1,2-Dichloroethene	0.5	ND
1,1-Dichloroethane	0.5	ND
Chloroform	0.5	ND
1,1,1-Trichloroethane	0.5	ND
Carbon tetrachloride	0.5	ND
1,2-Dichloroethane	0.5	1
Trichloroethylene	0.5	ND
1,2-Dichloropropane	0.5	ND
Bromodichloromethane	0.5	ND
Cis-1,3-Dichloropropene	0.5	ND
trans-1,3-Dichloropropene	0.5	ND
1,1,2-Trichloroethane	0.5	ND
Tetrachloroethene	0.5	ND
Dibromochloromethane	0.5	ND
Chlorobenzene	0.5	ND
Bromoform	0.5	ND
1,1,2,2-Tetrachloroethane	0.5	ND
1,3-Dichlorobenzene	0.5	ND
1,2-Dichlorobenzene	0.5	ND
1,4-Dichlorobenzene	0.5	ND
Cis-1,2-Dichloroethene	0.5	ND

MDL = Method Detection Limit
ug/l = parts per billion (ppb)
QA/QC Summary: Daily Standard RPD = <15%
MS/MSD average recovery = 91% :MS/MSD RPD =< 2%

Richard Srna, Ph.D.
Laboratory Director

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CERTIFICATE OF ANALYSIS

LABORATORY NO.: 11197-10
CLIENT: Western Geologic Resources
JOB NO.: 1-012.05

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DATE ANALYZED: 11/19/90

EPA SW-846 METHOD 8010
HALOGENATED VOLATILE ORGANICS
SAMPLE: 11130.10

Compound	MDL (ug/L)	RESULTS (ug/l)
Chloromethane/Vinyl Chloride	1.0	ND
Bromomethane/Chloroethane	1.0	ND
Trichlorofluoromethane	2.5	ND
1,1-Dichloroethene	0.5	ND
Methylene Chloride	0.5	ND
trans-1,2-Dichloroethene	0.5	ND
1,1-Dichloroethane	0.5	ND
Chloroform	0.5	4
1,1,1-Trichloroethane	0.5	ND
Carbon tetrachloride	0.5	5
1,2-Dichloroethane	0.5	ND
Trichloroethylene	0.5	ND
1,2-Dichloropropane	0.5	ND
Bromodichloromethane	0.5	ND
Cis-1,3-Dichloropropene	0.5	ND
trans-1,3-Dichloropropene	0.5	ND
1,1,2-Trichloroethane	0.5	ND
Tetrachloroethene	0.5	ND
Dibromochloromethane	0.5	ND
Chlorobenzene	0.5	ND
Bromoform	0.5	ND
1,1,2,2-Tetrachloroethane	0.5	ND
1,3-Dichlorobenzene	0.5	ND
1,2-Dichlorobenzene	0.5	ND
1,4-Dichlorobenzene	0.5	ND
Cis-1,2-Dichloroethene	0.5	ND

MDL = Method Detection Limit
ug/l = parts per billion (ppb)
QA/QC Summary: Daily Standard RPD = <15%
MS/MSD average recovery = 91% :MS/MSD RPD =< 2%

Richard Srna, Ph.D.

Laboratory Director

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

LABORATORY NO.: 11197-11
CLIENT: Western Geologic Resources
JOB NO.: 1-012.05

DATE SAMPLED: 11/13/90
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DATE ANALYZED: 11/19/90

EPA SW-846 METHOD 8010
HALOGENATED VOLATILE ORGANICS
SAMPLE: 11130.11

Compound	MDL (ug/L)	RESULTS (ug/l)
Chloromethane/Vinyl Chloride	1.0	ND
Bromomethane/Chloroethane	1.0	ND
Trichlorofluoromethane	2.5	ND
1,1-Dichloroethene	0.5	ND
Methylene Chloride	0.5	ND
trans-1,2-Dichloroethene	0.5	ND
1,1-Dichloroethane	0.5	ND
Chloroform	0.5	ND
1,1,1-Trichloroethane	0.5	5
Carbon tetrachloride	0.5	ND
1,2-Dichloroethane	0.5	ND
Trichloroethylene	0.5	ND
1,2-Dichloropropane	0.5	ND
Bromodichloromethane	0.5	ND
Cis-1,3-Dichloropropene	0.5	ND
trans-1,3-Dichloropropene	0.5	ND
1,1,2-Trichloroethane	0.5	ND
Tetrachloroethene	0.5	39
Dibromochloromethane	0.5	ND
Chlorobenzene	0.5	ND
Bromoform	0.5	ND
1,1,2,2-Tetrachloroethane	0.5	ND
1,3-Dichlorobenzene	0.5	ND
1,2-Dichlorobenzene	0.5	ND
1,4-Dichlorobenzene	0.5	ND
Cis-1,2-Dichloroethene	0.5	2

MDL = Method Detection Limit
ug/l = parts per billion (ppb)
QA/QC Summary: Daily Standard RPD = <15%
MS/MSD average recovery = 91% :MS/MSD RPD =< 2%

Richard Srna, Ph.D.
Laboratory Director

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CERTIFICATE OF ANALYSIS

LABORATORY NO.: 11197-12
CLIENT: Western Geologic Resources
JOB NO.: 1-012.05

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EPA SW-846 METHOD 8010
HALOGENATED VOLATILE ORGANICS
SAMPLE: 11130.12

Compound	MDL (ug/L)	RESULTS (ug/l)
Chloromethane/Vinyl Chloride	1.0	ND
Bromomethane/Chloroethane	1.0	ND
Trichlorofluoromethane	2.5	ND
1,1-Dichloroethene	0.5	ND
Methylene Chloride	0.5	ND
trans-1,2-Dichloroethene	0.5	ND
1,1-Dichloroethane	0.5	ND
Chloroform	0.5	ND
1,1,1-Trichloroethane	0.5	3
Carbon tetrachloride	0.5	ND
1,2-Dichloroethane	0.5	ND
Trichloroethylene	0.5	ND
1,2-Dichloropropane	0.5	ND
Bromodichloromethane	0.5	ND
Cis-1,3-Dichloropropene	0.5	ND
trans-1,3-Dichloropropene	0.5	ND
1,1,2-Trichloroethane	0.5	ND
Tetrachloroethene	0.5	9
Dibromochloromethane	0.5	ND
Chlorobenzene	0.5	ND
Bromoform	0.5	ND
1,1,2,2-Tetrachloroethane	0.5	ND
1,3-Dichlorobenzene	0.5	ND
1,2-Dichlorobenzene	0.5	ND
1,4-Dichlorobenzene	0.5	ND
Cis-1,2-Dichloroethene	0.5	3

MDL = Method Detection Limit
ug/l = parts per billion (ppb)
QA/QC Summary: Daily Standard RPD = <15%
MS/MSD average recovery = 91% :MS/MSD RPD =< 2%

Richard Srna, Ph.D.
Laboratory Director

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CERTIFICATE OF ANALYSIS

LABORATORY NO.: 11197-13
CLIENT: Western Geologic Resources
JOB NO.: 1-012.05

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EPA SW-846 METHOD 8010
HALOGENATED VOLATILE ORGANICS
SAMPLE: 11130.13

Compound	MDL (ug/L)	RESULTS (ug/l)
Chloromethane/Vinyl Chloride	1.0	ND
Bromomethane/Chloroethane	1.0	ND
Trichlorofluoromethane	2.5	ND
1,1-Dichloroethene	0.5	ND
Methylene Chloride	0.5	ND
trans-1,2-Dichloroethene	0.5	ND
1,1-Dichloroethane	0.5	ND
Chloroform	0.5	ND
1,1,1-Trichloroethane	0.5	ND
Carbon tetrachloride	0.5	ND
1,2-Dichloroethane	0.5	ND
Trichloroethylene	0.5	ND
1,2-Dichloropropane	0.5	ND
Bromodichloromethane	0.5	ND
Cis-1,3-Dichloropropene	0.5	ND
trans-1,3-Dichloropropene	0.5	ND
1,1,2-Trichloroethane	0.5	ND
Tetrachloroethene	0.5	ND
Dibromochloromethane	0.5	ND
Chlorobenzene	0.5	ND
Bromoform	0.5	ND
1,1,2,2-Tetrachloroethane	0.5	ND
1,3-Dichlorobenzene	0.5	ND
1,2-Dichlorobenzene	0.5	ND
1,4-Dichlorobenzene	0.5	ND
Cis-1,2-Dichloroethene	0.5	ND

MDL = Method Detection Limit
ug/l = parts per billion (ppb)
QA/QC Summary: Daily Standard RPD = <15%
MS/MSD average recovery = 91% :MS/MSD RPD =< 2%

Richard Srna, Ph.D.
Laboratory Director

OUTSTANDING QUALITY AND SERVICE

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