Chevron U.S.A. Products Company
2410 Camino Ramon, San Ramon, California • Phone (510) 842-9500
Mail Address: P.O. Box 5004, San Ramon, CA 94583-0804

December 16, 1992

478

Ms. Jennifer Eberle
Alameda County Health Care Services
80 Swan Way, Room 200
Oakland, CA 94621

Re: Former Chevron Service Station #9-4816
301 14th Street, Oakland

Dear Ms. Eberle:

Enclosed we are forwarding the Bimonthly Progress Report dated December 11, 1992, prepared by our consultant Weiss Associates for the above referenced site. This report presents an evaluation of the soil vapor extraction and treatment system operating at the referenced site during the period of October 1, 1992 to November 30, 1992. During this period, we began cyclic operation of the system. This cycling operation was performed to maximize vapor extraction efficiency. An improved hydrocarbon removal rate was recognized with a decrease in supplementary propane consumption. The system operated for one week and then shut down for a week. During this period approximately 121 lbs. of hydrocarbons have been removed. Cumulative to date, approximately 10,167 lbs. of hydrocarbons (approximately 1,540,45 gallons) have been removed.

why? see p. 2

Chevron will continue to submit bimonthly progress reports on the soil vapor extraction system until system shutdown. We are currently evaluating an alternate treatment methodology as continued operation of the ICE is no longer cost effective based on the present vapor concentrations.

If you have any questions or comments, please do not hesitate to contact me at (510) 842-9581.

Very truly yours,
CHEVRON U.S.A. PRODUCTS COMPANY

Nancy Vukelich
Site Assessment and Remediation Engineer

Enclosure

cc: Mr. Rich Hiett, RWQCB
Mr. Thomas Berry, Weiss Associates
Mr. R.W. Cosby, 225/1936
Ms B.C. Owen
File (9-4816-6)

Ms. Beth D. Castleberry
Ware & Freidenrich
400 Hamilton Avenue
Palo Alto, CA 94301-1825

Weiss Associates
Environmental and Geologic Services
5500 Shellmound Street, Emeryville, CA 94608-2411 Fax: 510-547-5043 Phone. 510-547-5420

December 11, 1992

Nancy Vukelich
Chevron U.S.A. Products Company
P.O. Box 5004
San Ramon CA 94583-0804

Re: Bi-monthly Progress Report
October through November 1992
Chevron Service Station #9-4816
301-14th Street
Oakland, California
WA Job #4-582-51

Dear Ms. Vukelich,

As you requested, Weiss Associates (WA) presents the following bi-monthly report for the soil vapor extraction (SVE) and treatment system operating at the above referenced site (Figure 1). The SVE and treatment system consists of an internal combustion engine (ICE) which presently extracts vapors from wells VEW-1 and VEW-2 (Figure 2). ICE operation is permitted by the Bay Area Air Quality Management District (BAAQMD) under Permit to Operate #8272. The system operated in compliance throughout this reporting period.

In accordance with BAAQMD requirements, WA monitors the influent and effluent vapor stream monthly. Samples are collected in Tedlar bags for submittal to a state-certified analytical laboratory where they are analyzed for total petroleum hydrocarbons as gasoline (TPH-G), benzene, ethylbenzene, toluene and total xylenes. Additionally, field measurements are taken with a flame ionization detector (FID). Table 1 presents a summary of analytic results, FID measurements, hours of system operation, calculated emission rates and estimated destruction efficiencies since system start-up. Table 2 presents calculated hydrocarbon removal rates and total pounds of hydrocarbons removed. Figure 3 illustrates total pounds of hydrocarbons removed from the site via SVE versus time. We estimate that as of November 23, 1992, about 10,167 lbs (1,540 gallons) of hydrocarbons have been removed from soil and ground water beneath the site. As shown on Figure 4, influent concentrations of TPH-G have declined from 100,000 parts per million by volume (ppmv) to 1,300 ppmv since mid-March 1992. Benzene concentrations have declined from 1,800 to 7.5 ppmv. The analytical reports and chain-of-custody forms for October and November are included as Attachment A. A sample emissions

calculation based on the BAAQMD Manual of Procedures for Soil Vapor Extraction dated July 12, 1991, is presented as Attachment B.

To maximize vapor extraction efficiency and cost effectiveness, WA began cyclic operation on November 2, 1992. WA operates the system for one week and then shuts it down for a week, allowing hydrocarbon concentrations to diffuse from ground water and/or soil to soil vapor. When the system is restarted, increased vapor concentrations result in an improved hydrocarbon removal rate and a decrease in supplementary fuel consumption.

WA shut the SVE system down from October 16 to November 2, from November 9 to 16, and from November 23 to 30 for cyclic operation. Analytic results from influent vapor samples collected November 2, immediately following system start up, indicated a substantial increase in TPH-G concentrations from 1,800 ppmv to 9,400 ppmv. Analysis of samples collected November 23, immediately prior to system shut down, indicated that influent vapor concentrations had decreased to 1,300 ppmv.

The system also shut down on October 7 and 16, 1992 due to mechanical problems. On October 7, the engine stalled due to high oil temperature and shut down automatically. We restarted the system less than 7 hours later. On October 16, the system shut down due to a broken fan belt. We repaired the belt and restarted the system on November 2 as part of the cyclic operation.

In conjunction with vapor stream monitoring, WA measured separate-phase hydrocarbon thicknesses in onsite wells and bailed product from well CR-1. These measurements and the volume of bailed product are presented in Table 3. We also attempted to bail product from well C-3 but were unable to access the well due to a deviated well casing. During October and November, separate-phase hydrocarbons were detected in wells C-3 and CR-1 at maximum thicknesses of 1.66 and 1.67 ft, respectively. About 2.75 gallons of separate-phase hydrocarbons were bailed from well CR-1 during this reporting period.

must be repaired!

As required, WA will continue monthly monitoring and bimonthly reporting. Please call if you have any questions or require additional information.

Sincerely,
Weiss Associates

Kimberly Ohara
Staff Engineer

Thomas R. Berry
Project Geologist

TRB:kao
C:\KAO\582L1DE2.WP

Attachments:
Figure 1 - Site Location Map
Figure 2 - Monitoring and Extraction Well Locations
Figure 3 - Total Hydrocarbon Removal
Figure 4 - Influent Concentrations
Table 1 - System Performance and Analytic Results
Table 2 - Total Hydrocarbon Removal
Table 3 - Free Product Thickness
Attachment A - Analytical Reports and Chain-of-Custody Forms
Attachment B - Sample Emission Calculations

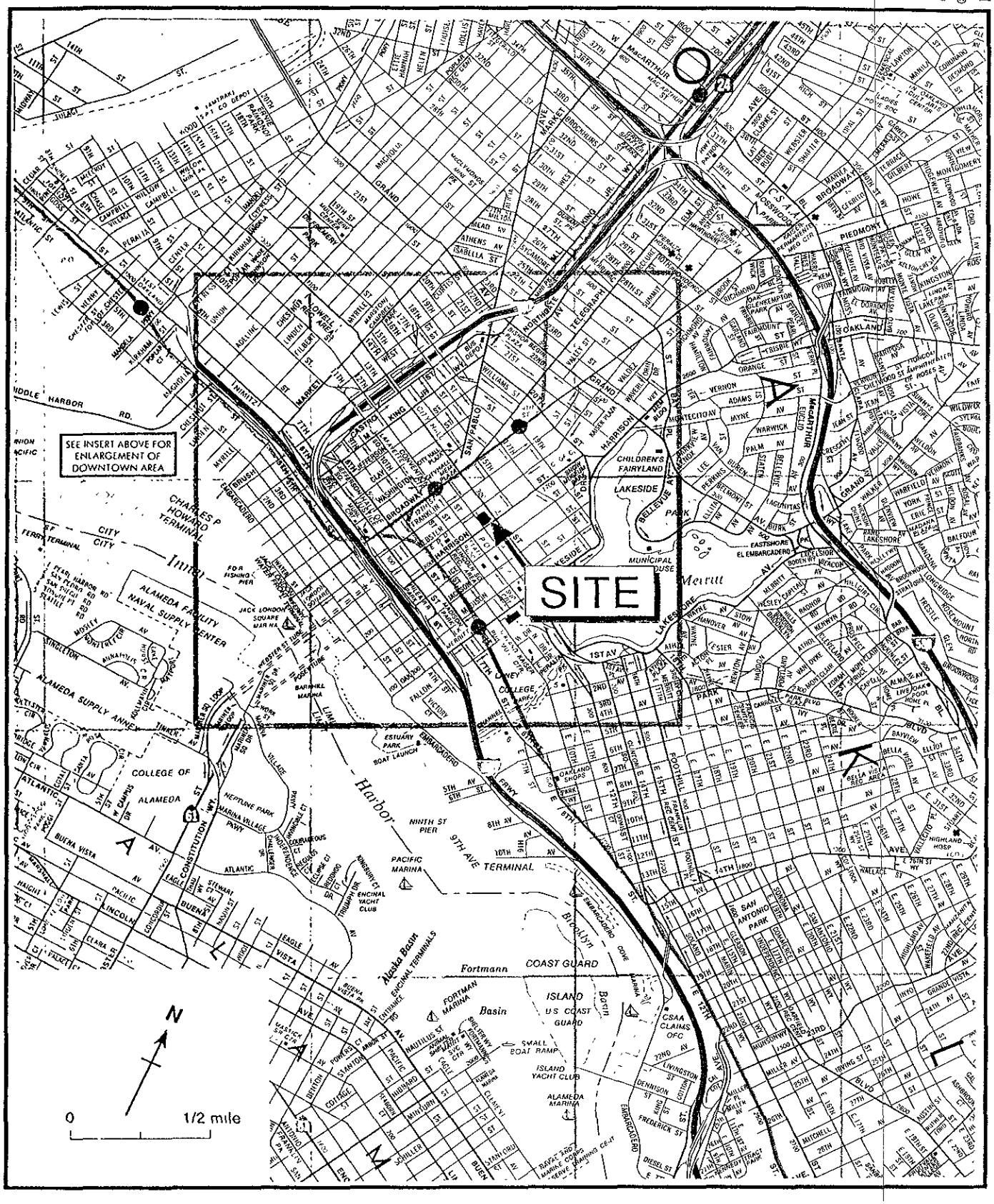


Figure 1. Site Location Map - Former Chevron Service Station #9-4816, 301 14th Street, Oakland, California

10/22/91

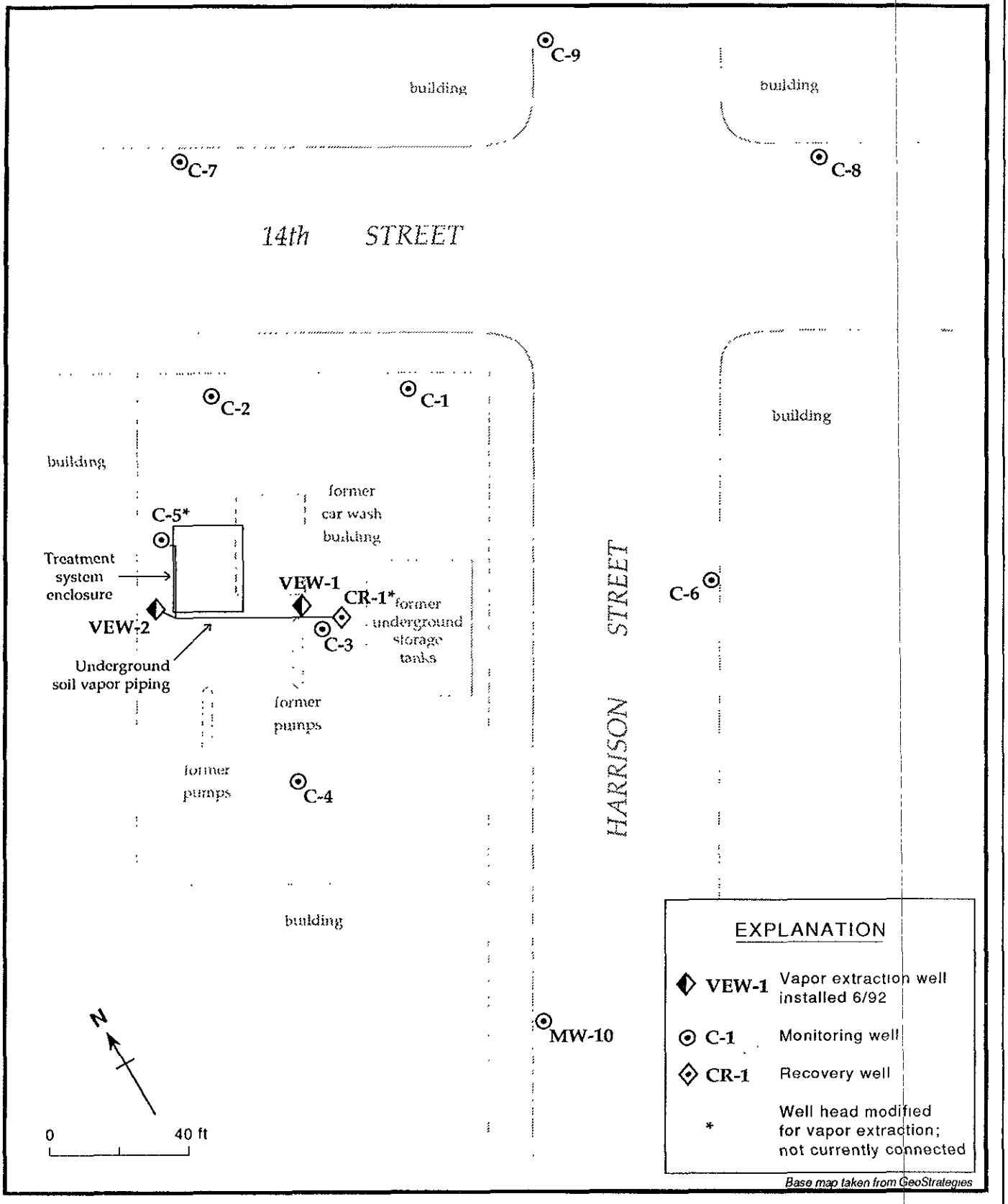
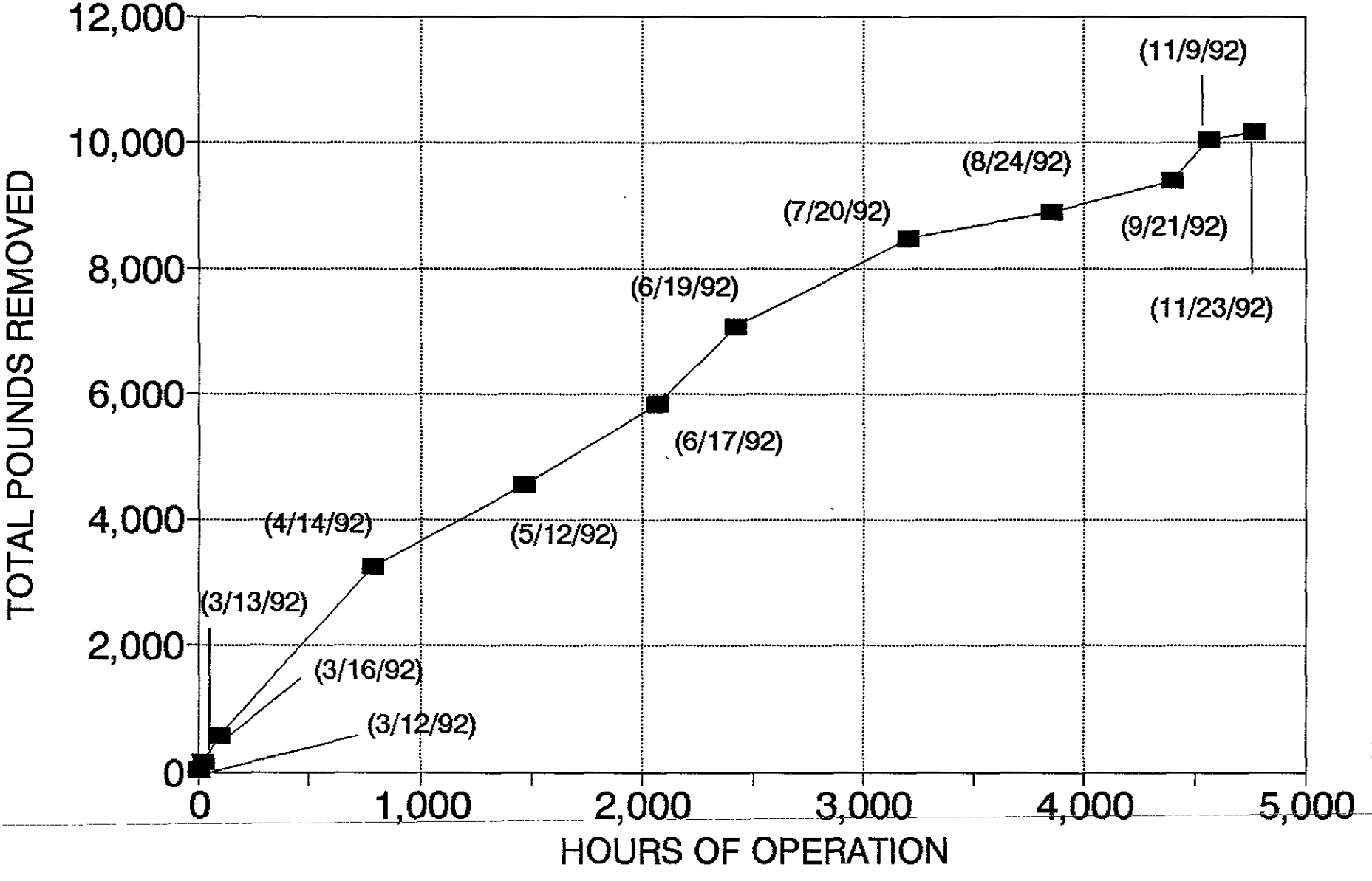


Figure 2. Monitoring and Extraction Well Locations - Former Chevron Service Station #9-4816, 301 14th Street, Oakland, California

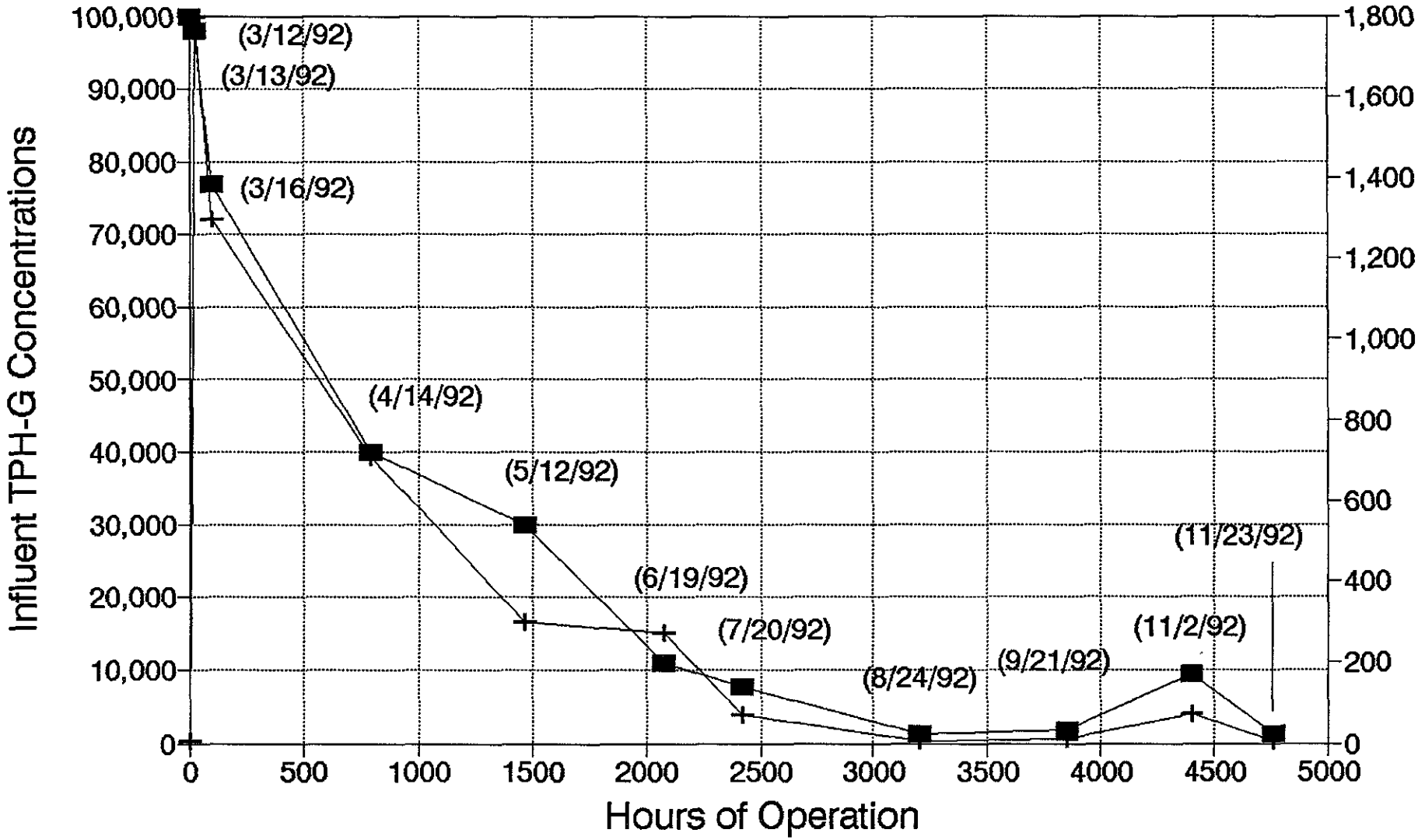
10/7/92

Figure 3. TOTAL HYDROCARBON REMOVAL
FORMER CHEVRON SS#9-4816, OAKLAND



Weiss Associates

Figure 4. INFLUENT CONCENTRATIONS
Former Chevron SS#9-4816



Weiss Associates

Table 1. System Performance and Analytic Results, Former Chevron SS#9-4816, 301 14th Street, Oakland, California

DATE	WELL ID a	TOTAL HOURS b	TOTAL WELL GAS FLOW RATE (SCFM)		TOTAL SYSTEM FLOW RATE (SCFM)	FUEL HYDROCARBON CONCENTRATIONS (ppmv) INFLUENT			EFFLUENT		
						FID c	TPH-G	BENZENE	FID c	TPH-G	BENZENE
03/12/92	CR-1/C-5	5	4.9	f	34.5	>46,000	100,000	<4.2	185	<30	<0.085
03/13/92	CR-1/C-5	23	4.9	f	27.0	>47,800	98,000	1,800	80	<30	<0.085
03/16/92	CR-1/C-5	98	4.9	f	26.5	>50,000	77,000	1,300	NA	<30	0.12
04/14/92	CR-1/C-5	790	5.1	h	39.3	2,550	40,000	710	NA	<30	0.54
05/12/92	CR-1/C-5	1,465	2.7	h	52.9	6,500	30,000	300	NA	450	8.1
05/26/92	CR-1/C-5					2,934	---	---	1.9	---	---
06/17/92	CR-1/C-5	2,071	8.0	h,l	35.1	---	---	---	---	---	---
06/19/92	CR-1/C-5/VEW1/VEW2	2,077	25.6	h,m	77.0	2,100	11,000	270	100	<30	0.64
07/20/92	CR-1/C-5/VEW1/VEW2	2,422	31	h	72.0	900	7,600	70	22	31	0.33
08/10/92	CR-1/C-5/VEW1/VEW2	2,700	31.2	h	70.7	750	---	---	---	---	---
08/10/92	VEW-1/VEW-2 n		34.8	h		1,980	---	---	---	---	---
08/17/92	VEW-1/VEW-2	3,036	24.7	h	74.1	1,778	---	---	300	---	---
08/24/92	VEW-1/VEW-2	3,204	31.4	h	67.6	---	1,100	7.8	---	<30	0.15
08/31/92	VEW-1/VEW-2	3,345			76.2	8,850	---	---	100	---	---
09/08/92	VEW-1/VEW-2	3,541	38.3	h	78.8	8,760	---	---	100	---	---
09/21/92	VEW-1/VEW-2	3,852	37.6	h	78.5	15,740	1,800	10	640	<30	<0.085
11/02/92	VEW-1/VEW-2	4,400 o	30.2	h	63.0	1,330	9,400	72	100	<30	<0.085
11/23/92	VEW-1/VEW-2	4,764 p	35.5	h	74.3	450	1,300	7.5	78	<30	<0.085

--- Table 1 continues on next page ---

Table 1. System Performance and Analytic Results, Former Chevron SS#9-4816, 301 14th Street, Oakland, California (continued)

DATE	WELL ID a	REMOVAL RATE (#/DAY) d		EMISSION RATE (#/DAY) e		DESTRUCTION EFFICENCY (%)	
		TPH-G	BENZENE	TPH-G	BENZENE	TPH-G	BENZENE
03/12/92	CR-1/C-5	157	<0.06	<0.33	<0.0009	>99.80 g	>85.80 g
03/13/92	CR-1/C-5	154	2.6	<0.26	<0.0006	>99.80 g	>99.98 g
03/16/92	CR-1/C-5	121	1.9	<0.26	0.0009	>99.80 g	99.95
04/14/92	CR-1/C-5	65	1.1	<0.38	0.0062	>99.40 g	99.40
05/12/92	CR-1/C-5	26	0.24	7.1	0.12	72.60	50.00 i,j
05/26/92	CR-1/C-5					99.93 k	
06/17/92	CR-1/C-5						
06/19/92	CR-1/C-5/VEW1/VEW2	90	2.0	<0.74	0.014	99.20	99.30
07/20/92	CR-1/C-5/VEW1/VEW2	76	0.63	0.72	0.0069	99.00	98.90
08/10/92	CR-1/C-5/VEW1/VEW2						
08/10/92	VEW-1/VEW-2 n						
08/17/92	VEW-1/VEW-2						
08/24/92	VEW-1/VEW-2	11	0.071	<0.65	0.0030	>94.1 g	95.8
08/31/92	VEW-1/VEW-2					98.9	
09/08/92	VEW-1/VEW-2					98.9	
09/21/92	VEW-1/VEW-2	21.7	0.11	<0.76	<0.0019	>96.5 g	>98.3 g
11/02/92	VEW-1/VEW-2	91.1	0.63	<0.61	<0.0016	>99.3 g	>99.7 g
11/23/92	VEW-1/VEW-2	14.8	0.078	<0.72	<0.0018	>95.1 g	>97.7 g

--Table 1 continues next page--

Table 1. System Performance and Analytic Results, Former Chevron SS#9-4816, 301 14th Street, Oakland, California (continued)

NOTES:

a = Measurements/samples represent combined extraction from wells listed.
b = Total hours of operation equals engine hours as appear on engine computer printout minus 3050 hours of previous use at other sites.
c = Value reflects subtraction of carbon-tip (methane) measurement. In some cases, FID measurement of total VOCs exceeded instrument measurement range of 50,000 ppmv.
d = Removal rate based on total well gas flow rate.
e = Emission rate based on total system flow rate which includes system dilution air and is measured by the ICE internal flow sensor.
f = Based on flow data for similar operation parameters, measured vacuum, and assumed influent temperature of 70 F.
g = Destruction efficiency calculation limited by analytic detection limit.
h = Based on measured vacuum and flow, and assumed influent temperature of 70 F.
i = System was shut down May 19, 1992, immediately following receipt of analytic results indicating system non-compliance due to low low system destruction efficiency. Low efficiency was due to system adjustments made during a manufacturer's demonstration for Chevron USA. System was restarted May 20, 1992 and optimized according to previously effective system parameters. Mr. Alex Saschin of the BAAQMD was also notified of system non-compliance on May 20.
j = Contains corrected removal and emission rates and destruction efficiencies
k = Destruction efficiency based on FID measurements. The measurements were collected as requested by the BAAQMD to verify that the system optimization performed on May 20, 1992 was effective.
l = Based on vacuum and flow readings from the 6/10/92 site visit.
m = First day of system operations with the new wells VEW-1 and VEW-2 (installed June 11, 1992) connected to the system as extraction wells.
n = CR-1 and C-5 disconnected from system to optimize TPH removal rate.
o = Engine hours upon system start up on November 2, 1992.
p = Engine hours immediately prior to system shut down on November 23, 1992.

DEFINITIONS:

--- = Samples not collected
SCFM = Standard cubic feet per minute.
ppmv = Parts per million on volume to volume basis as measured by Foxburo organic vapor analyzer/flame ionization device.
TPH-G = Total purgeable hydrocarbons as gasoline.
NA = FID not functioning.
<n = Analytic result below detection limit of n.

Table 2. Total Hydrocarbon Removal, Former Chevron SS#9-4816, 301 14th Street, Oakland, California

DATE	WELL ID a	HOURS OF OPERATION b	TOTAL WELL GAS FLOW RATE (SCFM)		REMOVAL #TPH-G/HR		INTERVAL AVERAGE #TPH-G/HR	INTERVAL HOURS	INTERVAL TOTAL POUNDS TPH-G	CUMMULATIVE TOTAL POUNDS TPH-G REMOVED
03/12/92	CR-1/C-5	5	4.9	c	6.54		6.54	5	33	33
							6.48	18	117	150
03/13/92	CR-1/C-5	23	4.9	c	6.42					
							5.73	75	430	580
03/16/92	CR-1/C-5	98	4.9	c	5.04					
							3.88	692	2,685	3,265
04/14/92	CR-1/C-5	790	5.1	d	2.71					
							1.90	675	1,283	4,548
05/12/92	CR-1/C-5	1,465	2.7	d	1.08					
							2.15	606	1,297	5,845
06/17/92 e	CR-1/C-5	2,071	8.0	d,f	3.21	g				
06/19/92	CR-1/C-5/VEW1/VEW2	2,077	25.6	d	3.75		3.75	6	23	5,868
							3.45	345	1,190	7,058
07/20/92	CR-1/C-5/VEW1/VEW2	2,422	31.0	d	3.15					
							1.80	782	1,408	8,465
08/24/92	VEW1/VEW2	3,204	31.4	d	0.45					
							0.68	648	437	8,903
09/21/92	VEW1/VEW2	3,852	37.6	d	0.90					
							0.90	548	493	9,396
10/16/92	VEW1/VEW2	4,400	40.0	d,h						
										9,396
11/02/92	VEW1/VEW2	4,400	30.2	d,i	3.80		3.80			
								171	650	10,046
11/09/92	VEW1/VEW2	4,571		h						
11/16/92	VEW1/VEW2	4,571		j						
								195	121	10,167
11/23/92	VEW1/VEW2	4,766	35.5	h,j	0.62		0.62			

--- Table continued on next page ---

Table 2. Total Hydrocarbon Removal, Former Chevron SS#9-4816, 301 14th Street, Oakland, California

Notes and Definitions:

a = Measurements/samples represent combined extraction from wells listed.
b = Total hours of operation equals engine hours as appear on engine computer printout minus 3050 hours of previous use at other sites.
c = Based on flow data for similar operation parameters, measured vacuum, and assumed influent temperature of 70 F.
d = Based on measured vacuum and flow, and assumed influent temperature of 70 F.
e = First day of system operation with the two new wells (installed June 11, 1992) connected to the system as extraction wells.
f = Based on measured vacuum and flow from the 06/10/92 site visit.
g = Calculated estimates based on concentrations in samples collected 05/12/92.
h = System down upon departure to allow vapors to accumulate in pore spaces.
i = System restarted November 2, 1992. Operation parameters and samples recorded and collected at system stabilization. Removal rate is based on data collected November 2, and is not an interval average.
j = System restarted November 16, 1992. Operation parameters recorded and samples collected November 23, 1992. Removal rate is based on data collected November 23, and is not an interval average.

SCFM = Standard cubic feet per minute.
ppmv = Parts per million on volume to volume basis.
# = Pounds
FID = Total volatile organic compounds (VOCs) as measured by Foxboro organic vapor analyzer/flame ionization device.
TPH-G = Total purgeable hydrocarbons as gasoline.

Table 3. Free Product Thickness, Former Chevron Service Station #9-4816
301 14th Street, Oakland, California

DATE		C-1	C-2	C-3	C-4	C-5	CR-1		VEW-1	VEW-2
		<---------- product thickness (ft) ---------->								
11/05/91	a	0	0.04	2.46	0	2.29	2.43			
03/11/92		0	NM	1.09	NM	0.30	3.21			
03/16/92		0	NM	2.32	NM	0	8.88			
03/25/92		0	NM	2.31	NM	0	7.83			
05/05/92		NM	NM	2.11	0	0	5.67			
05/12/92		0	0	1.89	0	0.27	5.97			
05/19/92	b	NM	NM	2.00	NM	NM	2.92			
06/18/92	c	0	0	2.16	NM	0.85	3.12		NM	NM
07/28/92		0	0	0.51	NM	0	3.41		NM	NM
08/17/92		0	0	0	0	0	0		NM	NM
09/15/92		0	0	0	0	0	0		Dry	Dry
11/02/92		0	0	1.64	0	0	0		Dry	Dry
11/16/92		NM	NM	1.66	NM	0	1.67	d	NM	NM
11/30/92		0	0	1.61	0	0	0.77	e	Dry	Dry

Notes and Definitions:

NM = Not Measured
DRY = Attempted to measure depth to water and free product thickness but the well was dry.

a = From 4th Quarter 1992 Ground Water Monitoring Report prepared by Alton Geoscience, Concord, California
b = Measurement on 5/19/92 was taken prior to free product removal by Erickson, Inc. from wells CR-1 and C-3. Erickson vacuumed product from the wells until <1/4 inch remained.
c = VEW-1 and VEW-2 installed June 11, 1992 by Groundwater Technology, Concord, California
d = 1.75 gallons separate-phase product were bailed from well CR-1.
e = About 1 gallon separate-phase product was bailed from well CR-1.

ATTACHMENT A

ANALYTICAL REPORTS AND CHAIN-OF-CUSTODY FORMS

Superior Precision Analytical, Inc.
1555 Burke, Unit I • San Francisco, California 94124 • (415) 647-2081 / fax (415) 821-7123

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

LABORATORY NO.: 13698
CLIENT: WEISS ASSOCIATES
CLIENT JOB NO.: 4-582-51

DATE RECEIVED: 11/03/92
DATE REPORTED: 11/05/92
DATE ANALYZED: 11/04/92

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS
by Modified EPA SW-846 Method 5030 and 8015

LAB #	Sample Identification	Concentration (ppm) Gasoline Range
1	112A-IN	9400
2	112A-EFF	ND<30

ppm - parts per million in air
Minimum Detection Limit for Gasoline in Air: 30 ppm
Concentration of gasoline in air is calculated based on 20 C and 1 ATM and an assumed molecular weight of hexane.
Reported as volume to volume.

QAQC Summary:
Daily Standard run at 2mg/L: %DIFF Gasoline = <15
MS/MSD Average Recovery = 97%: Duplicate RPD = 1%

Richard Srna, Ph.D.

Laboratory Director

Superior Precision Analytical, Inc.
1555 Burke, Unit I • San Francisco, California 94124 • (415) 647-2081 / fax (415) 821-7123

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

LABORATORY NO.: 13698
CLIENT: WEISS ASSOCIATES
CLIENT JOB NO.: 4-582-51

DATE RECEIVED: 11/03/92
DATE REPORTED: 11/05/92
DATE ANALYZED: 11/04/92

ANALYSIS FOR BENZENE, TOLUENE, ETHYL BENZENE & XYLENES
by EPA SW-846 Methods 5030 and 8020

LAB #	Sample Identification	Concentration(ppb) Benzene	Toluene	Ethyl Benzene	Xylenes
1	112A-IN	72000	42000	1600	12000
2	112A-EFF	ND<85	ND<250	ND<65	ND<250

ppb - parts per billion in air

Minimum Detection Limit for Benzene in air = 85 ppb
Minimum Detection Limit for Toluene and Xylenes in air = 250 ppb
Minimum Detection Limit for Ethyl Benzene in air = 65 ppb
Concentration of BTXE in air is calculated based on 20 C and 1 ATM.
Reported as volume to volume.

QAQC Summary:

Daily Standard run at 20ug/L: %DIFF 8020 = <15%
MS/MSD Average Recovery = 97% : Duplicate RPD = 4%

Richard Srna, Ph.D.

Laboratory Director

Superior Precision Analytical, Inc.
1555 Burke, Unit I • San Francisco, California 94124 • (415) 647-2081 / fax (415) 821-7123

MOCK INVOICE

Chevron USA
P.O. Box 5004
San Ramon, CA 94583

Date: 11/05/92
Date Rcvd: 11/03/92
Date Rptd: 11/05/92
Our Job #: 13698
Invoice #: 13698

Weiss Associates Job # 4-582-51
Chevron USA Release # 3523000 Facility #: 9-4816

QTY/MATRIX	ANALYSIS	EXT. PRICE
2 AIR	sample(s) for VBAIR @ $0.00 (RUSH)	0.00
TOTAL INVOICE		0.00

Please Send Payment To:
Superior Precision Analytical
P.O. Box 1545
Martinez, CA 94553

TERMS: NET 30
A charge of 1.5% per month may be applied to unpaid balances.

Fax copy of Lab Report and COC to Chevron Contact: ☐ No 15698 **Chain-of-Custody-Record**

Chevron U.S.A. Inc. P.O. BOX 5004 San Ramon, CA 94583 FAX (415)842-9591	Chevron Facility Number 9-4816 Facility Address 310 14th Street, Oakland, CA Consultant Project Number 4-582-51 Consultant Name WEISS ASSOCIATES Address 5500 SHELLMOUND ST. Project Contact (Name) THOMAS BERRY (Phone) (510) 547-5420 (Fax Number)	Chevron Contact (Name) NANCY VUKELICH VUKELICH (Phone) (510) 842-9581 Laboratory Name SUPERIOR PRECISION ANALYTICAL Laboratory Release Number 3523000 Samples Collected by (Name) RONALD C. JENSEN Collection Date 11/2/92 Signature Ronald C. Jensen

Sample Number	Lab Sample Number	Number of Containers	Matrix S = Soil A = Air W = Water C = Charcoal	Type G = Grab C = Composite D = Discrete	Time	Sample Preservation	Iced (Yes or No)	BTEX + TPH GAS (8020 + 8015)	TPH Diesel (8015)	Oil and Grease (5520)	Purgeable Halocarbons (8010)	Purgeable Aromatics (8020)	Purgeable Organics (8240)	Extractable Organics (8270)	Metals Cd,Cr,Pb,Zn,Ni (ICAP or AA)					Remarks
112A-IN		1	A	G	15:35	NONE	N	X												
112A-EFF		1	A	G	15:20	NONE	N	X												

RUSH

Please initial: CGJ
Samples Stored in ice. NA
Appropriate containers. YES
Samples preserved. NA
VOA's without headspace. NA
Comments:

→ SAMPLES STORED IN SECURE AREA OVERNIGHT

Relinquished By (Signature)	Organization	Date/Time	Received By (Signature)	Organization	Date/Time	Turn Around Time (Circle Choice)
Ronald C. Jensen	Weiss Assoc	11/3/92 11:45	P Lobell	EX-IT	11-3-92 1015	24 Hrs.
Paul Lobell	EX-IT	11/3/92 1210				48 Hrs. / 5 Days / 10 Days
			Received For Laboratory By (Signature): Cecilia G Jacquez		11/3/92 1210	As Contracted

COC-3.DWG/03 91/HGH

Superior Precision Analytical, Inc.
1555 Burke, Unit I • San Francisco, California 94124 • (415) 647-2081 / fax (415) 821 7123

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

LABORATORY NO.: 13793
CLIENT: Weiss Associates
CLIENT JOB NO.: 4-582-51

DATE RECEIVED: 11/24/92
DATE REPORTED: 12/01/92
DATE ANALYZED: 11/25/92

ANALYSIS FOR TOTAL PETROLEUM HYDROCARBONS
by Modified EPA SW-846 Method 5030 and 8015

LAB #	Sample Identification	Concentration (ppm) Gasoline Range
1	IN	1300
2	EFF	ND<30

ppm - parts per million in air
Minimum Detection Limit for Gasoline in Air: 30 ppm
Concentration of gasoline in air is calculated based on 20 C and 1 ATM and an assumed molecular weight of hexane.
Reported as volume to volume.

QAQC Summary:
Daily Standard run at 2mg/L: %DIFF Gasoline = <15
MS/MSD Average Recovery = 92 %: Duplicate RPD =12%

Richard Srna, Ph.D.

Cecilia G. Jacinto (for)
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

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ANALYSIS FOR BENZENE, TOLUENE, ETHYL BENZENE & XYLENES by EPA SW-846 Methods 5030 and 8020

LAB #	Sample Identification	Concentration(ppb) Benzene	Toluene	Ethyl Benzene	Xylenes
1	IN	7500	14000	1300	22000
2	EFF	ND<85	ND<250	ND<65	ND<250

ppb - parts per billion in air

Minimum Detection Limit for Benzene in air = 85 ppb
Minimum Detection Limit for Toluene and Xylenes in air = 250 ppb
Minimum Detection Limit for Ethyl Benzene in air = 65 ppb
Concentration of BTXE in air is calculated based on 20 C and 1 ATM.
Reported as volume to volume.

QAQC Summary:

Daily Standard run at 20ug/L: %DIFF 8020 = <15%
MS/MSD Average Recovery = 92% : Duplicate RPD = 1%

Richard Srna, Ph.D.

Laboratory Director

Fax copy of Lab Report and COC to Chevron Contact: ☐ No

Chain-of-Custody-Record

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

Chevron Facility Number: 9-4816
Facility Address: 310 14th ST. OAK. CA
Consultant Project Number: 4-582-51
Consultant Name: WEISS ASSOC.
Address: 5500 SHELLMOUND ST.
Project Contact (Name): THOMAS BERRY
(Phone) 510 5475420 (Fax Number)

Chevron Contact (Name): NANCY VOKELICH
(Phone) 510 842 9581
Laboratory Name: SUPERIOR.
Laboratory Release Number: 3523000
Samples Collected by (Name): R. HOFFMAN
Collection Date: 11/24/92
Signature: [signature]

Sample Number	Lab Sample Number	Number of Containers	Matrix S = Soil W = Water A = Air C = Charcoal	Type G = Grab C = Composite D = Discrete	Time	Sample Preservation	Iced (Yes or No)	BTEX + TPH GAS (8020 + 8015)	TPH Diesel (8015)	Oil and Grease (5520)	Purgeable Halocarbons (8010)	Purgeable Aromatics (8020)	Purgeable Organics (8240)	Extractable Organics (8270)	Metals Cd,Cr,Pb,Zn,Ni (ICAP or AA)					Remarks
IN		1	A	G	1235	NONE	N	X												
EFF		1	A	G	1230	NONE	N	X												

RUSH

Relinquished By (Signature)	Organization	Date/Time	Received By (Signature)	Organization	Date/Time
[signature]	WEISS	11/24/92 14:30	[signature]	WEISS	11/24/92 14:50
[signature]	WEISS	11/24/92 1440	[signature]	J.K. KRISS	11-24-92 1440
[signature]	[illegible]	11-24-92 1535	Received For Laboratory By (Signature) [signature]		Date/Time 11/24/92 1535

Turn Around Time (Circle Choice)
(24 Hrs.) DUE TO HOLIDAYS
48 Hrs.
5 Days
10 Days
As Contracted

COC-3.DWG/03 91/HCH

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MOCK INVOICE

Chevron USA
P.O. Box 5004
San Ramon, CA 94583

Date: 11/28/92
Date Rcvd: 11/24/92
Date Rptd: 11/28/92
Our Job #: 13793
Invoice #: 13793

Weiss Associates Job # 4-582-51
Chevron USA Release # 3523000 Facility #: 9-4816

QTY/MATRIX	ANALYSIS	EXT. PRICE
2 Air sample(s)	for VBAIR @ $0.00 (RUSH)	0.00
TOTAL INVOICE		0.00

Please Send Payment To:
Superior Precision Analytical
P.O. Box 1545
Martinez, CA 94553

TERMS: NET 30
A charge of 1.5% per month may be applied to unpaid balances.

ATTACHMENT B

SAMPLE EMISSION CALCULATIONS

$$flowrate\ (scfm) = flowrate(ICE)\ (cfm) \times \left(\frac{14.7 + psig}{14.7}\right) \times \left(\frac{520}{460 + T_F}\right)$$

where

- T_F = temperature of air in °F,
- 520 = 460 + 60° = standard temperature rankine, and
- psig = $\frac{\text{inches of water pressure (negative)}}{\text{27.7 inches of water /1 psi}}$

So the effluent flow rate is:

$$Flowrate = 56.5\ cfm \times \frac{14.7 - \frac{45}{27.7}}{14.7} \times \frac{520}{460 + 70} = 49.3\ scfm$$

For TPH-G and benzene:

$$TPH\text{-}G = 450 \times 10^{-6} \times 49.3\ scfm \times \frac{1 lb\text{-}mole}{386\ ft^3} \times \frac{86\ lbs}{lb\text{-}mole} \times \frac{1440\ \text{min.}}{day} = 7.11\ \frac{lbs}{day}$$

$$Benzene = 8.1 \times 10^{-6} \times 49.3\ scfm \times \frac{1 lb\text{-}mole}{386\ ft^3} \times \frac{78\ lbs}{lb\text{-}mole} \times \frac{1440\ \text{min.}}{day} = 0.12\ \frac{lbs}{day}$$

Destruction Efficiency

The equation for destruction efficiency is:

$$Destruction\ efficiency = \frac{\frac{lbs\ removed}{day} - \frac{lbs\ emitted}{day}}{\frac{lbs\ removed}{day}} \times 100\%$$

For TPH-G and benzene:

$$TPH\text{-}G\ destruction\ efficiency = \frac{25.9 - 7.1}{25.9} \times 100\% = 72.6\%$$

$$\textit{benzene destruction efficiency} = \frac{0.24 - 0.12}{0.24} \times 100\% = 50.0\%$$