FINAL REPORT
SOIL AND GROUNDWATER INVESTIGATION
ALCOPARK FUELING FACILITY
OAKLAND, CALIFORNIA

April 1998

prepared for

ALAMEDA COUNTY GENERAL SERVICES AGENCY
1401 Lakeside Drive, 11th Floor
Oakland, California

prepared by

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

April 17, 1998
575-8G004

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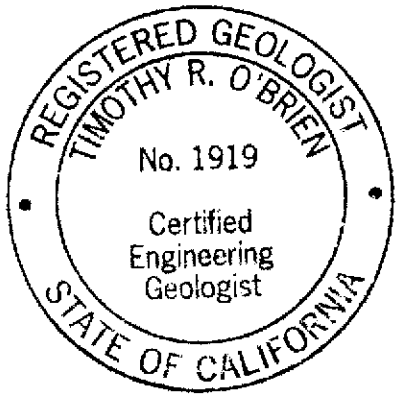
STATEMENT OF LIMITATIONS AND PROFESSIONAL CERTIFICATION

Information provided in this report, prepared by Professional Service Industries, Inc. (PSI), is intended exclusively for the use of County of Alameda, General Services Agency 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 GSA 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 County of Alameda General Services Agency (GSA) to perform an investigation of soil and groundwater conditions at the Alcopark fueling station located at 165 13th Street, Oakland, California. The site location is presented on Figure 1.

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

1.1 SCOPE OF WORK

The scope of work consisted of the following tasks:

- Prepare a site specific Health and Safety Plan.
- Obtain groundwater levels in the existing wells to verify the groundwater gradient prior to drilling.
- Drill soil borings to collect soil and groundwater samples. Soil samples and soil cuttings were field screened for total organic vapor concentration using a photoionization detector (PID).
- Construct a groundwater monitoring well in one of the soil borings. Develop and sample the well for chemical analysis.
- Obtain groundwater samples from the three existing monitoring wells.
- Transport soil and groundwater samples to McCampbell Analytical Laboratories, a California State certified laboratory, for analysis of Total Petroleum Hydrocarbons as Gasoline (TPH-G) by EPA Method 8015M; Benzene, Toluene, Ethylbenzene, total Xylenes (BTEX) and Methyl Tertiary Butyl Ether (MTBE) by EPA Method 8020;
- Prepare a report summarizing the findings of the investigation and evaluate the groundwater plume stability.

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 the fuel dispensing island. 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 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 letter dated September 11, 1997, the HCSA directed GSA to investigate the extent and stability of the plume.

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).

1.3 PROJECT OBJECTIVES

The investigation was performed to assess the extent of the groundwater plume.

2. PRE-FIELD IMPLEMENTATION ACTIVITIES

Drilling permits were obtained prior to field implementation. To ensure the optimum location placement of the additional soil borings and groundwater monitoring well, the groundwater flow direction was measured.

2.1.1 Well Construction Permit Application

In accordance with well construction requirements in Alameda County, a well construction permit was obtained from the Alameda County Public Works Department. A copy of the permit is included in Appendix A.

2.1.2 Preparation of Site Specific Health and Safety Plan

Prior to the commencement of field activities at the site, a site-specific Health and Safety Plan (HSP) was developed in compliance with 29 CFR 1910.120. The HSP addressed the potentially hazardous materials and physical hazards that might have been encountered during field activities at the site.

2.1.3 Utility Clearance

Prior to beginning drilling activities, the boring locations were marked with white paint. The utility location service, Underground Service Alert (USA), was notified of the drilling schedule 72 hours prior to implementation. In addition, the boring locations were cleared by a private underground utility locating service.

2.1.4 Groundwater Flow Direction

Depth to water measurements were collected on March 11, 1998, using an electric water level sounder. The depth to groundwater measurements were converted to groundwater elevations and the groundwater gradient was calculated. The depth to groundwater data is presented in Table 2-1. The calculated groundwater flow direction was to the east, consistent with previous measurements.

3. SUBSURFACE INVESTIGATION

The subsurface investigation was performed to collect soil and groundwater samples and install a groundwater monitoring well to allow better interpretation of soil and groundwater conditions.

3.1 SOIL BORINGS

Two soil borings were drilled at the site on March 23, 1998 to further investigate the soil and groundwater conditions at the site. The borings were advanced far enough to allow collection of a grab groundwater sample in Boring B1 and construct a groundwater monitoring well (MW-6) in Boring B2. Because no contaminants were measured with the PID or noted by the field geologist, proposed Boring B3 was not drilled. The soil boring locations are presented on Figure 2.

Fisch Environmental Exploration Services of Valley Springs, California provided drilling services. The borings were drilled by the direct push GeoProbe drilling technique. Soil borings were logged by a PSI geologist using the Unified Soil Classification System (USCS). The work was performed under the supervision of a State of California Registered Geologist.

Soil samples were collected in plastic sample liners. Upon retrieval of the soil samples, a portion of the sample was placed in a plastic Ziplock bag, labeled, and set aside to allow the soil gas concentration in the bag to equilibrate. The steel probe of the PID was used to push through the sample bags and collect a soil gas concentration measurement. The PID measurements were recorded on the boring logs. Soil boring logs are presented in Appendix A.

3.1.1 Soil Sample Collection

One soil sample was collected from each soil boring for the chemical analyses described in Section 4.0. Because no measurable concentration of total VOCs was observed, samples for chemical analysis were selected as close to the capillary fringe as possible. In each boring the sample collected at the 14-15 foot depth interval was selected.

Soil samples were collected by cutting the interval for chemical analysis out of the plastic liners they were collected in and capping the ends with Teflon sheeting, plastic end caps, and duct tape. Samples were labeled using a permanent marking pen identifying the sampler, boring name, sample collection depth, time, and date. Collected samples were placed in a cooler containing ice and maintained under chain of custody protocol.

3.1.2 Grab Groundwater Sampling

Upon completion of the Boring B1, a grab groundwater sample was collected. The grab groundwater sample was collected using disposable polyethylene tubing equipped with a check valve lowered through the drill stem. Field work for groundwater sampling was conducted in accordance with the procedures described in Appendix B. Samples were stored in a cooler containing ice and maintained under chain of custody protocol.

Upon collection of the groundwater sample, Boring B1 was grouted with neat cement.

3.1.3 Monitoring Well Construction

A 1/2-inch, inside diameter, poly vinyl chloride well was constructed in Boring B2. The screened interval of the well was constructed to allow for the evaluation of the presence of floating product on the water table. A well construction detail is presented on Figure 3.

The screened interval of the well consists of pre-packed, factory milled 0.020-inch slots. A one-foot bentonite transition seal was placed above the sandpack, and neat cement grout fills the annular space to the surface. A tamper resistant wellhead cover was set in concrete slightly above grade to minimize surface water ponding.

3.1.4 Well Development

The well grout was allowed to cure for at least 48 hours. The well was developed by surging and pumping. Groundwater parameters temperature and electrical conductivity were monitored as development progressed to determine when equilibrium conditions are reached. Development water was stored on-site in labeled DOT approved drums. The well development log is included in Appendix C.

3.2 MONITORING WELL SAMPLING

The three existing monitoring wells (Wells MW-1, MW-4, and MW-5), and the new well installed by PSI (Well MW-6) were sampled by a PSI technician on April 1, 1998. The samples were collected and preserved as described in the field procedures presented in Appendix B. The samples were chemically analyzed as described in Section 4.0.

3.2.1 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 April 1, 1998. The map is presented as Figure 2.

Interpretation of the groundwater elevation map indicates the groundwater is flowing to the east under a hydraulic gradient of approximately 0.007 foot per foot. Chart 1, Appendix D, presents groundwater elevation over time.

3.2.2 Groundwater Well Sample Procedures

The monitoring wells were sampled without purging as requested in the ACHS letter dated September 11, 1997. Groundwater samples were collected with disposable polyethylene tubing equipped with a check valve. Groundwater samples were collected according to PSI's standard protocol, included in Appendix B and were stored in an ice chest at 4 degrees Celsius and maintained under chain of custody protocol.

To minimize the possibility of contaminant cross-contamination between sampling locations, most of the sampling equipment used is disposable. To further minimize the possibility of cross-contamination, all re-usable sampling equipment was cleaned with a non-phosphate detergent and rinsed twice with deionized water prior to use at a new sampling location.

4. LABORATORY ANALYSIS PROGRAM

The soil and 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 types of analyses and analytical methods is presented below.

All soil and 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.

The samples were transported to the laboratory under chain of custody protocol. Copies of the chain of custody forms are included in Appendix C.

4.1 ANALYTICAL RESULTS DISCUSSION

Soil and groundwater samples were collected and chemically analyzed in accordance with the approved work plan for the investigation. The following discussion describes the chemical analysis results. The data is summarized in Tables 2-1 and 2-2. Laboratory reports are presented in Appendix C.

Analytical results did not indicate concentrations of TPH-G, BTEX, or MTBE exist in the soil sampled in this investigation. The analytical report is summarized in Table 2-2.

Analytical results revealed measurable concentrations of TPH-G, MTBE, and BTEX constituents in groundwater at the site. The analytical report is summarized in Table 2-1.

TPH-G concentrations in Well MW-1 have decreased dramatically since the sample events performed in 1997. The groundwater samples collected from downgradient locations Boring B1 and Well MW-6 contained moderate concentrations of TPH-G. TPH-G was not detected in samples from Wells MW-4 or MW-5. Chart 2, Appendix D presents TPH-G concentrations over time.

MTBE concentrations in Wells MW-1 (6.3 ug/l), MW-4 (ND [5.0 ug/l]), MW-5 (11 ug/l) were slightly lower and consistent with former measurements. MTBE was measured in groundwater samples collected from downgradient location Boring B1 (4,200 ug/l) and Well MW-6 (4,600 ug/l).

Benzene concentrations in groundwater decreased dramatically since the sample events performed in 1997. Benzene concentrations were measured in groundwater samples collected from downgradient locations Boring B1 (250 ug/l) and Well MW-6 (9.8 ug/l). Chart 3, Appendix D, presents benzene concentrations over time.

5. CONCLUSIONS

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

- Site soils consists of clay and sand mixtures. Groundwater exists in an unconfined condition approximately 16 feet bgs.
- Groundwater flow direction is to the east under a gradient of 0.007 foot per foot.
- Elevated concentrations of TPH-G, MTBE, and BTEX exist in site groundwater downgradient of the tank pit.
- Soil samples collected from the capillary fringe did not contain detectable TPH-G, MTBE, or BTEX.

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, RFP for Groundwater Investigation 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 De Vos, May 20.

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

USGS, 1980, Oakland West, California topographic map.

TABLE 2-1
GROUNDWATER ELEVATION AND ANALYTICAL DATA
ALCOPARK FUELING FACILITY
OAKLAND, CALIFORNIA

All concentrations in ug/l (PPB).

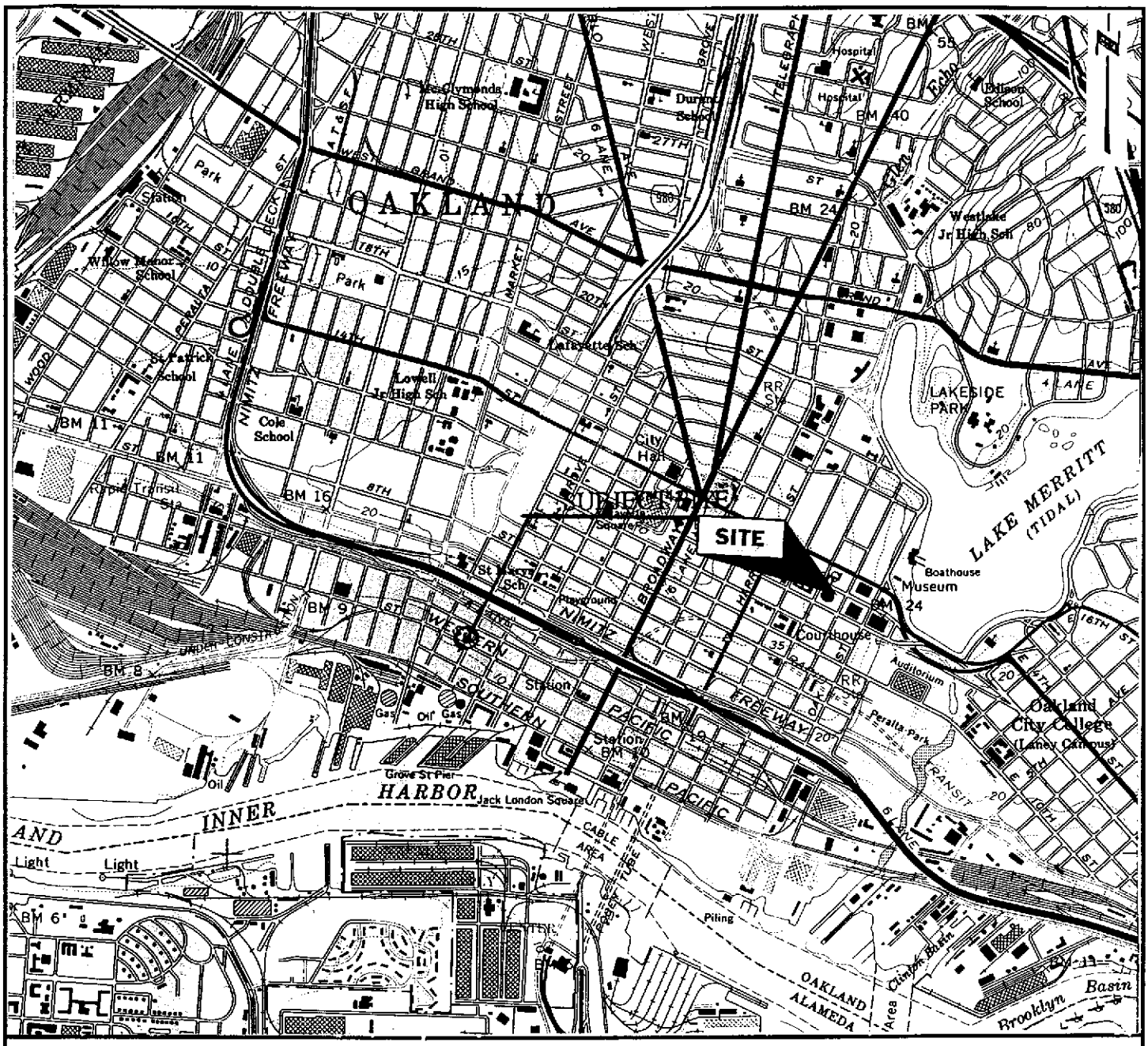
Well	Date	Groundwater Elevation	TPH-G	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes
W-MW1	3/21/89	12.2	ND	NA	21	3.9	0.4	4.5
W-MW1	7/26/90	12.3	1,400	NA	200	45	ND	53
W-MW1	10/25/90	12.1	1,200	NA	ND	7.3	2.2	46
W-MW1	1/25/91	11.9	270	NA	23	1.5	ND	3.1
W-MW1	4/25/91	11.8	230	NA	ND	ND	ND	ND
W-MW1	8/27/91	11.8	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-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-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-MW6	4/1/98	NA	740	4,600	9.8	3.2	3.0	15
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.

TABLE 2-2
SUMMARY OF SOIL SAMPLE ANALYTICAL DATA
ALCOPARK FUELING FACILITY
OAKLAND, CALIFORNIA

	All concentrations in ug/kg (PPB).					
	TPH-G	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes
SB-1-14'	ND (1,000)	ND (50)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)
SB-2-14'	ND (1,000)	ND (50)	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)

Notes:
TPH-G denotes Total Petroleum Hydrocarbons as Gasoline
MTBE denotes Methyl tert-Butyl Ether
ND denotes not detected (detection limit shown in parentheses).



0 1/2 1 MILE

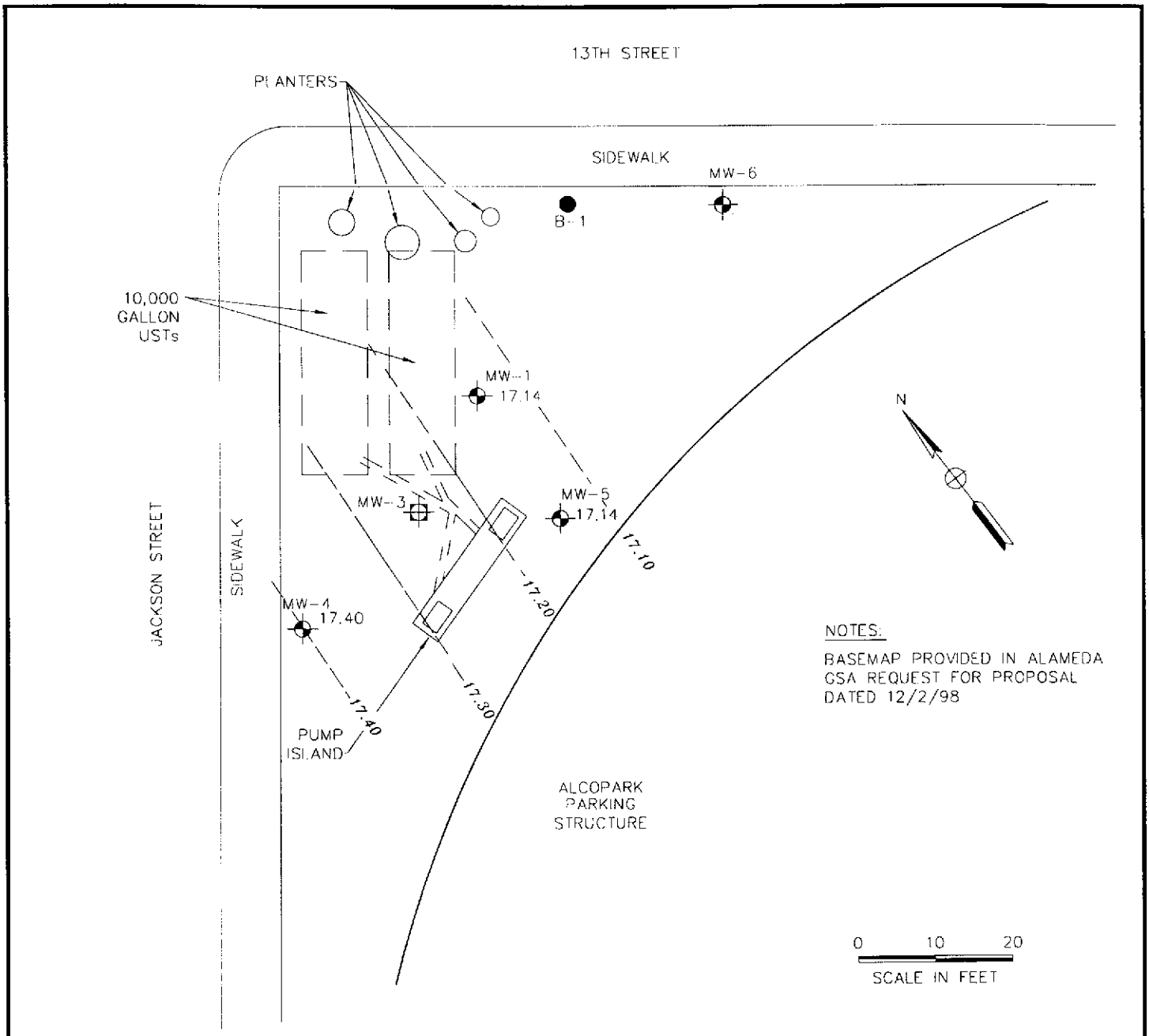
SCALE

REFERENCE:
U.S.G.S. OAKLANDWEST, CALIFORNIA, 1959
PHOTOREVISED 1980

psi ENVIRONMENTAL GEOTECHNICAL CONSTRUCTION
CONSULTING • ENGINEERING • TESTING

SITE LOCATION
ALCOPARK FUELING STATION
165 13TH STREET
OAKLAND, CALIFORNIA
PROJECT NUMBER: 575-8G004

DATE: 1/14/98	CKD BY:	FIGURE NO: 1
FILE NO: 8G004 -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

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CONSULTING • ENGINEERING • TESTING

GROUNDWATER ELEVATION MAP – 4/1/98
ALCOPARK FUELING STATION
165 13TH STREET
OAKLAND, CALIFORNIA
PROJECT NUMBER: 575-8G004

DATE: 1/13/98	CKD BY: JO	FIGURE NO.: 2
FILE NO: 8G004-2		DRAWN BY: S.BOWERS

APPENDIX A

DRILLING PERMIT AND SOIL BORING LOGS

ALAMEDA COUNTY PUBLIC WORKS AGENCY

WATER RESOURCES SECTION
951 TURNER COURT, SUITE 300, HAYWARD, CA 94545-2651
PHONE (510) 670-5575 ANDREAS GODFREY FAX (510) 670-5262
(510) 670-5248 ALVIN KAN

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT Alcopark Fueling Facility
1645 13th Street
Oakland, CA

California Coordinates Source _____ ft. Accuracy ± ___ ft.
CCN _____ ft. CCE _____ ft.
APN _____

CLIENT Rod Freitag, P.E.
Name Alameda Co., General Services Agency
Address 1401 Lakeside Dr. Phone 510 208 9532
City Oakland, CA Zip 94612

APPLICANT
Name Professional Service Industries (PSI)
Timothy R. Dixon Fax 510 785 1192
Address 1320 W. Winton Phone 510 785 1111
City Hayward, CA Zip 94545

TYPE OF PROJECT

Well Construction		Geotechnical Investigation	
Cathodic Protection	○	General	○
Water Supply	○	Contamination	X
Monitoring	X	Well Destruction	○

PROPOSED WATER SUPPLY WELL USE

New Domestic	○	Replacement Domestic	○
Municipal	○	Irrigation	○
Industrial	○	Other _____	○

DRILLING METHOD:

Mud Rotary	○	Air Rotary	○	Auger	○
Cable	○	Other	X Direct Push		

DRILLER'S LICENSE NO. 683865

WELL PROJECTS
Drill Hole Diameter 2.5" in. Maximum
Casing Diameter 1.0 in. Depth 30 ft.
Surface Seal Depth 10 ft. Number 1 GEOPROBE

GEOTECHNICAL PROJECTS
Number of Borings 2 Maximum
Hole Diameter 2.5 in. Depth 25 ft.

ESTIMATED STARTING DATE 3/16/98
ESTIMATED COMPLETION DATE 3/16/98

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE [signature] DATE 3/11/98

FOR OFFICE USE

PERMIT NUMBER 98WR116
WELL NUMBER _____
APN _____

PERMIT CONDITIONS

Circled Permit Requirements Apply

(A.) GENERAL
1. A permit application should be submitted to as to arrive at the ACPWA office five days prior to proposed starting date.
(7.) Submit to ACPWA within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well projects, or drilling logs and location sketch for geotechnical projects.
(3.) Permit is void if project not begun within 90 days of approval date.

B. WATER SUPPLY WELLS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved.

(C.) GROUNDWATER MONITORING WELLS INCLUDING PIEZOMETERS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

(D.) GEOTECHNICAL
Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.

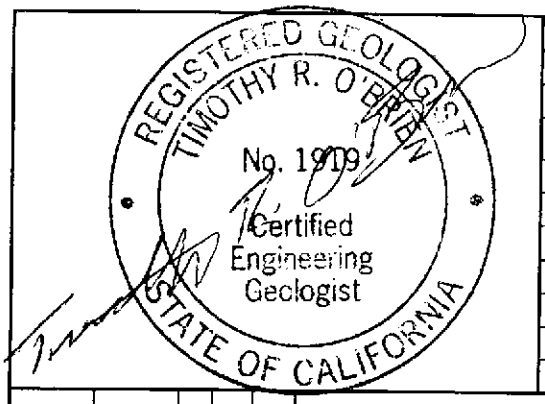
E. CATHODIC
Fill hole above anode zone with concrete placed by tremie

F. WELL DESTRUCTION
See attached.

G. SPECIAL CONDITIONS

APPROVED [signature] DATE 3/13/98

SOIL BORING LOG



BORING NO:	B2
SHEET 1 OF 2	
PROJECT NAME: ALCOPARK	PROJECT NO: 8G004
DATE: 3/23/98	
NORTHINGS:	EASTINGS:
DRILLING COMPANY:	FISCH ENVIRONMENTAL SERVICES
DRILLING METHOD:	DIRECT PUSH - GEOPROBE
BORING DIMENSIONS:	2.5 INCH DIAMETER DEPTH: 24 FT

GROUNDWATER LEVELS

DATE	COMMENTS	DEPTH BGS
3/23/98	INITIAL	19 FT
3/23/98	STABILIZED	16 FT

DEPTH (FEET)	SAMPLE NO.	RECOVERY (IN)	SAMPLE INTERVAL	BLOW COUNT	DESCRIPTION	PID (PPM)	USCS	REMARKS
1					Sand with some clay, fine to medium grained sand, brown, moist, low plasticity fines, no odor.		SP	Concrete pavement surface.
5						0		
6		22						
10						0		
11		16						
15						0		
16		19						
18								Color change to green.
19								Slight organic (sewage) odor noted.
20		16				0		
								Log continued on Sheet 2 of 2

LOGGED BY: TIM O'BRIEN

SOIL BORING LOG

BORING NO:	B2
SHEET 2	OF 2
PROJECT NAME: ALCOPARK	PROJECT NO: 8G004
DATE: 3/23/98	
NORTHINGS:	EASTINGS:
DRILLING COMPANY:	FISCH ENVIRONMENTAL SERVICES
DRILLING METHOD:	DIRECT PUSH - GEOPROBE
BORING DIMENSIONS:	2.5 INCH DIAMETER DEPTH: 24 FT

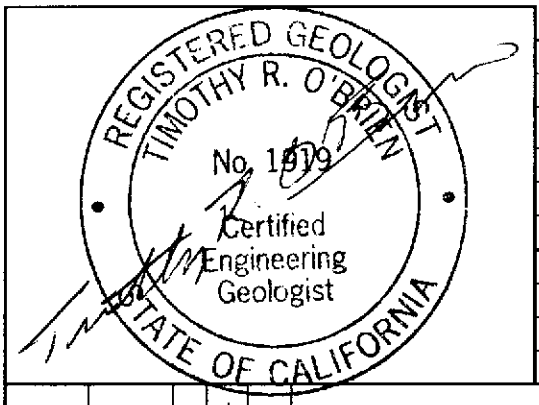
GROUNDWATER LEVELS

DATE	COMMENTS	DEPTH BGS
3/23/98	STABILIZED	16 FT

DEPTH (FEET)	SAMPLE NO.	RECOVERY (IN)	SAMPLE INTERVAL	BLOW COUNT	DESCRIPTION	PID (PPM)	USCS	REMARKS
					Sand with trace fines as described above.	0	SP	Sample interval continued from 19 ft. bgs.
21		16						
22								
23								
24								Probe refusal at 24 ft. bgs.
								Total Depth = 24 feet.
25								Boring terminated at depth of
								probe refusal.
26								Well MW-6 constructed in boring.
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								

LOGGED BY: Tim O'Brien

SOIL BORING LOG



BORING NO:	B1
SHEET 1 OF 2	
PROJECT NAME: ALCOPARK	PROJECT NO: 8G004
DATE: 3/23/98	
NORTHINGS:	EASTINGS:
DRILLING COMPANY:	FISCH ENVIRONMENTAL SERVICES
DRILLING METHOD:	DIRECT PUSH - GEOPROBE
BORING DIMENSIONS:	2.5 INCH DIAMETER DEPTH: 21 FT

GROUNDWATER LEVELS

DATE	COMMENTS	DEPTH BGS
3/23/98	INITIAL	19 FT
3/23/98	STABILIZED	16 FT

DEPTH (FEET)	SAMPLE NO.	RECOVERY (IN)	SAMPLE INTERVAL	BLOW COUNT	DESCRIPTION	PID (PPM)	USCS	REMARKS
0					Sand with some clay, fine to medium grained sand, tan,		SP	Concrete pavement surface.
1					moist, moderate plasticity fines, no odor.			
2								
3								
4								
5						0		
6		21						
7								
8								
9								
10					Silty sand, fine to medium grained, greenish-gray, moist,	0	SM	
11		20			low plasticity fines, no odor.			
12								
13					Sand with trace fines, fine to medium grained, tan, very moist, low plasticity fines, no odor.		SP	
14								
15								
16		22				0		
17								
18								Color change to green, moisture increase to very moist to wet.
19								Organic (sewage) odor noted.
20		23				0		Log continued on Sheet 2 of 2

LOGGED BY: TIM O'BRIEN

SOIL BORING LOG

BORING NO:	B1
SHEET 2	OF 2
PROJECT NAME: ALCOPARK	PROJECT NO: 8G004
DATE: 3/23/98	
NORTHINGS:	EASTINGS:
DRILLING COMPANY:	FISCH ENVIRONMENTAL SERVICES
DRILLING METHOD:	DIRECT PUSH - GEOPROBE
BORING DIMENSIONS:	2.5 INCH DIAMETER DEPTH:

GROUNDWATER LEVELS

DATE	COMMENTS	DEPTH BGS
3/23/98	STABILIZED	16 FT

DEPTH (FEET)	SAMPLE NO.	RECOVERY (IN)	SAMPLE INTERVAL	BLOW COUNT	DESCRIPTION	PID (PPM)	USCS	REMARKS
		23			Sand with trace fines as described above.	0	SP	Sample interval continued from 19 ft. bgs.
21								Total Depth = 21 feet.
22								Boring terminated at depth sufficient for investigation.
23								Boring grouted with neat cement.
24								
25								
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								
38								
39								
40								

LOGGED BY: Tim O'Brien

APPENDIX B

PSI STANDARD FIELD PROCEDURES

APPENDIX B
PSI STANDARD FIELD PROCEDURES

I. DRILLING OF SOIL BORINGS AND COLLECTION OF SOIL SAMPLES

The following procedures will be used for the drilling and sampling of the soil borings drilled at the site:

1. Drilling will be conducted by Fisch Environmental under the supervision of PSI. Drilling equipment will be pressure washed at the beginning of the day and between soil borings.

2. Prior to the commencement of drilling activities at the site, Underground Service Alert (USA) will be contacted to identify underground utilities in the areas that the borings will be located.

3. Boring logs for the soil borings drilled at the site will be prepared under the supervision of a State of California-registered geologist. The soil cuttings observed during drilling will be described in accordance with the Unified Soil Classification System.

4. Soil samples will be collected using a continuous core, stainless steel sampler. Undisturbed soil samples are collected by pushing the sampler into the subsurface using a hydraulic press or percussion hammer.

5. Once the sampler has been retrieved the ends of the sample tube will be covered with Teflon sheets and capped with polyethylene end caps. The sample will be labeled and placed in a zip-lock bag in a chilled cooler pending delivery to the laboratory for analysis.

6. Soil samples will be assigned identification numbers such as S-B1-12, where "S" indicates a soil sample, "B1" indicates Boring 1 and "12" indicates that the sample was collected at 12 feet bgs. The samples will be labeled with the sampling designation, depth, date, client name, and project number.

7. Continuous core barrels will be washed between sampling intervals with Alconox soap followed by two deionized-water rinses.

8. Chain of custody procedures using chain of custody forms will be used to document sample handling and transportation.

9. A photo ionization detector (PID) will be used to monitor volatile organic compounds (VOCs) in the ambient air during drilling at the site in accordance with the site health and safety plan. VOC concentrations in the soil will be measured and recorded on the borings logs for depths that soil samples were collected. VOCs in the soil will be measured at the sampling depths by punching holes in the sample tubes and

inserting the PID probe into the hole. PID measurements will be recorded on the boring log.

10. Soil cuttings and steam wash water generated during drilling activities at the site will be contained in Department of Transportation (DOT) approved drums. The drums will be labeled with the contents, date, well or boring number, client name, and project number.

II FIELD DOCUMENTATION OF SAMPLING PROCEDURES

The following outline describes the procedures adhered by PSI for proper sampling documentation.

1. Sampling procedures will be documented in a field notebook that will contain:

    1. Sample collection procedures
    2. Date and time of collection
    3. Date of shipping
    4. Sample collection location
    5. Sample identification number(s)
    6. Intended analysis
    7. Quality control samples
    8. Sample preservation
    9. Name of sampler
    10. Any pertinent observations

2. Samples will be labeled with the following information:

    1. Sample number
    2. Well number
    3. Date and time sample was collected
    4. Sampler's name
    5. Sample preservatives (if required)

3. The following is the sample designation system for the site:

    For Borings and Hand-Auger Borings the samples will be labeled B-(Boring Number)-(Depth) (i.e. sample collected from boring 4 at 0.9 meters would be B4-0.9)

    For groundwater samples (W) (Boring Number) (i.e. WB4)

3. Handling of the samples will be recorded on a chain of custody form which shall include:

1. Site name
2. Signature of Collector
3. Date and time of collection
4. Sample identification number
5. Number of containers in sample set
6. Description of sample and container
7. Name and signature of persons, and the companies or agencies they represent, who are involved in the chain of possession
8. Inclusive dates and times of possession
9. Analyses to be completed

III. 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 Solinst water-interface probe to 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 polyethylene disposable bailer. 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 C

SAMPLING LOG/ANALYTICAL REPORT/CHAIN OF CUSTODY

FLUID MEASUREMENT FIELD DATA

SHEET: 1 OF 1

DATE: 4/1/98	PROJECT NAME: Alameda Co. GSA, Alcopark fueling station		PROJECT NO: 575-8G004
WATER LEVEL MEASUREMENT INSTRUMENT:	Solinst oil/water interface probe		SERIAL NO:
PRODUCT DETECTION INSTRUMENT:	Solinst oil/water interface probe		SERIAL NO:

EQUIP. DECON: ■ ALCONOX WASH ☐ DIST/DEION 1 RINSE ☐ ISOPROPANOL ☐ ANALYTE FREE FINAL RINSE ☐ TAP WATER FINAL RINSE

☐ TAP WATER WASH ☐ LIQUINOX WASH ☐ DIST/DEION 2 RINSE ☐ OTHER SOLVENT ☐ DIST/DEION FINAL RINSE ☐ AIR DRY

WELL NUMBER	GROUND SURFACE ELEVATION	TOP OF CASING ELEVATION	DEPTH TO PRODUCT BELOW TOC	DEPTH TO WATER BELOW TOC	WELL DEPTH BELOW TOC	PRODUCT THICKNESS	WATER TABLE ELEVATION	ACTUAL TIME
MW-1	----------	33.00	----------	15.86	----------	----------	17.14	9:20
MW-4	----------	33.63	----------	16.23	----------	----------	17.40	9:10
MW-5	----------	33.01	----------	15.87	----------	----------	17.14	9:05
MW-6	----------	----------	----------	----------	20.22	----------	----------	9:25

REMEMBER TO CORRECT PRODUCT THICKNESS FOR DENSITY BEFORE CALCULATING WATER TABLE ELEVATION

PREPARED BY: Scott A. Bowers

PSI
Rev 12/95

McCAMPBELL ANALYTICAL INC.
110 Second Avenue South, #D7, Pacheco, CA 94553
Telephone : 510-798-1620 Fax : 510-798-1622
http://www.mccampbell.com E-mail: main@mccampbell.com

PSI 1320 W. Winton Ave Hayward, CA 94545	Client Project ID: Alcopark	Date Sampled: 03/23/98
		Date Received: 03/24/98
	Client Contact: Tim O'Brien	Date Extracted: 03/24/98
	Client P.O: #8G004	Date Analyzed: 03/24/98

03/31/98

Dear Tim:

Enclosed are:

1). the results of **3** samples from your **Alcopark** 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.
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http://www.mccampbell.com E-mail: main@mccampbell.com

PSI 1320 W. Winton Ave Hayward, CA 94545	Client Project ID: Alcopark	Date Sampled: 03/23/98
		Date Received: 03/24/98
	Client Contact: Tim O'Brien	Date Extracted: 03/24-03/30/98
	Client P.O: #8G004	Date Analyzed: 03/24-03/30/98

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)[+]	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	% Recovery Surrogate
87190	SB-1-14'	S	ND	ND	ND	ND	ND	ND	101
87191	SB-2-14'	S	ND	ND	ND	ND	ND	ND	98
87192	W-B1	W	3100,a,i	4200	250	18	160	290	98
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	

Need to confirm 8260 with GC/MS

* 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.

DHS Certification No. 1644

Edward Hamilton, Lab Director

McCAMPBELL ANALYTICAL INC.
110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

QC REPORT FOR HYDROCARBON ANALYSES

Date: 03/24/98-03/25/98 Matrix: WATER

Analyte	Concentration (mg/L) Sample (#87088)	MS	MSD	Amount Spiked	% Recovery MS	MSD	RPD
TPH (gas)	0.0	94.3	98.1	100.0	94.3	98.1	4.0
Benzene	0.0	10.0	10.2	10.0	100.0	102.0	2.0
Toluene	0.0	10.1	10.3	10.0	101.0	103.0	2.0
Ethyl Benzene	0.0	10.1	10.4	10.0	101.0	104.0	2.9
Xylenes	0.0	30.4	31.3	30.0	101.3	104.3	2.9
TPH(diesel)	0	168	166	150	112	111	1.1
TRPH (oil & grease)	0	24800	24200	23700	105	102	2.4

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

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

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110 2nd Avenue South, #D7, Pacheco, CA 94553
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QC REPORT FOR HYDROCARBON ANALYSES

Date: 03/30/98 Matrix: WATER

Analyte	Concentration (mg/L) Sample (#87316)	MS	MSD	Amount Spiked	% Recovery MS	MSD	RPD
TPH (gas)	0.0	99.1	99.4	100.0	99.1	99.4	0.3
Benzene	0.0	10.5	10.6	10.0	105.0	106.0	0.9
Toluene	0.0	10.6	10.7	10.0	106.0	107.0	0.9
Ethyl Benzene	0.0	10.8	10.8	10.0	108.0	108.0	0.0
Xylenes	0.0	32.6	32.9	30.0	108.7	109.7	0.9
TPH(diesel)	0	142	152	150	95	102	7.3
TRPH (oil & grease)	N/A	N/A	N/A	N/A	N/A	N/A	N/A

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

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

McCAMPBELL ANALYTICAL INC.
110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

QC REPORT FOR HYDROCARBON ANALYSES

Date: 03/23/98-03/24/98 Matrix: SOIL

Analyte	Concentration (mg/kg) Sample (#80334)	MS	MSD	Amount Spiked	% Recovery MS	MSD	RPD
TPH (gas)	0.000	2.226	2.270	2.03	110	112	2.0
Benzene	0.000	0.200	0.204	0.2	100	102	2.0
Toluene	0.000	0.208	0.208	0.2	104	104	0.0
Ethylbenzene	0.000	0.204	0.206	0.2	102	103	1.0
Xylenes	0.000	0.610	0.612	0.6	102	102	0.3
TPH(diesel)	0	294	298	300	98	99	1.1
TRPH (oil and grease)	0.0	35.1	33.5	30	117	112	4.7

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

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

McCAMPBELL ANALYTICAL INC.
110 2nd Avenue South, #D7, Pacheco, CA 94553
Tele: 510-798-1620 Fax: 510-798-1622

QC REPORT FOR HYDROCARBON ANALYSES

Date: 03/30/98 Matrix: SOIL

Analyte	Concentration (mg/kg) Sample (#80337)	MS	MSD	Amount Spiked	% Recovery MS	MSD	RPD
TPH (gas)	0.000	1.797	2.219	2.03	89	109	21.0
Benzene	0.000	0.162	0.170	0.2	81	85	4.8
Toluene	0.000	0.170	0.200	0.2	85	100	16.2
Ethylbenzene	0.000	0.164	0.182	0.2	82	91	10.4
Xylenes	0.000	0.496	0.532	0.6	83	89	7.0
TPH(diesel)	0	307	307	300	102	102	0.1
TRPH (oil and grease)	0.0	28.5	23.9	30	95	80	17.6

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

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

Pace Analytical

10791 xpsi Gold

CHAIN-OF-CUSTODY RECORD
Analytical Request

Client: Professional Service Industries
Address: 1320 W. Winton Ave
Hayward, CA 94545
Phone: 510 785 1111

Report To: Tim O'Brien
Bill To: PSI Hayward
P.O. # / Billing Reference: 8G004
Project Name / No.: Alcopark

Pace Client No.
Pace Project Manager
Pace Project No.
*Requested Due Date

Sampled By (PRINT): Tim O'Brien
Sampler Signature: Tim O'Brien
Date Sampled: 3/23/98

ITEM NO.	SAMPLE DESCRIPTION	TIME	MATRIX	PACE NO.	NO. OF CONTAINERS	PRESERVATIVES: UNPRESERVED	H_2SO_4	HNO_3	VOA	HCl	ice	ANALYSES REQUEST: TPH-G	BTEX + MTBE & 8010	REMARKS
1	SB-1-14'				1						X	X	X	
2	SB-2-14'				1						X	X	X	
+3	W-B1				5					X	X	X	X	40mL VOAs
4														
5														
6														
7														
8														

87190
87191
87192

VOAS | O&G | METALS | OTHER
PRESERVATION
PRESERVATION CORRECT/APPROPRIATE
SAMPLE LABELS
CONTAINERS

COOLER NOS.	BAILERS	SHIPMENT METHOD OUT/DATE	SHIPMENT METHOD RETURNED/DATE

ITEM NUMBER	RELINQUISHED BY / AFFILIATION	ACCEPTED BY / AFFILIATION	DATE	TIME
	Tim O'Brien D Coppock	D Coppock ACO651 [illegible]	3/24/98 3/24/98	1355 1550

Additional Comments
Normal turnaround time

SEE REVERSE SIDE FOR INSTRUCTIONS

ORIGINAL

McCAMPBELL ANALYTICAL INC.
110 Second Avenue South, #D7, Pacheco, CA 94553
Telephone : 510-798-1620 Fax : 510-798-1622
http://www.mccampbell.com E-mail: main@mccampbell.com

Professional Service Industries	Client Project ID: #8G004; Alco Park	Date Sampled: 04/01/98
1320 West Winton Avenue		Date Received: 04/02/98
Hayward, CA 94545	Client Contact: Tim O'Brien	Date Extracted: 04/04/98
	Client P.O:	Date Analyzed: 04/04/98

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)^	MTBE	Benzene	Toluene	Ethylben-zene	Xylenes	% Recovery Surrogate
87712	W-MW1	W	ND	6.3	5.4	ND	ND	0.82	92
87713	W-MW4	W	ND	ND	ND	ND	ND	ND	98
87714	W-MW5	W	ND	11	ND	ND	ND	ND	96
87715	W-MW6	W	740,a	4600	9.8	3.2	3.0	15	92
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.

DHS Certification No. 1644

Edward Hamilton, Lab Director

ace Analytical

10887xpsi5

CHAIN-OF-CUSTODY RECORD
Analytical Request

PSI
1320 W. Winton Ave
Hayward CA 94545
510 785 1111

Report To: Tim O'Brien
Bill To: Cherryhill Alameda
P.O. # / Billing Reference: County GSA
Project Name / No.: 86004/Alcoport

Pace Client No.
Pace Project Manager
Pace Project No.
*Requested Due Date:

Sampled By (PRINT): Scott Bowers
Sampler Signature
Date Sampled: 4/1/98

SAMPLE DESCRIPTION	TIME	MATRIX	PACE NO.	NO. OF CONTAINERS	PRESERVATIVES: UNPRESERVED	H_2SO_4	HNO_3	VOA	HCl	ice	ANALYSES REQUEST: TPH-G 8015 BTEX, MTBE & 8020	REMARKS
W-MW1 ✓				4					X	X	X X	877 12
W-MW4 (+)				4					X	X	X X	877 13
W-MW5 (+)				4					X	X	X X	877 14
W-MW6 5+				4					X	X	X X	877 15

COOLER NOS.	BAILERS	SHIPMENT METHOD OUT-DATE	SHIPMENT METHOD RETURNED-DATE

ITEM NUMBER	RELINQUISHED BY / AFFILIATION	ACCEPTED BY / AFFILIATION	DATE	TIME
	John Nolan 608	Dean Price	4/2/98	1215

ICE ✓
GOOD CONDITION ✓
HEAD SPACE ABSENT ✓

PRESERVATION ✓ (VOAS | O&G | METALS | OTHER)
APPROPRIATE CONTAINERS ✓

Cooler Received Sealed & Intact OK

Additional Comments:
annual turnaround
Bill ALAMEDA Co.
C: " " Rod Freitag

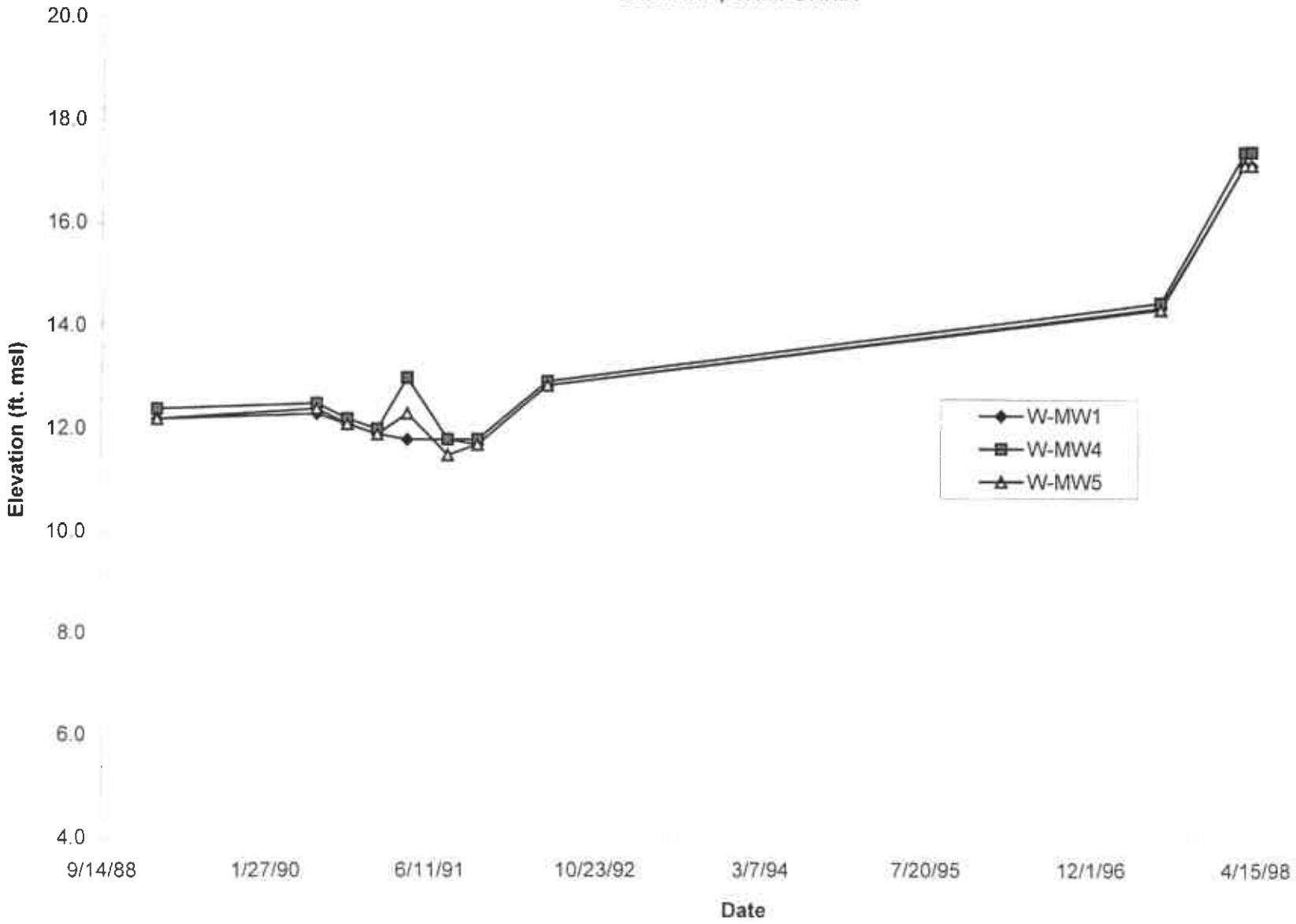
ORIGINAL

SEE REVERSE SIDE FOR INSTRUCTIONS

APPENDIX D

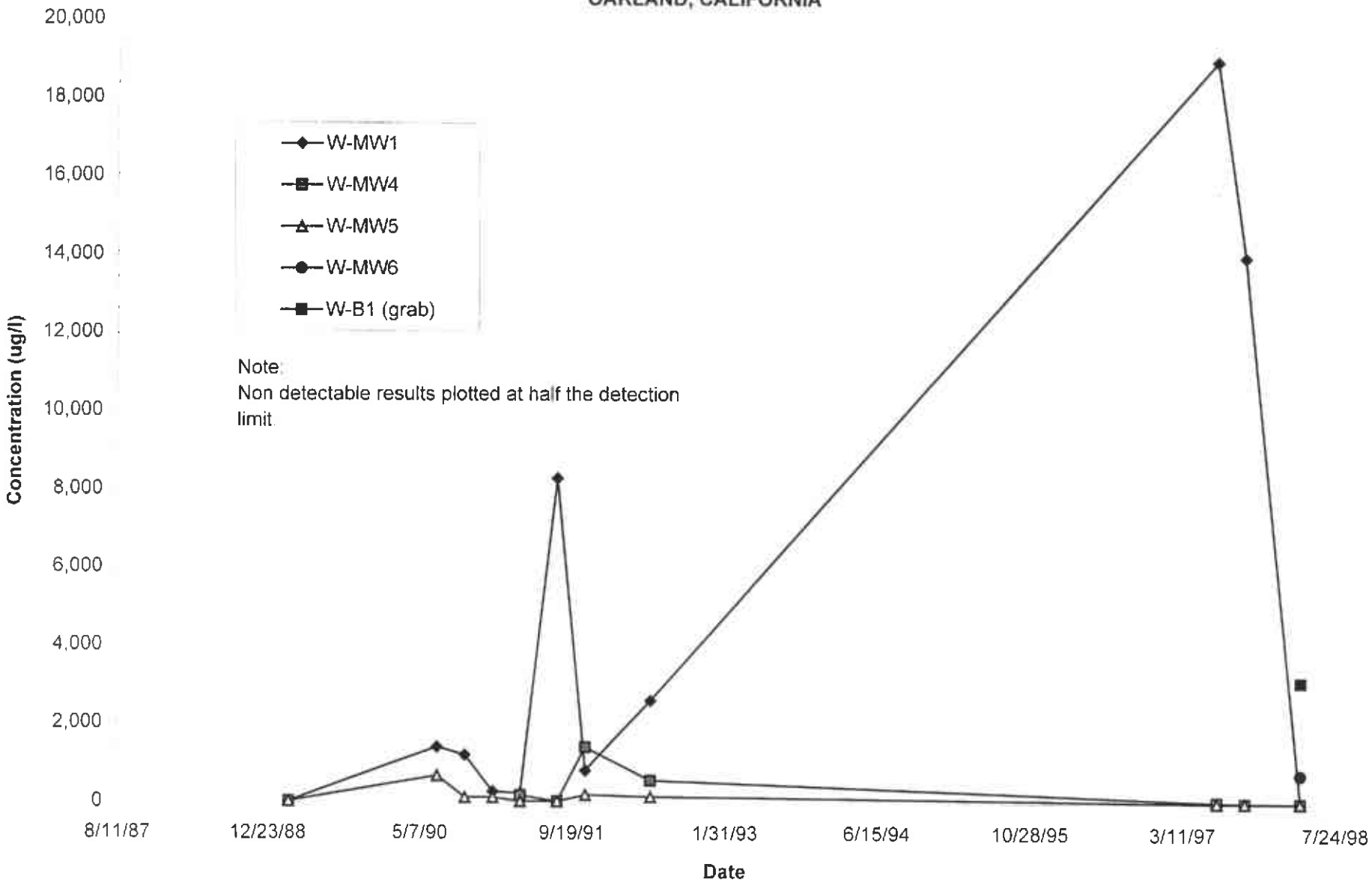
CHART DATA PLOTS

CHART 1
GROUNDWATER ELEVATION
ALCOPARK FUELING FACILITY
OAKLAND, CALIFORNIA



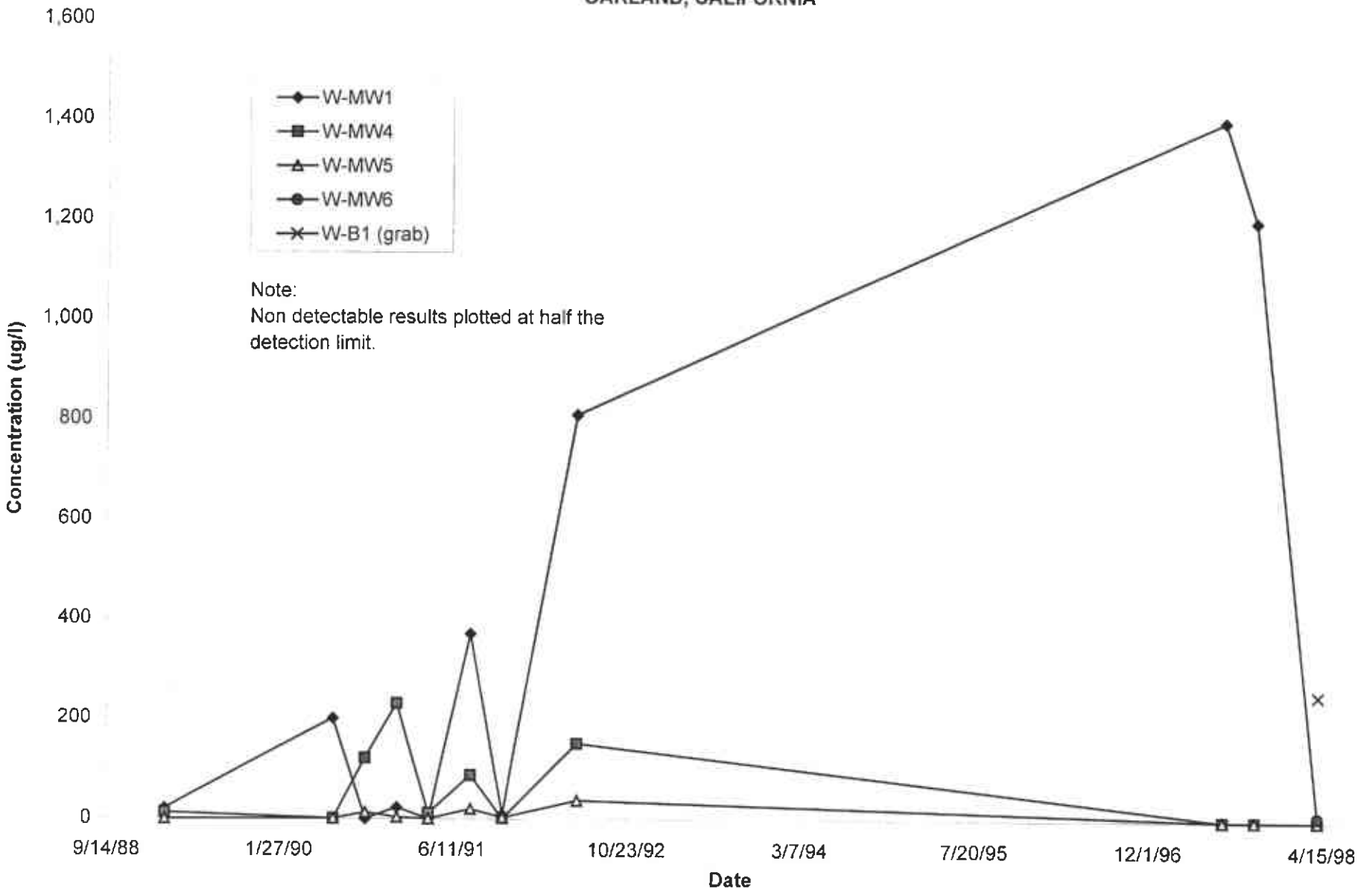
F:\transfer\project\ALAGSA\Alcopark\Tables\GW Chart

CHART 2
TOTAL PETROLEUM CONCENTRATIONS
ALCOPARK FUELING FACILTY
OAKLAND, CALIFORNIA



F:\transfer\project\ALAGSA\Alcopark\Tables\TPH-G Chart

CHART 3
BENZENE CONCENTRATIONS
ALCOPARK FUELING FACILITY
OAKLAND, CALIFORNIA



F:\transfer\project\ALAGSA\Alcopark\Tables\Benzene Chart