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3164 Gold Camp Drive • Suite 200
Rancho Cordova, California 95670 USA

916.638.2085 800.477 7411
Fax 916.638.8385

April 22, 2003

Mr. Barney Chan
Alameda County Health Care Services
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-9335

1038
Alameda County
APR 29 2003
Environmental Health

Subject: *Response to Email Regarding Concern of Petroleum Hydrocarbon Concentration
Reported in Soil Sample from SP6
Former Chevron Service Station No. 9-4587
609 Oak Street
Oakland, California
Delta Project No. DG94-587*

Dear Mr. Chan:

Delta Environmental Consultants, Inc. (Delta) has been authorized by Chevron Products Company (Chevron) to prepare a response to your concern about the concentration of petroleum hydrocarbon constituents reported in a soil sample collected with a geoprobe in December 1995 at the above-referenced site. Your concern was expressed in your March 26, 2003 e-mail included in Enclosure A.

The soil sample was collected by Terra Vac on December 20, 1995 from the soil boring for air sparging well SP6 prior to the initiation of remediation. It was collected at 9.7 feet bsg and contained total petroleum hydrocarbons as gasoline (TPHg) at 11,000 milligrams per kilogram (mg/kg) and benzene, toluene, ethylbenzene and xylenes (BTEX) at 160, 1,300, 300, and 1,600 mg/kg, respectively. A deeper sample collected from SP6 at 14.7 feet bsg contained significantly reduced concentrations of TPHg (4.4 mg/kg) and BTEX (0.81, 0.22, 0.24, and 0.56 mg/kg, respectively). Review of Terra Vac's boring log for SP6 indicates that the lithology encountered in the boring consisted of silt (ML) to approximately 9 feet bsg and fine sand with up to 20 to 25 percent silt and up to 15 percent clay to the total depth drilled (27 feet bsg). First groundwater was reportedly encountered at 10 feet bsg. Copies of the soil boring log and table summarizing the soil sample analytical results for SP6 are included in Enclosure B.

As you are aware, from December 1993 to January 1995, Geraughty & Miller, Inc., installed and operated a groundwater extraction and treatment system, and extracted and treated approximately 460,000 gallons of water from well CR-1. Initial influent groundwater concentrations were reported at 110,000 µg/L TPHg and decreased to 9,900 µg/L at the end of operations. From September 1995 to January 1996, Terra Vac operated a dual vacuum extraction and sparging system at the site. Terra Vac reported initial hydrocarbon extraction rates up to 200 pounds per day declined to two pounds per day at the end of DVE operations. Terra Vac reported that air sparging continued after January 1996, and that the vapor extraction wells, air sparging wells and dual completion wells were properly abandoned between 1997 and 1998.

A member of.



Review of groundwater analytical data for the two monitoring wells (C-1 and CR-1) located nearest to air sparge well SP6 indicates that prior to remediation in June 1995, wells C-1 and CR-1 had TPHg concentrations of 220,000 and 49,000 µg/L, respectively and benzene concentrations of 11,000 and 9,400 µg/L, respectively. Following implementation of the dual vapor extraction and air sparging system in September 1995, significant decreases of benzene and TPHg concentrations in groundwater in wells C-1 and CR-1 were observed. By August 1998, the benzene concentrations in C-1 and CR-1 had decreased to 3.5 and 4.1 µg/L, respectively; and the TPHg concentrations had decreased to 120 and 110 µg/L, respectively. Since August 1998, the benzene and TPHg concentrations in the groundwater samples collected from wells C-1 and CR-1 have been below the laboratory's reporting limits for benzene and TPHg (0.5 µg/L for benzene and 50 µg/L for TPHg) during each of the sampling events, with the exception of benzene in C-1 at 0.58 µg/L on September 10, 2001, and TPHg in CR-1 at 56.6 µg/L on March 13, 2001. A copy of Gettler Ryan's (Chevron's current consultant performing groundwater monitoring) table summarizing groundwater monitoring and analytical data for wells C-1 and CR-1 since December 6, 1989 is included in Enclosure C.

According to Terra Vac's map (Enclosure B) wells C-1 and CR-1 were located approximately 12 and 17 feet, respectively from former air sparge well SP6 and dual completion vapor extraction/sparge well DVSP-1 and vapor extraction well DVE-1 were located approximately 17 and 22 feet, respectively from air sparge well SP6. It is Delta's opinion that the benzene concentration observed at 9.7 feet in SP6 has been significantly reduced, the risk to human health is low and additional assessment is not warranted. We base our opinion on the following: The lithology (sand) reported in the boring logs for wells C-1, CR-1, SP6, DVE-1 and DVSP-1, the close proximity of SP6 to the other remediation wells, the fact that air sparging was performed in well SP6, and the significant reduction of petroleum hydrocarbon concentrations observed in the groundwater samples collected from wells C-1 and CR-1, without any rebound following shutdown of the remediation system.

Remarks/Signatures

The interpretations contained in this document represent our professional opinions, and are based in part, on information supplied by the client. These opinions are based on currently available information and are arrived at in accordance with currently accepted hydrogeological and engineering practices at this time and location. Other than this, no warranty is implied or intended.

If you have any questions regarding this project, please contact Mike Berrington at (916) 536-2616.

Sincerely,

DELTA ENVIRONMENTAL CONSULTANTS, INC.

James R. Brownell
James R. Brownell, R.G.
Unit Manager

California Registered Geologist No. 5078



JRB (LRP004.9-4587 Re-Concern of Petro Hydro in Soil from SP6)
Enclosures

cc: Ms. Karen Streich – Chevron Products Company
Mr. Chuck Headlee – San Francisco Bay Regional Water Quality Control Board
Mr. A. Guidotti, #1 Bates Boulevard, Orinda, CA 94563

ENCLOSURE A

Copy of March 26, 2003
E-mail from Alameda County Health Care Services

Mike Berrington

From: Chan, Barney, Env. Health
Sent: Wednesday, March 26, 2003 3:17 PM
To: Mberrington (E-mail)
Subject: 609 Oak St., former Chevron 9-4587

Mike:

I was working on the site/closure summary for this site and came across some data that need some discussion. The soil sample from SP6 from 9.7' depth reported 11,000 ppm TPHg and 160, 1300, 300 and 1600 BTEX, respectively. I understand that this sample was at the capillary fringe, however, it is within the historical range of depth to water and could be considered within the vadose zone. The concentration of benzene is a concern regarding human health risk. How can you justify this sample not needing additional investigation?

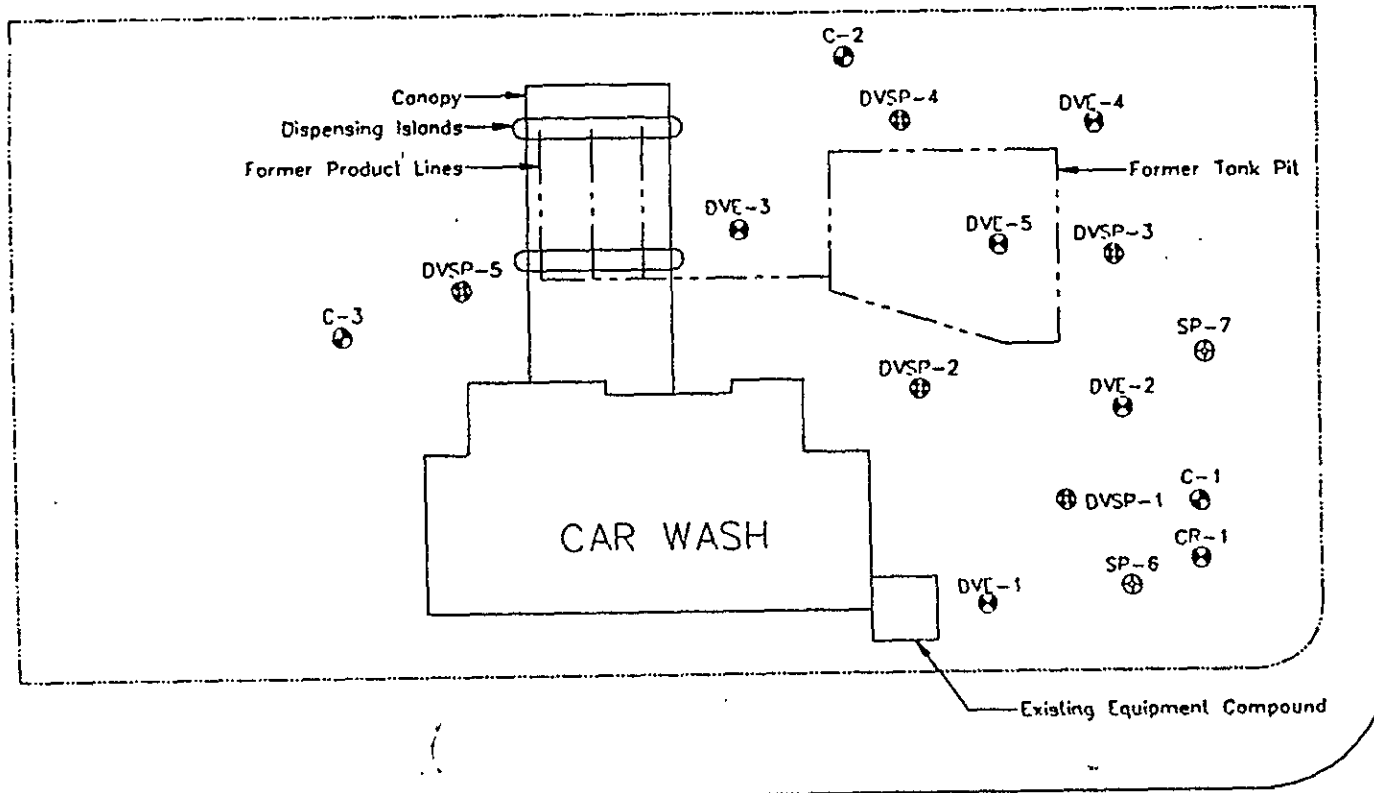
Thanks

Barney M. Chan
Hazardous Materials Specialist
Alameda County Environmental Health
510-567-6765

4/2/2003

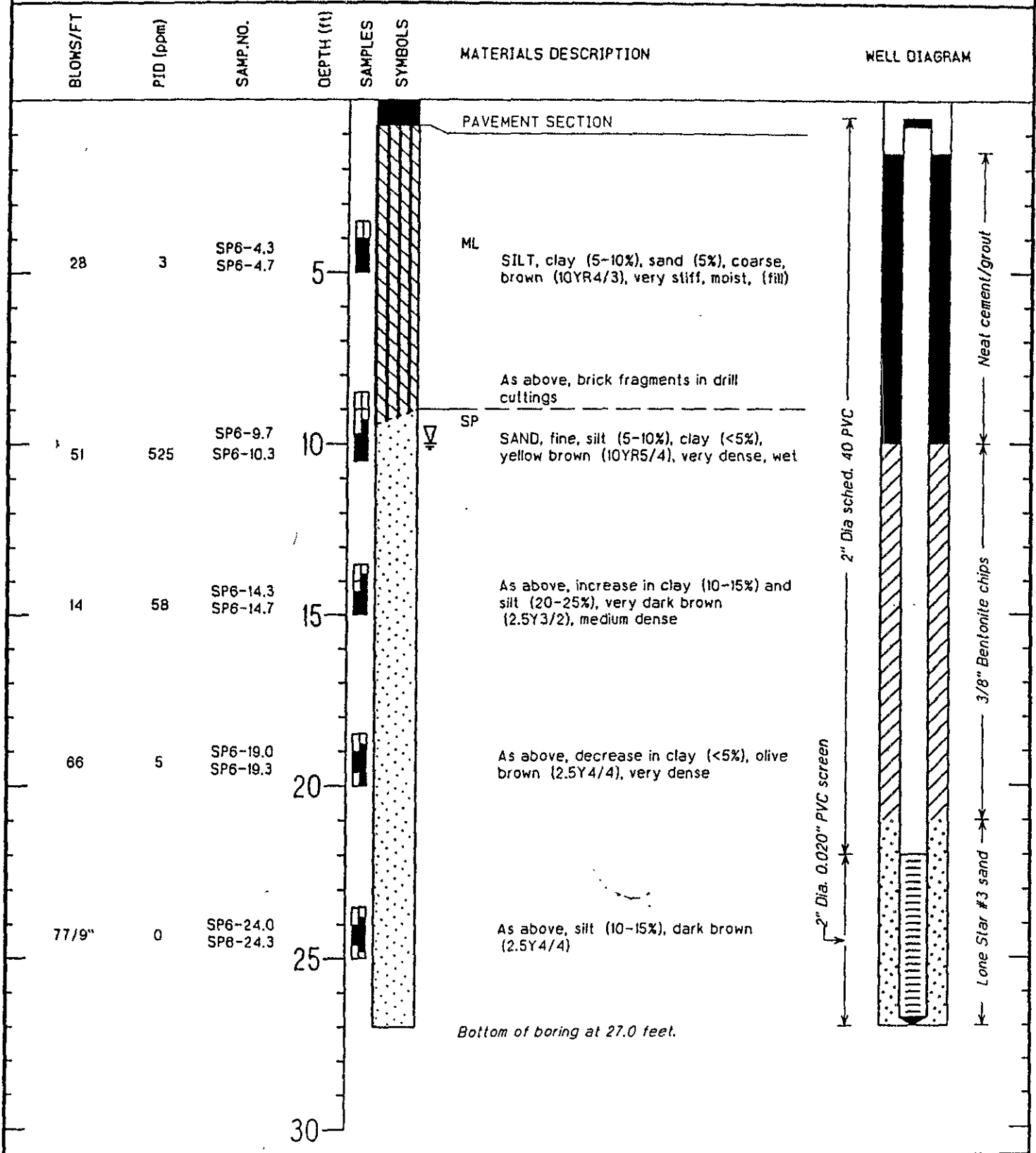
ENCLOSURE B

Copies of Terra Vac Site Map, Boring Log and
Soil Sample Analytical Results for SP-6



- C-1
⊕ = Monitoring Well
- DVE-1
⊕ = Vapor Extraction Well
- SP-7
⊕ = Sparge Well
- DVSP-1
⊕ = Dual Completed Well
(entrainment extraction & sparging)

Site Map Former Chevron Station 9-4587 609 Oak Street Oakland, California			
Project	30-0219	Drawn	JLN
Date	2/7/96	Revision	
Scale	1" = 30'	Checked	
TERRA VAC 14798 Wicks Boulevard San Leandro, CA 94577 (510) 351-8900 Fax: -0221			Figure 1



PROJECT	Chevron	DRILLING COMPANY	West Hazmat Drilling Co
LOCATION	609 Oak Street, Oakland	DATE DRILLED	12/20/95
JOB NUMBER	30-0219	SURFACE ELEVATION	Not surveyed
GEOLOGIST	Karel L. Detterman, R.G.	TOTAL DEPTH OF HOLE	27.0 Feet
BORING DIAMETER	8 in. dia	FIRST OBSERVED GW	10.0 Feet

TABLE 1
SUMMARY OF ANALYTICAL RESULTS

Sample No.	TPH-g	Benzene	Toluene	Ethylbenzene	Xylene
SP6-9.7	11,000	160	1,300	300	1,600
SP6-14.7	4.4	0.81	0.22	0.24	0.56
SP7-4.7	<1.0	<0.005	<0.005	<0.005	<0.005
SP7-9.3	1.2	<0.005	0.038	0.009	0.032
SP7-14.3	3.1	1.2	0.068	0.19	0.18
SP7-19.3	<1.0	<0.005	0.0086	<0.005	0.067
SP7-24.3	<1.0	<0.005	<0.005	<0.005	0.0052

Analytical results in mg/kg (ppm).

<Value = None detected above the specified detection limit.

ENCLOSURE C

Gettler-Ryan's
Groundwater Monitoring and Analytical Results Table
for Wells C-1 and CR-1

Table 1
Groundwater Monitoring Data and Analytical Results
Former Chevron Service Station #9-4587
609 Oak Street
Oakland, California

WELL ID/ DATE	TOC (ft.)	GWE (msl)	DTW (ft.)	SPHT (ft.)	SPH						MTBE (ppb)
					REMOVED (gallons)	TPH-G (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	
C-1											
12/06/89	16.07	--	--	0.20	--	--	--	--	--	--	--
10/30/90	16.07	5.30	10.79	0.02	--	--	--	--	--	--	--
01/14/91	16.07	4.70	11.39	0.02	--	--	--	--	--	--	--
04/03/91	16.07	6.66	9.43	0.02	--	--	--	--	--	--	--
07/17/91	16.07	5.64	10.46	0.04	--	--	--	--	--	--	--
10/07/91	16.07	5.36	10.74	0.04	--	--	--	--	--	--	--
02/04/92	16.07	5.71	10.37	0.01	--	--	--	--	--	--	--
03/06/92	16.07	6.87	9.20	--	--	--	--	--	--	--	--
04/01/92	16.07	6.79	9.28	--	--	--	--	--	--	--	--
06/25/92	16.07	6.10	9.98	0.01	--	100,000	8,800	7,000	2,800	19,000	--
09/17/92	16.07	5.56	10.51	Sheen	--	--	--	--	--	--	--
12/16/92	16.07	6.26	9.81	Sheen	--	--	--	--	--	--	--
03/18/93	16.07	7.19	8.88	Sheen	--	--	--	--	--	--	--
06/11/93	16.07	6.78	9.31	0.02	--	--	--	--	--	--	--
09/08/93	16.07	--	--	--	--	--	--	--	--	--	--
09/17/93	16.07	6.37	9.72	0.02	--	--	--	--	--	--	--
12/23/93	16.07	6.58	9.49	--	--	41,000	5,400	590	710	5,600	--
03/07/94	16.07	7.32	8.96	0.26	--	--	--	--	--	--	--
06/17/94	16.07	6.39	9.70	0.02	--	--	--	--	--	--	--
09/12/94	16.07	3.66	12.42	0.01	--	--	--	--	--	--	--
06/29/95	16.07	7.29	8.78	--	--	220,000	11,000	3,600	3,500	19,000	--
09/13/95	16.07	6.54	9.56	0.04	0.21	--	--	--	--	--	--
12/19/95	16.07	6.76	9.31	--	--	14,000	180	81	240	2,200	440
03/26/96	16.07	7.14	8.93	--	--	790	22	5.3	21	96	<12
06/10/96	16.07	7.84	8.23	--	--	NOT SAMPLED DUE TO INSUFFICIENT WATER				--	--
09/13/96	16.07	6.55	9.52	--	--	110	0.85	<0.5	0.95	1.9	3.6
12/19/96	16.07	7.36	8.71	--	--	51	<0.5	<0.5	0.69	1.3	<2.5
03/12/98 ¹	15.48	8.67	6.81	--	--	61	1.2	1.6	0.69	6.5	<2.5
08/20/98	15.48	6.61	8.87	--	--	120	3.5	<0.5	<0.5	3.2	2.7
03/25/99	15.48	8.20	7.28	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5

Table 1
Groundwater Monitoring Data and Analytical Results
Former Chevron Service Station #9-4587
609 Oak Street
Oakland, California

WELL ID/ DATE	TOC (ft.)	GWE (msl)	DTW (ft.)	SPHT (ft.)	SPH		B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)
					REMOVED (gallons)	TPH-G (ppb)					
C-1 (cont)											
09/29/99	15.48	6.10	9.38	--	--	<50	<0.5	<0.5	<0.5	3.06	<2.5
02/29/00	15.48	8.09	7.39	--	--	<50	<0.5	<0.5	<0.5	<0.5	<5.0
08/25/00	15.48	6.79	8.69	0.00	0.00	<50	<0.50	<0.50	<0.50	1.2	45
03/13/01	15.48	7.36	8.12	0.00	0.00	<50.0	<0.500	<0.500	<0.500	<0.500	<0.500
09/10/01	15.48	7.05	8.43	0.00	0.00	<50	0.58	<0.50	<0.50	<0.50	17
03/28/02	15.48	8.14	7.34	0.00	0.00	<50	<0.50	<0.50	<0.50	<1.5	22
09/09/02	15.48	7.23	8.25	0.00	0.00	<50	<0.50	<0.50	<0.50	<1.5	24
03/04/03	15.48	8.02	7.46	0.00	0.00	<50	<0.50	<0.50	<0.50	<1.5	<2.5
C-2											
12/06/89	16.84	--	--	--	--	16,000	250	1,200	550	1,400	--
10/30/90	16.84	5.68	11.16	--	--	28,000	3,700	1,900	1,200	4,300	--
01/14/91	16.84	5.73	11.11	--	--	24,000	3,300	1,200	1,100	4,100	--
01/14/91	16.84	5.73	11.11	--	--	30,000	3,900	1,500	1,500	5,000	--
04/03/91	16.84	7.31	9.53	--	--	12,000	1,100	840	650	1,800	--
04/03/91	16.84	7.31	9.53	--	--	14,000	1,100	990	680	1,800	--
07/17/91	16.84	6.16	10.68	--	--	13,000	1,700	560	650	1,700	--
07/17/91	16.84	6.16	10.68	--	--	14,000	1,700	640	720	1,900	--
10/07/91	16.84	5.82	11.02	--	--	25,000	3,700	1,300	1,400	3,800	--
02/04/92	16.84	6.24	10.60	--	--	16,000	2,600	300	880	1,900	--
04/01/92	16.84	7.54	9.30	--	--	15,000	1,900	300	700	1,500	--
06/25/92	16.84	6.39	10.45	--	--	23,000	3,400	740	1,300	3,400	--
09/17/92	16.84	6.06	10.78	--	--	18,000	3,500	550	1,400	3,900	--
12/16/92	16.84	6.90	9.94	--	--	12,000	1,200	120	460	1,100	--
03/18/93	16.84	8.04	8.80	--	--	5,200	990	130	290	430	--
06/11/93	16.84	7.41	9.43	--	--	34,000	8,200	910	2,400	6,600	--
09/08/93	16.84	--	--	--	--	3,400	690	26	190	330	--
09/17/93	16.84	6.93	9.91	--	--	--	--	--	--	--	--
12/23/93	16.84	7.15	9.69	--	--	2,500	830	26	130	260	--

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Groundwater Monitoring Data and Analytical Results
Former Chevron Service Station #9-4587
609 Oak Street
Oakland, California

WELL ID/ DATE	TOC (ft.)	GWE (msl)	DTW (ft.)	SPHT (ft.)	SPH REMOVED (gallons)	TPH-G (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)
C-7 (cont)											
12/19/96	15.78	7.39	8.39	--	--	--	--	--	--	--	--
03/12/98 ¹	15.36	8.64	6.72	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5
08/20/98	15.36	6.11	9.25	--	--	--	--	--	--	--	--
03/25/99	15.36	7.67	7.69	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5
09/29/99	15.36	5.57	9.79	--	--	--	--	--	--	--	--
02/29/00	15.36	7.86	7.50	--	--	<50	<0.5	<0.5	<0.5	<0.5	<5.0
08/25/00	15.36	INACCESSIBLE - OBSTRUCTION IN WELL				--	--	--	--	--	--
03/13/01 ²	15.36	6.78	8.58	0.00	0.00	<50.0	<0.500	<0.500	0.776	2.19	<0.500
09/10/01	15.36	6.15	9.21	0.00	0.00	SAMPLED ANNUALLY		--	--	--	--
03/28/02	15.36	7.91	7.45	0.00	0.00	<50	<0.50	<0.50	<0.50	<1.5	<2.5
09/09/02	15.36	7.27	8.09	0.00	0.00	--	--	--	--	--	--
03/04/03	15.36	7.89	7.47	0.00	0.00	<50	<0.50	<0.50	<0.50	<1.5	<2.5
CR-1											
10/30/90	--	--	10.51	--	--	9,600	7,100	65	610	190	--
01/14/91	--	--	10.29	--	--	1,500	3,200	52	190	77	--
07/17/91	--	--	10.19	--	--	15,000	9,300	220	680	530	--
10/07/91	--	--	10.46	--	--	17,000	7,600	50	440	68	--
10/07/91	--	--	10.46	--	--	14,000	9,400	52	430	110	--
02/04/92	--	--	10.12	--	--	19,000	6,100	32	350	100	--
04/01/92	--	--	9.24	--	--	29,000	5,300	820	380	1,200	--
06/25/92	--	--	10.03	--	--	12,000	3,300	280	210	460	--
09/17/92	--	--	10.30	--	--	--	--	--	--	--	--
12/16/92	--	--	9.59	Sheen	--	--	--	--	--	--	--
03/18/93	--	--	8.82	0.05	--	--	--	--	--	--	--
06/11/93	--	--	9.58	0.87	--	--	--	--	--	--	--
09/08/93	--	--	--	--	--	--	--	--	--	--	--
09/17/93	--	--	--	--	--	--	--	--	--	--	--
12/23/93	--	--	9.02	0.02	--	--	--	--	--	--	--

Table 1
Groundwater Monitoring Data and Analytical Results
Former Chevron Service Station #9-4587
609 Oak Street
Oakland, California

WELL ID/ DATE	TOC (ft.)	GWE (msl)	DTW (ft.)	SPHT (ft.)	SPH REMOVED (gallons)	TPH-G (ppb)	B (ppb)	T (ppb)	E (ppb)	X (ppb)	MTBE (ppb)
CR-1 (cont)											
03/07/94	--	--	8.41	0.04	--	--	--	--	--	--	--
06/17/94	--	--	--	--	--	--	--	--	--	--	--
09/12/94	--	--	15.32	0.02	--	--	--	--	--	--	--
06/29/95	--	--	8.67	--	--	49,000	9,400	310	2,400	7,200	--
09/13/95	--	--	9.93	0.03	0.13	--	--	--	--	--	--
12/19/95	--	--	8.75	--	--	19,000	880	48	1,600	3,100	4,000
03/26/96	--	--	7.50	--	--	60	2.6	<0.5	0.86	6.3	67
06/10/96	--	--	8.15	--	--	1,100	38	30	9.7	190	54
09/13/96	--	--	9.27	--	--	77	1.1	<0.5	<0.5	<0.5	33
12/19/96	--	--	7.96	--	--	<50	0.86	<0.5	<0.5	0.62	<2.5
03/12/98 ¹	15.33	9.29	6.04	--	--	55	1.1	<0.5	<0.5	<0.5	6.0
08/20/98	15.33	7.28	8.05	--	--	110	4.1	0.9	0.94	<0.5	5.5
03/25/99	15.33	8.53	6.80	--	--	<50	<0.5	<0.5	<0.5	<0.5	2.9
09/29/99	15.33	6.37	8.96	--	--	<50	<0.5	<0.5	<0.5	<0.5	<2.5
02/29/00	15.33	8.48	6.85	--	--	<50	<0.5	<0.5	<0.5	<0.5	<5.0
08/25/00	15.33	7.49	7.84	0.00	0.00	<50	<0.50	<0.50	<0.50	<0.50	20
03/13/01	15.33	8.12	7.21	0.00	0.00	56.6	<0.500	<0.500	<0.500	<0.500	<0.500
09/10/01	15.33	7.80	7.53	0.00	0.00	<50	<0.50	<0.50	<0.50	0.83	13
03/28/02	15.33	8.85	6.48	0.00	0.00	<50	<0.50	<0.50	5.1	<1.5	16
09/09/02	15.33	7.96	7.37	0.00	0.00	<50	<0.50	<0.50	<0.50	<1.5	9.1
03/04/03	15.33	8.50	6.83	0.00	0.00	<50	<0.50	<0.50	<0.50	<1.5	13
C-A											
12/06/89	--	--	--	--	--	44,000	20,000	66	1,600	2,220	--
10/30/90	--	--	11.20	Sheen	--	31,000	23,000	110	1,100	160	--
10/30/90	--	--	11.20	Sheen	--	30,000	23,000	150	1,000	180	--
01/14/91	--	--	11.25	--	--	12,000	30,000	540	1,400	560	--
04/03/91	--	--	9.82	--	--	59,000	33,000	2400	2,200	3,100	--
07/17/91	--	--	10.93	--	--	52,000	38,000	380	1,300	500	--

Table 1
Groundwater Monitoring Data and Analytical Results
Former Chevron Service Station #9-4587
609 Oak Street
Oakland, California

EXPLANATIONS:

Groundwater monitoring data and laboratory analytical results prior to August 25, 2000, were compiled from reports prepared by Blaine Tech Services, Inc.

TOC = Top of Casing

(ft.) = Feet

GWE = Groundwater Elevation

(msl) = Mean sea level

DTW = Depth to Water

SPHT = Separate Phase Hydrocarbon Thickness

SPH = Separate Phase Hydrocarbons

TPH-G = Total Petroleum Hydrocarbons as Gasoline

B = Benzene

T = Toluene

E = Ethylbenzene

X = Xylenes

MTBE = Methyl tertiary butyl ether

(ppb) = Parts per billion

-- = Not Measured/Not Analyzed

QA = Quality Assurance/Trip Blank

¹ Site resurveyed on May 8, 1998.

² Cleaned out roots in well.