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10:06 am, Mar 31, 2011

Alameda County  
Environmental Health

March 29, 2011

Ms. Barbara Jakub  
Hazardous Materials Specialist  
Alameda County Environmental Health Services  
1131 Harbor Bay Parkway, Suite 250  
Alameda, CA 94502

Subject: Report Submittal- 6th Street & Castro Street, Oakland, CA 94607

Reference: ACEH Fuel Leak Case No. RO250, Facility Global ID # T0600102155

Dear Ms. Jakub:

On behalf of California Department of Transportation (Caltrans), I am pleased to submit the following environmental investigation reports for the above referenced site:

1. 6th at Castro St, Oakland Work Plan
2. 4th Quarter 2008 Quarter Groundwater Monitoring Report
3. 1st Quarter 2009 Groundwater Monitoring Report
4. 2nd Quarter 2009 Groundwater Monitoring Report
5. Caltrans Site Investigation 6th and castro\_OAK9R048.pdf
6. 2nd Quarter 2000 GW Monitoring Report

The groundwater monitoring reports were prepared by Kleinfelder, Inc. and Professional Service Industries. The work plan for further investigation was prepared by Northgate Environmental Management, Inc.

**Certification**

*I certify under penalty of law that these documents are prepared for Caltrans by the consultants in accordance with the system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing the violations.*

If you have any questions, or comments, please contact me at (510) 286-5635.

Sincerely,

A handwritten signature in blue ink that reads "Charles D. Smith".

CHARLES D. SMITH, P.E.  
Senior Transportation Engineer  
Office of Environmental Engineering

**SECOND QUARTER 2000**

**FOURTH QUARTERLY GROUNDWATER  
MONITORING REPORT**

**TASK ORDER NUMBER 04-952137-ES  
CONTRACT NUMBER 43A0012**

**SIXTH AND CASTRO STREETS  
OAKLAND, CALIFORNIA**

Prepared for

**CALIFORNIA DEPARTMENT OF TRANSPORTATION**  
**District 4**  
**P.O. Box 23660**  
**Oakland, California**

Prepared by

**Professional Service Industries**  
1320 West Winton Avenue  
Hayward, California 94545  
(510) 785-1111

August 18, 2000  
575-9G034

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**STATEMENT OF LIMITATIONS AND PROFESSIONAL CERTIFICATION**

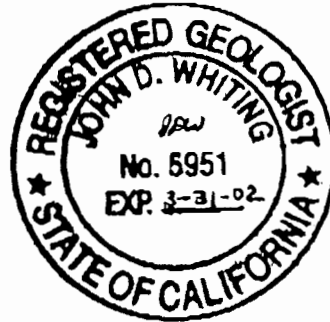
Information provided in this Site Investigation Report, prepared by Professional Service Industries, Inc. (PSI), is intended exclusively for the use of Caltrans for the evaluation of subsurface conditions as it pertains to the subject site. The professional services provided have been performed in accordance with practices generally accepted by other geologists, hydrologists, hydrogeologists, engineers, and environmental scientists practicing in this field. No other warranty, either expressed or implied, is made. As with all subsurface investigations, there is no guarantee that the work conducted identified any or all sources or locations of contamination.

This report is issued with the understanding that Caltrans is responsible for ensuring that the information contained herein is brought to the attention of the appropriate regulatory agency. This report has been reviewed by a geologist who is registered in the State of California and whose signature and license number appear below.

---

Frank R. Poss  
Senior Hydrogeologist

*John D. Whiting*  
John D. Whiting, RG  
Senior Project Geologist



## 1.0 INTRODUCTION

This report summarizes the results of the Second Quarter 2000 groundwater monitoring activities conducted on April 27, 2000 at the intersection of 6th and Castro Streets located in Oakland, California. The subject site location is presented on Figure 1. The purpose of this project is to comply with quarterly sampling requirements for Alameda County Department of Environmental Health. This is the fourth quarter of groundwater monitoring conducted by PSI.

## 2.0 SITE HISTORY

The site is currently a vacant lot that is surrounded by Brush Street to the west, 7th Street to the north, Castro Street to the east, and 6th Street to the south. In 1987, ERM-West Consultants (ERM) conducted an environmental site assessment to identify any environmental concerns resulting from chemical hazardous waste generation at the site. Historical records searches indicated that the site has formerly been occupied by a number of businesses, most notably a gas station, an auto repair garage, Durham Farm Creamery, a machine shop, and a laundry facility. At least four underground storage tanks (USTs) were associated with the former gas station and dairy (IT, 1996). This service station was located at the intersection of 6th Street and Brush Street (Geocon, 1995).

ERM drilled seven soil borings at the site to collect soil samples for analyses. The results from the analyses of the soil samples identified up to 1.3 parts per million (ppm) ethylbenzene, 1.5 ppm toluene, and 7.9 ppm xylenes. The analytical results from groundwater samples collected during drilling had concentrations up to 0.5 ppb ethylbenzene, 0.3 ppb toluene, and 5 ppb total xylenes (ACHCSA, 1998).

In a 1995 investigation conducted by Geocon Environmental Consultants (Geocon), soil and groundwater samples were collected from seven additional locations. The results of the analyses of the soil samples identified up to 410 ppm lead and 8,000 ppm oil and grease. The results from two groundwater samples analyzed did not contain detectable concentrations of Total Petroleum Hydrocarbons as Gasoline (TPH-G); TPH as Diesel (TPH-D); and Benzene, Toluene, Ethylbenzene, and Total Xylenes (BTEX) (IT, 1996).

In a 1996 investigation conducted by International Technology Corporation (IT), soil and groundwater samples were collected from 11 additional borings. The maximum concentration in the soil samples analyzed are presented below:

Total Petroleum Hydrocarbons as Gasoline (TPH-G)	1,100 ppm
Benzene	2.6 ppm
Toluene	34 ppm
Ethylbenzene	25 ppm
Total Xylenes	140 ppm
Total Lead	397 ppm

The maximum concentration in the four groundwater samples collected from the above referenced borings are the following:

Total Petroleum Hydrocarbons as Gasoline (TPH-G)	1,700 ppb
Benzene	51 ppb
Toluene	200 ppb
Ethylbenzene	59 ppb
Total Xylenes	290 ppb
1,2 Dichloroethane	5.4 ppb

In a 1999 investigation completed by PSI, soil and groundwater samples were collected from 11 additional borings and three groundwater monitoring wells were installed. The maximum concentration in the soil samples analyzed are presented below:

Total Petroleum Hydrocarbons as Gasoline (TPH-G)	600 ppm
Benzene	0.2 ppm
Toluene	3.7 ppm
Ethylbenzene	17 ppm
Total Xylenes	67 ppm
Total Lead	1,700 ppm

The maximum concentration in the 14 groundwater samples analyzed are the following:

Total Petroleum Hydrocarbons as Gasoline (TPH-G)	58,000 ppb
Benzene	3,900 ppb
Toluene	3,700 ppb
Ethylbenzene	14,000 ppb
Total Xylenes	12,000 ppb
1,2 Dichloroethane	160 ppb

The petroleum hydrocarbon impacted soil and groundwater was primarily found in the southwestern corner of the site.

### 3.0 GROUNDWATER MONITORING ACTIVITIES

#### 3.1 GROUNDWATER ELEVATION AND HYDRAULIC GRADIENT

On April 27, 2000, static groundwater elevations were measured in wells MW-1, MW-2, and MW-3 (Figure 2). The groundwater depths were measured using a groundwater interface probe. The average groundwater elevation increased 0.4 meters (1.35 feet) compared to last quarter. Depth to groundwater has decreased in each of the quarters following the initial groundwater sampling.

A summary of the depth to groundwater data collected during this monitoring event and previous monitoring events is presented in Table 1. Based on the groundwater data, the inferred groundwater flow direction beneath the site is to the south with a hydraulic gradient of 0.009 (Figure 2). Other than the first quarter of groundwater sampling where the flow direction was to the east, the flow direction at the site has been to the south. The hydraulic gradient site at the site has ranged from 0.006 to 0.009 at the site.

#### 3.2 GROUNDWATER SAMPLING

Groundwater samples were collected from monitoring wells MW-1, MW-2, and MW-3. A duplicate sample of MW-3 was obtained and labeled MW-11. Prior to the collection of groundwater samples, the monitoring wells were purged of a minimum of three well volumes of water until pH, conductivity, and temperature stabilized.

The following procedures for well monitoring, well purging, and water sampling were implemented while sampling the wells:

1. All equipment was washed prior to entering the well with an Alconox solution, followed by two tap water rinses and a deionized water rinse.
2. Prior to purging the wells, depth-to-water was measured using an Solinst groundwater interface probe to an accuracy of approximately 0.01 foot. The measurements were made to the top of the well casing on the north side.
3. Monitoring wells at the site were prepared for sampling by purging the well of approximately 3 well volumes of water using disposable Teflon bailers.
4. Water samples were collected with a single-use Teflon bailer. The water collected was immediately decanted into laboratory-supplied vials and bottles. The containers were overfilled, capped, labeled, and placed in a chilled cooler prior to delivery to the laboratory for analysis.

5. Chain-of-custody procedures, including chain-of-custody forms, were used to document water sample handling and transport from collection to delivery to the laboratory for analyses.
6. Purged water was contained in a DOT approved 55-gallon drum. The drum was labeled with the contents, date, well number, client name, and project number.
7. Groundwater samples were delivered to the State-certified hazardous waste laboratory within 24-hours of collection.

The groundwater monitoring purge logs are presented in Appendix A.

### 3.3 LABORATORY ANALYSIS AND RESULTS

The groundwater samples were submitted for analyses to Centrum Analytical of Redlands, California, a State of California certified hazardous waste analytical laboratory. The samples were analyzed for the following:

- EPA Method 413.2 – Total Oil & Grease (TOG)
- EPA 8015 modified - TPH-G;
- EPA 8015 modified - Total Petroleum Hydrocarbons as Diesel (TPH-D);
- EPA 8260 - Volatile Organic Compounds (VOCs).
- EPA 6010 – Soluble Lead.

A summary of the laboratory results for groundwater samples is presented in Table 2 and Table 3. A copy of the laboratory reports and chain of custody records are presented in Appendix B. The following are the results of the groundwater sampling:

- TOG was detected in Well MW-2 at 10 milligrams per liter (mg/L). This concentration is greater than the previous sampling result of 8.8 mg/L in Well MW-2.
- TPH-G was detected in Well MW-2 at 56 mg/L. This concentration is greater than the previous sampling result of 29 mg/L in Well MW-2.
- TPH-D was not detected in groundwater samples from the site this quarter. This is comparable to the previous sampling results.
- MTBE was not detected in groundwater samples from the site this quarter. This is comparable to the previous sampling results.



- Benzene was detected in Well MW-2 at 0.74 mg/L. This concentration is greater than the previous sampling result of 0.67 mg/L in Well MW-2.
- Toluene (5,200 ug/L), and Total Xylenes (11,00 ug/L), were detected in well MW-2 at concentrations comparable to the previous sampling results. Ethylbenzene (2,500 ug/L) in MW-2 had increased by approximately 67% over the previous quarter.
- Trace concentrations of toluene (0.0009 ug/L), ethylbenzene (0.0019 ug/L), and total xylenes (0.0036 ug/L) were detected in monitoring well MW-3 for the first time.
- Concentrations of gasoline related compounds isopropylbenzene (77 ug/L), p-isopropyltoluene (28 ug/L), naphthalene (1,100 ug/L), n-Propylbenzene (270 ug/L), 1,2,4 Trimethylbenzene (2,000 ug/L), and 1,3,5 Trimethylbenzene (570 ug/L) were detected in Well MW-2.
- 1,2 DCA (78 ug/L) was detected in MW-2 and was comparable to the previous quarters result (79 ug/L). The common usage for this compound in a service station environment is as a brake and electrical parts cleaner or as an additive to leaded gasoline.
- Trichloroethene (TCE) was detected in MW-2 at 9.1 ug/L and in MW-1 at 0.9 ug/L for the first time. The common usage for this compound in a service station environment is as a brake and electrical parts cleaner.
- Soluble lead was detected for the first time in groundwater sample MW-3 at 370 ug/L.

The State of California Primary Drinking Water Standards (PDWS) for benzene is 1 ug/L, toluene is 150 ug/L, ethylbenzene is 700 ug/L, total xylenes is 1,750 ug/L, TCE is 5 ug/L, and 1,2 DCA is 0.5 ug/L. The concentrations of BTEX, TCE, and 1,2 DCA in the groundwater sample collected from Well MW-2 exceeded their respectable PDWS. The contaminants of concern (COC) did not exceed the PDWS in MW-1 and MW-3.

Figure 3 depicts the concentrations of benzene, 1,2 DCA, and TCE detected in monitoring well MW-2 with time. It is apparent from this figure that the benzene concentration has stayed relatively constant, the 1,2 DCA concentration has declined gradually, and the data is insufficient at this time to make a determination of the trend of the TCE concentration.

#### **4.0 SUMMARY AND CONCLUSIONS**

PSI performed a quarterly monitoring event on April 27, 2000. Groundwater samples were collected from the three monitoring wells with a duplicate obtained from MW-3 and labeled MW-11. Based on measurements collected and analytical data the following summary is provided.

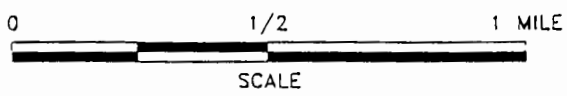
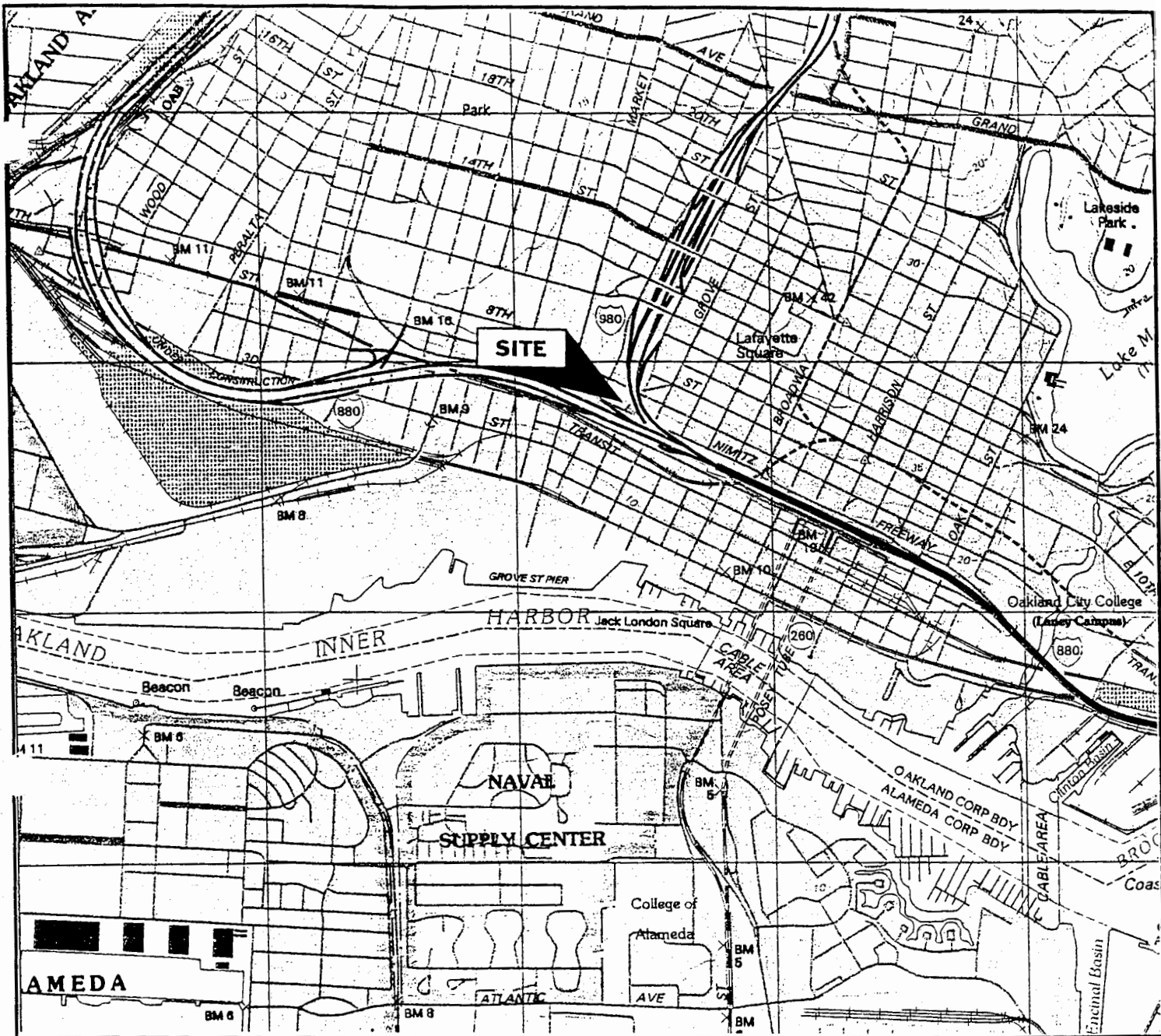
- Groundwater elevation data indicates the groundwater flow direction beneath the site is towards the south, with a hydraulic gradient of 0.009 meter per meter (0.009 foot per foot). This is comparable to the previous two sampling events.
- Average groundwater elevations is approximately 0.13 meters (0.42 feet) higher than the average groundwater elevation measured for the previous sampling event.
- TPH-D was not detected in groundwater samples this quarter.
- TPH-G was detected in the sample collected from Well MW-2 (56 mg/l).
- BTEX concentrations were detected in the sample collected from well MW-2.
- Toluene, ethylbenzene, and total xylenes were detected in the sample collected from Well MW-3
- The oxygenates MTBE, TBA, DIPE, ETBE, and TAME were not detected in the EPA Method 8260 analyses this quarter.
- Concentrations of the gasoline related compounds isopropylbenzene, n-isopropyltoluene, naphthalene, n-Propylbenzene, 1,2,4 Trimethylbenzene and 1,3,5 Trimethylbenzene were detected in Well MW-2.
- 1,2 DCA was detected in MW-2 at 78 µg/l.
- TCE was detected in MW-2 at 9.1 ug/L and in MW-1 at 0.9 ug/L for the first time.
- The BTEX, TCE and 1,2 DCA concentrations in well MW-2 are above their respective State of California Primary Drinking Water Standards.
- Soluble lead was detected for the first time in groundwater sample MW-3 at 370 ug/L.

Based on four quarters of groundwater sampling, the following can be concluded.

- The groundwater flow direction at the site is to the south at a shallow gradient.
- A groundwater plume that exceeds the PDWS for numerous compounds associated with a gas station is present on the southwest corner of the subject property. The contaminated groundwater is likely due to historical use of this portion of the property as a gas station.
- Concentrations of the main COCs have not decreased with time with the exception of 1,2 DCA.
- The extent of the groundwater plume has not been identified to the south and likely has migrated off of the site boundaries.

PSI recommends continued groundwater monitoring at the site and an off-site investigation to determine the extent of the groundwater plume to the south. Copies of this report should be provided to the appropriate regulatory agencies.

# FIGURES

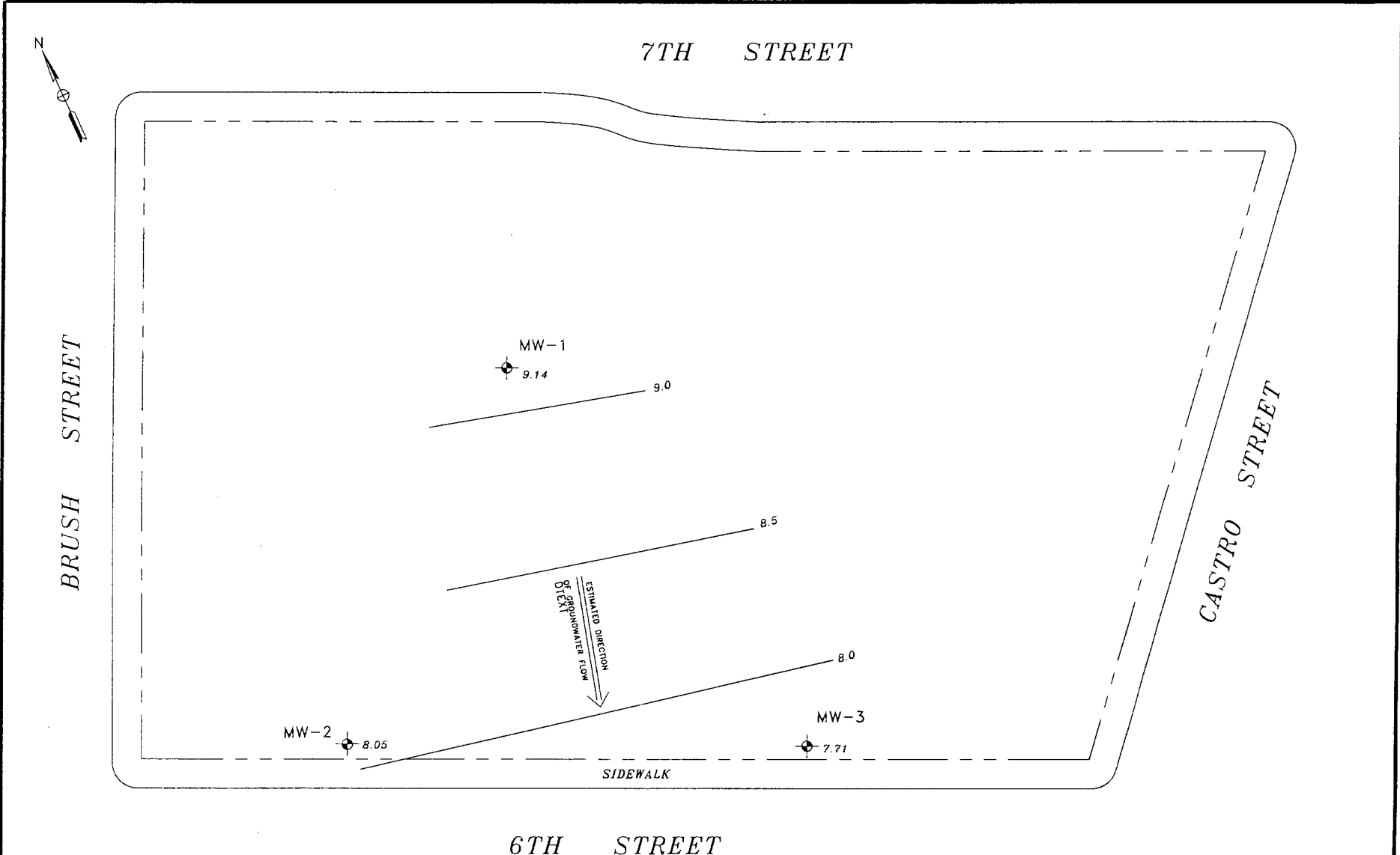


REFERENCE:  
U.S.G.S. OAKLAND WEST, CALIFORNIA, 1993




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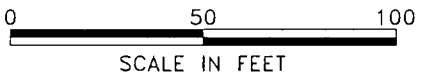
SITE LOCATION  
STATE RIGHT-OF-WAY  
SIXTH AND CASTRO STREETS  
OAKLAND, CALIFORNIA  
PROJECT NUMBER: 575-9G034

DATE: 5/05/99	CKD'D BY:	FIGURE NO.: 1
FILE NO.: 9G034-1		DRAWN BY: S. BOWERS




LEGEND

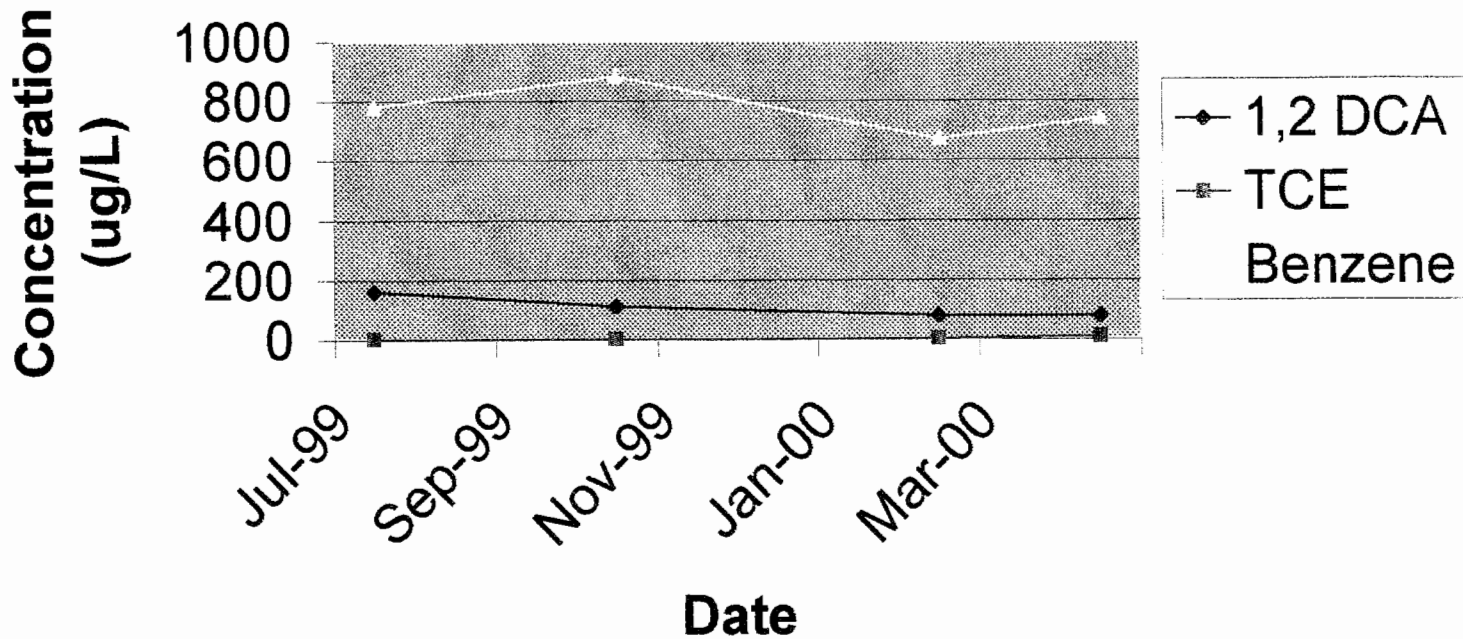
-  GROUNDWATER MONITORING WELL LOCATION
-  8.5 GROUNDWATER ELEVATION CONTOUR
-  FENCE



SOURCE: NORCAL, 1999

 ENVIRONMENTAL GEOTECHNICAL CONSTRUCTION CONSULTING • ENGINEERING • TESTING		
GROUNDWATER ELEVATION MAP: 4/27/00 STATE RIGHT-OF-WAY SIXTH AND CASTRO STREETS OAKLAND, CALIFORNIA PROJECT NUMBER: 575-9G034		
DATE: 8/25/99	CKD BY:	FIGURE NO.: 5
FILE NO: 9G034-3		DRAWN BY: S.BOWERS

## Contaminants of Concern (MW-2)



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CONTAMINANTS OF CONCERN IN MW-2  
 STATE RIGHT-OF-WAY  
 SIXTH AND CASTRO STREETS  
 OAKLAND, CALIFORNIA  
 PROJECT NUMBER: 575-9G034

DATE: 8/25/99	CKD BY:	FIGURE NO.: 3
FILE NO: 9G034-3		DRAWN BY: S.BOWERS

## **TABLES**



**TABLE 1**  
**SUMMARY OF GROUNDWATER ELEVATIONS**  
**CALTRANS MAINTENANCE STATION**  
**6TH AND CASTRO STREETS, OAKLAND, CA**

<b>SAMPLE NUMBER</b>	<b>DATE</b>	<b>GROUND SURFACE ELEVATION</b>	<b>WELL CASING ELEVATION</b>	<b>DEPTH TO GROUNDWATER</b>	<b>GROUNDWATER ELEVATION</b>
MW-1	7/2/99	23.74	26.85	19.89	6.96
	10/25/99	23.74	26.85	19.71	7.14
	2/7/00	23.74	26.85	19.22	7.63
	4/27/00	23.74	26.85	17.71	9.14
MW-2	7/2/99	18.67	21.56	14.21	7.35
	10/25/99	18.67	21.56	15.38	6.18
	2/7/00	18.67	21.56	14.52	7.04
	4/27/00	18.67	21.56	13.51	8.05
MW-3	7/2/99	19.60	21.04	14.57	6.47
	10/25/99	19.60	21.04	15	6.04
	2/7/00	19.60	21.04	14.85	6.19
	4/27/00	19.60	21.04	13.33	7.71

**NOTES:**

All elevation and depth data presented in feet.

**TABLE 2**  
**SUMMARY OF GROUNDWATER ANALYTICAL DATA**  
**CALTRANS MAINTENANCE STATION**  
**6TH CASTRO STREETS, OAKLAND, CA**

<i>All concentrations in ug/l (PPB).</i>											
<b>SAMPLE NUMBER</b>	<b>DATE</b>	<b>OIL &amp; GREASE</b>	<b>TPH-G</b>	<b>TPH-D</b>	<b>MTBE</b>	<b>Benzene</b>	<b>E-Benzene</b>	<b>Toluene</b>	<b>Xylenes</b>	<b>VOCs*</b>	<b>LEAD</b>
MW-1	7/2/99	<2,000	<500	<400	<1	<0.5	<0.5	<0.5	<0.5	ND*	<100
	10/25/99	<2,000	<500	<400	<1	<0.5	<0.5	<0.5	<0.5	ND*	<100
	2/7/00	<2,000	<500	<400	<1	<0.5	<0.5	<0.5	<0.5	ND*	<100
	4/27/00	<2,000	<500	<400	<1	<0.5	<0.5	<0.5	<0.5	<b>0.9</b>	<100
MW-2	7/2/99	<b>6,300</b>	<b>26,000</b>	<4,000	<1	<b>780</b>	<b>1,300</b>	<b>4,200</b>	<b>5,000</b>	<b>2,830</b>	<100
	10/25/99	<b>4,400</b>	<b>33,000</b>	<400	<50	<b>880</b>	<b>1,800</b>	<b>4,300</b>	<b>4,800</b>	<b>2,490</b>	<100
	2/7/00	<b>8,800</b>	<b>29,000</b>	<400	<50	<b>670</b>	<b>1,500</b>	<b>4,800</b>	<b>8,700</b>	<b>2,240</b>	<100
	4/27/00	<b>10,000</b>	<b>56,000</b>	<400	<50	<b>740</b>	<b>2,500</b>	<b>5,200</b>	<b>11,000</b>	<b>4,150</b>	<100
MW-3	7/2/99	<2,000	<500	<400	<1	<0.5	<0.5	<0.5	<0.5	ND*	<100
	10/25/99	<2,000	<500	<400	<1	<0.5	<0.5	<0.5	<0.5	ND*	<100
	2/7/00	<2,000	<500	<400	<1	<0.5	<0.5	<0.5	<0.5	ND*	<100
	4/27/00	<2,000	<500	<400	<1	<0.5	<b>1.9</b>	<b>0.9</b>	<b>3.6</b>	ND*	0.37

**NOTES**

Sample concentrations reported in ug/l (micrograms per liter).

TPH-G denotes Total Petroleum Hydrocarbons as Gasoline, TPH-D denotes Total Petroleum Hydrocarbons as Diesel.

MTBE denotes Methyl Tert Butyl Ether, E-Benzene denotes Ethylbenzene, VOCs\* denotes Volatile Organic Compounds analyzed by EPA Method 8260.

ND denotes Not Detected, detection limit presented in parentheses.

ND\* denotes all analytes included in EPA Method 8260 analyte list not presented on this table, Not Detected.

**TABLE 3  
SUMMARY OF VOC COMPOUNDS  
CALTRANS MAINTENANCE STATION  
6TH CASTRO STREETS, OAKLAND, CA**

*All concentrations in ug/l (PPB).*

SAMPLE NUMBER	DATE	1,2 DCA	1,2-DCP	IPB	IPT	Naphthalene	n-Propylbenzene	TCE	1,2,4 TMB	1,3,5 TMB
MW-1	7/2/99	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	10/25/99	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	2/7/00	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	4/27/00	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<b>0.9</b>	<0.5	<0.5
MW-2	7/2/99	<b>160</b>	<25	<b>60</b>	<25	<b>590</b>	<b>200</b>	<25	<b>1,400</b>	<b>420</b>
	10/25/99	<b>110</b>	<25	<b>54</b>	<25	<b>600</b>	<b>170</b>	<25	<b>1,200</b>	<b>360</b>
	2/7/00	<b>79</b>	<5	<b>44</b>	<5	<b>620</b>	<b>160</b>	<5	<b>1,100</b>	<b>320</b>
	4/27/00	<b>78</b>	<b>15</b>	<b>77</b>	<b>28</b>	<b>1,100</b>	<b>270</b>	<b>9.1</b>	<b>2,000</b>	<b>570</b>
MW-3	7/2/99	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	10/25/99	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	2/7/00	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
	4/27/00	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

**NOTES**

Sample concentrations reported in ug/l (microgram per liter).

1,2 DCA denotes 1,2 Dichloroethane; 1,2-DCP denotes 1,2-Dichloropropane; IPB denotes Isopropylbenzene; IPT denotes p-Isopropyltoluene

TCE denotes Trichloroethene; 1,2,4 TMB denotes 1,2,4 Trimethylbenzene; 1,3,5 TMB denotes 1,3,5 Trimethylbenzene,

<0.5 = Not detected at detection limit shown

**APPENDIX A**  
GROUNDWATER PURGE LOGS







# WELL PURGING AND SAMPLING DATA

DATE: 4/27/00		PROJECT NAME: 6 <sup>th</sup> & Castro Caltrans		WELL NO: MW-3		PROJECT NO:		
WEATHER CONDITIONS:								
WELL DIAMETER (IN.)		<input type="checkbox"/> 1	<input checked="" type="checkbox"/> 2	<input type="checkbox"/> 4	<input type="checkbox"/> 6	<input type="checkbox"/> OTHER _____		
SAMPLE TYPE:		<input type="checkbox"/> GROUNDWATER	<input checked="" type="checkbox"/> WASTEWATER	<input type="checkbox"/> SURFACE WATER	<input type="checkbox"/> OTHER			
WELL DEPTH (TOC)		22.42	FT.	DEPTH TO WATER BEFORE PURGING (TOC) 13.5				FT.
LENGTH OF WATER			FT.	CALCULATED ONE WELL VOLUME <sup>1</sup> :				GAL.
PURGING DEVICE:		<input type="checkbox"/> DEDICATED		<input checked="" type="checkbox"/> DISPOSABLE		<input type="checkbox"/> DECONTAMINATED		
SAMPLING DEVICE:		<input type="checkbox"/> DEDICATED		<input checked="" type="checkbox"/> DISPOSABLE		<input type="checkbox"/> DECONTAMINATED		
EQUIP. DECON.		<input type="checkbox"/> TAP WATER WASH		<input type="checkbox"/> ISOPROPANOL		<input type="checkbox"/> ANALYTE FREE FINAL RINSE		
<input type="checkbox"/> ALCONOX WASH		<input type="checkbox"/> DIST/DEION 1 RINSE		<input type="checkbox"/> OTHER SOLVENT		<input type="checkbox"/> DIST/DEION FINAL RINSE		
<input type="checkbox"/> LIQUINOX WASH		<input type="checkbox"/> DIST/DEION 2 RINSE		<input type="checkbox"/> TAP WATER FINAL RINSE		<input type="checkbox"/> AIR DRY		
CONTAINER PRESERVATION:		<input type="checkbox"/> LAB PRESERVED		<input type="checkbox"/> FIELD PRESERVED				
WATER ANALYZER MODEL & SERIAL NO:								
ACTUAL TIME (MIN)	CUMUL. VOLUME PURGED (GAL)	TEMP <input type="checkbox"/> °F <input checked="" type="checkbox"/> °C	SPECIFIC CONDUCT.	pH	DISS. OXYGEN	TURBIDITY (NTUs)	WATER APPEAR CL=CLEAR CO=CLOUDY TU=TURBID	REMARKS (EVIDENT ODOR, COLOR, PID)
1230	INITIAL	19.0	620	6.74				
1233	1.5	19.5	617	6.59				
1236	3.0	19.1	612	6.53				
1239	4.5	19.3	608	6.74				
DEPTH TO WATER AFTER PURGING (TOC)					FT.	SAMPLE FILTERED <input type="checkbox"/> YES <input type="checkbox"/> NO SIZE _____		
NOTES:					SAMPLE TIME: 1250		ID# MW-3	
					DUPLICATE <input type="checkbox"/> TIME:		ID#:	
					EQUIP. BLANK: <input type="checkbox"/> TIME:		ID#:	
					PREPARED BY: JP			

PSI 1A.1 FOOT LENGTH OF WATER = 0.05 GAL IN 1" DIA. PIPE 0.17 GAL IN 2" DIA PIPE 0.65 GAL IN 4" DIA PIPE 1.5 GAL IN 6" DIA PIPE  
Rev. 12/95



**APPENDIX B**

**LABORATORY REPORTS AND CHAIN-OF-CUSTODY FORMS**



# Centrum Analytical Laboratories, Inc.

CERTIFIED HAZARDOUS WASTE TESTING LABORATORY • CHEMICAL AND BIOLOGICAL ANALYSES

Client: PSI  
1320 W. Winton Ave.  
Hayward, CA 94545

Date Sampled: 04/27/00  
Date Received: 04/28/00  
Job Number: 16372

Project: Caltrans - 6th & Castro

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## CASE NARRATIVE

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The following information applies to samples which were received on 04/28/00 :

The samples were received at the laboratory chilled and sample containers were intact.

Unless otherwise noted below, the Quality Control acceptance criteria were met for all samples for every analysis requested.

Report approved by:

Robert R. Clark, Ph.D.  
Laboratory Director

ELAP # 1184

DL : Detection Limit -- The lowest level at which the compound can reliably be detected under normal laboratory conditions.  
ND : Not Detected -- The compound was analyzed for but was not found to be present at or above the detection limit.  
NA : Not Analyzed -- Per client request, this analyte was not on the list of compounds to be analyzed for.

**Lead By GFAA**

Client: PSI  
 Project: Caltrans - 6th & Castro  
 Job No.: 16372  
 Matrix: Water  
 Analyst: RLB

Date Sampled: 04/27/00  
 Date Received: 04/28/00  
 Date Digested: 05/04/00  
 Date Analyzed: 05/04/00  
 Batch Number: 6010W1555  
 Method Number: 7421

Sample ID	Detection Limit mg/L	Lead mg/L
Method Blank	0.10	ND
MW-1	0.10	ND
MW-2	0.10	ND
MW-3	0.10	0.37

## QC Sample Report - Metals

Matrix: Water  
Batch #: 6010W1555

### Batch Accuracy Results

Sample ID: Laboratory Control Sample

Compound	Spike Concentration mg/L	% Recovery LCS	Acceptance Limits % Recovery	Pass/Fail
Lead	1.0	101.9	75 - 125	Pass

Analytical Notes:

### Batch Precision Results

MS/MSD Sample ID: 16393-1

Compound	Spike Sample Recovery mg/L	Spike Duplicate Recovery mg/L	Relative Percent Difference (RPD)	Upper Control Limit RPD	Pass/Fail
Lead	1.015	1.016	0%	20%	Pass

Analytical Notes:

MS: Matrix Spike Sample  
MSD: Matrix Spike Duplicate

**EPA 413.2 - Oil & Grease**

Client: PSI  
 Project: Caltrans - 6th & Castro  
 Job No.: 16372  
 Matrix: Water  
 Analyst: KS

Date Sampled: 04/27/00  
 Date Received: 04/28/00  
 Date Extracted: 05/04/00  
 Date Analyzed: 05/04/00  
 Batch Number: 4131W1170

Sample ID	Detection Limit mg/L	Total Oil & Grease mg/L
Method Blank	2.0	ND
MW-1	2.0	ND
MW-2	2.0	10
MW-3	2.0	ND
MW-11	2.0	11

**QC Report - EPA 413.2 Oil & Grease**

Matrix: Water  
Batch #: 4132W1170

**Batch Accuracy Results**

Sample ID: Laboratory Control Sample

Analyte	Spike Concentration mg/Kg	% Recovery LCS	Acceptance Limits % Recovery	Pass/Fail
Reference Oil	10	84	70 - 130	<b>Pass</b>

Analytical Notes:

**Batch Precision Results**

MS/MSD Sample ID: Laboratory Control Sample

Analyte	Spike Sample Recovery mg/Kg	Spike Duplicate Recovery mg/Kg	Relative Percent Difference (RPD)	Upper Control Limit RPD	Pass/Fail
Reference Oil	8.40	10.40	21%	25%	<b>Pass</b>

Analytical Notes:

MS: Matrix Spike Sample  
MSD: Matrix Spike Duplicate

**Modified 8015 - Total Extractable Petroleum Hydrocarbons as Diesel**

Client: PSI  
 Project: Caltrans - 6th & Castro  
 Job No.: 16372  
 Matrix: Water  
 Analyst: JL

Date Sampled: 04/27/00  
 Date Received: 04/28/00  
 Date Extracted: 04/28/00  
 Date Analyzed: 04/28/00  
 Batch Number: 8015DW1908

Sample ID	Detection Limit mg/L	Diesel mg/L	Surrogate (OTP) Limit: 50 - 150%
Method Blank	0.40	ND	109%
MW-1	0.40	ND	99%
MW-2	0.40	ND	107%
MW-3	0.40	ND	99%
MW-11	0.40	ND	112%

**QC Sample Report - EPA 8015M Diesel**

Matrix: Water  
Batch #: 8015DW1908

**Batch Accuracy Results**

Sample ID: Laboratory Control Sample

Analyte	Spike Concentration mg/L	% Recovery LCS	Acceptance Limits % Recovery	Pass/Fail
Diesel	0.8	77	70 - 130	Pass

Analytical Notes:

**Batch Precision Results**

MS/MSD Sample ID: Laboratory Control Sample

Analyte	Spike Sample Recovery mg/L	Spike Duplicate Recovery mg/L	Relative Percent Difference (RPD)	Upper Control Limit RPD	Pass/Fail
Diesel	0.62	0.65	5%	25%	Pass

Analytical Notes:

MS: Matrix Spike Sample  
MSD: Matrix Spike Duplicate



**Modified 8015 - Total Volatile Hydrocarbons as Gasoline**

Client: PSI  
 Project: Caltrans - 6th & Castro  
 Job No.: 16372  
 Matrix: Water  
 Analyst: CP

Date Sampled: 04/27/00  
 Date Received: 04/28/00  
 Date Analyzed: 05/02/00  
 Batch Number: 8015GW2592

Sample ID	Detection Limit mg/L	Petroleum Hydrocarbons as Gasoline mg/L
Method Blank	0.5	ND
MW-1	0.5	ND
MW-2	5.0	56
MW-3	0.5	ND
MW-11	5.0	51

**QC Sample Report - EPA 8015M Gasoline**

Matrix: Water  
Batch #: 8015GW2592

**Batch Accuracy Results**

Sample ID: Laboratory Control Sample

Analyte	Spike Concentration mg/L	% Recovery LCS	Acceptance Limits % Recovery	Pass/Fail
Gasoline	10.0	100	70 - 130	Pass

Analytical Notes:

**Batch Precision Results**

MS/MSD Sample ID: Laboratory Control Sample

Analyte	Spike Sample Recovery mg/L	Spike Duplicate Recovery mg/L	Relative Percent Difference (RPD)	Upper Control Limit RPD	Pass/Fail
Gasoline	9.98	9.33	7%	25%	Pass

Analytical Notes:

MS: Matrix Spike Sample  
MSD: Matrix Spike Duplicate

**EPA 8260 - Volatile Organics with Oxygenates**

Client: PSI  
 Project: Caltrans - 6th & Castro  
 Job No.: 16372  
 Matrix: Water  
 Analyst: JMR

Date Sampled: 04/27/00  
 Date Received: 04/28/00  
 Date Analyzed: 05/11-12/00  
 Batch Number: MS48260W2102

Compounds	Sample ID:	Blank	MW-1	MW-2	MW-3
	DL	µg/L	µg/L	µg/L	µg/L
Acetone	50	ND	ND	ND	ND
tert-Amyl Methyl Ether (TAME)	5.0	ND	ND	ND	ND
Benzene	0.5	ND	ND	740	ND
Bromobenzene	1.0	ND	ND	ND	ND
Bromochloromethane	1.0	ND	ND	ND	ND
Bromodichloromethane	0.5	ND	ND	ND	ND
Bromoform	0.5	ND	ND	ND	ND
Bromomethane	0.5	ND	ND	ND	ND
tert-Butanol (TBA)	50	ND	ND	ND	ND
2-Butanone (MEK)	10	ND	ND	ND	ND
n-Butylbenzene	0.5	ND	ND	ND	ND
sec-Butylbenzene	0.5	ND	ND	ND	ND
tert-Butylbenzene	0.5	ND	ND	ND	ND
Carbon disulfide	10	ND	ND	ND	ND
Carbon tetrachloride	0.5	ND	ND	ND	ND
Chlorobenzene	0.5	ND	ND	ND	ND
Chloroethane	0.5	ND	ND	ND	ND
Chloroform	0.5	ND	ND	ND	ND
Chloromethane	0.5	ND	ND	ND	ND
2-Chlorotoluene	0.5	ND	ND	ND	ND
4-Chlorotoluene	0.5	ND	ND	ND	ND
Dibromochloromethane	0.5	ND	ND	ND	ND
1,2-Dibromoethane	0.5	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	10	ND	ND	ND	ND
Dibromomethane	0.5	ND	ND	ND	ND
1,2-Dichlorobenzene	0.5	ND	ND	ND	ND
1,3-Dichlorobenzene	0.5	ND	ND	ND	ND
1,4-Dichlorobenzene	0.5	ND	ND	ND	ND
Dichlorodifluoromethane	0.5	ND	ND	ND	ND
1,1-Dichloroethane	0.5	ND	ND	ND	ND
1,2-Dichloroethane	0.5	ND	ND	78	ND
1,1-Dichloroethene	0.5	ND	ND	ND	ND
cis-1,2-Dichloroethene	0.5	ND	ND	ND	ND
trans-1,2-Dichloroethene	0.5	ND	ND	ND	ND
1,2-Dichloropropane	0.5	ND	ND	15	ND
1,3-Dichloropropane	0.5	ND	ND	ND	ND
2,2-Dichloropropane	0.5	ND	ND	ND	ND
1,1-Dichloropropene	0.5	ND	ND	ND	ND

**EPA 8260 - Volatile Organics with Oxygenates**

 Client: PSI  
 Project: Caltrans - 6th & Castro  
 Job No.: 16372  
 Matrix: Water  
 Analyst: JMR

 Date Sampled: 04/27/00  
 Date Received: 04/28/00  
 Date Analyzed: 05/11-12/00  
 Batch Number: MS48260W2102

Compounds	Sample ID:	Blank	MW-1	MW-2	MW-3
	DL	µg/L	µg/L	µg/L	µg/L
cis-1,3-Dichloropropene	0.5	ND	ND	ND	ND
trans-1,3-Dichloropropene	0.5	ND	ND	ND	ND
Diisopropyl Ether (DIPE)	5.0	ND	ND	ND	ND
Ethylbenzene	0.5	ND	ND	2,500	0.9
Ethyl tert-Butyl Ether (EtBE)	5.0	ND	ND	ND	ND
Hexachlorobutadiene	0.5	ND	ND	ND	ND
2-Hexanone	10	ND	ND	ND	ND
Isopropylbenzene	0.5	ND	ND	77	ND
p-Isopropyltoluene	0.5	ND	ND	28	ND
Methylene chloride	20	ND	ND	ND	ND
4-Methyl-2-pentanone	5.0	ND	ND	ND	ND
Methyl-tert-butyl ether (MtBE)	1.0	ND	ND	ND	ND
Napthalene	0.5	ND	ND	1,100	ND
n-Propylbenzene	0.5	ND	ND	270	ND
Styrene	0.5	ND	ND	ND	ND
1,1,1,2-Tetrachloroethane	0.5	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	1.0	ND	ND	ND	ND
Tetrachloroethene	0.5	ND	ND	ND	ND
Toluene	1.0	ND	ND	5,200	1.9
1,2,3-Trichlorobenzene	0.5	ND	ND	ND	ND
1,2,4-Trichlorobenzene	0.5	ND	ND	ND	ND
1,1,1-Trichloroethane	0.5	ND	ND	ND	ND
1,1,2-Trichloroethane	0.5	ND	ND	ND	ND
Trichloroethene	0.5	ND	0.9	9.1	ND
1,2,3-Trichloropropane	0.5	ND	ND	ND	ND
Trichlorofluoromethane	0.5	ND	ND	ND	ND
Trichlorotrifluoroethane	5.0	ND	ND	ND	ND
1,2,4-Trimethylbenzene	0.5	ND	ND	2,000	ND
1,3,5-Trimethylbenzene	0.5	ND	ND	570	ND
Vinyl chloride	0.5	ND	ND	ND	ND
Xylenes (total)	1.5	ND	ND	11,000	3.6

**Surrogates (% recovery) Limits: 80 - 130**

Sample ID:	Blank	MW-1	MW-2	MW-3
Dibromofluoromethane	106	106	110	107
Toluene-d8	108	101	105	101
Bromofluorobenzene	99	103	101	102

**EPA 8260 - Volatile Organics with Oxygenates**

Client: PSI  
 Project: Caltrans - 6th & Castro  
 Job No.: 16372  
 Matrix: Water  
 Analyst: JMR

Date Sampled: 04/27/00  
 Date Received: 04/28/00  
 Date Analyzed: 05/11-12/00  
 Batch Number: MS48260W2102

Sample ID: MW-11		
Compounds	DL	µg/L
Acetone	500	ND
tert-Amyl Methyl Ether (TAME)	50	ND
Benzene	5.0	<b>870</b>
Bromobenzene	10	ND
Bromochloromethane	10	ND
Bromodichloromethane	5.0	ND
Bromoform	5.0	ND
Bromomethane	5.0	ND
tert-Butanol (TBA)	500	ND
2-Butanone (MEK)	100	ND
n-Butylbenzene	5.0	ND
sec-Butylbenzene	5.0	ND
tert-Butylbenzene	5.0	ND
Carbon disulfide	100	ND
Carbon tetrachloride	5.0	ND
Chlorobenzene	5.0	ND
Chloroethane	5.0	ND
Chloroform	5.0	ND
Chloromethane	5.0	ND
2-Chlorotoluene	5.0	ND
4-Chlorotoluene	5.0	ND
Dibromochloromethane	5.0	ND
1,2-Dibromoethane	5.0	ND
1,2-Dibromo-3-chloropropane	100	ND
Dibromomethane	5.0	ND
1,2-Dichlorobenzene	5.0	ND
1,3-Dichlorobenzene	5.0	ND
1,4-Dichlorobenzene	5.0	ND
Dichlorodifluoromethane	5.0	ND
1,1-Dichloroethane	5.0	ND
1,2-Dichloroethane	5.0	<b>100</b>
1,1-Dichloroethene	5.0	ND
cis-1,2-Dichloroethene	5.0	ND
trans-1,2-Dichloroethene	5.0	ND
1,2-Dichloropropane	5.0	<b>19</b>
1,3-Dichloropropane	5.0	ND
2,2-Dichloropropane	5.0	ND
1,1-Dichloropropene	5.0	ND

**EPA 8260 - Volatile Organics with Oxygenates**

 Client: PSI  
 Project: Caltrans - 6th & Castro  
 Job No.: 16372  
 Matrix: Water  
 Analyst: JMR

 Date Sampled: 04/27/00  
 Date Received: 04/28/00  
 Date Analyzed: 05/11-12/00  
 Batch Number: MS48260W2102

Sample ID: MW-11		
Compounds	DL	µg/L
cis-1,3-Dichloropropene	5.0	ND
trans-1,3-Dichloropropene	5.0	ND
Diisopropyl Ether (DIPE)	50	ND
Ethylbenzene	5.0	<b>2,300</b>
Ethyl tert-Butyl Ether (EtBE)	50	ND
Hexachlorobutadiene	5.0	ND
2-Hexanone	100	ND
Isopropylbenzene	5.0	<b>76</b>
p-Isopropyltoluene	5.0	<b>30</b>
Methylene chloride	200	ND
4-Methyl-2-pentanone	50	ND
Methyl-tert-butyl ether (MtBE)	10	ND
Napthalene	5.0	<b>1,100</b>
n-Propylbenzene	5.0	<b>300</b>
Styrene	5.0	ND
1,1,1,2-Tetrachloroethane	5.0	ND
1,1,2,2-Tetrachloroethane	10	ND
Tetrachloroethene	5.0	ND
Toluene	10	<b>5,400</b>
1,2,3-Trichlorobenzene	5.0	ND
1,2,4-Trichlorobenzene	5.0	ND
1,1,1-Trichloroethane	5.0	ND
1,1,2-Trichloroethane	5.0	ND
Trichloroethene	5.0	<b>11</b>
1,2,3-Trichloropropane	5.0	ND
Trichlorofluoromethane	5.0	ND
Trichlorotrifluoroethane	50	ND
1,2,4-Trimethylbenzene	5.0	<b>1,900</b>
1,3,5-Trimethylbenzene	5.0	<b>570</b>
Vinyl chloride	5.0	ND
Xylenes (total)	15	<b>10,000</b>

**Surrogates (% recovery) Limits: 80 - 130**

Sample ID: MW-11	
Dibromofluoromethane	107
Toluene-d8	108
Bromofluorobenzene	97

## QC Sample Report - EPA Method 8260

Matrix: Water  
Batch #: MS48260W2102

### Batch Accuracy Results

Sample ID: Laboratory Control Sample

Analyte	Spike Concentration µg/L	% Recovery LCS	Acceptance Limits % Recovery	Pass/Fail
1,1-Dichloroethene	20	103	59 - 172	Pass
Benzene	20	100	66 - 142	Pass
Trichloroethene	20	100	71 - 137	Pass
Toluene	20	98	59 - 139	Pass
Chlorobenzene	20	95	60 - 133	Pass

Analytical Notes:

### Batch Precision Results

MS/MSD Sample ID: Laboratory Control Sample

Analyte	Spike Sample Recovery µg/L	Spike Duplicate Recovery µg/L	Relative Percent Difference (RPD)	Upper Control Limit RPD	Pass/Fail
1,1-Dichloroethene	51.6	52.0	1%	22%	Pass
Benzene	49.9	51.3	3%	21%	Pass
Trichloroethene	50.0	51.3	3%	24%	Pass
Toluene	49.0	50.3	3%	21%	Pass
Chlorobenzene	47.7	49.1	3%	21%	Pass

Analytical Notes:

MS: Matrix Spike Sample  
MSD: Matrix Spike Duplicate



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## Chain of Custody Record

Centrum Job # 16372

Page 1 of 1

Project No:		Project Name:		Please Circle Analyses Requested												Turn-Around Time							
96034		CALTRANS 6 <sup>th</sup> + CASTRO														<input type="checkbox"/> 24 Hr. RUSH* <input type="checkbox"/> 48 Hr. RUSH* <input checked="" type="checkbox"/> Normal TAT							
Project Manager:		Phone:		Fax:														*Requires PRIOR approval, additional charges apply					
FRANK ROSS		510 785-1111		510 785-1192														Requested due date: _____					
Client Name:		Address:														Remarks/Special Instructions							
(Report and Billing) PSE		(Report and Billing) 1320 W. WINTON AVE HAYWARD, CA 94545																					
Centrum ID (Lab use only)	Sample ID (As it should appear on report)	Date sampled	Time sampled	Sample matrix	Site location	Containers: # and type	8015M: <input checked="" type="checkbox"/> Diesel Fuel Screen, Carbon Chain	8015M: <input type="checkbox"/> Gas only	8021B: <input type="checkbox"/> BTEX/MBE Only	418.1 (TRPH) <input checked="" type="checkbox"/> 413.2	GCMS: <input checked="" type="checkbox"/> 8260B, 8021B, 624, 524.2	GCMS: <input type="checkbox"/> MIBE Conf. Only	GCMS: <input type="checkbox"/> 8270C, 625	8080: <input type="checkbox"/> Pesticides, PCBs, Pest/PCB	<input checked="" type="checkbox"/> Pb	Metals: <input type="checkbox"/> Title 22 (CAM), RCRA, PP	pH, TDS, TSS, Conductivity	Flashpoint, Hex Cr					
1	MW-1	4-27-04	1215	H <sub>2</sub> O		22, 1PLAS 4 VO/A	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>								
2	MW-2		1130				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>								
3	MW-3		1250				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>								
4	MW-11		1135				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>					<input checked="" type="checkbox"/>					*NOT TO BE RUN PER CHRIS 4/28			
1) Relinquished by: (Sampler's Signature)		Date:	Time:	3) Relinquished by:		Date:	Time:	To be completed by Laboratory personnel:												Sample Disposal			
CHRIS MERRITT		4-27-04	1700					Samples chilled? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> From Field Custody seals? <input type="checkbox"/> Yes <input type="checkbox"/> No All sample containers intact? <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Courier <input checked="" type="checkbox"/> UPS Fed Ex <input type="checkbox"/> Hand carried												<input type="checkbox"/> Client will pick up <input type="checkbox"/> Return to client <input checked="" type="checkbox"/> Lab disposal			
2) Received by:		Date:	Time:	4) Received by:		Date:	Time:																
The delivery of samples and the signature on this chain of custody form constitutes authorization to perform the analyses specified above under the Terms and Conditions set forth on the back hereof.						5) Relinquished by:		Date:	Time:														
						6) Received for Laboratory by:		Date:	Time:														
						Chris Merritt		4/28	9:00														
Laboratory Notes: <u>FILTER METAL SAMPLES PRIOR TO DIGESTION/ANALYSIS</u>																		Sample Locator No.					
																		RECEIVED AT 4°C					