



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

92 JUN 11 10 12 AM '92

STID 478

Marketing Department

June 8, 1992

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 94612

Dear Ms. Eberle:

Enclosed we are forwarding the Bimonthly Progress Report dated June 1, 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. As indicated in the report, the system commenced operation on March 12, 1992, and has continuously operated with the exception of approximately two-hours of shutdown time during weekly routine engine maintenance. To date, approximately 4,550 lbs. of hydrocarbons have been removed.

Due to total flow rates being lower than expected, we are planning to install two (2) additional vapor extraction wells this month. These wells will be screened approximately 7-feet higher than the existing extraction wells which should improve extraction flow rates. Prior to the submittal of the next bi-monthly progress report, a field test will be conducted to determine the capture zone/radius of influence. This data will be documented in the next report.

Chevron will continue to submit bimonthly progress reports on the soil vapor extraction system until system shutdown.

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. Eddy So, RWQCB
Mr. R.W. Cosby, 225/1936
Ms B.C. Owen
File (9-4816-2)

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



June 1, 1992

JUN 5 '92 JST

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

Re: Bi-monthly Progress Report
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 extracts vapors from wells CR-1 and C-5 (Figure 2). The ICE is permitted by the Bay Area Air Quality Management District (BAAQMD) under Permit to Operate #8272.

WA began continuous engine operation on March 12, 1992, and sampled the influent and effluent vapor stream on March 12, 13 and 16, 1992, as required by the BAAQMD. Since the initial start-up period, the ICE has operated almost continuously and is only inactive for about 1 to 2 hours each week during routine engine maintenance. In accordance with BAAQMD permit requirements, WA monitors the influent and effluent vapor stream monthly and collects Tedlar bag samples for submittal to a state-certified analytical laboratory. Additionally, field measurements are taken with a flame ionization detector (FID). Table 1 presents analytic results and FID measurements. Table 1 also summarizes the system's hours of operation and calculated emission rates and 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 May 12, 1992, about 4,550 lbs of hydrocarbons have been removed from soil and ground water beneath the site. Influent concentrations have declined accordingly as illustrated on Figure 4. The analytical reports and chain-of-custody forms are included as

Nancy Vukelich
June 1, 1992

2

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

Total flow rates from wells CR-1 and C-5 have ranged from 2.7 standard cubic feet per minute (scfm) to 5.1 scfm. These flow rates are lower than expected, possibly due to the upwelling of floating hydrocarbons and ground water in the well casing. Under vacuum, the liquid may rise in the well, blocking much of the well screen in the vadose zone and limiting the vapor extraction flow rate. To improve the system's hydrocarbon removal rate, Chevron is planning to install and connect two additional vadose zone wells by mid-June 1992. These new wells will have well screens extending about seven ft higher into the vadose zone than wells CR-1 and C-5, which should improve vapor extraction flow rates. Until the new wells are connected, the system will continue to operate at the highest obtainable flow rates from wells CR-1 and C-5.

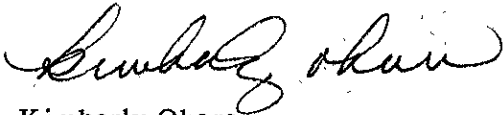
In conjunction with vapor stream monitoring, WA measured floating hydrocarbon thicknesses in on-site wells. Wells with the greatest hydrocarbon thicknesses are CR-1, C-3 and C-5. These measurements are presented in Table 3. Floating hydrocarbon thicknesses in wells CR-1 and C-3 more than doubled within the first five days of operation (March 12 to 16, 1992) suggesting movement of floating hydrocarbons towards these wells. While the hydrocarbon thickness in well C-3 remains about 2 ft, the thickness in well CR-1 decreased from just under 9 ft to less than 3 ft since March 16, 1992. This may be a result of either actual hydrocarbon removal or floating hydrocarbons coming into equilibrium with the induced vacuum.

On May 19, 1992, Erickson Inc. removed 11 and 9 gallons of floating product from wells CR-1 and C-3, respectively. Product thickness measurements immediately following the removal activities indicated that less than 1/4 inch of product remained in the wells. WA will continue monthly floating hydrocarbon thickness measurements.

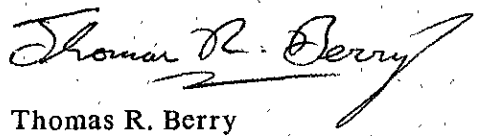
Nancy Vukelich
June 1, 1992

Please call if you have any questions or require additional information.

Sincerely,
Weiss Associates



Kimberly Ohara
Staff Engineer



Thomas R. Berry
Project Geologist

KAO:kao

C:\KAO\582L1MY2.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

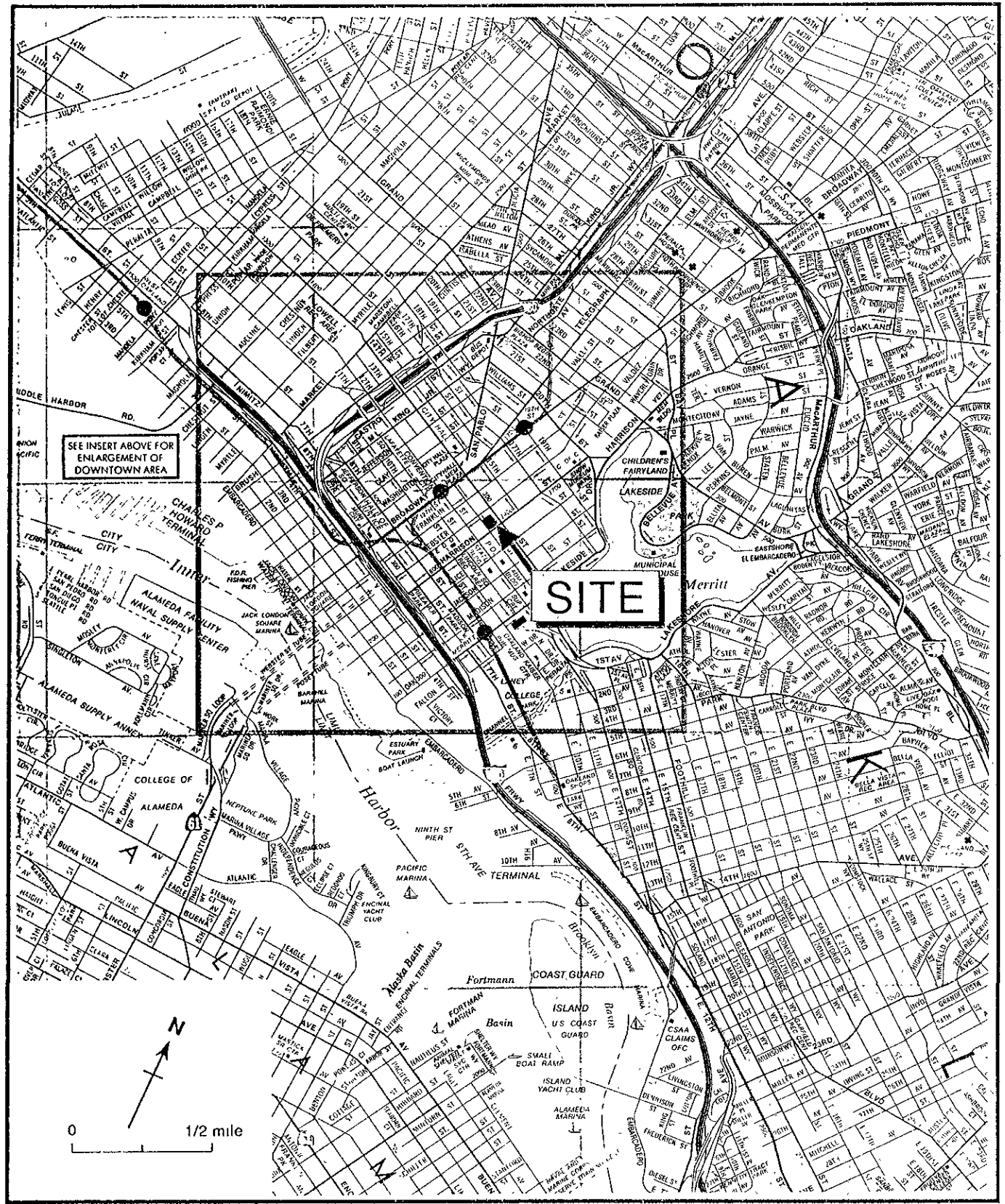


Figure 1. Site Location Map - Former Chevron Service Station #9-4816, 301 14th Street, Oakland, California

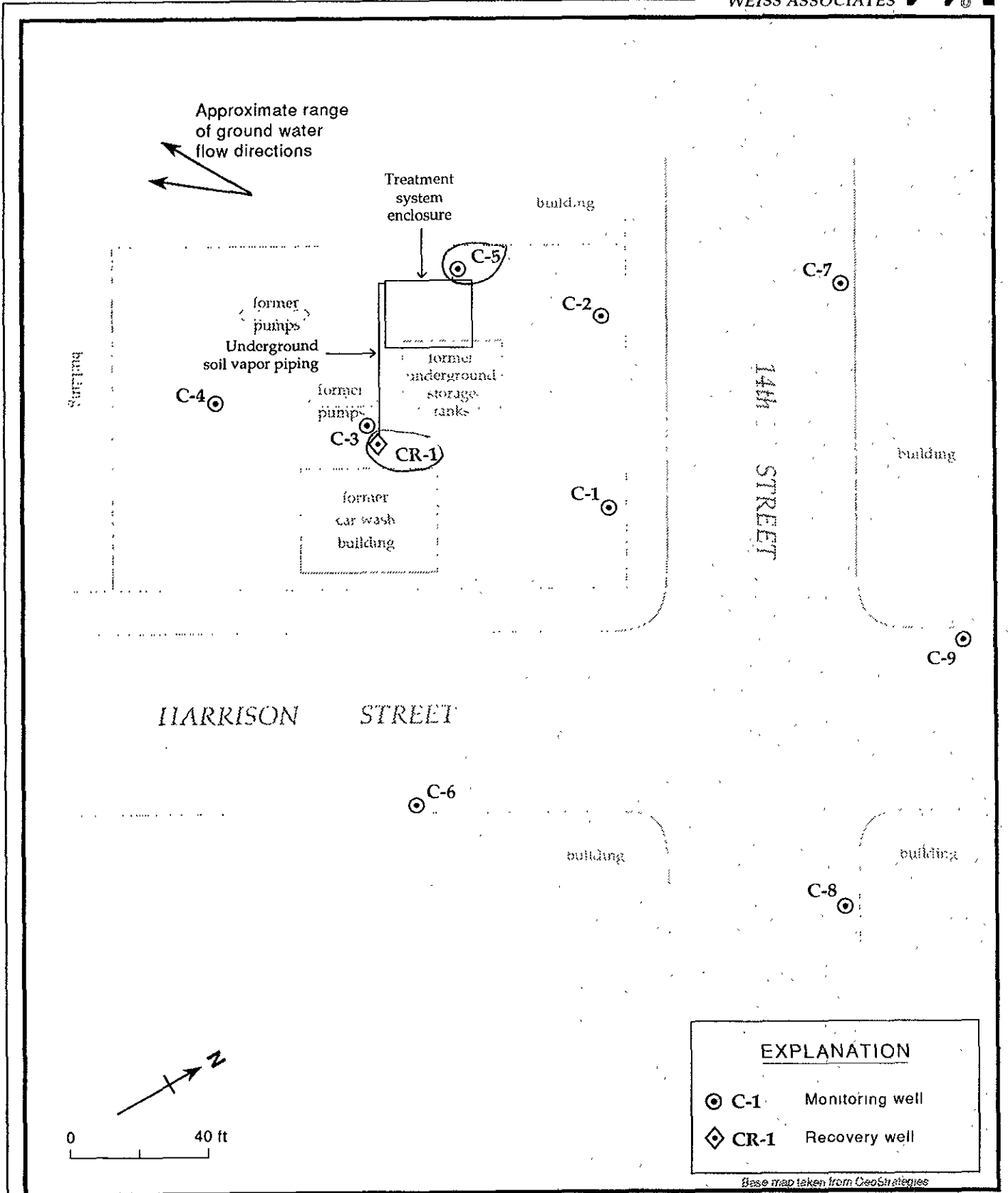


Figure 2. Monitoring and Extraction Well Locations - Former Chevron Service Station #9-4816, 301 14th Street, Oakland, California

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

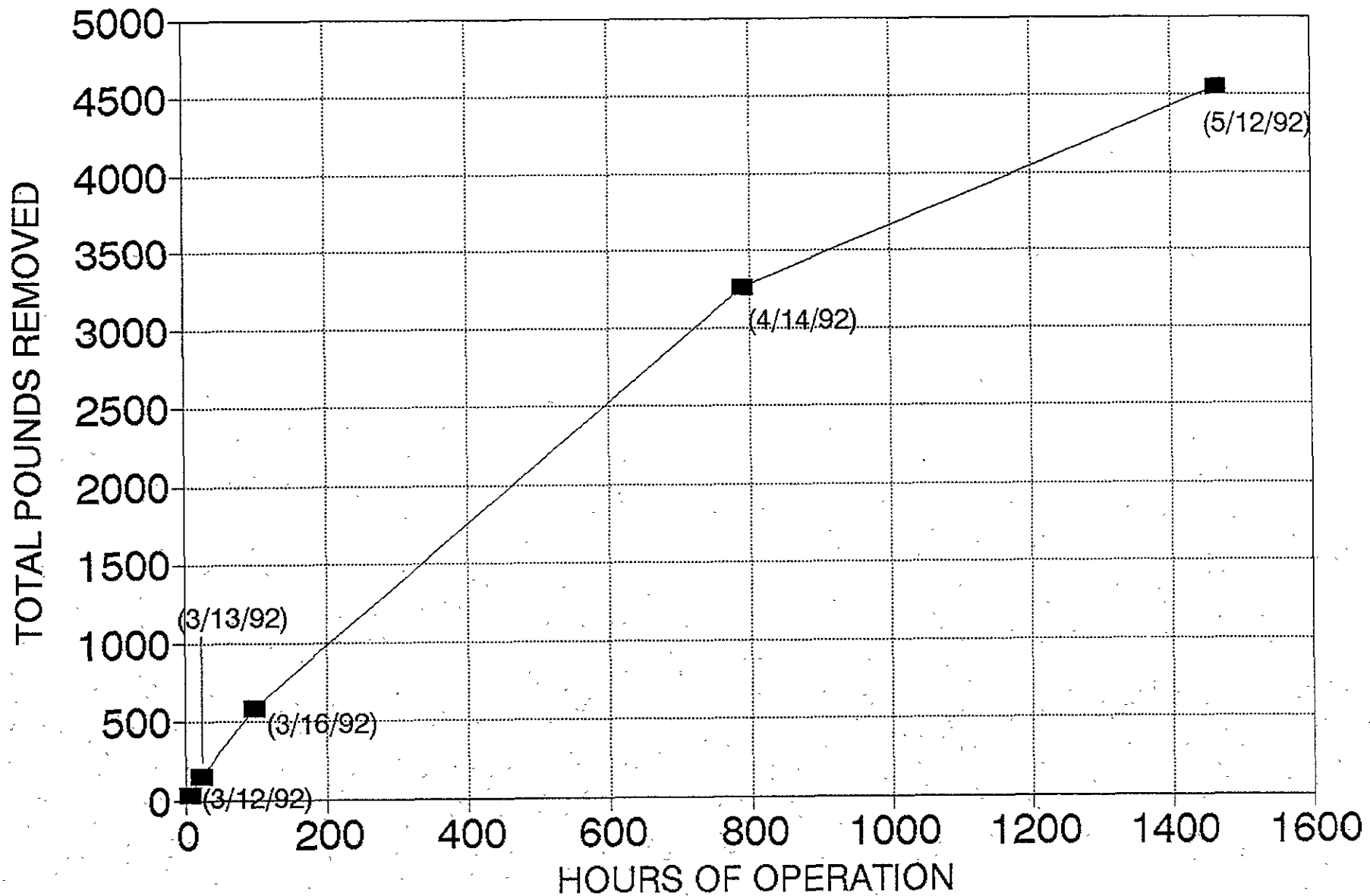
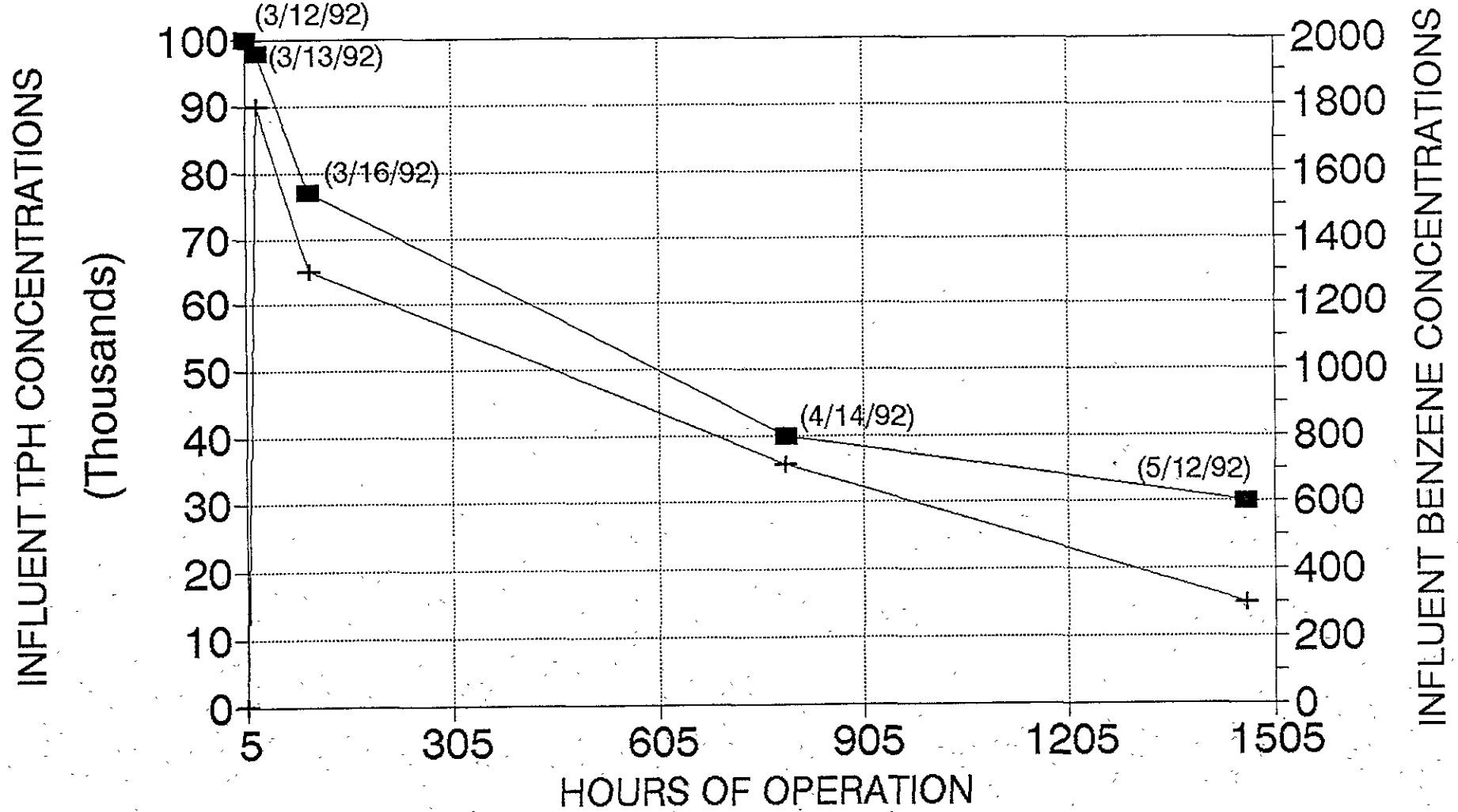


Figure 4. INFLUENT CONCENTRATIONS

FORMER CHEVRON SS#9-4816, OAKLAND



TPH (ppmv)
 Benzene (ppmv)



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

DATE	WELL ID a	HOURS OF OPERATION b	FLOW RATE (SCFM) c	FUEL HYDROCARBON CONCENTRATIONS (ppmv)						REMOVAL RATE (#/DAY)		EMISSION RATE (#/DAY)		DESTRUCTION EFFICIENCY (%)	
				FID d	TPH-G	BENZENE	FID d	TPH-G e	BENZENE	TPH-G	BENZENE	TPH-G	BENZENE	TPH-G	BENZENE
03/12/92	CR-1/C-5	5	4.9 c	>46,000	100,000	<4.2	185	<30	<0.085	157	<0.060	<0.33	<0.0009	>99.8	>85.8
03/13/92	CR-1/C-5	23	4.9 c	>47,800	98,000	1,800	80	<30	<0.085	154	2.6	<0.26	<0.0006	>99.8	>99.98
03/16/92	CR-1/C-5	98	4.9 c	>50,000	77,000	1,300	NA	<30	0.12	121	1.9	<0.26	0.0009	>99.8	99.95
04/14/92	CR-1/C-5	790	5.1 f	2,550	40,000	710	NA	<30	0.54	65	1.1	<0.38	0.0062	>99.4	99.4
05/12/92	CR-1/C-5	1465	2.7 f	6,500	30,000	300	NA	450	8.1	26	0.56	7.6	0.12	70.6	78.6 g

Notes:

- a = Measurements/samples represent combined extraction from wells CR-1 and C-5.
- 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 = Value reflects subtraction of carbon-tip (methane) measurement. In some cases, FID measurement of total VOCs exceeded instrument measurement range of 50,000 ppmv.
- e = <n indicates result below analytic detection limit of n.
- f = Based on measured vacuum and flow, and assumed influent temperature of 70 F.
- g = BAAQMD was notified of higher emission rates and lower destruction efficiency. System optimization is scheduled to maximize destruction efficiency.
- 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.
- NA = FID not functioning.



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

DATE	WELL ID ^a	HOURS OF OPERATION ^b	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
03/13/92	CR-1/C-5	23	4.9 ^c	6.42	6.48	18	117	150
03/16/92	CR-1/C-5	98	4.9 ^c	5.04	5.73	75	430	580
04/14/92	CR-1/C-5	790	5.1 ^d	2.71	3.88	692	2685	3265
05/12/92	CR-1/C-5	1465	2.7 ^d	1.08	1.90	675	1283	4548

Notes:

a = Measurements/samples represent combined extraction from wells CR-1 and C-5.

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.

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
	<-----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

Notes:

NM = Not Measured

a = From 4th Quarter 1991 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.

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.: 12884
CLIENT: Weiss Associates
CLIENT JOB NO.: 4-582-83

DATE RECEIVED: 03/13/92
DATE REPORTED: 03/16/92

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

LAB #	Sample Identification	Concentration (ppm) Gasoline Range
1	12032-IN	100000
2	12032-OUT	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 = 0.7%

Richard Srna, Ph.D.

Cecilia G. Jonquin (for)
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.: 12884
CLIENT: Weiss Associates
CLIENT JOB NO.: 4-582-83

DATE RECEIVED: 03/13/92
DATE REPORTED: 03/16/92

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	12032-IN	ND<4200	2000000	130000	620000
2	12032-OUT	ND<85	570	70	450

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 = 91% : Duplicate RPD = 1.5%

Richard Srna, Ph.D.

Alilia G. Jaquin (for)
Laboratory Director

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 4-582-83
 Consultant Name WEISS ASSOCIATES
 Address 5500 SHELLMOUND ST.
 Project Contact (Name) THOMAS BERRY
 (Phone) (510)547-5420 (Fax Number)

Chevron Contact (Name) NANCY VOLLELICH
 (Phone) (510)
 Laboratory Name SUPERIOR PRECISION ANALYTICAL
 Laboratory Release Number 3523000
 Samples Collected by (Name) Jim Martin
 Collection Date 3/12/92
 Signature Jim Martin

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)	Analyses To Be Performed											Remarks				
								BTEX + TPH GAS (8020 + 8015)	TPH Diesel (8015)	Oil and Greases (5520)	Purgeable Halocarbons (8010)	Purgeable Aromatics (8020)	Purgeable Organics (8240)	Extractable Organics (8270)	Metals Cd,Cr,Pb,Zn,Ni (ICAP or AA)								
12032-IN		2	A	G	1758	NONE	N	X															High Concentrations
12032-OUT		1	A	G	1618	NONE	N	X															

Please Initial:

Samples Stored in Ice. NO

Appropriate Containers. YES

Samples Preserved. NO

VOA's without headspace. NA

Comments: OK

Stored in locked building overnight.

Relinquished By (Signature) <i>Thomas Berry</i>	Organization <i>Weiss Assoc</i>	Date/Time * <i>3/13/92 0600</i>	Received By (Signature) <i>Robert L. Brewer</i>	Organization <i>Weiss</i>	Date/Time 1300 <i>3/12/92</i>	Turn Around Time (Circle Choice) 24 Hrs. 48 Hrs. 5 Days 10 Days <u>As Contracted</u>
Relinquished By (Signature) <i>Robert L. Brewer</i>	Organization <i>Weiss</i>	Date/Time 10:30 <i>3/13/92</i>	Received By (Signature) <i>[Signature]</i>	Organization <i>Express-IT</i>	Date/Time <i>3/13/92/1030</i>	
Relinquished By (Signature) <i>[Signature]</i>	Organization <i>Express-IT</i>	Date/Time <i>3/13/92/1347</i>	Received For Laboratory By (Signature) <i>[Signature]</i>	Date/Time 1420 <i>3/12/92</i>		



Superior Precision Analytical, Inc.

1555 Burke, Unit 1 • 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.: 12882
CLIENT: Weiss Associates
CLIENT JOB NO.: 4-582-83

DATE RECEIVED: 03/13/92
DATE REPORTED: 03/16/92

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

LAB #	Sample Identification	Concentration (ppm) Gasoline Range
1	13032-IN	98000
2	13032-OUT	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 = 0.7%

Richard Srna, Ph.D.

Carla G. Gonzalez (for)
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.: 12882
CLIENT: Weiss Associates
CLIENT JOB NO.: 4-582-83

DATE RECEIVED: 03/13/92
DATE REPORTED: 03/16/92

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	13032-IN	1800000	2000000	140000	690000
2	13032-OUT	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 = 91% : Duplicate RPD = 1.5%

Richard Srna, Ph.D.

Cecilia G. Joaquin (for)
Laboratory Director

Chevron U.S.A. Inc. P.O. BOX 5004 San Ramon, CA 94583 FAX (415)842-9591	Chevron Facility Number <u>9-4816</u> Facility Address <u>310 14th Street, Oakland, CA</u> Consultant Project Number <u>4-582-83</u> Consultant Name <u>WEISS ASSOCIATES</u> Address <u>5500 SHELLMOUND ST.</u> Project Contact (Name) <u>THOMAS BERRY</u> (Phone) <u>(510) 547-5420</u> (Fax Number)	Chevron Contact (Name) <u>NANCY VOUELICH</u> (Phone) <u>(510)</u> Laboratory Name <u>SUPERIOR PRECISION ANALYTICAL</u> Laboratory Release Number <u>3523000</u> Samples Collected by (Name) <u>John M. Weston</u> Collection Date <u>3/13/92</u> Signature <u>[Signature]</u>
--	---	---

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)	Analyses To Be Performed										Remarks				
								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)							
13032-IN		2	A	G	1000	NONE	NO	X														
13032-OUT		1	A	G	947	↓	↓	X														

Please initial:

Samples Stored in ice. NO

Appropriate containers. YES

Samples preserved. NO

VOA's without headspace. NA

Comments: OK

Relinquished By (Signature) <u>[Signature]</u>	Organization <u>APB/ISS</u>	Date/Time <u>3/13/92 1030</u>	Received By (Signature) <u>[Signature]</u>	Organization <u>X519 Express-IT</u>	Date/Time <u>3/13/92/1030</u>	Turn Around Time (Circle Choice) 24 Hrs. 48 Hrs. 5 Days 10 Days <u>As Contracted</u>
Relinquished By (Signature) <u>[Signature]</u>	Organization <u>X519 Express-IT</u>	Date/Time <u>3/13/92/1347</u>	Received By (Signature) <u>[Signature]</u>	Organization	Date/Time	
Relinquished By (Signature)	Organization	Date/Time	Received For Laboratory By (Signature) <u>[Signature]</u>		Date/Time <u>1420 3/13/92</u>	

COC-3.PHWG/03 01/HCH



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.: 12895
CLIENT: Weiss Associates
CLIENT JOB NO.: 4-582-83

DATE RECEIVED: 03/17/92
DATE REPORTED: 03/18/92

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	16032-IN	1300000	1400000	100000	490000
2	16032-OUT	120	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 =6.9%

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.: 12895
CLIENT: Weiss Associates
CLIENT JOB NO.: 4-582-83

DATE RECEIVED: 03/17/92
DATE REPORTED: 03/18/92

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

LAB #	Sample Identification	Concentration (ppm) Gasoline Range
1	16032-IN	77000
2	16032-OUT	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 =103%: Duplicate RPD =4.1%

Richard Srna, Ph.D.

Laboratory Director

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 4-582-83
Consultant Name WEISS ASSOCIATES
Address 5500 SHELLMOUND ST.
Project Contact (Name) THOMAS BERRY
(Phone) (510) 547-5420 (Fax Number) _____

Chevron Contact (Name) NANCY VOULELICH
(Phone) (510) 842-9581
Laboratory Name SUPERIOR PRECISION ANALYTICAL
Laboratory Release Number 3523000
Samples Collected by (Name) BRIAN BUSCH
Collection Date MARCH 16, 1992
Signature Brian Busch

Sample Number	Lab Sample Number	Number of Containers	Matrix		Time	Sample Preservation	Iced (Yes or No)	Analytes To Be Performed										Remarks			
			S = Soil	W = Water				A = Air	C = Charcoal	G = Grab	C = Composite	D = Discrete	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)
16032-IN		2	A	G	15:02	NONE	NO	X													ANALYZE
16032-OUT		2	A	G	14:45	NONE	NO	X													ONLY ONE SAMPLE, THE OTHER IS A DUPLICATE.

203

Relinquished By (Signature) <u>Brian Busch</u>	Organization <u>WEISS</u>	Date/Time <u>3/16/92 17:05</u>	Received By (Signature) <u>Tom Berry</u>	Organization <u>WEISS</u>	Date/Time <u>3/17/92 09:10</u>	Turn Around Time (Circle Choice) 24 Hrs. 48 Hrs. <u>72 hrs.</u> 5 Days 10 Days As Contracted
Relinquished By (Signature) <u>Tom Berry</u>	Organization <u>WEISS</u>	Date/Time <u>3/17/92 09:31</u>	Received By (Signature) <u>UNIDENTIFIED</u>	Organization <u>WEISS</u>	Date/Time <u>3-17-92 0555</u>	
Relinquished By (Signature) <u>[Signature]</u>	Organization <u>WEISS</u>	Date/Time <u>3-17-92 1111</u>	Received for Laboratory By (Signature) <u>[Signature]</u>	Organization <u>WEISS</u>	Date/Time <u>3/17/92 1123</u>	

STORER OVERNIGHT IN A LOCKED SECURITY UNIT

COC-3.0WIG/03 91/HCH



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.: 12996
CLIENT: Weiss Associates
CLIENT JOB NO.: 4-582-51

DATE RECEIVED: 04/14/92
DATE REPORTED: 04/17/92

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	04142-IN	710000	890000	70000	310000
2	04142-OUT	540	660	140	770

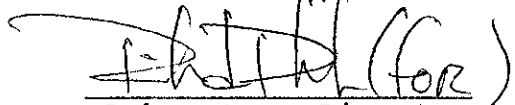
ppb - parts per billion in air

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 = 95 % : Duplicate RPD = 9.7 %

Richard Srna, Ph.D.


Laboratory Director



Superior Precision Analytical, Inc.

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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.: 12996
CLIENT: Weiss Associates
CLIENT JOB NO.: 4-582-51

DATE RECEIVED: 04/14/92
DATE REPORTED: 04/17/92

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

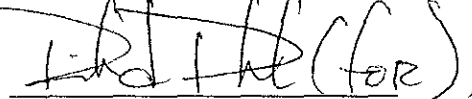
LAB #	Sample Identification	Concentration (ppm) Gasoline Range
1	04142-IN	40000
2	04142-OUT	ND<30

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 = 94 %: Duplicate RPD = 8.6 %

Richard Srna, Ph.D.


Laboratory Director

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

Chevron Facility Number 9-4816
 Facility Address 301 14th St., OAKLAND, CA
 Consultant Project Number 4-582-51
 Consultant Name WEISS ASSOCIATES
 Address 5500 SHELLMOUND, EMERYVILLE, CA
 Project Contact (Name) TOM BERRY
 (Phone) 510/547-5420 (Fax Number) 510/547-5043

Chevron Contact (Name) NANCY VUKELICH
 (Phone) 510-842-9581 / Fax 510-842-9591
 Laboratory Name SUPERIOR ANALYTICAL
 Laboratory Release Number 3523000
 Samples Collected by (Name) B. BUSCH
 Collection Date 4-14-92
 Signature Brian Busch

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)	Analyses To Be Performed											Remarks		
								BTX + 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)						
<u>04142-IN</u>		<u>2</u>	<u>A</u>	<u>G</u>	<u>12:45</u>	<u>NONE</u>	<u>No</u>	<u>X</u>													<i>Analyze only one sample from each - The other is a duplicate.</i>
<u>04142-OUT</u>		<u>2</u>	<u>A</u>	<u>G</u>	<u>12:51</u>	<u>NONE</u>	<u>No</u>	<u>X</u>													

Please initial:

Samples Stored in ice. NO

Appropriate containers. YES

Samples preserved. NO

VOA's without headspace NA

Comments: OK

Relinquished By (Signature) <u>Brian Busch</u>	Organization <u>WEISS</u>	Date/Time <u>4-14-92 13:53</u>	Received By (Signature) <u>Ronald C. Jensen</u>	Organization <u>Weiss Assoc</u>	Date/Time <u>4/14/92 13:53</u>	Turn Around Time (Circle Choice) 24 Hrs. 48 Hrs. <u>72hr</u> 5 Days 10 Days <input checked="" type="radio"/> Contracted <u>BB</u>
Relinquished By (Signature) <u>Ronald C. Jensen</u>	Organization <u>Weiss Assoc</u>	Date/Time <u>4/14/92 14:20</u>	Received By (Signature) <u>Tom Brown</u>	Organization <u>EX-17</u>	Date/Time <u>4/14/92</u>	
Relinquished By (Signature) <u>Tom Brown</u>	Organization <u>EX-17</u>	Date/Time <u>4/14/92 15:35</u>	Received For Laboratory By (Signature) <u>[Signature]</u>		Date/Time <u>4/14/92</u>	



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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.: 13093
CLIENT: Weiss Associates
CLIENT JOB NO.: 4-582-51

DATE RECEIVED: 05/13/92
DATE REPORTED: 05/14/92

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

LAB #	Sample Identification	Concentration (ppm) Gasoline Range
1	12052-IN	30000
2	12052-OUT	450

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 =86 %: Duplicate RPD =6.1 %

Richard Srna, Ph.D.

Omig A. Nurgun (A)
Laboratory Director



Superior Precision Analytical, Inc.

1555 Burke, Unit 1 • 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.: 13093
CLIENT: Weiss Associates
CLIENT JOB NO.: 4-582-51

DATE RECEIVED: 05/13/92
DATE REPORTED: 05/14/92

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	12052-IN	300000	250000	9100	33000
2	12052-OUT	8100	30000	6500	32000

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 =94 % : Duplicate RPD =8.7 %

Richard Srna, Ph.D.

Orly A. Nunez
Laboratory Director

Chevron U.S.A. Inc. P.O. BOX 5004 San Ramon, CA 94583 FAX (415)842-9591	Chevron Facility Number <u>9-4816</u> Facility Address <u>310 14th Street, Oakland, CA</u> Consultant Project Number <u>4-582-51</u> Consultant Name <u>WEISS ASSOCIATES</u> Address <u>5500 SHELLMOUND ST.</u> Project Contact (Name) <u>THOMAS BERRY</u> (Phone) <u>(510)547-5420</u> (Fax Number) _____	Chevron Contact (Name) <u>NANCY VUKELICH</u> (Phone) <u>(510) 842-9581</u> Laboratory Name <u>SUPERIOR PRECISION ANALYTICAL</u> Laboratory Release Number <u>3523000</u> Samples Collected by (Name) <u>RON JENSEN</u> Collection Date <u>5/12/92</u> Signature <u>Ronald C. Jensen</u>
--	--	---

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)	Analytes To Be Performed										Remarks					
								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)								
12052-IN		2	A	G	11:30	NONE	N	X															
12052-OUT		2	A	G	11:54	NONE	N	X															HOLD DUPLICATES
																							ONLY ANALYZE IF NECESSARY

Please initial: JRJ

Samples Stored in ice: No

Appropriate containers: Yes

Samples preserved: No

VOA's without headspace: N/A

Comments: _____

7 SAMPLES STORED IN SECURE AREA OVERNIGHT

Relinquished By (Signature) <u>Ronald C. Jensen</u>	Organization <u>WISS ASSOC</u>	Date/Time <u>5/13/92 10:05</u>	Received By (Signature) <u>Nancy Vukelich</u>	Organization <u>EXPRESS IT</u>	Date/Time <u>5-13-92</u>	Turn Around Time (Circle Choice) 24 Hrs. <u>48 Hrs.</u> 5 Days 10 Days As Contracted
Relinquished By (Signature) <u>Nancy Vukelich</u>	Organization <u>EXPRESS IT</u>	Date/Time <u>5-13-92</u>	Received By (Signature) <u>[Signature]</u>	Organization <u>[Blank]</u>	Date/Time <u>[Blank]</u>	
Relinquished By (Signature) <u>Charles Mahin</u>	Organization <u>EXPRESS IT</u>	Date/Time <u>5/13/92 1140</u>	Received For Laboratory By (Signature) <u>[Signature]</u>	Date/Time <u>5-13-92 1140</u>		

COC-3.DWG/03 91/HCH

ATTACHMENT B
SAMPLE EMISSION CALCULATIONS

SAMPLE EMISSION CALCULATIONS
Chevron Service Station #9-4816
301-14th Street
Oakland, California

Given: System data from May 12, 1992

- Influent TPH-G concentration = 30,000 ppmv
- Effluent TPH-G concentration = 450 ppmv
- Influent benzene concentration = 300 ppmv
- Effluent benzene concentration is = 8.1 ppmv
- System vacuum = 38 inches of water
- Molecular weight of TPH-G (assumed to be equal to hexane) = 86 lbs/lb-mole.
- Molecular weight of benzene = 78 lbs/lb-mole
- Extraction flow rate based on the flow sensor and differential pressure gauge located before the ICE. The differential pressure = 0.05
- Emission flow rate is based on measurement by the ICE flow meter. Flow rate = 56.5 cfm

Uncontrolled Emissions (lb per day):

The extraction flow rate is based on measurements using a pitot tube type flow sensor with a differential pressure gauge and an assumed temperature at the sensor of 60°F. The estimated extraction flow rate for the May 12, 1992 data is 2.7 scfm.

The equation for the mass of hydrocarbons entering the treatment system per unit time is:

$$\text{Removal Rate} \left(\frac{\text{lbs}}{\text{day}} \right) = \text{Conc. (ppmv)} \times 10^{-6} \times \text{flowrate (scfm)} \times \frac{1 \text{ lb-mole}}{386 \text{ ft}^3} \times \text{mol. wt.} \left(\frac{\text{lb}}{\text{lb-mole}} \right) \times \frac{1440 \text{ min.}}{\text{day}}$$

For TPH-G and benzene:

$$\text{TPH-G} = 30,000 \times 10^{-6} \times 2.7 \text{ scfm} \times \frac{1 \text{ lb-mole}}{386 \text{ ft}^3} \times \frac{86 \text{ lbs}}{\text{lb-mole}} \times \frac{1440 \text{ min.}}{\text{day}} = 25.9 \frac{\text{lbs}}{\text{day}}$$

$$\text{Benzene} = 300 \times 10^{-6} \times 2.7 \text{ scfm} \times \frac{1 \text{ lb-mole}}{386 \text{ ft}^3} \times \frac{78 \text{ lbs}}{\text{lb-mole}} \times \frac{1440 \text{ min.}}{\text{day}} = 0.56 \frac{\text{lbs}}{\text{day}}$$

Controlled Emissions (lb per day):

The emission flow rate is based on the measurement by the ICE flow sensor in cfm, which must be converted to scfm using the following equation:

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

where

- T_F = temperature of air in °F,
- $520 = 460 + 60^\circ$ = standard temperature rankine, and
- $\text{psig} = \frac{\text{inches of water pressure (negative)}}{2.77 \text{ inches of water / 1 psi}}$

So the effluent flow rate is:

$$\text{Flowrate} = 60.6 \text{ cfm} \times \frac{14.7 - \frac{45}{27.7}}{14.7} \times \frac{520}{460 + 70} = 52.9 \text{ scfm}$$

For TPH-G and benzene:

$$\text{TPH-G} = 450 \times 10^{-6} \times 52.9 \text{ scfm} \times \frac{1 \text{ lb-mole}}{386 \text{ ft}^3} \times \frac{86 \text{ lbs}}{\text{lb-mole}} \times \frac{1440 \text{ min.}}{\text{day}} = 7.64 \frac{\text{lbs}}{\text{day}}$$

$$\text{Benzene} = 8.1 \times 10^{-6} \times 52.9 \text{ scfm} \times \frac{1 \text{ lb-mole}}{386 \text{ ft}^3} \times \frac{78 \text{ lbs}}{\text{lb-mole}} \times \frac{1440 \text{ min.}}{\text{day}} = 0.12 \frac{\text{lbs}}{\text{day}}$$

Destruction Efficiency

The equation for destruction efficiency is:

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

For TPH-G and benzene:

$$\text{TPH-G destruction efficiency} = \frac{25.9 - 7.6}{25.9} \times 100\% = 70.6\%$$

$$\text{benzene destruction efficiency} = \frac{0.56 - 0.12}{0.56} \times 100\% = 78.6\%$$