



**Chevron U.S.A. Inc.**

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Manager, Operations  
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C. G. Trimbach  
Manager, Engineering

STD 1110  
JE

October 2, 1989

Rafat Shahid  
Alameda County  
Environmental Health Department  
80 Swan Way, Rm. 200  
Oakland, CA 94621

Re: Chevron Service Station #90019  
210 Grand Ave.  
Oakland, California

Dear Mr. Shahid:

Enclosed are the results of the quarterly groundwater monitoring dated September 20, 1989, conducted by our consultant, Western Geologic Resources, Inc. for the above referenced site.

As indicated to you in a previous correspondence, we are in the process of securing encroachment permits to do further assessment work at this site. We will forward the results when available.

I declare under penalty of perjury that the information contained in the attached report is true and correct and that any recommended actions are appropriate under the circumstances to the best of my knowledge.

Very truly yours,

C. G. TRIMBACH

By John Randall  
John Randall, Engineer

JMR/jt:X1-1

Enclosure

cc: California Regional Water Quality  
Control Board - SF Bay Region  
111 Jackson St., Rm 6040  
Oakland, CA 94607

ALAMEDA COUNTY  
DEPT. OF ENVIRONMENTAL HEALTH  
HAZARDOUS MATERIALS

10/4/89

2169 E. FRANCISCO BOULEVARD, SUITE B  
SAN RAFAEL, CALIFORNIA 94901  
415/457-7595 FAX: 415/457-8521

20 September 1989

John Randall  
Chevron USA  
2410 Camino Ramon  
San Ramon, CA 94583

SEP 22 '89 H.C.H.

Re: Quarterly Groundwater Sampling Report  
Chevron Service Station #90019  
Oakland, California  
WGR Job #1-101.03

Dear Mr. Randall:

This letter report presents the results of the quarterly groundwater sampling performed by Western Geologic Resources, Inc. (WGR) at the subject site, located at 210 Grand Avenue in Oakland, California (Figure 1).

As requested, the following work was performed:

- 1) Collect depth-to-groundwater measurements in all wells onsite, and produce a potentiometric map (Figure 2) based on the liquid-level measurements;
- 2) Collect groundwater samples from all wells for analysis of total purgeable petroleum hydrocarbons (TPPH) and purgeable priority pollutants by EPA Method 8260;
- 3) Produce concentration maps of TPPH and benzene in groundwater based on the analytic results (Figures 3 and 4);
- 4) Update the database for groundwater-level measurements and groundwater chemistry data (Tables 1 and 2); and,
- 5) Review the field and laboratory results and prepare a report for this investigation.

#### BACKGROUND

In February and March 1989, WGR conducted a Soil Vapor Survey (SVS) at the site. The highest concentrations of total volatile hydrocarbons (TVH) were detected in points installed at 5 ft and between 13 to 15 ft below grade, located in the vicinity of the underground fuel-storage tanks and pump islands on the south half of the site. Lower concentrations of TVH were detected on the north part of the site behind the service station building. Based on the results of the SVS, WGR drilled soil borings B-1 through B-5 and completed them as 4-inch diameter monitor wells MW-1 through MW-5. Wells were screened in the shallow water-bearing zone from 6 ft to 16.5 ft below grade.



J. Randall/20 September 1989

Soil samples collected during the drilling of borings B-1 through B-5 contained total purgeable petroleum hydrocarbons (TPPH) at concentrations ranging from 6 ppm to 390 ppm, with the highest concentration detected in the sample from boring B-5. Benzene, toluene, ethylbenzene, and total xylenes (BTEX) compounds were detected in soil samples collected from four of the five borings. The depths of the samples that contained BTEX compounds ranged from 5 ft to 16.5 ft below grade, and the highest concentrations were found in the soil sample collected from 5 ft below grade in boring B-2. The soil samples collected from boring B-1 were below the limits of detection for BTEX compounds.

TPPH concentrations, reported as gasoline, in groundwater samples collected from wells MW-1 through MW-5 ranged from nondetectable to a high of 20,000 ppb in well MW-5. Groundwater collected from well MW-1 at the north end of the site contained 600 ppm TPPH. The highest concentrations for the BTEX compounds in groundwater were also detected in the sample collected from well MW-5. Petroleum-based oil and grease compounds were below the detection limit of 3 ppb in groundwater for the five wells.

Measurements of static groundwater levels made on 14 March 1989 indicated that the estimated direction of groundwater flow was to the south with wells MW-1 and MW-2 the most upgradient and well MW-5 in the most downgradient position.

#### GROUNDWATER SAMPLING

On 9 June 1989, groundwater samples were collected from wells MW-1 through MW-5 by WGR environmental technician Elizabeth Adams, according to WGR's standard operating procedure included as Attachment A. Approximately 92 gallons were evacuated from the wells prior to sampling and temporarily stored onsite in 55-gallon drums. Groundwater samples and laboratory-supplied travel blanks consisting of deionized water were sent under chain-of-custody to Central Coast Analytic Services (CCAS) of San Luis Obispo, California for analysis.

#### ANALYTIC RESULTS

Concentrations of TPPH in groundwater are presented in Figure 3. Total purgeable petroleum hydrocarbons (TPPH) characterized as gasoline were detected in groundwater samples collected from wells MW-4 and MW-5 at concentrations of 900 ppb and 12,000 ppb, respectively.

J. Randall/20 September 1989

BTEX compounds were also detected in groundwater from wells MW-4 and MW-5, with the highest concentrations in samples from well MW-5. Concentrations of benzene in groundwater are presented in Figure 4. Benzene concentrations in samples collected from wells MW-4 and MW-5 were 440 ppb and 5,100 ppb, respectively; ethylbenzene was detected at 22 ppb and 240 ppb; toluene at 13 ppb and 300 ppb; and total xylenes at 40 ppb and 700 ppb. Trichlorotrifluoroethane (F113) was detected in groundwater from well MW-4 at 60 ppb. 1,2-Dichloroethane (EDC) was detected in well MW-3 at a concentration of 3.3 ppb. Groundwater samples from wells MW-1 and MW-2 were below the detection limits for all compounds analyzed.

### GROUNDWATER FLOW

Based on static water level measurements taken prior to groundwater sampling on 8 June 1989, groundwater is estimated to flow in a northwesterly direction at a gradient of approximately 1.7%. Static water levels previously measured on 14 March 1989 by WGR staff indicated groundwater flow to the south at a gradient of about 1.1%.

### TRENDS IN GROUNDWATER DATA

Concentrations for TPPH in the 9 June 1989 analysis are comparable to concentrations reported for 14 March 1989, with the exception of well MW-1, which went from a previously reported concentration of 600 ppb to below the detection limit. TPPH were detected in well MW-5 at 12,000 ppb, while the previous analysis indicated 20,000 ppb. Similarly, TPPH concentrations in samples from well MW-4 declined from a value of 3,000 ppb to 900 ppb.

Concentrations of benzene, ethylbenzene, and total xylenes for wells MW-4 and MW-5 decreased overall, but remained generally within the same order of magnitude when compared to results for the 14 March 1989 sampling. Toluene levels decreased from 1,600 ppb to 300 ppb in samples from well MW-5, and from 200 ppb to 13 ppb in samples from well MW-4. BTEX was nondetectable in samples from wells MW-1, MW-2 and MW-3, while the previous analysis indicated up to 6.7 ppb benzene, 7.1 ppb toluene, 3.2 ppb ethylbenzene and 4.6 ppb total xylenes.

EDC was not detected in the current analysis of groundwater samples from well MW-2 while the previous analysis, in March 1989, indicated a concentration of 0.7 ppb. Chloroform was not detected in samples from well MW-1, although the previous analysis indicated a concentration of 1.0 ppb. Conversely, trichlorotrifluoroethane (F113) was detected in samples from well MW-4 at a concentration of 60 ppb, but the previous analysis indicated F113 was not detectable. Measurements of static groundwater level made on 8 June 1989 indicate a reversal of groundwater flow since 14 March 1989. Well MW-5 has consequently changed from the most downgradient to one of the most upgradient wells.

J. Randall/20 September 1989

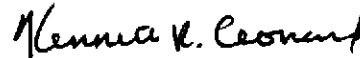
**SUMMARY**

Overall, concentrations of TPPH and purgeable priority pollutants in June 1989 were found to be lower than reported in March 1989, with the exception of trichlorotrifluoroethane detected in well MW-4, which increased from below the detection limit of 20 ppb to 60 ppb. The samples collected from monitor well MW-5 contained the highest concentrations of TPPH and BTEX compounds. Samples collected from monitor wells MW-1, MW-2, and MW-3 were below detection limits for all compounds except for 3.3 ppb EDC detected in well MW-3.

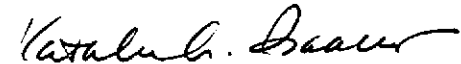
The estimated direction of groundwater flow has changed from a southerly trend measured on 14 March 1989 to an estimated north-northwest orientation measured on 8 June 1989. As a result, wells MW-4 and MW-5 have changed from relatively downgradient to upgradient positions.

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

Sincerely,  
Western Geologic Resources, Inc.



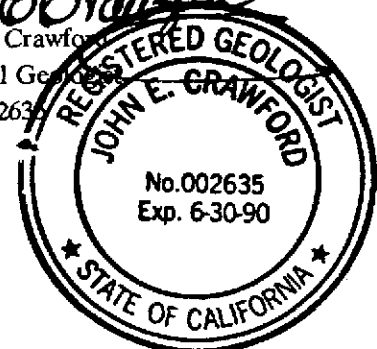
Kenneth Leonard  
Staff Geologist



Kathleen A. Isaacson  
Senior Geologist



John E. Crawford  
Principal Geologist  
CRG #2635



dms/KL/KAI/JEC

101R1AU9

J. Randall/20 September 1989

Figures:

1. Site Location Map
2. Potentiometric Map of the Shallow Water-Bearing Zone: 8 June 1989
3. Concentration Map of Total Purgeable Petroleum Hydrocarbons: 9 June 1989
4. Concentration Map of Benzene: 9 June 1989

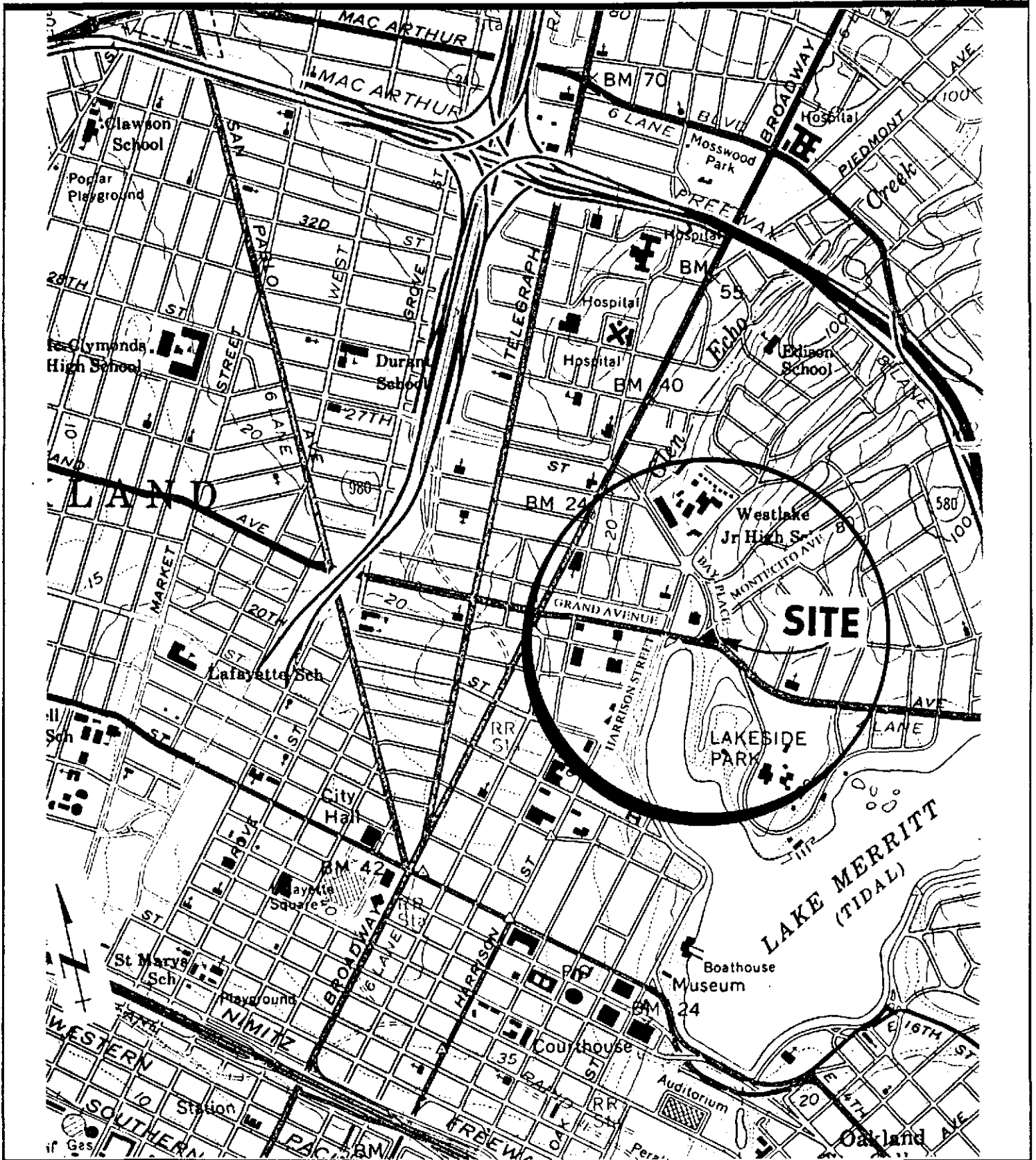
Tables:

1. Groundwater Elevations
2. Analytic Results: Groundwater

Attachments:

- A. SOP-4: Groundwater Sampling
- B. Laboratory Report
- C. Chain-of-Custody Forms
- D. Quality Assurance Reports

101R1AU9



NOT TO SCALE

Site Location Map  
Chevron SS #9019, Oakland, California

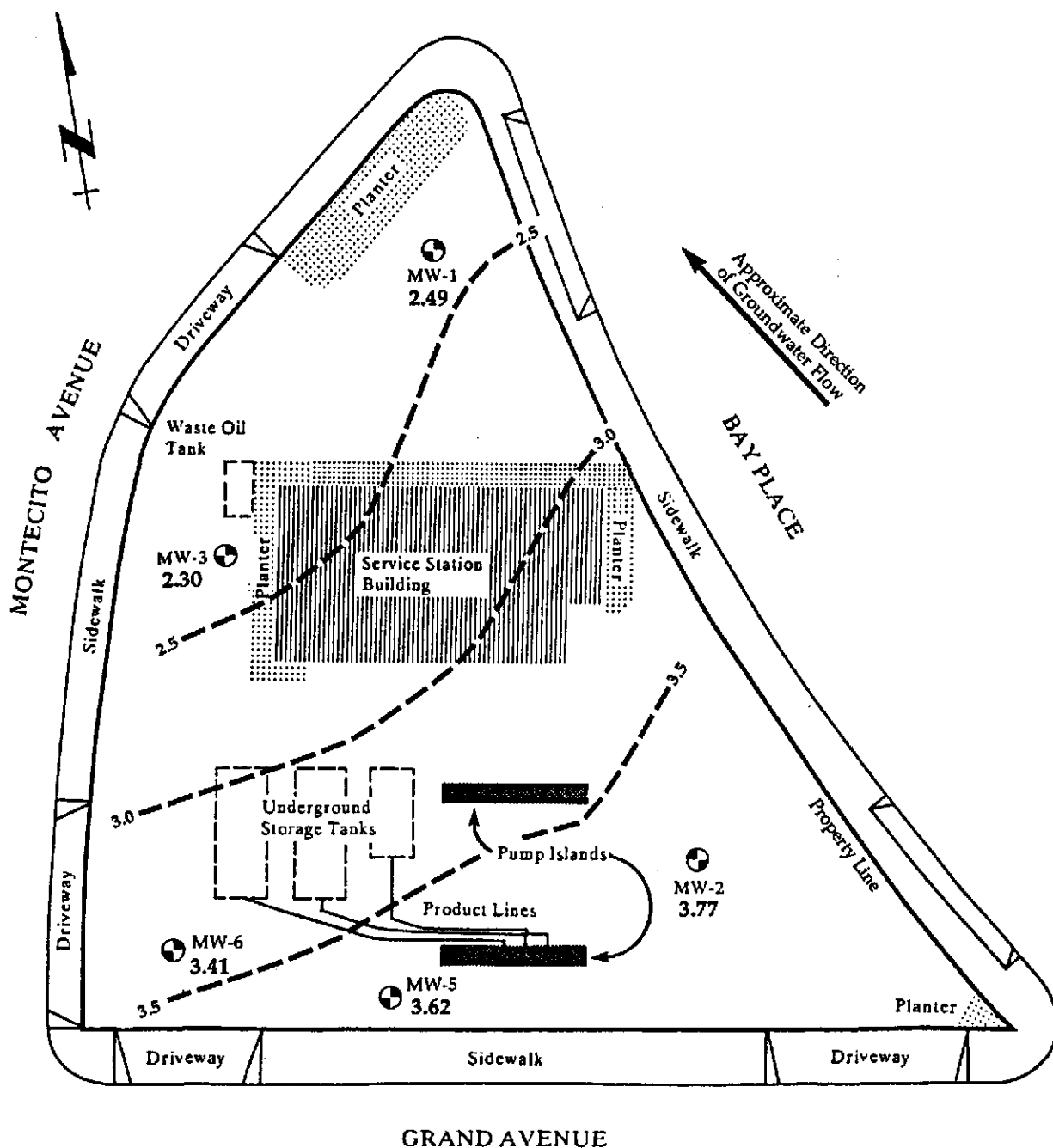
FIGURE

1



August 1989

WESTERNGEOLOGICRESOURCES, INC.

1-101.02



**LEGEND**

- 
**MW-1**  
**2.49**     Monitor well location and groundwater elevation, feet above mean sea level
- 
**2.5**     Groundwater elevation contour, feet above mean sea level, dashed where inferred

Potentiometric Surface of the Shallow Water-Bearing Zone, 8 June 1989, Chevron SS #90019, Oakland, California

August 1989

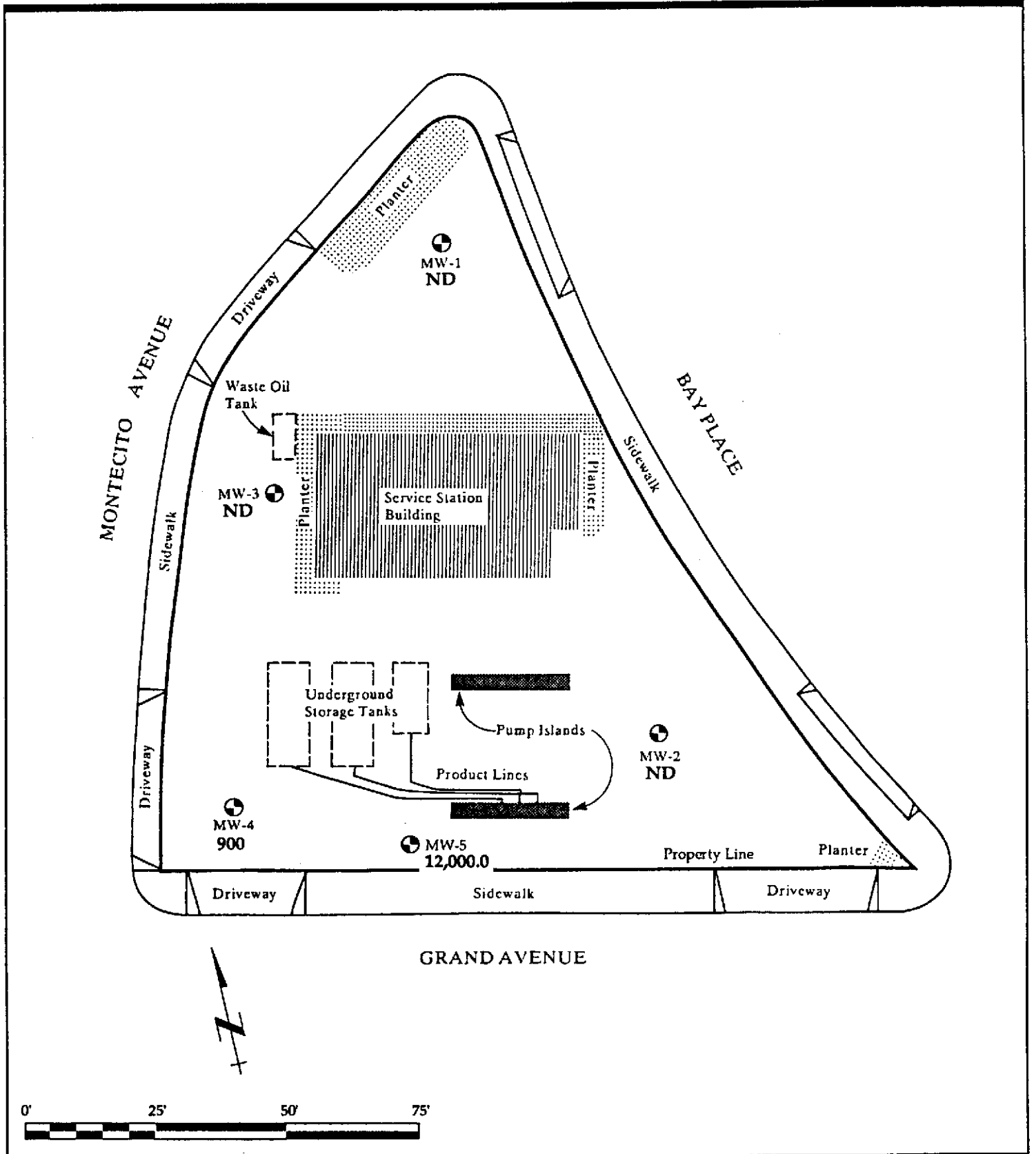
WESTERN GEOLOGIC RESOURCES, INC.

FIGURE


**2**

1-101.03





**LEGEND**

- 
**MW-1**  
**12,000.0**  
 Monitor well location and TPH in ppb (parts per billion)
- ND**  
 Not Detected

Concentration of Total Purgeable Petroleum Hydrocarbons (TPPH) in the Shallow Water-Bearing Zone, 9 June 1989, Chevron SS #90019, Oakland, California

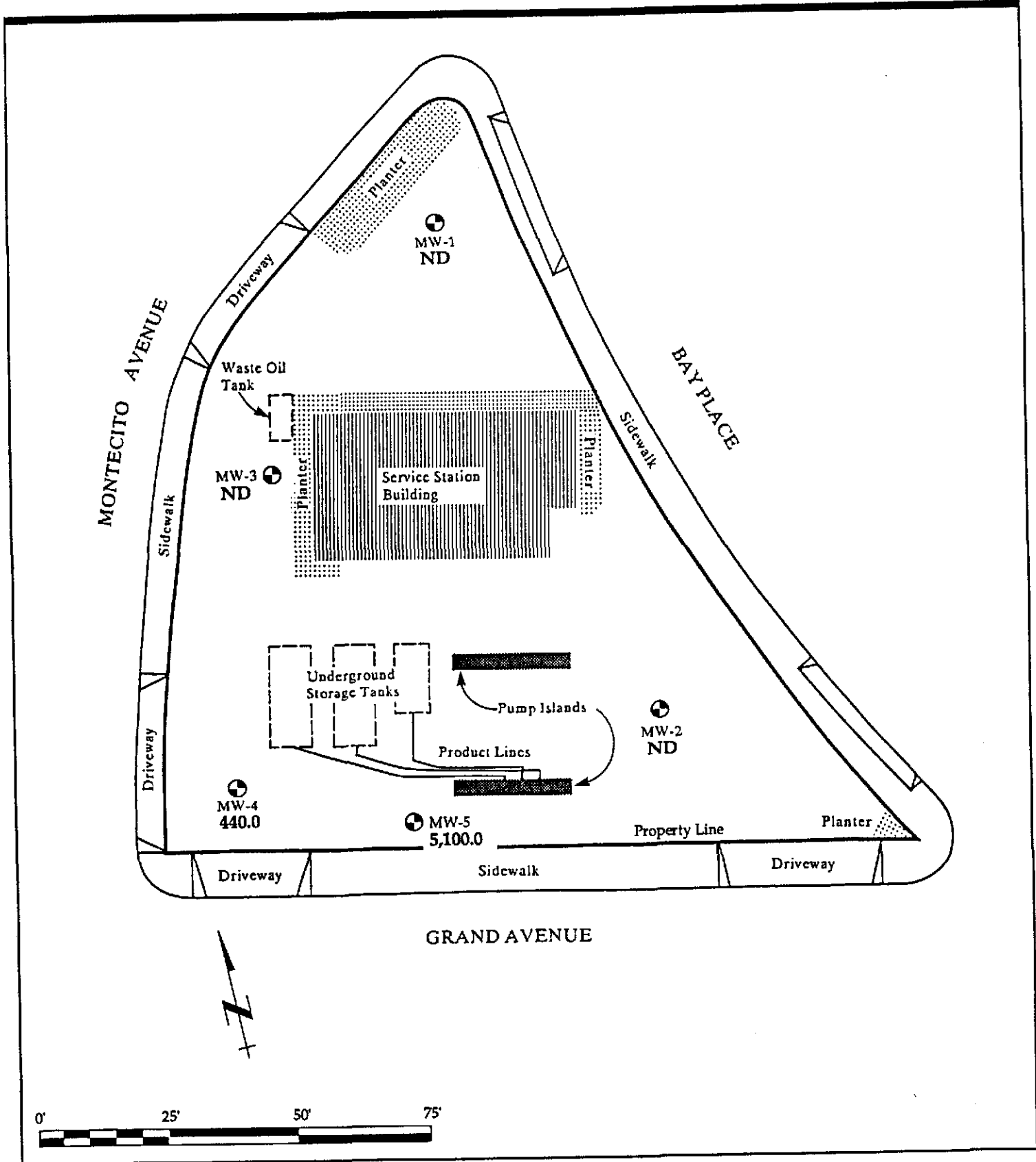
August 1989


WESTERN GEOLOGIC RESOURCES, INC.

FIGURE

**3**

1-101.02



LEGEND	
 MW-1 440.0	Monitor well location and Benzene in ppb (parts per billion)
ND	Not Detected

Concentration of Benzene in the Shallow Water-Bearing Zone, 9 June 1989, Chevron SS #90019, Oakland, California  
  
 August 1989  
  
**WESTERNGEOLOGICRESOURCES, INC.**

FIGURE  
**4**  
  
 1-101.02

TABLE 1 - GROUNDWATER AND PRODUCT ELEVATIONS  
 Chevron SS #90019, Oakland, CA  
 WGR Project # 1-101.03

MONITORING WELLS

Well ID #	Date	DTP	DTW	PT	Elev.	Elev.-P	Elev.-W
-----ft----->							
MW-1	14 Mar 89	---	6.74	0.00	9.63	---	2.89
MW-1	8 Jun 89	---	7.14	0.00	9.63	---	2.49
MW-2	14 Mar 89	---	6.08	0.00	8.99	---	2.91
MW-2	8 Jun 89	---	5.22	0.00	8.99	---	3.77
MW-3	14 Mar 89	---	6.02	0.00	8.18	---	2.16
MW-3	8 Jun 89	---	5.88	0.00	8.18	---	2.30
MW-4	14 Mar 89	---	5.52	0.00	7.60	---	2.08
MW-4	8 Jun 89	---	4.19	0.00	7.60	---	3.41
MW-5	14 Mar 89	---	6.98	0.00	8.35	---	1.37
MW-5	8 Jun 89	---	4.73	0.00	8.35	---	3.62

Notes:

- DTP = Depth To Product
- DTW = Depth To Water
- PT = Product Thickness
- Elev. = Top-Of-Casing Elevation
- Elev.-P = Elevation Of Product
- Elev.-W = Elevation Of Water
- = Not Measured

TABLE 2 - ANALYTIC RESULTS: GROUNDWATER  
Chevron SS #90019, Oakland, CA  
WGR Project # 1-101.03

WELL ID#	DATE	EPA/CS METHOD	BENZENE	TOLUENE	ETHYLBENZ	XYLENES	CHLORO.	EDC	f113	TPPH(G)	O & G
			←-----ppb-----→								←--ppm--→
MW-1	14 Mar 89	8260	<0.2	<0.2	3.2	1.7	1.0	<0.2	<20.0	600.0	---
MW-1	14 Mar 89	503E	---	---	---	---	---	---	---	---	<3.0
MW-1	09 Jun 89	8260	<0.1	<0.5	<0.1	<0.2	<0.5	<0.1	<20.0	<50.0	---
MW-2	14 Mar 89	8260	6.7	7.1	0.5	4.6	<1.0	0.7	<20.0	<100.0	---
MW-2	14 Mar 89	503E	---	---	---	---	---	---	---	---	<3.0
MW-2	09 Jun 89	8260	<0.2	<1.0	<0.2	<0.4	<1.0	<0.2	<20.0	<100.0	---
MW-3	14 Mar 89	8260	2.1	0.8	<0.2	2.0	<1.0	3.0	<20.0	<100.0	---
MW-3	14 Mar 89	503E	---	---	---	---	---	---	---	---	<3.0
MW-3	09 Jun 89	8260	<0.5	<1.0	<0.2	<0.4	<1.0	3.3	<20.0	<100.0	---
MW-4	14 Mar 89	8260	810.0	200.0	30.0	130.0	<20.0	<5.0	<20.0	3000.0	---
MW-4	14 Mar 89	503E	---	---	---	---	---	---	---	---	<3.0
MW-4	09 Jun 89	8260	440.0	13.0	22.0	40.0	<20.0	<5.0	60.0	900.0	---
MW-5	14 Mar 89	8260	6600.0	1600.0	270.0	1100.0	<100.0	<20.0	<20.0	20000.0	---
MW-5	14 Mar 89	503E	---	---	---	---	---	---	---	---	<3.0
MW-5	09 Jun 89	8260	>2800.0*	270.0	240.0	640.0	<20.0	28.0	<20.0	15000.0	---
MW-5D	09 Jun 89	8260	5100.0	300.0	240.0	700.0	<200.0	<50.0	<20.0	12000.0	---
T.B.	3 Mar 89	8260	<0.1	<0.2	<0.1	<0.2	<0.5	<0.1	<20.0	<100.0	---
T.B.	09 Jun 89	8260	<0.5	<0.5	<0.1	<0.2	<0.5	<0.1	<20.0	<50.0	---

ETHYLBENZ = Ethylbenzene

CHLORO. = Chloroform

EDC = 1,2-Dichloroethane

TPPH(G) = Total Purgeable Petroleum Hydrocarbons characterized as gasoline

O & G = Oil and Grease reported in parts-per-million

T.B. = Travel Blank

f113 = Trichlorotrifluoroethane

\* = Saturated Column

MW-#D = Duplicate Analysis



**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 for each well. This sample is held at the laboratory unless needed. 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.

Central Coast

Central  
Coast  
Analytical  
Services

Analytical Services, Inc.  
141 Suburban Road, Suite C-4  
San Luis Obispo, California 93401  
(805) 543-2553

Lab Number : F-07826  
Collected : 06/09/89  
Received : 06/10/89  
Tested : 07/04/89  
Collected by: E. Adams

ATTN: Kathleen Isaacson  
Western Geologic Resources  
2169 E. Francisco Blvd.  
Suite B  
San Rafael, CA 94901

EXTRACTED BY EPA METHOD 5030 (purge-and-trap)  
EPA METHOD 8260

Sample Description:  
Project #1-101.03, Oakland Bay & Grand,  
10101 A/B, Water

Compound Analyzed	Detection Limit (ug/L) (Practical Quantitation Limit)	Concentration (ug/L)
Benzene	0.1	not found
Bromodichloromethane	0.1	not found
Bromoform	0.2	not found
Carbon Tetrachloride	0.1	not found
Chlorobenzene	0.1	not found
2-Chloroethyl Vinyl Ether	1.	not found
Chloroform	0.5	not found
Dibromochloromethane	0.1	not found
1,2-Dichlorobenzene	2.	not found
1,3-Dichlorobenzene	0.2	not found
1,4-Dichlorobenzene	0.5	not found
1,1-Dichloroethane	0.1	not found
1,2-Dichloroethane (EDC)	0.1	not found
1,1-Dichloroethene	0.1	not found
c-1,2-Dichloroethene	0.1	not found
t-1,2-Dichloroethene	0.1	not found
1,2-Dichloropropane	0.1	not found
c-1,3-Dichloropropene	0.1	not found
t-1,3-Dichloropropene	0.1	not found
Ethylbenzene	0.1	not found
Ethyl Chloride	0.1	not found
Ethylene Dibromide	0.1	not found
Methyl Bromide	0.1	not found
Methyl Chloride	0.1	not found
Methylene Chloride	1.	not found
1,1,1,2-Tetrachloroethane	0.5	not found
Tetrachloroethylene (PCE)	0.1	not found
Toluene	0.5	not found
1,1,1-Trichloroethane (TCA)	0.1	not found
1,1,2-Trichloroethane	0.1	not found
Trichloroethene (TCE)	0.1	not found
Trichlorotrifluoroethane (f113)	0.5	not found
Trichlorofluoromethane(F-11)	0.5	not found
Vinyl Chloride	0.1	not found
Xylenes	0.2	not found
Total Purgeable Petroleum Hydrocarbons (Gasoline)	50.	not found

Percent Recoveries of Sample-Specific Quality Assurance Spikes are: 104/121.

07/14/89/MSD#7  
F07826vd.wr1/84  
MH/tz/jc/tl

Respectfully submitted,  
*Mary Havlicek*  
Mary Havlicek, Ph.D., President

Central Coast Analytical Services

Central Coast Analytical Services, Inc.  
 141 Suburban Road, Suite C-4  
 San Luis Obispo, California 93401  
 (805) 543-2553

Lab Number : F-07827  
 Collected : 06/09/89  
 Received : 06/10/89  
 Tested : 06/17/89  
 Collected by: E. Adams


ATTN: Kathleen Isaacson  
 Western Geologic Resources  
 2169 E. Francisco Blvd.  
 Suite B  
 San Rafael, CA 94901

EXTRACTED BY EPA METHOD 5030 (purge-and-trap)  
 EPA METHOD 8260  
 Sample Description:  
 Oakland Bay & Grand, Water  
 Project #1-101.03, 10102 A/B

Compound Analyzed	Detection Limit (ug/L) (Practical Quantitation Limit)	Concentration (ug/L)
Benzene	0.2	not found
Bromodichloromethane	0.2	not found
Bromoform	0.4	not found
Carbon Tetrachloride	0.2	not found
Chlorobenzene	0.2	not found
2-Chloroethyl Vinyl Ether	2.	not found
Chloroform	1.	not found
Dibromochloromethane	0.2	not found
1,2-Dichlorobenzene	0.2	not found
1,3-Dichlorobenzene	0.2	not found
1,4-Dichlorobenzene	0.2	not found
1,1-Dichloroethane	0.2	not found
1,2-Dichloroethane (EDC)	0.2	not found
1,1-Dichloroethene	0.2	not found
c-1,2-Dichloroethene	0.2	not found
t-1,2-Dichloroethene	0.2	not found
1,2-Dichloropropane	0.2	not found
c-1,3-Dichloropropene	0.2	not found
t-1,3-Dichloropropene	0.2	not found
Ethylbenzene	0.2	not found
Ethyl Chloride	0.2	not found
Ethylene Dibromide	0.2	not found
Methyl Bromide	0.2	not found
Methyl Chloride	0.2	not found
Methylene Chloride	2.	not found
1,1,2,2-Tetrachloroethane	1.	not found
Tetrachloroethylene (PCE)	0.2	not found
Toluene	1.	not found
1,1,1-Trichloroethane (TCA)	0.2	not found
1,1,2-Trichloroethane	0.2	not found
Trichloroethene (TCE)	0.2	not found
Trichlorotrifluoroethane (f113)	1.	not found
Trichlorofluoromethane(F-11)	1.	not found
Vinyl Chloride	0.2	not found
Xylenes	0.4	not found
Total Purgeable Petroleum Hydrocarbons (Gasloine)	100.	not found

Percent Recovery of Sample-Specific Quality Assurance Spike is: 125.

MSD#3/07-05-89  
 F07827v.wr1/76  
 MH/jm/jc/rh

Respectfully submitted,  
  
 Mary Havlicek, Ph.D., President

Central  
Coast  
Analytical  
Services

Central Coast  
Analytical Services, Inc.  
141 Suburban Road, Suite C-4  
San Luis Obispo, California 93401  
(805) 543-2553

Lab Number : F-87828  
Collected : 06/09/89  
Received : 06/10/89  
Tested : 06/17/89  
Collected by: E. Adams

ATTN: Kathleen Isaacson  
Western Geologic Resources  
2169 E. Francisco Blvd.  
Suite B  
San Rafael, CA 94901

EXTRACTED BY EPA METHOD 5030 (purge-and-trap)  
EPA METHOD 8260  
Sample Description:  
Oakland Bay & Grand, Water  
Project #1-101.03, 10103 A/B

Compound Analyzed	Detection Limit (ug/L) (Practical Quantitation Limit)	Concentration (ug/L)
Benzene	0.5	not found
Bromodichloromethane	0.2	not found
Bromoform	0.4	not found
Carbon Tetrachloride	0.2	not found
Chlorobenzene	0.2	not found
2-Chloroethyl Vinyl Ether	2.	not found
Chloroform	1.	not found
Dibromochloromethane	0.2	not found
1,2-Dichlorobenzene	0.2	not found
1,3-Dichlorobenzene	0.2	not found
1,4-Dichlorobenzene	0.2	not found
1,1-Dichloroethane	0.2	not found
1,2-Dichloroethane (EDC)	0.2	3.3
1,1-Dichloroethene	0.2	not found
c-1,2-Dichloroethene	0.2	not found
t-1,2-Dichloroethene	0.2	not found
1,2-Dichloropropane	0.2	not found
c-1,3-Dichloropropene	0.2	not found
t-1,3-Dichloropropene	0.2	not found
Ethylbenzene	0.2	not found
Ethyl Chloride	0.2	not found
Ethylene Dibromide	0.2	not found
Methyl Bromide	0.2	not found
Methyl Chloride	0.2	not found
Methylene Chloride	2.	not found
1,1,2,2-Tetrachloroethane	1.	not found
Tetrachloroethylene (PCE)	0.2	not found
Toluene	1.	not found
1,1,1-Trichloroethane (TCA)	0.2	not found
1,1,2-Trichloroethane	0.2	not found
Trichloroethene (TCE)	0.2	not found
Trichlorotrifluoroethane (f113)	1.	not found
Trichlorofluoromethane(F-11)	1.	not found
Vinyl Chloride	0.2	not found
Xylenes	0.4	not found
Total Purgeable Petroleum Hydrocarbons (Gasloine)	100.	not found

Percent Recovery of Sample-Specific Quality Assurance Spike is: 130.

MSD#3/87-05-89  
F07828v.wr1/77  
MH/jm/jc/rh

Respectfully submitted,  
*Mary Havlicek*  
Mary Havlicek, Ph.D., President



Central  
Coast  
Analytical  
Services

Central Coast  
Analytical Services, Inc.  
141 Suburban Road, Suite C-4  
San Luis Obispo, California 93401  
(805) 543-2553

Lab Number : F-07829  
Collected : 06/09/89  
Received : 06/10/89  
Tested : 06/17/89  
Collected by: E. Adams

ATTN: Kathleen Isaacson EXTRACTED BY EPA METHOD 5030 (purge-and-trap)  
Western Geologic Resources EPA METHOD 8260  
2169 E. Francisco Blvd. Sample Description:  
Suite B Oakland Bay & Grand, Water  
San Rafael, CA 94901 Project #1-101.03, 10104 A/B

Compound Analyzed	Detection Limit (ug/L) (Practical Quantitation Limit)	Concentration (ug/L)
Benzene	5.	440.
Bromodichloromethane	5.	not found
Bromoform	10.	not found
Carbon Tetrachloride	5.	not found
Chlorobenzene	5.	not found
2-Chloroethyl Vinyl Ether	50.	not found
Chloroform	20.	not found
Dibromochloromethane	5.	not found
1,2-Dichlorobenzene	5.	not found
1,3-Dichlorobenzene	5.	not found
1,4-Dichlorobenzene	5.	not found
1,1-Dichloroethane	5.	not found
1,2-Dichloroethane (EDC)	5.	not found
1,1-Dichloroethene	5.	not found
c-1,2-Dichloroethene	5.	not found
t-1,2-Dichloroethene	5.	not found
1,2-Dichloropropane	5.	not found
c-1,3-Dichloropropene	5.	not found
t-1,3-Dichloropropene	5.	not found
Ethylbenzene	5.	22.
Ethyl Chloride	5.	not found
Ethylene Dibromide	5.	not found
Methyl Bromide	5.	not found
Methyl Chloride	5.	not found
Methylene Chloride	50.	not found
1,1,2,2-Tetrachloroethane	20.	not found
Tetrachloroethylene (PCE)	5.	not found
Toluene	20.	13.
1,1,1-Trichloroethane (TCA)	5.	not found
1,1,2-Trichloroethane	5.	not found
Trichloroethene (TCE)	5.	not found
Trichlorotrifluoroethane (f113)	20.	60.
Trichlorofluoromethane(F-11)	20.	not found
Vinyl Chloride	5.	not found
Xylenes	10.	40.
Total Purgeable Petroleum Hydrocarbons (Gasloine)	2000.	not found

Percent Recovery of Sample-Specific Quality Assurance Spike is: 120.

MSD#3/07-05-89  
F07829v.wr1/77  
MH/jm/jc/rh

Respectfully submitted,  
*Mary Havlicek*  
Mary Havlicek, Ph.D., President

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Lab Number : F-07830dup  
Collected : 06/09/89  
Received : 06/10/89  
Tested : 06/17/89  
Collected by: E. Adams

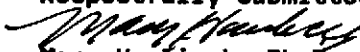
ATTN: Kathleen Isaacson  
Western Geologic Resources  
2169 E. Francisco Blvd.  
Suite B  
San Rafael, CA 94901

EXTRACTED BY EPA METHOD 5030 (purge-and-trap)  
EPA METHOD 8260  
Sample Description:  
Oakland Bay & Grand, Water  
Project #1-101.03, 10105 A/B  
Duplicate Analysis

Compound Analyzed	Detection Limit (ug/L) (Practical Quantitation Limit)	Concentration (ug/L)
Benzene	50.	5100.
Bromodichloromethane	50.	not found
Bromoform	100.	not found
Carbon Tetrachloride	50.	not found
Chlorobenzene	50.	not found
2-Chloroethyl Vinyl Ether	500.	not found
Chloroform	200.	not found
Dibromochloromethane	50.	not found
1,2-Dichlorobenzene	50.	not found
1,3-Dichlorobenzene	50.	not found
1,4-Dichlorobenzene	50.	not found
1,1-Dichloroethane	50.	not found
1,2-Dichloroethane (EDC)	50.	not found
1,1-Dichloroethene	50.	not found
c-1,2-Dichloroethene	50.	not found
t-1,2-Dichloroethene	50.	not found
1,2-Dichloropropane	50.	not found
c-1,3-Dichloropropene	50.	not found
t-1,3-Dichloropropene	50.	not found
Ethylbenzene	50.	240.
Ethyl Chloride	50.	not found
Ethylene Dibromide	50.	not found
Methyl Bromide	50.	not found
Methyl Chloride	50.	not found
Methylene Chloride	500.	not found
1,1,2,2-Tetrachloroethane	200.	not found
Tetrachloroethylene (PCE)	50.	not found
Toluene	200.	300.
1,1,1-Trichloroethane (TCA)	50.	not found
1,1,2-Trichloroethane	50.	not found
Trichloroethene (TCE)	50.	not found
Trichlorotrifluoroethane (f113)	200.	not found
Trichlorofluoromethane(F-11)	200.	not found
Vinyl Chloride	50.	not found
Xylenes	100.	700.
Total Purgeable Petroleum Hydrocarbons (Gasoline)	5000.	12000.

Percent Recovery of Sample-Specific Quality Assurance Spike is: 121.

MSD#3/07-05-89  
F07830vd.wr1/77  
MH/jm/jc/rh

Respectfully submitted,  
  
Mary Havlicek, Ph.D., President

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Analytical  
Services

Central Coast  
Analytical Services, Inc.  
141 Suburban Road, Suite C-4  
San Luis Obispo, California 93401  
(805) 543-2553

Lab Number : F-#7830  
Collected : 06/09/89  
Received : 06/10/89  
Tested : 06/17/89  
Collected by: E. Adams

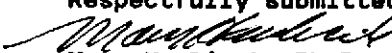
ATTN: Kathleen Isaacson EXTRACTED BY EPA METHOD 5030 (purge-and-trap)  
Western Geologic Resources EPA METHOD 8260  
2169 E. Francisco Blvd. Sample Description:  
Suite B Oakland Bay & Grand, Water  
San Rafael, CA 94901 Project #1-101.03, 10105 A/B

Compound Analyzed	Detection Limit (ug/L) (Practical Quantitation Limit)	Concentration (ug/L)
Benzene	5.	>2800.*
Bromodichloromethane	5.	not found
Bromoform	10.	not found
Carbon Tetrachloride	5.	not found
Chlorobenzene	5.	not found
2-Chloroethyl Vinyl Ether	50.	not found
Chloroform	20.	not found
Dibromochloromethane	5.	not found
1,2-Dichlorobenzene	5.	not found
1,3-Dichlorobenzene	5.	not found
1,4-Dichlorobenzene	5.	not found
1,1-Dichloroethane	5.	not found
1,2-Dichloroethane (EDC)	5.	28.
1,1-Dichloroethene	5.	not found
c-1,2-Dichloroethene	5.	not found
t-1,2-Dichloroethene	5.	not found
1,2-Dichloropropane	5.	not found
c-1,3-Dichloropropene	5.	not found
t-1,3-Dichloropropene	5.	not found
Ethylbenzene	5.	240.
Ethyl Chloride	5.	not found
Ethylene Dibromide	5.	not found
Methyl Bromide	5.	not found
Methyl Chloride	5.	not found
Methylene Chloride	50.	not found
1,1,2,2-Tetrachloroethane	20.	not found
Tetrachloroethylene (PCE)	5.	not found
Toluene	20.	270.
1,1,1-Trichloroethane (TCA)	5.	not found
1,1,2-Trichloroethane	5.	not found
Trichloroethene (TCE)	5.	not found
Trichlorotrifluoroethane (f113)	50.	not found
Trichlorofluoromethane(F-11)	20.	not found
Vinyl Chloride	5.	not found
Xylenes	10.	640.
Total Purgeable Petroleum Hydrocarbons (Gasloine)	2000.	15000.

\* Saturated; use result from duplicate analysis.

Percent Recoveries of Sample-Specific Quality Assurance Spikes are: 104/80.

MSD#3/07-05-89  
F07830v.wr1/77  
MH/jm/jc/rh

Respectfully submitted,  
  
Mary Havlicek, Ph.D., President

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Central Coast  
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Lab Number : F-07831  
Collected : 04/21/89  
Received : 06/10/89  
Tested : 06/17/89  
Collected by: DM of CCAS

ATTN: Kathleen Isaacson  
Western Geologic Resources  
2169 E. Francisco Blvd.  
Suite B  
San Rafael, CA 94901

EXTRACTED BY EPA METHOD 5030 (purge-and-trap)  
EPA METHOD 8260  
Sample Description:  
Oakland Bay & Grand, Water  
Project #1-101.03, 101TB A/B  
TB#42189DM39

Compound Analyzed	Detection Limit (ug/L) (Practical Quantitation Limit)	Concentration (ug/L)
Benzene	0.5	not found
Bromodichloromethane	0.1	not found
Bromoform	0.2	not found
Carbon Tetrachloride	0.1	not found
Chlorobenzene	0.1	not found
2-Chloroethyl Vinyl Ether	1.	not found
Chloroform	0.5	not found
Dibromochloromethane	0.1	not found
1,2-Dichlorobenzene	0.1	not found
1,3-Dichlorobenzene	0.1	not found
1,4-Dichlorobenzene	0.1	not found
1,1-Dichloroethane	0.1	not found
1,2-Dichloroethane (EDC)	0.1	not found
1,1-Dichloroethene	0.1	not found
c-1,2-Dichloroethene	0.1	not found
t-1,2-Dichloroethene	0.1	not found
1,2-Dichloropropane	0.1	not found
c-1,3-Dichloropropene	0.1	not found
t-1,3-Dichloropropene	0.1	not found
Ethylbenzene	0.1	not found
Ethyl Chloride	0.1	not found
Ethylene Dibromide	0.1	not found
Methyl Bromide	0.1	not found
Methyl Chloride	0.1	not found
Methylene Chloride	1.	not found
1,1,1,2-Tetrachloroethane	0.5	not found
Tetrachloroethylene (PCE)	0.1	not found
Toluene	0.5	not found
1,1,1-Trichloroethane (TCA)	0.1	not found
1,1,2-Trichloroethane	0.1	not found
Trichloroethene (TCE)	0.1	not found
Trichlorotrifluoroethane (f113)	1.	not found
Trichlorofluoromethane(F-11)	0.5	not found
Vinyl Chloride	0.1	not found
Xylenes	0.2	not found
Total Purgeable Petroleum Hydrocarbons (Gasoline)	50.	not found

Percent Recovery of Sample-Specific Quality Assurance Spike is: 120.

MSD#3/07-05-89  
F07831v.wr1/77  
MK/tz/jc/rh

Respectfully submitted,  
*Mary Havlicek*  
Mary Havlicek, Ph.D., President

Central  
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Air, Water, & Hazardous Waste Sampling, Analysis, & Consultation  
State Certified Hazardous Waste, Chemistry, & Bacteriology Laboratories

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Fax (805) 543-2555  
(805) 543-2553

2453-D Calle Real  
Goleta, CA 93117  
Fax (805) 976-4386  
(805) 964-7838

### SAMPLE CHAIN OF CUSTODY

ISSUED BY: \_\_\_\_\_ COMPANY: **WESTERN GEOLOGIC RESOURCES** CONTACT NAME: **Kathleen Jackson**

ADDRESS: **2169 E. Francisco Blvd, San Rafael, CA 94901** PHONE: **415 457 7595**

PROJECT #: **-101.03** PROJECT NAME: **Oakland - Bay + Grand** ANALYSIS REQUESTED: \_\_\_\_\_

AMPLER (Print & Sign Name): **Elizabeth Adams, Elizabeth Adams**

CCAS LAB #	SAMPLE IDENTIFICATION (ID #, location, matrix)	DATE/TIME COLLECTED	# of ITEMS	PRESERVE	ANALYSIS REQUESTED
<del>7826</del>	<del>10101 A,B</del>	<del>6-9-89 15:45</del>	<del>2</del>	<del>NaHSO<sub>4</sub></del>	<del>X</del>
7827	10102 A,B	13:09			
7828	10103 A,B	12:57			
7829	10104 A,B	14:21			
7830	10105 A,B	14:45		↓	
7831	101 TB A,B	-	↓	NONE	↓

REMARKS: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

SAMPLE RELINQUISHED BY:	DATE/TIME	RECEIVED BY:
<i>Elizabeth Adams</i>	<del>6-9-89 17:00</del>	<i>Greg Howard</i>
<i>Greg Howard</i>	<del>6-10-89 09:30</del>	<i>Greg Howard</i>
		<i>being put in cool box sealed</i>

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Central Coast  
Analytical Services, Inc.  
141 Suburban Road, Suite C-4  
San Luis Obispo, California 93401  
(805) 543-2553

Lab Number : QS-06179  
Collected :  
Received :  
Tested : 06/17/89  
Collected by:

CCAS

EXTRACTED BY EPA METHOD 5030 (purge-and-trap)  
EPA METHOD 8260  
Sample Description:  
BOILED WATER SPIKE  
Spiked with 2 ug/L VOA Stock

Compound Analyzed	Detection Limit (ug/L)(PQL)*	Concentration w/spike (ug/L)	Percent Recovery
Benzene	0.1	2.1	103.
Bromodichloromethane	0.1	2.1	106.
Bromoform	0.2	not spiked	----
Carbon Tetrachloride	0.1	2.4	120.
Chlorobenzene	0.1	1.9	97.
2-Chloroethyl Vinyl Ether	1.	not spiked	----
Chloroform	0.5	2.0	101.
Dibromochloromethane	0.1	2.3	114.
1,2-Dichlorobenzene	0.1	1.8	88.
1,3-Dichlorobenzene	0.1	not spiked	----
1,4-Dichlorobenzene	0.1	not spiked	----
1,1-Dichloroethane	0.1	2.1	104.
1,2-Dichloroethane (EDC)	0.1	2.3	117.
1,1-Dichloroethene	0.1	2.3	114.
c-1,2-Dichloroethene	0.1	2.0	101.
t-1,2-Dichloroethene	0.1	2.0	99.
1,2-Dichloropropane	0.1	2.2	108.
c-1,3-Dichloropropene	0.1	2.1	107.
t-1,3-Dichloropropene	0.1	2.1	105.
Ethylbenzene	0.1	not spiked	----
Ethyl Chloride	0.1	2.7	135.
Ethylene Dibromide	0.1	not spiked	----
Methyl Bromide	0.1	1.2	60.
Methyl Chloride	0.1	not spiked	----
Methylene Chloride	1.	2.4	121.
1,1,2,2-Tetrachloroethane	0.5	not spiked	----
Tetrachloroethylene (PCE)	0.1	2.2	110.
Toluene	0.1	2.2	109.
1,1,1-Trichloroethane (TCA)	0.1	2.4	118.
1,1,2-Trichloroethane	0.1	2.2	109.
Trichloroethene (TCE)	0.1	2.0	99.
Trichlorotrifluoroethane	0.5	2.6	128.
Trichlorofluoromethane	0.5	2.2	109.
Vinyl Chloride	0.1	1.9	93.
Xylenes	0.2	not spiked	----

Percent Recovery of Sample-Specific Quality Assurance Spike is: 102.

MSD#3/07-05-89  
QS06179v.wr1/77  
MH/tz/jc/rh

Respectfully submitted,

*Mary Havlicek*  
Mary Havlicek, Ph.D., President

Central Coast Analytical Services, Inc.  
 141 Suburban Road, Suite C-4  
 San Luis Obispo, California 93401  
 (805) 543-2553

Lab Number : B-06179  
 Collected :  
 Received :  
 Tested : 06/17/89  
 Collected by:

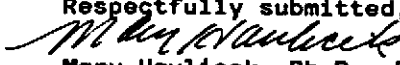
CCAS

EXTRACTED BY EPA METHOD 5030 (purge-and-trap)  
 EPA METHOD 8260  
 Sample Description:  
 INSTRUMENT BLANK

Compound Analyzed	Detection Limit (ug/L) (Practical Quantitation Limit)	Concentration (ug/L)
Benzene	0.1	not found
Bromodichloromethane	0.1	not found
Bromoform	0.2	not found
Carbon Tetrachloride	0.1	not found
Chlorobenzene	0.1	not found
2-Chloroethyl Vinyl Ether	1.	not found
Chloroform	0.5	not found
Dibromochloromethane	0.1	not found
1,2-Dichlorobenzene	0.1	not found
1,3-Dichlorobenzene	0.5	not found
1,4-Dichlorobenzene	0.5	not found
1,1-Dichloroethane	0.1	not found
1,2-Dichloroethane (EDC)	0.1	not found
1,1-Dichloroethene	0.1	not found
c-1,2-Dichloroethene	0.1	not found
t-1,2-Dichloroethene	0.1	not found
1,2-Dichloropropane	0.1	not found
c-1,3-Dichloropropene	0.1	not found
t-1,3-Dichloropropene	0.1	not found
Ethylbenzene	0.1	not found
Ethyl Chloride	0.1	not found
Ethylene Dibromide	0.1	not found
Methyl Bromide	0.1	not found
Methyl Chloride	0.1	not found
Methylene Chloride	1.	not found
1,1,2,2-Tetrachloroethane	0.5	not found
Tetrachloroethylene (PCE)	0.1	not found
Toluene	0.5	not found
1,1,1-Trichloroethane (TCA)	0.1	not found
1,1,2-Trichloroethane	0.1	not found
Trichloroethene (TCE)	0.1	not found
Trichlorotrifluoroethane (f113)	0.5	not found
Trichlorofluoromethane(F-11)	0.5	not found
Vinyl Chloride	0.1	not found
Xylenes	0.2	not found

Percent Recoveries of Sample-Specific Quality Assurance Spikes are: 111/107.

MSD#3/07-05-89  
 B06179v.wr1/76  
 MH/jm/jc/rh

Respectfully submitted,  
  
 Mary Havlicek, Ph.D., President