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QUARTERLY GROUNDWATER INVESTIGATION

PERALTA COMMUNITY COLLEGE - MAINTENANCE YARD
501 5TH AVENUE
OAKLAND, CALIFORNIA, 94606

Prepared for:

Mr. Thomas Peacock
Hazardous Materials Specialist
Alameda County Health Care Services Agency
Division of Hazardous Materials

November 1994

Job Number 6045-11

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1.0 INTRODUCTION

This report presents the procedures and findings of quarterly groundwater investigation conducted by ACC Environmental Consultants, Inc., (ACC) on behalf of the Peralta Community College District, site owner at 501 5th Avenue, Oakland, California. The project objective, as described in the Work Plan prepared on April 27, 1993, was to evaluate the extent of groundwater impact from the previous underground storage of petroleum products using analysis of groundwater samples collected from four monitoring wells onsite.

2.0 BACKGROUND

Five underground storage tanks were installed prior to the 1960's. The tanks were used for storage of fuel and waste oil for the City of Oakland Corporation Yard. The tanks consisted of two 6,000-gallon gasoline tanks, one 2,000-gallon diesel tank, one 2,000-gallon ethyl (premium) gasoline tank, and one 550-gallon waste oil tank. In 1980 Peralta Community College District acquired the property. The District abandoned the existing five underground tanks by filling with water and installed three fiberglass underground storage tanks. The new tanks consisted of two 6,000-gallon and one 4,000-gallon fiberglass tanks to store gasoline fuel. The new tanks were installed approximately 150 feet from the original tanks.

In 1992, the five original underground storage tanks were removed. During removal, a total of eight soil samples and one grab groundwater sample were collected from the excavation. Laboratory analysis of the soil samples indicated up to 228 parts per million (ppm) of Total Petroleum Hydrocarbons (TPH) as diesel, 134 ppm of TPH as gasoline, 2,407 parts per billion (ppb) benzene, 4,617 ppb toluene, 7,170 ppb ethylbenzene, 6,147 ppb total xylenes and 5,477 ppm oil and grease. Laboratory analysis of the water samples collected from the excavation indicated 170 ppm TPH as diesel, 15 ppm TPH as gasoline, 286 ppb benzene, 698 ppb toluene, 300 ppb ethylbenzene, 808 ppb total xylenes and 284 ppm oil and grease.

In September 1992, a preliminary study was performed by Environ of Emeryville to evaluate the soil and groundwater conditions on the site and on neighboring sites. This study indicated that hydrocarbons constituents reported in the soil and grab groundwater samples are possibly a result of regional impact.

In November 1992, ACC performed a subsurface environmental site assessment of the soil around the former tank excavation. Petroleum hydrocarbons as gasoline and motor oil were detected in the soil and groundwater samples collected from the borings. Laboratory analysis of the soil indicated up to 370 ppm of TPH as gasoline, 12 ppm TPH as diesel, 5,342 ppm motor oil, 76.94 ppm benzene, 73.9 ppm toluene, 30.4 ppm ethylbenzene, and 95.41 ppm xylenes.

In November 1993, three underground gasoline tanks were removed from the property. Soil samples collected from the excavation indicated up to 1.3 ppm TPH as gasoline, 190 ppb benzene, and 18 ppb toluene. Initial groundwater samples collected from the excavation indicated 27 ppm TPH as gasoline, 1,200 ppb benzene, 5,100 ppb toluene, 690 ppb ethylbenzene and 5,700 ppb xylenes.

Approximately 3,500 gallons of water was removed from the excavation. Analysis of subsequent groundwater samples from the excavation indicated 210 ppb TPH as gasoline, and 14 ppb xylenes.

Due to the detectable levels reported in the soil and groundwater onsite, additional groundwater investigations were requested from the regulatory agencies.

In February 1994, four additional borings (MW-1, MW-2, MW-3 and MW-4) were drilled onsite and converted into 2-inch monitoring wells. The monitoring wells were used to evaluate the extent of groundwater impact from the two former excavations (See Figure 1 - Site Plan).

Laboratory analysis of the groundwater samples collected in February 1994 from monitoring wells MW-1 and MW-4 (down gradient from the tank excavations) indicated below detectable levels of the constituents evaluated. The groundwater results from monitoring well MW-1 indicated a downgradient extent of groundwater impact. Laboratory analysis of groundwater collected from monitoring wells MW-2 and MW-3 (upgradient of the former tank excavations) indicated detectable levels of constituents. Samples collected from borings MW-2 and MW-3 indicated detectable levels of TPH as diesel, TPH as gasoline with BTEX. Motor oil was reported in the soil from boring MW-2. However, motor oil was not detected in the groundwater sample from monitoring well MW-2. TPH as diesel was only detected in the soil from boring MW-2.

An additional soil and groundwater investigation was conducted on May 9, 1994, to evaluate possible upgradient sources onsite. The investigation included drilling five borings upgradient (east) of existing monitoring wells MW-2 and MW-3.

Laboratory analysis of the soil samples collected during the additional investigation indicate detectable levels of diesel up to 11 ppm and motor oil up to 100 ppm. Below detectable levels of TPH as gasoline and BTEX were reported in the soil samples analyzed.

Groundwater was encountered approximately 5 to 6 feet below ground surface (bgs) during the additional investigation. Laboratory analysis of grab groundwater samples collected from the boreholes indicated below detectable levels of diesel, motor oil, and BTEX. TPH as gasoline at 61 parts per billion (ppb) was reported in one grab groundwater sample collected from a boring.

Motor oil was not detected in the groundwater samples collected from the borings and monitoring wells, therefore motor oil does not appear to currently impact the groundwater.

Results of the analytical data from previous investigations indicate that upgradient sources of TPH and motor oil exist. Fine-grain fill material and Bay Mud appear to restrict the mobility of the petroleum hydrocarbons from impacting groundwater. However, groundwater flow direction data suggests that constituent movement is to the westerly direction, away from monitoring wells MW-2 and MW-3.

3.0 SITE DESCRIPTION

The site consists of several warehouse/office buildings surrounded by a fenced parking lot. The former location of the older tanks was within the fenced yard adjacent to the northern entrance, the former newer tanks were situated near the southern entrance (Figure 2).

4.0 FIELD PROCEDURES

4.1 Groundwater Sampling

Groundwater samples were collected on November 16, 1994 from monitoring wells MW-1, MW-2, MW-3 and MW-4. Prior to groundwater sampling the depth to the surface of the water table was measured from the top of the PVC casing using a Solinst Water Level Meter. Information regarding well elevations and groundwater level measurements is summarized in Table 1.

TABLE 1 - Groundwater Depth Information

Well No.	Date Sampled	TOC Elevation	Depth to Groundwater (Ft)	Groundwater Elevation (Ft.)
MW-1	02/14/94	6.78 MSL	3.69	3.09
	05/16/94		6.80	-0.02
	08/25/94		7.05	-0.27
	11/16/94		3.50	3.28
MW-2	02/14/94	8.70 MSL	4.70	4.00
	05/16/94		4.74	3.96
	08/25/94		5.49	3.21
	11/16/94		5.03	3.67
MW-3	02/14/94	8.83 MSL	4.57	4.26
	05/16/94		4.78	4.05
	08/25/94		5.93	2.90
	11/16/94		4.04	4.79
MW-4	02/14/94	5.45 MSL	1.69	3.76
	05/16/94		2.36	3.09
	08/25/94		3.25	2.20
	11/16/94		1.01	4.44

Notes: All measurements in feet
MSL = Mean Sea Level
TOC = Top of Casing

After water-level measurements were collected, each onsite well was purged by hand using a designated precleaned disposable Teflon bailer for each well. Groundwater pH, temperature and electrical conductivity were monitored during well purging. Each well was considered to be purged when these parameters stabilized. Three to four well volumes were removed to purge each well. Worksheets of conditions monitored during purging are attached in Appendix A.

After the groundwater level had recovered to a minimum of approximately 80 percent of its static level, water samples were obtained using designated disposable Teflon bailers. Two 40 ml VOA vials, without headspace were filled from the water collected from each monitoring well.

The samples were preserved on ice and submitted to Chromalab Inc. under chain of custody protocol. Laboratory results with chain of custody forms are attached in Appendix B.

5.0 FINDINGS

5.1 Analytical Results - Groundwater

One groundwater sample each from monitoring wells MW-1, MW-2, MW-3, and MW-4 was collected and submitted to Chromalab for analysis for TPH as gasoline by EPA test method 5030 and BTEX by EPA test method 602. Analysis results from the groundwater samples are summarized in Table 2. Analytical results are attached in Appendix B.

TABLE 2 - Analytical Results - Groundwater

Well No.	Date Sampled	TPH-g (ppb)	TEPH (ppb)	Benzene (ppb)	Toluene (ppb)	E.benzene (ppb)	Xylene (ppb)
MW-1	02/14/94	<50	<50	<0.5	<0.5	<0.5	<0.5
	05/23/94	<50	<50	<0.5	<0.5	<0.5	<0.5
	08/25/94	<50	NT	<0.5	<0.5	<0.5	<0.5
	11/16/94	<50	NT	<0.5	<0.5	<0.5	<0.5
MW-2	02/14/94	200	<50	1.7	<0.5	1.1	1.1
	05/23/94	600	<50	1.8	0.9	0.7	2.1
	08/25/94	70	NT	<50	<0.5	<0.5	0.5
	11/16/94	<50	NT	<50	<0.5	<0.5	0.6
MW-3	02/14/94	780	<50	0.6	0.6	1.7	2.7
	05/23/94	680	<50	<0.5	<0.5	2.2	2.2
	08/25/94	310	NT	6.4	2.7	1.9	4.1
	11/16/94	**650**	NT	**1.6**	1.5	<0.5	2.7
MW-4	02/14/94	<50	<50	<0.5	<0.5	<0.5	<0.5
	05/23/94	93	<50	<0.5	<0.5	<0.5	<0.5
	08/29/94	<50	NT	<0.5	<0.5	<0.5	<0.5
	11/16/94	**100**	NT	**2.7**	<0.5	<0.5	1.0

Notes: TPH-g = Total Petroleum Hydrocarbons as gasoline
TEPH = Total Extractable Petroleum Hydrocarbons as diesel, kerosene, and motor oil
ppb = parts per billion
NT = Not tested

5.2 Groundwater Gradient

Prior to calculating the groundwater gradient, elevations for the onsite monitoring wells were surveyed by Ron Archer Civil Engineer, Inc. to an accuracy of one-hundredth of a foot. The well elevations were surveyed at the top of the PVC well casing. The elevations of the monitoring wells were established relative to a nearby benchmark located in the intersection of 7th Street and 5th Avenue.

The groundwater gradient was calculated using the onsite monitoring wells. The location of the wells is shown on Figure 1 - Site Plan. Groundwater elevations were collected from the wells on November 16, 1994. The gradient was evaluated by triangulation using the elevation of the potentiometric surface measured with respect to Mean Sea Level datum. As shown in Figure 2, general direction of flow is southwest at a gradient of 0.013 foot per foot.

During the initial subsurface investigation conducted onsite, varying thicknesses of fill material was encountered onsite. In some areas onsite, the groundwater was migrating through the fill material producing preferential pathways. This mode of groundwater migration may be most evident during seasons of heavy rainfall when the groundwater is elevated. As observed during collection of the groundwater samples on November 16, 1994, elevated levels of groundwater was recorded in all the wells, however, was most prominent in monitoring well MW-4. This fluctuation may cause differential gradient patterns, as observed in Figure 2.

6.0 CONCLUSION

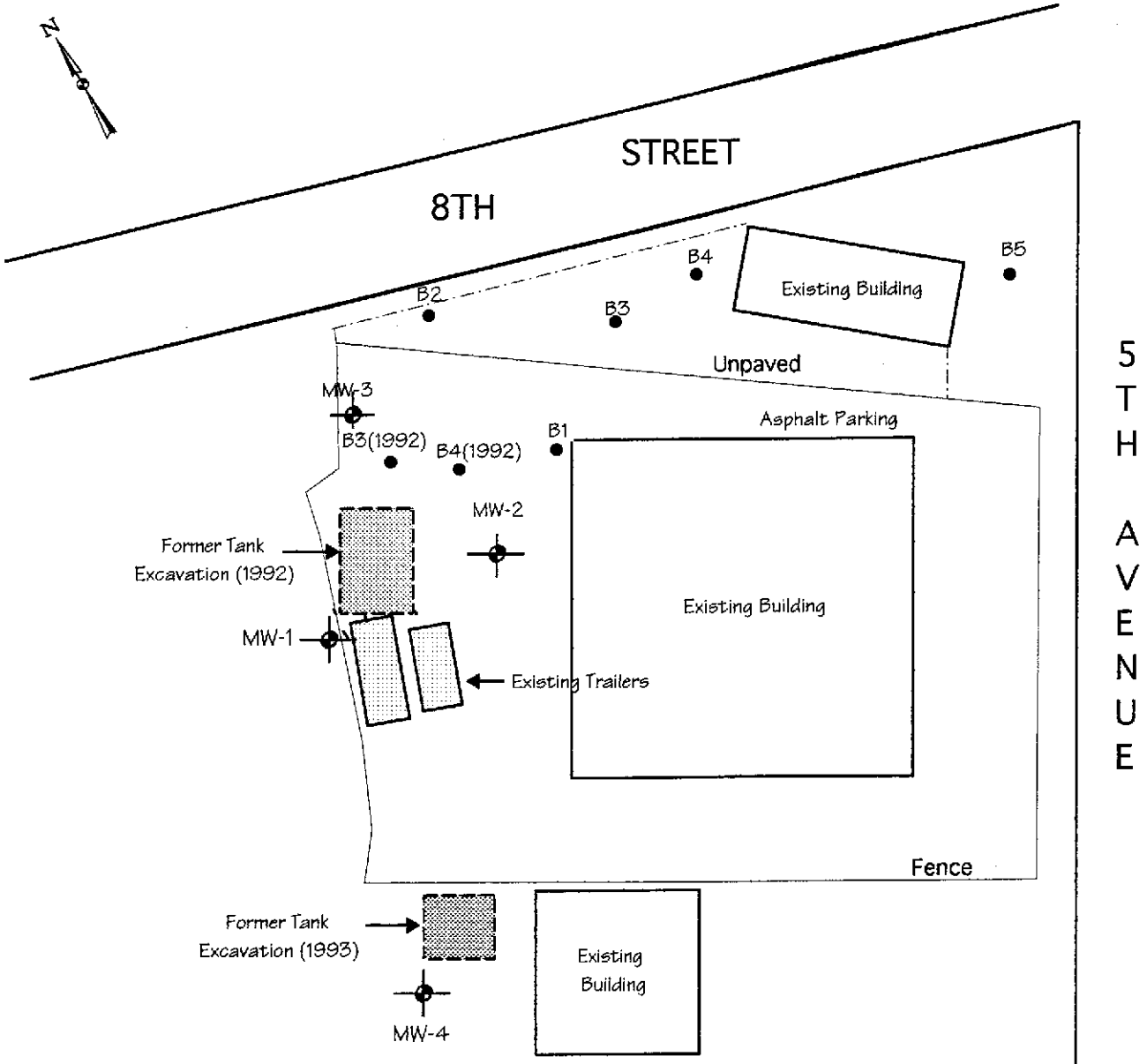
The analytical results and observations discussed herein indicate that groundwater has been impacted due to an unauthorized hydrocarbon release. The analytical parameters used for groundwater sampling performed were in accordance with the guidance document "Tri-Regional Water Quality Control Boards Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites", dated August 10, 1990.

The initial groundwater investigation conducted in February 1994 and the additional subsurface investigation conducted in August 1994 indicated detectable levels of TPH as diesel and motor oil in the soil, upgradient (east) of the former underground storage tank excavations. Laboratory analysis of the groundwater samples collected from monitoring wells and open boreholes indicated below detectable levels of Total Extractable Petroleum Hydrocarbons (TEPH) as diesel, motor oil and kerosene, therefore TEPH apparently does not impact the groundwater.

Laboratory results collected from the downgradient monitoring well (MW-1) indicated below detectable levels of constituents. Laboratory analysis of groundwater collected from monitoring well MW-3 (upgradient of the former tank excavations) indicated detectable levels of constituents indicating upgradient source(s). The groundwater results indicate that a hydrocarbon release from the former underground storage tanks onsite does not appear impact the groundwater downgradient from the tank excavation (MW-1). Historic observations indicate that the soil and groundwater impact upgradient is restricted in mobility due to the fine-grain soil. ACC anticipates a decline in concentrations of petroleum hydrocarbons over time. Groundwater levels appear to fluctuate onsite due to seasonal changes in precipitation and preferential pathways of shallow groundwater within the fill material. These seasonal changes appear to cause differential gradient patterns as evidenced by inconsistent fluctuations in water elevation levels in the four onsite groundwater monitoring wells.

7.0 RECOMMENDATIONS

Pursuant to the Tri-Regional Board guidelines, groundwater sampling and monitoring of the onsite wells should continue on a quarterly basis.



LEGEND

Boring Locations B1 ●

Monitoring Well MW1 ⊕

Scale: 1" = 100'

11/29/1994	Drawn By: MCK	Project: 6045-11	Figure 1:	**Site Plan** Peralta Maintainance Yard, Oakland, CA

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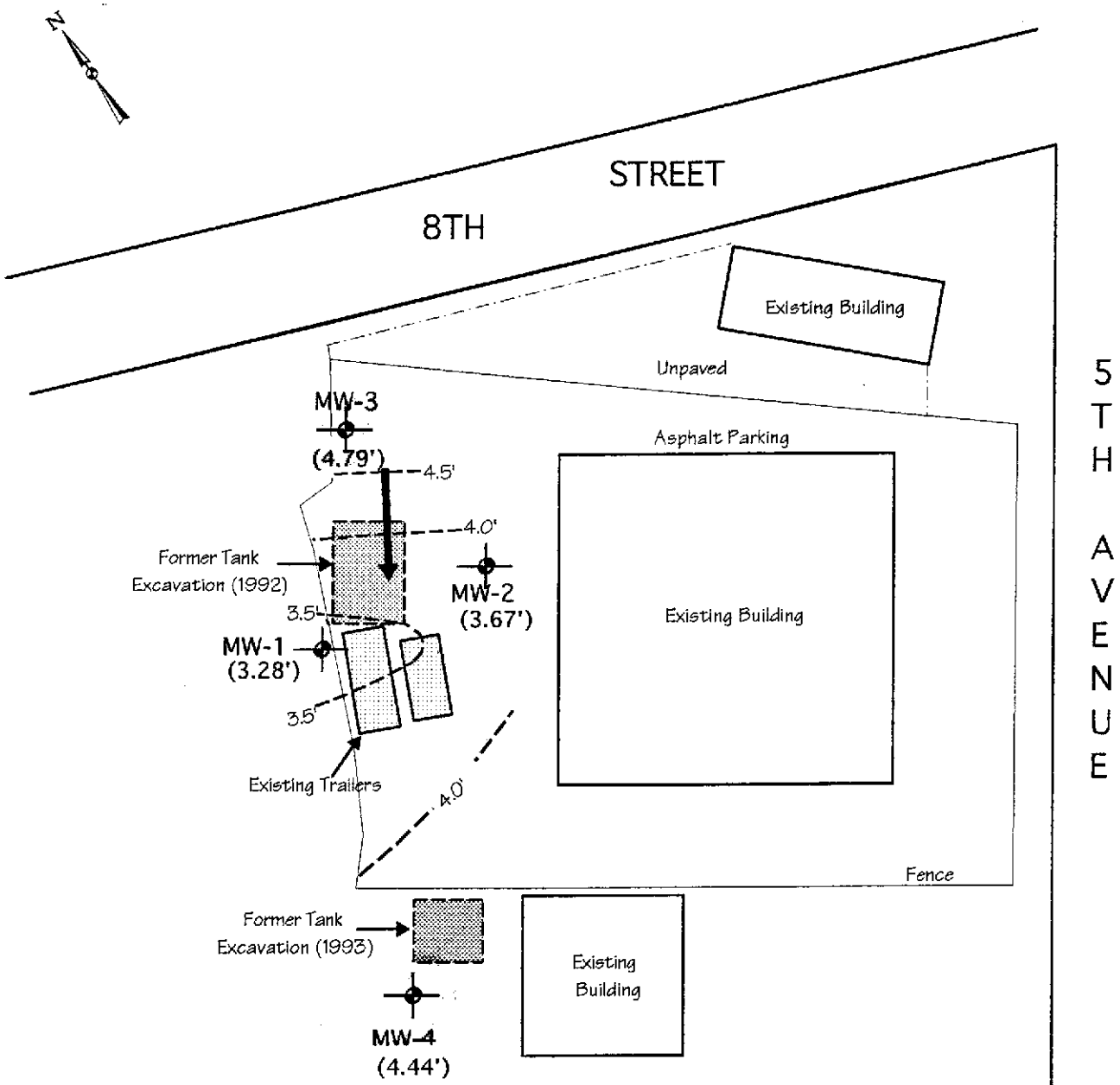

LEGEND

Monitoring Well MW1

Groundwater Flow Direction

Scale: 1" = 100'

Elevations in Feet Above Mean Sea Level **Measured on 11/16/94**

11/16/1994	Drawn By: MCK	Project: 6045-11	Figure 2:	**Groundwater Gradient** Peralta Maintainance Yard, Oakland, CA

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APPENDIX A

NOTES OF WELL SAMPLING

Well Sampling [✓] Well Development [ ] check one

Well Number: MW-1

Job Number: 6045-4

Job Name: Dowell

Date: 11-2-94

Sampler: B. Culbert

Depth to Water (measured from TOC): 3.50

Inside Diameter of Casing: 2"

Depth of Boring: 14'

Method of well development/purging: BAIL

Amount of Water Bailed/Pumped from well: 5.5 g

Depth to Water after well development: _____

Depth to water prior to sampling: 3.83

Bailed water stored on-site ? How ? Drums

Number of well volumes removed: 3

TSP wash, distilled rinse, new rope ? NEW

Water Appearance:

	yes	no
froth		✓
irridesence		✓
oil		✓
smell	✓	
product		✓
other, describe		✓

Gallons Removed	pH	EC	Temp
3	6.63	1.69	69.8
4	6.74	1.56	69.7
5	6.51	1.56	69.7
5.5	6.32	1.72	69.7
25			
30			
35			
40			
45			
50			

Samples Obtained:

TPH (gasoline)	
TPH (diesel)	
TPH (motor oil)	
BTXE	
EPA 624	
EPA 625	
EPA 608	
PCBs only	
Metals	
Other, specify	
Field Blank	

Well Sampling [✓] Well Development [ ] check one

Well Number: MW-2

Job Number: 6045-4

Job Name: Pennzoil

Date: 11-16-94

Sampler: B. Culbert

Depth to Water (measured from TOC): 5.03

Inside Diameter of Casing: 2"

Depth of Boring: 14'

Method of well development/purging: Bail

Amount of Water Bailed/Pumped from well: 5.5

Depth to Water after well development:

Depth to water prior to sampling: 11.47

Bailed water stored on-site ? How ? Drums

Number of well volumes removed: 3.5

TSP wash, distilled rinse, new rope ? NEW

Water Appearance:

	yes	no
froth		✓
irridesence		✓
oil		✓
smell	✓	
product		✓
other, describe		✓

Gallons Removed	pH	EC	Temp
~~2~~ 3	7.06	9.75	74.8
~~3~~ 3.5	7.07	10.10	75.0
~~4~~ 4.5	6.82	11.65	74.3
~~5~~ 5.0	6.87	11.69	74.3
~~5.5~~ 5.5	7.06	12.71	74.1
30 5.25	7.04	12.56	74.1
35 5.5	7.13	12.15	74.1
40			
45			
50			

Samples Obtained:

TPH (gasoline)	
TPH (diesel)	
TPH (motor oil)	
BTXE	
EPA 624	
EPA 625	
EPA 608	
PCBs only	
Metals	
Other, specify	
Field Blank	

Well Sampling [✓] Well Development [ ] check one

Well Number: MW-3

Job Number: 6045-4

Job Name: Peralta

Date: 11-16-94

Sampler: B. Calbert

Depth to Water (measured from TOC): 4.04

Inside Diameter of Casing: 2"

Depth of Boring: 14'

Method of well development/purging: Bail

Amount of Water Bailed/Pumped from well: 6.0

Depth to Water after well development: _____

Depth to water prior to sampling: 4.42

Bailed water stored on-site ? How ? drums

Number of well volumes removed: 4

TSP wash, distilled rinse, new rope ? NEW

Water Appearance:

	yes	no
froth		✓
irridesence		✓
oil		✓
smell	✓	
product		✓
other, describe		✓

Gallons Removed	pH	EC	Temp
~~4~~ 4.5	8.34	1.29	72.8
~~4~~ 4.75	8.41	1.41	73.0
~~5~~ 5.0	7.53	1.37	72.9
~~20~~ 5.5	7.41	1.42	72.9
25 6.0	7.31	1.40	72.9
30			
35			
40			
45			
50			

Samples Obtained:

TPH (gasoline)	
TPH (diesel)	
TPH (motor oil)	
BTXE	
EPA 624	
EPA 625	
EPA 608	
PCBs only	
Metals	
Other, specify	
Field Blank	

Well Sampling [✓] Well Development [ ] check one

Well Number: MW-4

Job Number: 6045-4

Job Name: Davalta

Date: 11-16-94

Sampler: B. Culbert

Depth to Water (measured from TOC): 1.01

Inside Diameter of Casing: 2

Depth of Boring: 14.0

Method of well development/purging: bail

Amount of Water Bailed/Pumped from well: 6.0

Depth to Water after well development: _____

Depth to water prior to sampling: 7.20

Bailed water stored on-site ? How ? Drums

Number of well volumes removed: 3

TSP wash, distilled rinse, new rope ? NEW

Water Appearance:

	yes	no
froth		✓
irridesence		✓
oil		✓
smell	✓	
product		✓
other, describe		✓

Gallons Removed	pH	EC	Temp
~~4~~	7.26	2.20	73.0
~~5~~	7.07	3.49	73.5
~~5.5~~	7.08	3.90	73.5
~~6.0~~	7.03	[illegible]	[illegible]
25			
30			
35			
40			
45			
50			

Samples Obtained:

TPH (gasoline)	
TPH (diesel)	
TPH (motor oil)	
BTXE	
EPA 624	
EPA 625	
EPA 608	
PCBs only	
Metals	
Other, specify	
Field Blank	

APPENDIX B

ANALYTICAL RESULTS
CHAIN OF CUSTODY

CHROMALAB, INC.

Environmental Services (SDB)

November 22, 1994 *Submission #:* 9411187

ACC ENVIRONMENTAL CONSULTANTS

Atten: Misty Kaltreider

Project: PERALTA COMMUNITY COLLEGE *Project#:* 6045-4
Received: November 16, 1994

re: 4 samples for Gasoline and BTEX analysis.

Matrix: WATER
Sampled: November 16, 1994 *Run#:* 4605 *Analyzed:* November 18, 1994
Method: EPA 5030/8015M/602/8020

Spl # CLIENT SMPL ID	Gasoline (mg/L)	Benzene (ug/L)	Toluene (ug/L)	Ethyl Benzene (ug/L)	Total Xylenes (ug/L)
69877 MW-1	N.D.	N.D.	N.D.	N.D.	N.D.
69878 MW-2	N.D.	N.D.	N.D.	N.D.	0.6
69879 MW-3	0.65	1.6	1.5	N.D.	2.7
69880 MW-4	0.10	2.7	N.D.	N.D.	1.0
Reporting Limits	0.05	0.5	0.5	0.5	0.5
Blank Result	N.D.	N.D.	N.D.	N.D.	N.D.
Blank Spike Result (%)	106	113	118	112	113

Jack Kelly
Chemist

Ali Khafrazi
Organic Manager

CHROMALAB, INC.

DOHS 1094

2239 Omega Road, #1 • San Ramon, California 94583
510/831-1788 • Facsimile 510/831-8798

Chain of Custody

DATE _____ PAGE _____ OF _____

PROJ. MGR. Misty Kaltreider
COMPANY ACC Environmental
ADDRESS 1000 Atlantic Ave, Ste 110
Alameda, CA 94501
SAMPLERS (SIGNATURE) (PHONE NO.)
Bret Culbert (510)522-8188

SAMPLE ID.	DATE	TIME	MATRIX	PRESERV.	TPH - Gasoline (EPA 5030, 8015)	TPH - Gasoline (5030, 8015) w/BTEX (EPA 602, 8020)	TPH - Diesel (EPA 3510/3550, 8015)	PURGEABLE AROMATICS BTEX (EPA 602, 8020)	PURGEABLE HALOCARBONS (EPA 601, 8010)	VOLATILE ORGANICS (EPA 624, 8240, 524.2)	BASE/NEUTRALS, ACIDS (EPA 625/627, 8270, 525)	TOTAL OIL & GREASE (EPA 5520, B+F, E+F)	PCB (EPA 608, 8080)	PESTICIDES (EPA 608, 8080)	TOTAL RECOVERABLE HYDROCARBONS (EPA 418.1)		METALS: Cd, Cr, Pb, Zn, Ni	CAM METALS (17)	PRIORITY POLLUTANT METALS (13)	TOTAL LEAD	EXTRACTION (TCLP, STLC)				NUMBER OF CONTAINERS
MW-1	11-16-94	12	H_2O	COLD		✓																			3
MW-2		1245				✓																			3
MW-3		100				✓																			3
MW-4		200				✓																			3

PROJECT INFORMATION

PROJECT NAME: PARALTA COMM. College
PROJECT NUMBER: 6045-4
P.O. #
TAT: STANDARD 5-DAY | 24 | 48 | 72 | OTHER
SPECIAL INSTRUCTIONS/COMMENTS:

SAMPLE RECEIPT

TOTAL NO. OF CONTAINERS: 12
HEAD SPACE:
REC'D GOOD CONDITION/COLD: ✓
CONFORMS TO RECORD:

RELINQUISHED BY 1

Bret Culbert 4:00pm
(SIGNATURE) (TIME)
BRET CULBERT 11-16-94
(PRINTED NAME) (DATE)
(COMPANY)

RECEIVED BY 1

(SIGNATURE) (TIME)
(PRINTED NAME) (DATE)
(COMPANY)

RELINQUISHED BY 2

(SIGNATURE) (TIME)
(PRINTED NAME) (DATE)
(COMPANY)

RECEIVED BY 2

(SIGNATURE) (TIME)
(PRINTED NAME) (DATE)
(COMPANY)

RELINQUISHED BY 3.

(SIGNATURE) (TIME)
(PRINTED NAME) (DATE)
(COMPANY)

RECEIVED BY (LABORATORY) 3.

(SIGNATURE) 5:19 (TIME)
B. Morcan 11-16-94
(PRINTED NAME) (DATE)
Chromalab
(LAB)