

570 3909

County of Alameda General Services Agency Technical Services Department 1401 Lakeside Drive, 11th Floor Oakland, CA 94612 Tel. (510) 208-9821	<b>LETTER OF TRANSMITTAL</b>  Date: <b>November 19, 1998</b>  Re: <b>Quarterly Groundwater Monitoring          for the Alcopark Fueling Facility          165 13th St., Oakland, California</b>
<b>To: Alameda County Dept. of Env. Health</b>  <b>Attention: Mr. Tom Peacock</b>	

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Drawings  Specifications  Shop Drawings  Submittals  Samples

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Signed: RF Rod FREITAS X 29522

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**FINAL REPORT  
GROUNDWATER MONITORING REPORT  
THIRD QUARTER, 1998  
ALCOPARK FUELING FACILITY  
OAKLAND, CALIFORNIA**

*Nov 1998*

prepared for

**ALAMEDA COUNTY GENERAL SERVICES AGENCY**  
1410 Lakeside Drive, 11<sup>th</sup> Floor  
Oakland, California

prepared by

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

November 16, 1998  
575-8G004

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TABLE 1                    GROUNDWATER ELEVATION AND ANALYTICAL DATA

FIGURE 1                SITE LOCATION

FIGURE 2                GROUNDWATER ELEVATION – 10/22/98

APPENDIX A              FIELD PROCEDURES

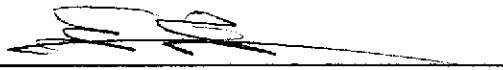
APPENDIX B              LABORATORY REPORT AND CHAIN OF CUSTODY

APPENDIX C              ANALYTICAL DATA CHARTS

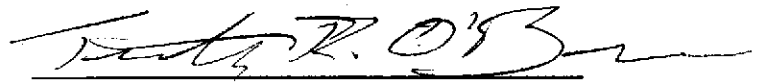
## STATEMENT OF LIMITATIONS AND PROFESSIONAL CERTIFICATION

Information provided in this report, prepared by Professional Service Industries, Inc. (PSI), is intended exclusively for the use of Alameda County General Services Agency (AGSA), 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 will identify any or all sources or locations of contamination.

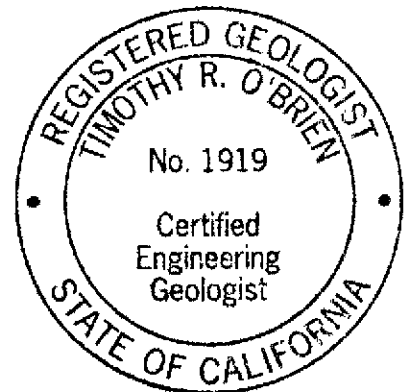
This report is issued with the understanding that AGSA is responsible for ensuring that the information contained herein is brought to the attention of the appropriate regulatory agency. This report has been reviewed by a geologist who is registered in the State of California and whose signature and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



Frank R. Poss  
Senior Hydrogeologist



Timothy R. O'Brien, RG/CEG/CHG  
Senior Geologist



## **1. INTRODUCTION**

Professional Service Industries, Inc. (PSI) was retained by the Alameda County General Services Agency (AGSA) to perform groundwater monitoring at the AGSA Alcopark Fueling Facility located at 165 13<sup>th</sup> Street, Oakland, California. The site location is presented on Figure 1.

The groundwater monitoring was prompted by a request by the Alameda County Health Care Services Agency (HCSA) which requested additional information on the extent of petroleum hydrocarbon impacted groundwater (HCSA, 1997a).

### **1.1 SCOPE OF WORK**

The scope of work consisted of the following tasks:

- Measure the depth to water in the site wells and prepare a groundwater elevation map.
- Determine the groundwater flow direction and gradient.
- Collect and chemically analyze groundwater samples from the wells.
- Prepare a report documenting the field procedures, analytical results, and conclusions regarding the site condition.

### **1.2 SITE BACKGROUND**

Three groundwater monitoring wells were installed at the Alcopark fueling station in March, 1989 to assess environmental conditions subsequent to the repair of a line leak at Dispenser No. 1. Initial sample results indicated the presence of BTEX in the groundwater. Subsequent sample results indicated the presence of TPH-G. Based on the analytical data, it was surmised that contaminants detected on-site were emanating from a source area located upgradient of the site. Sampling activities were halted in 1992 pending investigation of an upgradient source (GSA, 1997).

By letter dated May 30, 1997, the Alameda County Health Care Services Agency (HCSA) instructed GSA to resume groundwater monitoring at Alcopark (HCSA, 1997b). Sampling resumed in July, 1997. Analytical data from that sampling event indicated elevated TPH-G and BTEX concentrations in the downgradient well. MTBE was also detected. Additional samples collected in October, 1997 provided similar results (GSA,

1997). By a letter dated September 11, 1997, the HCSA directed GSA to investigate the extent and stability of the plume.

To better define groundwater conditions downgradient of the UST, two borings were drilled on March 23, 1998. A grab groundwater sample was collected from one of the borings, and Well MW-6 was installed in the other boring.

### **1.2.1 Storage Tank System Upgrades**

In September of 1992, overfill protection, spill containment, and automatic tank gauging were installed on the two underground tanks. In July and August of 1996, additional upgrade work was done to comply with Title 23 of the California Code of Regulations. This included replacement of underground single-walled steel piping with double-wall fiberglass piping, and installation of dispenser sumps, piping sumps, and sump leak sensors (GSA, 1997).

## **2. GROUNDWATER MONITORING ACTIVITIES**

Groundwater monitoring activities were performed by a PSI technician on October 22, 1998. The activities were performed in accordance with PSI standard procedures presented in Appendix A, and procedures described in a HCSA letter describing collection of samples without purging the wells (HCSA, 1997a).

### ***2.1 Groundwater Elevation and Flow Direction***

Prior to groundwater sampling, depth to groundwater was measured from the top of the well casings in each monitoring well. The groundwater measurements were converted to groundwater elevation and the data plotted on a groundwater elevation map. A groundwater elevation map was prepared for October 22, 1998. The map is presented as Figure 2. Chart 1, Appendix C presents groundwater elevation over time. The groundwater elevation data are presented in Table 1.

Interpretation of the groundwater elevation map indicates the groundwater is flowing to the east under a hydraulic gradient of 0.004 foot per foot. Interpretation of Chart 1, Appendix C reveals the groundwater elevation is lower than last quarter. The groundwater flow direction and gradient are consistent with previous monitoring events.

### ***2.2 Groundwater Sampling***

The monitoring wells were sampled without purging as requested in the HCSA letter dated September 11, 1997. Groundwater samples were collected with disposable Teflon bailers. Groundwater samples were collected according to PSI's standard protocol, included in Appendix A and were stored in an ice cooler at 4 degrees Celsius and maintained under chain of custody protocol.

To minimize the possibility of cross-contamination between sampling locations, most of the sampling equipment used is disposable. To further minimize the possibility of cross-contamination, the water sounder and all other reusable sampling equipment were cleaned with a non-phosphate detergent and rinsed twice with deionized water prior to use in the next well.

### **3. LABORATORY ANALYSIS PROGRAM**

The groundwater samples collected during this investigation were submitted to McCampbell Analytical, Inc. of Pacheco, California. McCampbell Analytical is a State of California Department of Health Services certified hazardous waste laboratory (Environmental Laboratory Accreditation Program [ELAP] #1644). A summary of the analytical methods is presented below.

All groundwater samples collected at the site were analyzed for the following constituents by the indicated methods:

- Total Petroleum Hydrocarbons as Gasoline (TPH-G) in accordance with Environmental Protection Agency (EPA) Method 8015-m.
- BTEX and MTBE by EPA Method 8020.
- MTBE and Oxygenates by EPA Method 8260 (only run on the sample with the highest MTBE concentration).

The samples were transported to the laboratory under chain of custody protocol. Copies of the chain of custody forms are included in Appendix B. Duplicate analysis of the sample from Well MW-6 was performed by EPA Method 8260 to verify the analytical result (LLNL, 1998).

#### **3.1 ANALYTICAL RESULTS**

Groundwater samples were collected and chemically analyzed in accordance with the analytical method requirements. The analytical data is summarized in Table 1. Laboratory reports are presented in Appendix B.

Analytical results reported measurable concentrations of TPH-G, BTEX, and MTBE in groundwater samples from Wells MW-1 and MW-6. This is consistent with analytical results from the last sampling event performed in July, 1998 (PSI, 1998a).

##### **3.1.1 Analytical Results Discussion**

Groundwater samples were collected and chemically analyzed in accordance with the HCSA guidelines for groundwater sampling (HCSA, 1997b).

TPH-G, BTEX, and MTBE were detected in groundwater samples from Wells MW-1 and MW-6 this quarter. The concentrations are consistent with concentrations measured in samples from the wells last quarter (PSI, 1998).



- TPH-G was detected in Wells MW-1 (5,100 ug/l) and MW-6 (4,700 ug/l). The concentration of TPH-G over time is presented on Chart 2, Appendix C.
- Benzene was detected in Wells MW-1 (520 ug/l) and MW-6 (470 ug/l). The concentration of benzene over time is presented on Chart 3, Appendix C.
- MTBE was detected in Wells MW-1 (360 ug/l) and MW-6 (9,600 ug/l) by the analytical method EPA 8020. Confirmation of the MTBE concentration was performed using EPA Method 8260. The EPA Method 8260 analysis reported a concentration of 9,100 ug/l. The EPA Method 8260 is considered a more reliable analysis method of MTBE concentrations when gasoline interferences are present in the sample (LLNL, 1998). The EPA Method 8260 analysis results over time are presented on Chart 4, Appendix C.
- The oxygenate Tert-Amyl Methyl Ether (TAME) was detected in the EPA Method 8260 analysis of samples from Well MW-6 (1,800 ug/l).

## 4. CONCLUSIONS

Based on the information presented in this report, the following conclusions have been reached:

- Groundwater exists at approximately 17.5 feet below the ground surface.
- Groundwater flow direction is to the east.
- Groundwater samples collected at the site contained measurable concentrations of TPH-G, BTEX, or MTBE in Wells MW-1 and MW-6.
- TAME was detected in a sample from Well MW-6.

Based on the results presented in this report, PSI recommends additional groundwater monitoring be performed to determine contaminant trends. Evaluation of the trends will assist in differentiating between a one time leak event (such as might have happened during piping upgrade work) and an ongoing source. It is noted that the Alcopark tank leak monitoring system has not indicated the occurrence of a tank or piping leak (Freitag, personal communication, 1998). At this time, PSI does not recommend further drilling to investigate the extent of the groundwater plume.

## REFERENCES

GSA, 1997, Request For Proposal (RFP) for Groundwater Services, December 2.

HCSA, 1997a, Workplan Request Letter to Mr. Rodman Freitag, September 11.

HCSA, 1997b, Continuation of Groundwater Monitoring Request, Letter to Mr. Jim DeVos, May 20.

HCSA, 1998, Quarterly Groundwater Monitoring Report Approval Letter, June 22.

Lawrence Livermore National Laboratory, 1995a, *Recommendations to Improve the Cleanup Process for California's Leaking Underground Fuel Tanks*, prepared for California State Water Resources Control Board, October 16.

Lawrence Livermore National Laboratory, 1995b, *California Leaking Underground Fuel Tank Historical Case Analyses*, prepared for California State Water Resources Control Board, November 16.

Lawrence Livermore National Laboratory, 1998, *An Evaluation of MTBE Impacts to California Groundwater Resources*, prepared for California State Water Resources Control Board, June 11.

Personal Communication, 1998, Mr. Rod Freitag of the Alameda General Services Agency, Discussion of the leak detection system at the Alcopark facility, April 15.

PSI 1998, Soil and Groundwater Investigation, Alcopark Fueling Facility, prepared for Alameda GSA, April 17.

PSI 1998a, Groundwater Monitoring Report, Second Quarter, 1998, Alcopark Fueling Facility, prepared for Alameda GSA, August 12.

USGS, 1980, Oakland West, California, topographic map.

**TABLE 1**  
**GROUNDWATER ELEVATION AND ANALYTICAL DATA**  
**ALCOPARK FUELING FACILITY**  
**OAKLAND, CALIFORNIA**

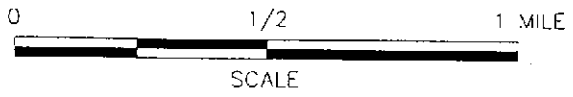
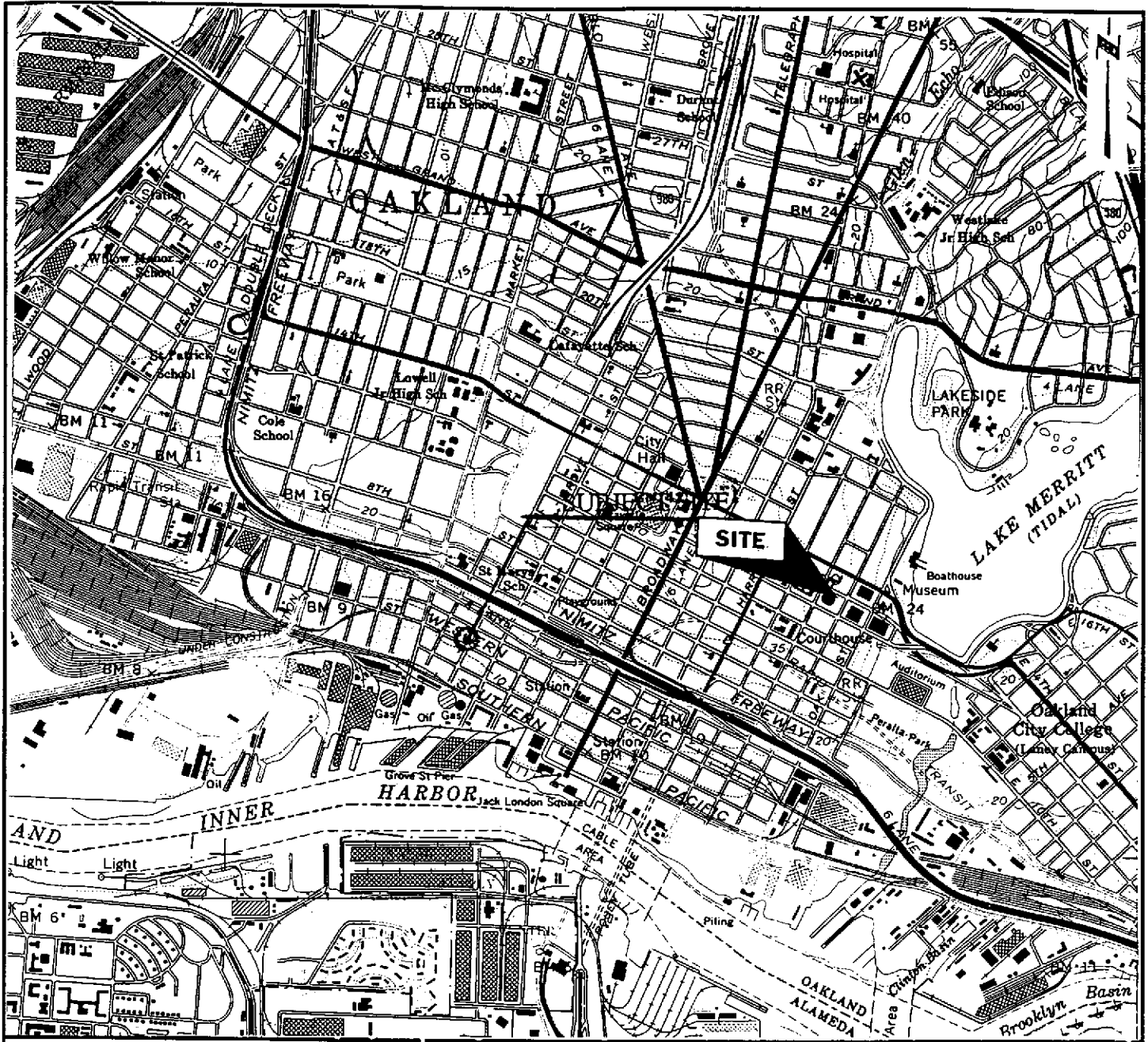
<i>All concentrations in ug/l (PPB).</i>								
Well	Date	Groundwater Elevation	TPH-G	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes
W-MW1	3/21/89	12.2	ND	NA	21	3.9	0.4	4.5
W-MW1	7/26/90	12.3	1,400	NA	200	45	ND	53
W-MW1	10/25/90	12.1	1,200	NA	ND	7.3	2.2	46
W-MW1	1/25/91	11.9	270	NA	23	1.5	ND	3.1
W-MW1	4/25/91	11.8	230	NA	ND	ND	ND	ND
W-MW1	8/27/91	11.8	8,300	NA	370	64	ND	120
W-MW1	11/25/91	11.7	810	NA	9.3	ND	7.8	32
W-MW1	6/11/92	12.85	2,600	NA	810	16	21	42
W-MW1	7/16/97	14.36	19,000	ND (150)	1,400	2,800	500	2,600
W-MW1	10/21/97	13.92	14,000	29	1,200	1,000	590	2,800
W-MW1	3/11/98	17.14	NS	NS	NS	NS	NS	NS
W-MW1	4/1/98	17.14	ND (50)	6.3	5.4	ND (0.5)	ND (0.5)	0.82
W-MW1	7/15/98	16.41	71	57	31	ND (0.5)	ND (0.5)	3.1
W-MW1	10/22/98	15.62	5,100	360	520	140	250	950
W-MW4	3/21/89	12.4	ND	NA	13	1.4	1.0	ND
W-MW4	7/26/90	12.5	NA	NA	0.8	ND	ND	ND
W-MW4	10/25/90	12.2	NA	NA	120	1.2	1.1	0.9
W-MW4	1/25/91	12.0	NA	NA	230	2.8	1.2	2.0
W-MW4	4/25/91	13.0	170	NA	12	ND	ND	2.3
W-MW4	8/27/91	11.8	ND	NA	87	1.3	0.8	0.8
W-MW4	11/25/91	11.8	1,400	NA	ND	1.7	8.6	3.6
W-MW4	6/11/92	12.93	560	NA	150	1.8	1.8	1.1
W-MW4	7/16/97	14.46	50	ND	ND	ND	ND	ND
W-MW4	10/21/97	14.10	ND	ND	ND	ND	ND	ND
W-MW4	3/11/98	17.39	NS	NS	NS	NS	NS	NS
W-MW4	4/1/98	17.40	ND (50)	ND (5.0)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
W-MW4	7/15/98	16.92	ND (50)	ND (5.0)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
W-MW4	10/22/98	15.75	ND (50)	ND (5.0)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
W-MW5	3/21/89	12.2	ND	NA	ND	ND	ND	ND
W-MW5	7/26/90	12.4	670	NA	0.8	ND	ND	ND
W-MW5	10/25/90	12.1	120	NA	13	ND	ND	ND
W-MW5	1/25/91	11.9	120	NA	3.2	ND	ND	ND
W-MW5	4/25/91	12.3	ND	NA	ND	ND	ND	ND
W-MW5	8/27/91	11.5	ND	NA	20	ND	0.5	ND
W-MW5	11/25/91	11.7	190	NA	2.7	ND	0.8	2.5
W-MW5	6/11/92	12.85	150	NA	37	ND	ND	ND
W-MW5	7/16/97	14.33	ND	22	ND	ND	ND	ND
W-MW5	10/21/97	13.88	ND	14	ND	ND	ND	ND
W-MW5	3/11/98	17.14	NS	NS	NS	NS	NS	NS
W-MW5	4/1/98	17.14	ND (50)	11	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
W-MW5	7/15/98	16.43	ND (50)	ND (5.0)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
W-MW5	10/22/98	15.60	ND (50)	ND (5.0)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)

**TABLE 1  
GROUNDWATER ELEVATION AND ANALYTICAL DATA  
ALCOPARK FUELING FACILITY  
OAKLAND, CALIFORNIA**


<i>All concentrations in ug/l (PPB).</i>								
Well	Date	Groundwater Elevation	TPH-G	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes
W-MW6	4/1/98	NA	740	4,600	9.8	3.2	3.0	15
W-MW6	7/15/98	NA	6,200	11,000	280	43	180	350
W-MW6	7/15/98	NA	NA	13,000	<i>ND (500)</i>	<i>ND (500)</i>	<i>ND (500)</i>	<i>ND (500)</i>
W-MW6	10/22/98	NA	4,700	9,600	450	13	200	200
W-MW6	10/22/98	NA	NA	9,100	470	<i>ND (250)</i>	<i>ND (250)</i>	<i>ND (250)</i>
W-B1	3/23/98	NA	3,100	4,200	250	18	160	290

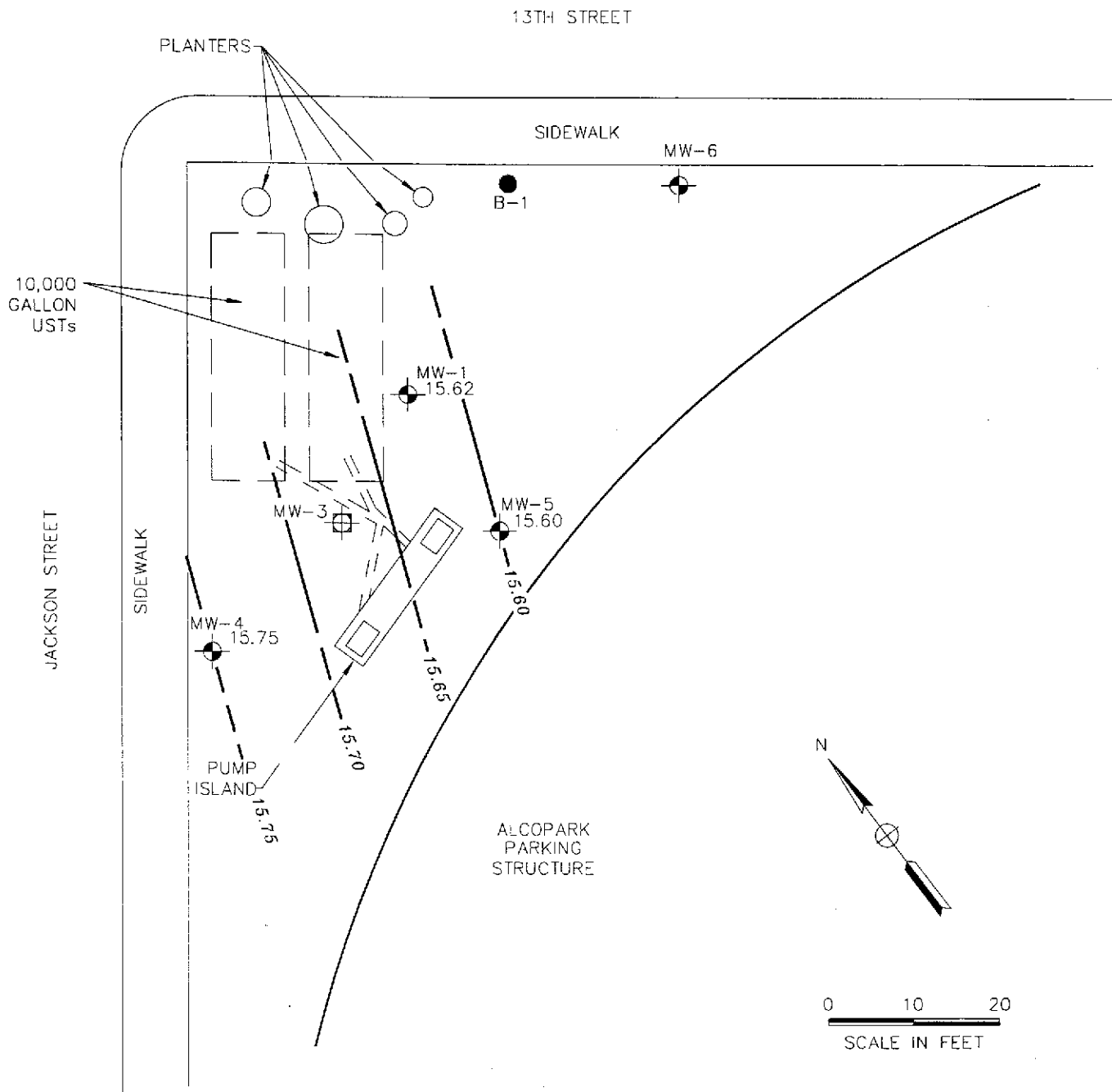
**Notes:**

TPH-G denotes Total Petroleum Hydrocarbons as Gasoline. MTBE denotes Methyl tert-Butyl Ether.  
 NA denotes Not Analyzed. NS denotes Not Sampled. ND denotes Not Detected. ( ) denotes detection limit.  
 Data collected prior to 1998 was reported in Alameda County Request for Proposal dated December 2, 1997.  
 Duplicate results presented in italics performed by EPA method 8260.



REFERENCE:  
 U.S.G.S. OAKLAND WEST, CALIFORNIA, 1959  
 PHOTOREVISED 1980

 <b>ENVIRONMENTAL          GEOTECHNICAL          CONSTRUCTION</b> CONSULTING • ENGINEERING • TESTING		
SITE LOCATION ALCOPARK FUELING STATION 185 13TH STREET OAKLAND, CALIFORNIA PROJECT NUMBER: 575-80004		
DATE: 1/14/98	CKD BY: <i>AD</i>	FIGURE NO. 1
FILE NO: 80004 -1		DRAWN BY: S.BOWERS



LEGEND

- MW-1 GROUNDWATER MONITORING WELL
- MW-3 VADOSE MONITORING WELL LOCATION
- B-1 SOIL BORING
- == UNDERGROUND PIPING
- - - - LINE OF EQUAL GROUNDWATER ELEVATION



GROUNDWATER ELEVATION MAP - 10/22/98  
 ALCOPARK FUELING STATION  
 165 13TH STREET  
 OAKLAND, CALIFORNIA  
 PROJECT NUMBER: 575-8G004

DATE: 11/6/98	CKD BY: TO	FIGURE NO.: 2
FILE NO: 8G004-2		DRAWN BY: S.BOWERS

**APPENDIX A**

**GROUNDWATER SAMPLING FIELD PROCEDURES**



## APPENDIX A

### GROUND-WATER SAMPLING

The following procedures will be used for ground water sampling:

1. All equipment shall be 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 wells, depth-to-water will be measured using an electronic sounder with an accuracy of approximately 0.01 foot. The measurements will be made to the top of the well casing on the north side.
4. Free floating product thickness and depth-to-ground water will be measured in wells containing free floating product using a Solinst oil-water interface probe to an accuracy of approximately 0.003 meters (0.01 foot). The measurements will be made to the top of the well casing on the north side.
5. Water samples will be collected with a Teflon disposable bailer. In the case of grab groundwater sampling, samples will be collected with a disposable Teflon lined plastic tube equipped with a check valve. The water collected will be immediately decanted into laboratory-supplied vials and bottles. The containers will be overfilled, capped, labeled, and placed in a chilled cooler, prior to delivery to the laboratory for analysis.
6. Chain of custody procedures, including chain of custody forms, will be used to document water sample handling and transport from collection to delivery to the laboratory for analysis.
7. Ground-water samples will be delivered to a State-certified hazardous waste laboratory within approximately 24 hours of collection.

**APPENDIX B**

**LABORATORY REPORT AND CHAIN OF CUSTODY**



McCAMPBELL ANALYTICAL INC.

110 Second Avenue South, #D7, Pacheco, CA 94553  
Telephone : 925-798-1620 Fax : 925-798-1622  
<http://www.mccampbell.com> E-mail: [main@mccampbell.com](mailto:main@mccampbell.com)

Professional Service Industries 1320 West Winton Avenue Hayward, CA 94545	Client Project ID: Alco Park	Date Sampled: 10/22/98
		Date Received: 10/22/98
	Client Contact: Tim O'Brien	Date Extracted: 10/22/98
	Client P.O:	Date Analyzed: 10/22/98

10/29/98

Dear Tim:

Enclosed are:

- 1). the results of 4 samples from your **Alco Park** project,
- 2). a QC report for the above samples
- 3). a copy of the chain of custody, and
- 4). a bill for analytical services.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits. If you have any questions please contact me. McCampbell Analytical Laboratories strives for excellence in quality, service and cost. Thank you for your business and I look forward to working with you again.

Yours truly,

Edward Hamilton, Lab Director



McCAMPBELL ANALYTICAL INC.

110 Second Avenue South, #D7, Pacheco, CA 94553  
 Telephone : 925-798-1620 Fax : 925-798-1622  
<http://www.mccampbell.com> E-mail: main@mccampbell.com

Professional Service Industries 1320 West Winton Avenue Hayward, CA 94545	Client Project ID: Alco Park	Date Sampled: 10/22/98
		Date Received: 10/22/98
	Client Contact: Tim O'Brien	Date Extracted: 10/27/98
	Client P.O:	Date Analyzed: 10/28-10/29/98

**Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline\*, with Methyl tert-Butyl Ether\* & BTEX\***

EPA methods 5030, modified 8015, and 8020 or 602; California RWQCB (SF Bay Region) method GCFID(5030)

Lab ID	Client ID	Matrix	TPH(g) <sup>+</sup>	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	% Recovery Surrogate
97583	MW-4	W	ND	ND	ND	ND	ND	ND	106
97584	MW-5	W	ND	ND	ND	ND	ND	ND	96
97585	MW-1	W	5100,a	360	520	140	250	950	93
97586	MW-6	W	4700,a	9600	450	13	200	200	101
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit	W		50 ug/L	5.0	0.5	0.5	0.5	0.5	
	S		1.0 mg/kg	0.05	0.005	0.005	0.005	0.005	

\* water and vapor samples are reported in ug/L, wipe samples in ug/wipe, soil and sludge samples in mg/kg, and all TCLP and SPLP extracts in ug/L

\* cluttered chromatogram; sample peak coelutes with surrogate peak

\*The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified gasoline is significant; b) heavier gasoline range compounds are significant(aged gasoline?); c) lighter gasoline range compounds (the most mobile fraction) are significant; d) gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline?; e) TPH pattern that does not appear to be derived from gasoline (?); f) one to a few isolated peaks present; g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~5 vol. % sediment; j) no recognizable pattern.



McCAMPBELL ANALYTICAL INC.

110 Second Avenue South, #D7, Pacheco, CA 94553

Telephone : 925-798-1620 Fax : 925-798-1622

http://www.mccampbell.com E-mail: main@mccampbell.com

Professional Service Industries 1320 West Winton Avenue Hayward, CA 94545	Client Project ID: Alco Park	Date Sampled: 10/22/98
		Date Received: 10/22/98
	Client Contact: Tim O'Brien	Date Extracted: 10/30/98
	Client P.O:	Date Analyzed: 10/30/98

**Volatile Organics By GC/MS**

EPA method 8260

Lab ID	97586		
Client ID	MW-6		
Matrix	W		
Compound	Concentration*	Compound	Concentration*
Acetone <sup>(b)</sup>	ND<850	Ethylbenzene	ND<250
Benzene	470	Hexachlorobutadiene	ND<250
Bromobenzene	ND<250	Iodomethane	ND<250
Bromochloromethane	ND<250	Isopropylbenzene	ND<250
Bromodichloromethane	ND<250	p-Isopropyl toluene	ND<250
Bromoform	ND<250	Methyl butyl ketone <sup>(d)</sup>	ND<250
Bromomethane	ND<250	Methylene Chloride <sup>(e)</sup>	ND<250
n-Butyl benzene	ND<250	Methyl ethyl ketone <sup>(f)</sup>	ND<250
sec-Butyl benzene	ND<250	Methyl isobutyl ketone <sup>(g)</sup>	ND<250
tert-Butyl benzene	ND<250	Methyl tert-Butyl Ether (MTBE)	---
Carbon Disulfide	ND<250	Napthalene	ND<250
Carbon Tetrachloride	ND<250	n-Propyl benzene	ND<250
Chlorobenzene	ND<250	Styrene <sup>(h)</sup>	ND<250
Chloroethane	ND<250	1,1,1,2-Tetrachloroethane	ND<250
2-Chloroethyl Vinyl Ether <sup>(i)</sup>	ND<250	1,1,2,2-Tetrachloroethane	ND<250
Chloroform	ND<250	Tetrachloroethene	ND<250
Chloromethane	ND<250	Toluene <sup>(j)</sup>	ND<250
2-Chlorotoluene	ND<250	1,2,3-Trichlorobenzene	ND<250
4-Chlorotoluene	ND<250	1,2,4-Trichlorobenzene	ND<250
Dibromochloromethane	ND<250	1,1,1-Trichloroethane	ND<250
1,2-Dibromo-3-chloropropane	ND<250	1,1,2-Trichloroethane	ND<250
Dibromomethane	ND<250	Trichloroethene	ND<250
1,2-Dichlorobenzene	ND<250	Trichlorofluoromethane	ND<250
1,3-Dichlorobenzene	ND<250	1,2,3-Trichloropropane	ND<250
1,4-Dichlorobenzene	ND<250	1,2,4-Trimethylbenzene	ND<250
Dichlorodifluoromethane	ND<250	1,3,5-Trimethylbenzene	ND<250
1,1-Dichloroethane	ND<250	Vinyl Acetate <sup>(k)</sup>	ND<250
1,2-Dichloroethane	ND<250	Vinyl Chloride <sup>(l)</sup>	ND<250
1,1-Dichloroethene	ND<250	Xylenes, total <sup>(m)</sup>	ND<250
cis-1,2-Dichloroethene	ND<250		
trans-1,2-Dichloroethene	ND<250		
1,2-Dichloropropane	ND<250		
1,3-Dichloropropane	ND<250		
2,2-Dichloropropane	ND<250	<b>Comments: Reporting limit raised due to high oxygenate content.</b>	
1,1-Dichloropropene	ND<250	<b>Surrogate Recoveries (%)</b>	
cis-1,3-Dichloropropene	ND<250	Dibromofluoromethane	98
trans-1,3-Dichloropropene	ND<250	Toluene-d8	105
Ethylene dibromide	ND<250	4-Bromofluorobenzene	98

\*water and vapor samples are reported in ug/L, soil and sludge samples in ug/kg, wipes in ug/wipe and all TCLP / SPLP extracts in ug/L  
Reporting limits unless otherwise stated: water samples 1.0 ug/L; vapor samples 0.5 ug/L; solid and sludge samples 5 ug/kg; wipes 0.2ug/wipe ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis  
(b) 2-propanone or dimethyl ketone; (c) (2-chloroethoxy) ethene; (d) 2-hexanone; (e) dichloromethane; (f) 2-butanone; (g) 4-methyl-2-pentanone or isopropylacetone; (h) lighter than water immiscible sheen is present; (i) liquid sample that contains greater than ~5 vol. % sediment; (j) sample diluted due to high organic content; (k) peaks present in this carbon range do not match the pattern of our standard for this analyte; (l) methylbenzene; (m) acetic acid ethenyl ester; (n) chloroethene; (o) dimethylbenzenes.



McCAMPBELL ANALYTICAL INC.

110 Second Avenue South, #D7, Pacheco, CA 94553  
 Telephone : 925-798-1620 Fax : 925-798-1622  
<http://www.mccampbell.com> E-mail: [main@mccampbell.com](mailto:main@mccampbell.com)

Professional Service Industries 1320 West Winton Avenue Hayward, CA 94545	Client Project ID: Alco Park	Date Sampled: 10/22/98
		Date Received: 10/22/98
	Client Contact: Tim O'Brien	Date Extracted: 10/30/98
	Client P.O:	Date Analyzed: 10/30/98

**Oxygenated Volatile Organics By GC/MS**

EPA method 8260 modified

Lab ID	97586				Reporting Limit	
Client ID	MW-6					
Matrix	W				S	W
Compound	Concentration*				ug/kg	ug/L
Di-isopropyl Ether (DIPE)	ND<250				5.0	1.0
Ethyl tert-Butyl Ether (ETBE)	ND<250				5.0	1.0
Methyl-tert Butyl Ether (MTBE)	9100				5.0	1.0
tert-Amyl Methyl Ether (TAME)	1800				5.0	1.0
tert-Butanol	ND<1300				25	5.0

**Surrogate Recoveries (%)**

Dibromofluoromethane	98					
Comments:						

\* water samples are reported in ug/L, soil and sludge samples in ug/kg, wipes in ug/wipe and all TCLP / STLC / SPLP extracts in ug/L  
 ND means not detected above the reporting limit; N/A means surrogate not applicable to this analysis  
 (h) lighter than water immiscible sheen is present; (i) liquid sample that contains greater than ~5 vol. % sediment; (j) sample diluted due to high organic content

## QC REPORT FOR HYDROCARBON ANALYSES

Date: 10/28/98-10/29/98

Matrix: WATER

Analyte	Concentration (mg/L)			Amount Spiked	% Recovery		RPD
	Sample (#97577)	MS	MSD		MS	MSD	
TPH (gas)	0.0	93.9	93.1	100.0	93.9	93.1	0.8
Benzene	0.0	9.7	9.8	10.0	97.0	98.0	1.0
Toluene	0.0	9.9	10.1	10.0	99.0	101.0	2.0
Ethyl Benzene	0.0	10.1	10.1	10.0	101.0	101.0	0.0
Xylenes	0.0	30.5	30.8	30.0	101.7	102.7	1.0
TPH(diesel)	0.0	164	169	150	110	113	2.9
TRPH (oil & grease)	0	25200	26600	23700	106	112	5.4

$$\% \text{ Rec.} = (\text{MS} - \text{Sample}) / \text{amount spiked} \times 100$$

$$\text{RPD} = (\text{MS} - \text{MSD}) / (\text{MS} + \text{MSD}) \times 2 \times 100$$

## QC REPORT FOR VOCs (EPA 8240/8260 )

Date: 10/29/98-10/30/98

Matrix: WATER

Analyte	Concentration (ug/kg, u Sample			Amount Spiked	% Recovery		RPD
	MS	MSD			MS	MSD	
1,1-Dichloroethe	0	115	122	100	115	122	5.9
Trichloroethene	0	94	96	100	94	96	2.1
EDB	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chlorobenzene	0	95	96	100	95	96	1.0
Benzene	0	101	105	100	101	105	3.9
Toluene	0	107	110	100	107	110	2.8

\* Rec. = (MS - Sample) / amount spiked x 100

RPD = (MS - MSD) / (MS + MSD) x 2 x 100





**APPENDIX C**

**ANALYTICAL DATA CHARTS**

CHART 1  
GROUNDWATER ELEVATION  
ALCOPARK FUELING FACILITY  
OAKLAND, CALIFORNIA

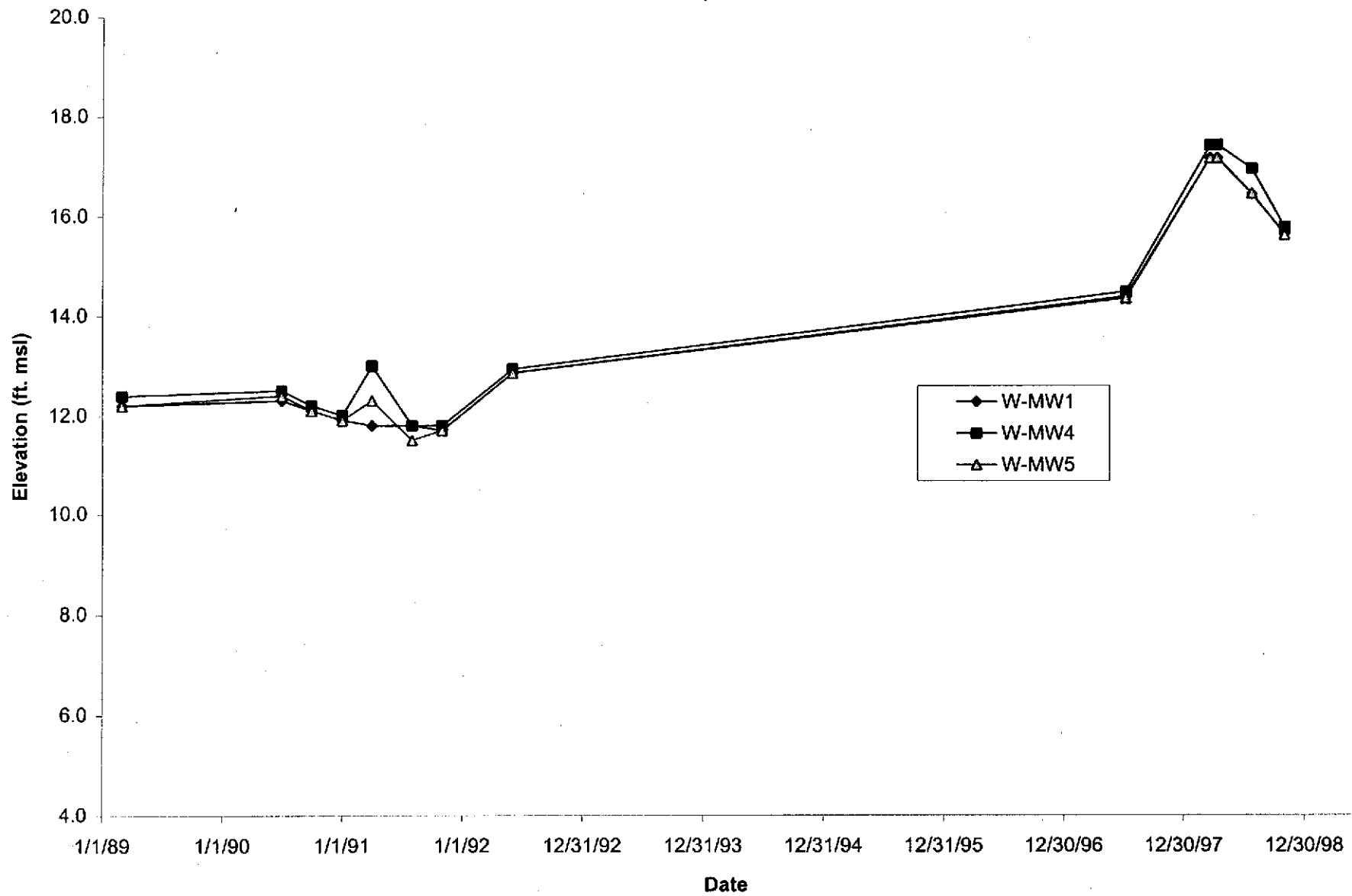


CHART 2  
 TOTAL PETROLEUM CONCENTRATIONS  
 ALCOPARK FUELING FACILITY  
 OAKLAND, CALIFORNIA

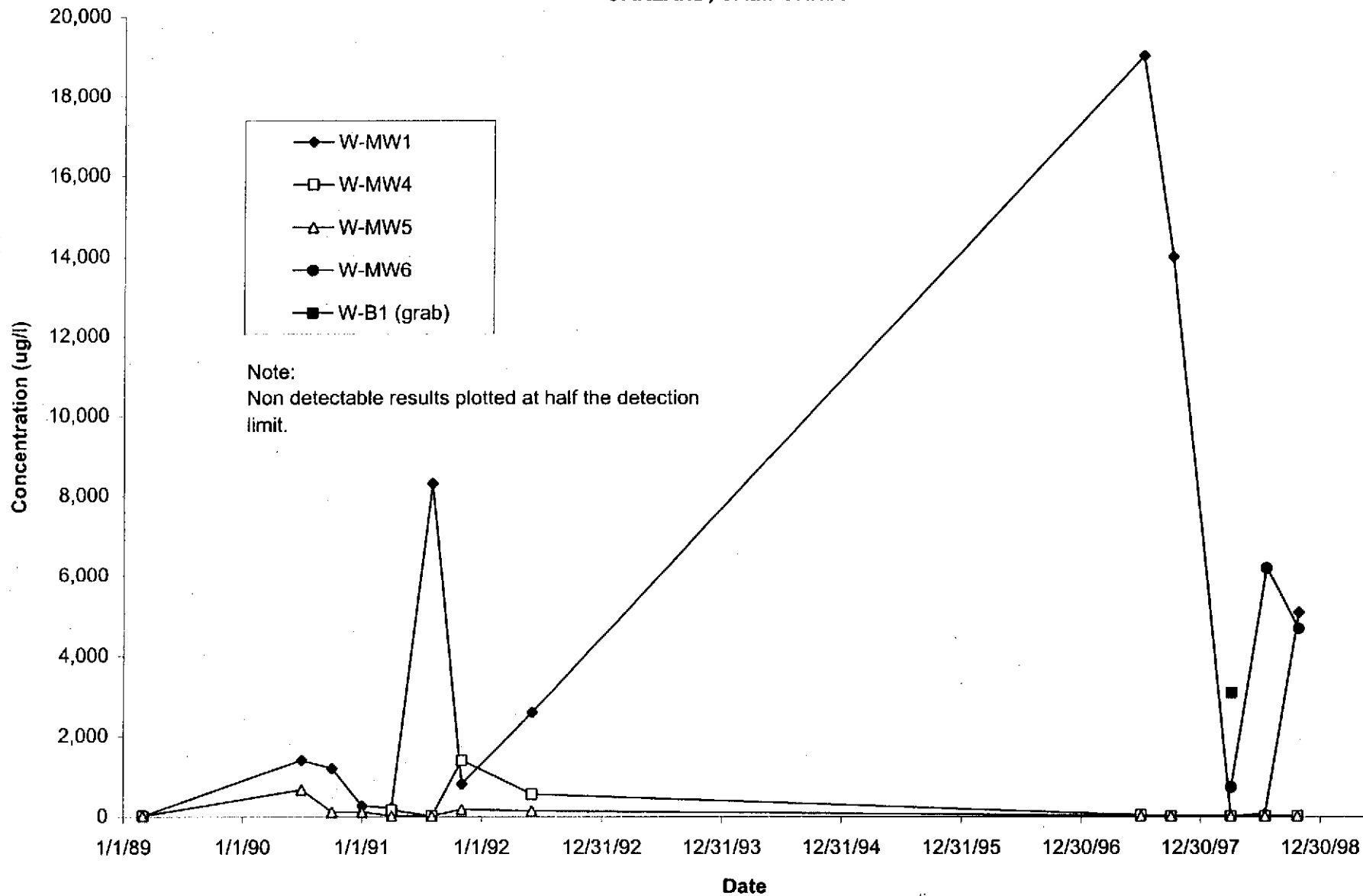
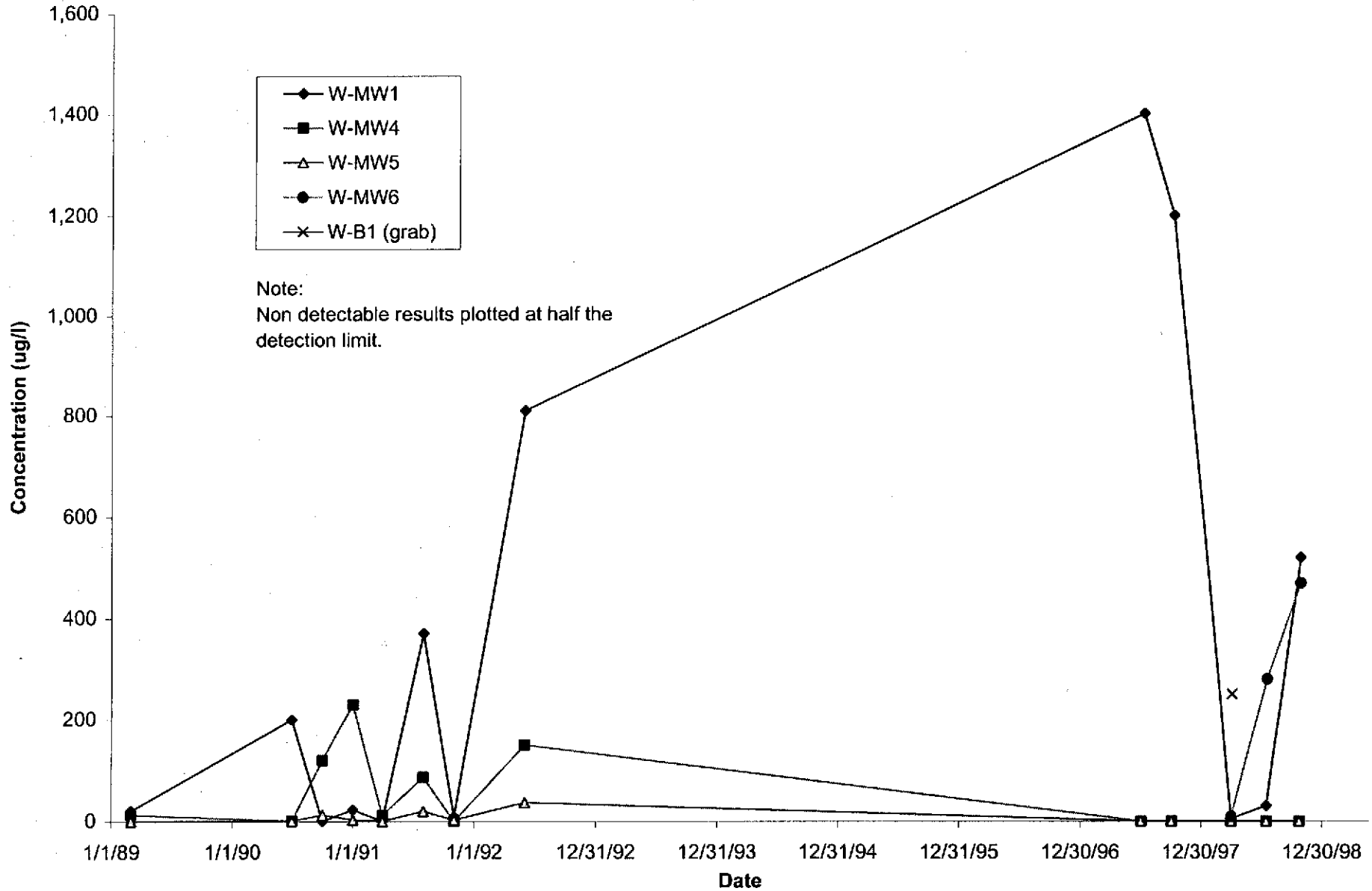


CHART 3  
 BENZENE CONCENTRATIONS  
 ALCOPARK FUELING FACILITY  
 OAKLAND, CALIFORNIA



Note:  
 Non detectable results plotted at half the  
 detection limit.

CHART 4  
MTBE CONCENTRATIONS  
ALCOPARK FUELING FACILITY  
OAKLAND, CALIFORNIA

