Woodward-Clyde Consultants

Engineering & sciences applied to the earth & its environment

April 7, 1993

Mr. Douglas Salter
P.O. Box 1970
Silverthorne, CO 80498

Subject: Groundwater Quality Monitoring Report
901 Jefferson Street Site, Oakland

Dear Mr. Salter:

This letter transmits the results of groundwater monitoring at the 901 Jefferson Street site in downtown Oakland. In accordance with your letter request of December 28, 1992 WCC has completed measurement, sampling, and analysis of groundwater from the three monitoring wells, MW-5, MW-18, and MW-19, on the site.

Groundwater measurements and sampling was performed on March 2, 1993 by Stephen Alton, an engineer with WCC. The depth to groundwater was measured at 22.93 feet from the top of the well casing (TOC) in MW-5, at 23.41 feet from TOC in MW-18, and at 23.50 feet from TOC in MW-19 (well locations shown in Attachment 1). Correlating these depths with the respective TOC elevations of the three wells allows evaluation of the groundwater gradient and flow direction. The groundwater gradient was calculated to be 0.0059 ft/ft and the flow direction was calculated to be approximately S38°E. Groundwater elevations and calculated gradients and flow directions for current and previous water level measurements are provided in Attachment 2.

Groundwater samples were analyzed for total petroleum hydrocarbons (TPH) as gasoline and benzene, toluene, ethyl benzene, and xylenes (BTEX). The results of these analyses are summarized in Attachment 3, along with data from previous groundwater analyses. The analytical laboratory report of the data from the March 2, 1993 sampling are provided in Attachment 4, along with the chain-of-custody form and the sampling logs.

The current laboratory results show that the contaminants detected in the groundwater are at about the same concentrations in wells MW-5 and MW-18 as they were in February 1991. Contaminant concentrations measured in MW-19 are significantly higher than previous concentrations measured in the 1991 analysis. These higher concentrations are most likely due to free phase product, observed in MW-19 during sampling. The presence of free phase product may be due to a significant rise in the groundwater elevation.

500 12th Street, Suite 100 • Oakland, CA 94607-4014 • (510) 893-3600 • Fax (510) 874-3268

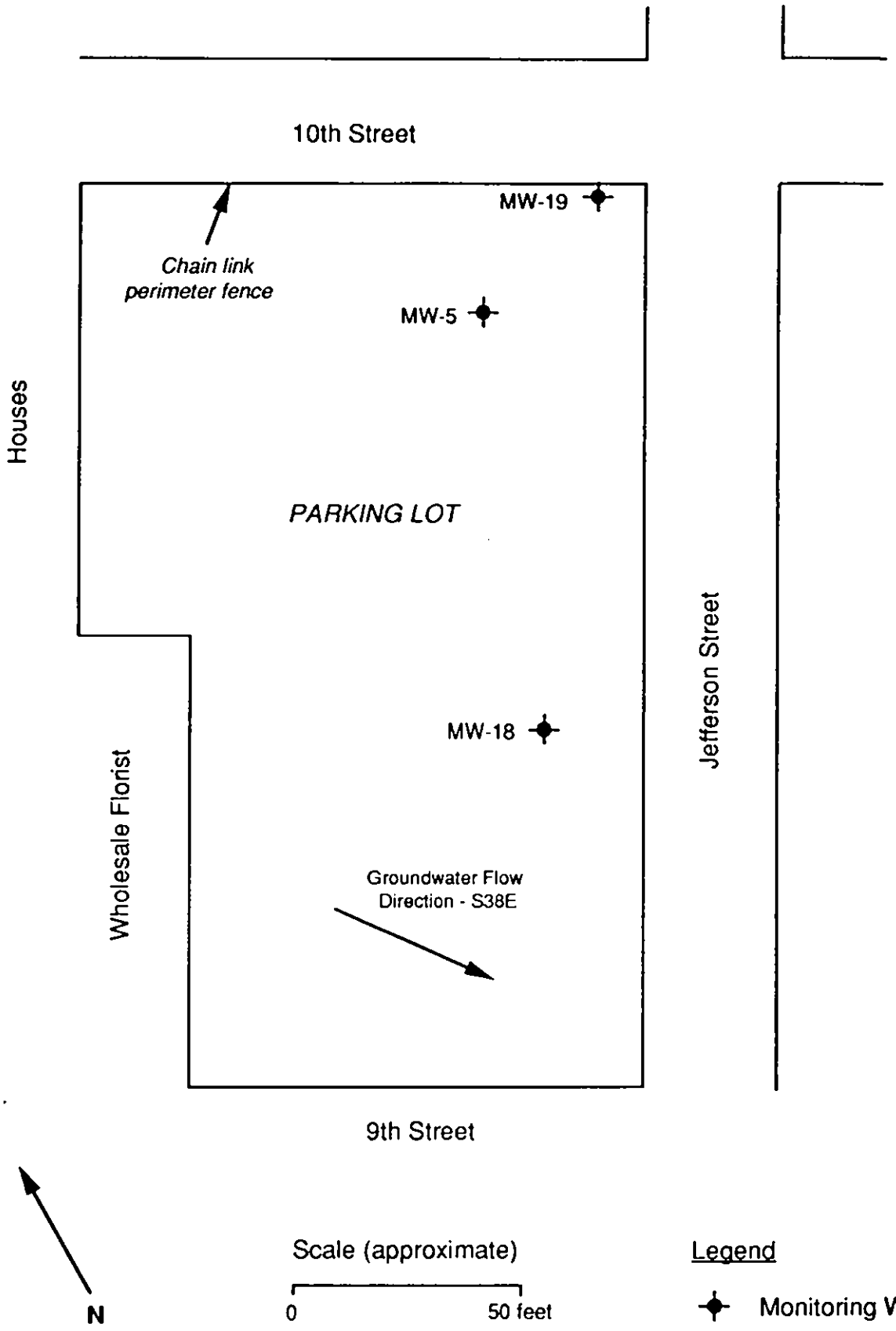
If you have any questions, please call me at (510) 874-3192. We appreciate this opportunity to be of service.

Sincerely,
WOODWARD-CLYDE CONSULTANTS

William B. Copeland
Assistant Project Geologist

Attachments:
1. 9th and Jefferson Site Map
2. Groundwater Elevations and Gradients
3. TPH and BTEX Concentrations in Groundwater
4. March 1993 Laboratory Analytical Report, Chain-of-Custody and Well Sampling Logs

cc: Mr. Norman Tuttle, Esq.
Crosby, Heafy, Roach and May



Project No. 8910084A	9th and Jefferson Sts.	9th and Jefferson Site Map	Attachment 1
Woodward-Clyde Consultants			

ATTACHMENT 2: GROUNDWATER ELEVATIONS AND GRADIENTS

Date	Depth to Water (ft)			Relative Groundwater Elevations* (ft)			Groundwater Gradient (ft/ft) and Direction
	MW-5	MW-18	MW-19	MW-5	MW-18	MW-19	
8/14/89	24.95	25.26	25.23	-25.42	-25.53	-25.23	0.0056, N84°W
2/15/91	25.95	26.30	26.40	-26.42	-26.57	-26.40	0.0018, S9°W
3/27/91	25.29	25.66	25.55	-25.76	-25.93	-25.55	0.0062, N90°W
3/2/93	22.93	23.41	23.50	-23.40	-23.68	-23.50	0.0059, S38°E

* Groundwater elevations are calculated using the TOC of well MW-19 as a datum at 0.0 ft; well MW-5 TOC was measured at an elevation of -0.47 ft and well MW-18 TOC was measured at an elevation of -0.27 ft from this datum by WCC.

ATTACHMENT 3

TPH AND BTEX CONCENTRATIONS IN GROUNDWATER

Date	Monitoring Well MW-5	MW-18	MW-19
TPH (mg/L) – gas			
04/24/89	24	--	--
08/14/89	19	7.6	26
02/15/91	13	2.7	13
03/02/93 ✓	32	3.2	46
BENZENE (µg/L)			
04/24/89	7,500	--	--
08/14/89	5,400	160	4,300
02/15/91	7,500	56	1,800
03/02/93	4,400 ✓	11 ✓	10,000
TOLUENE (µg/L)			
04/24/89	220	--	--
08/14/89	210	21	690
02/15/91	250	22	640
03/02/93	170	26	1,100
ETHYL BENZENE (µg/L)			
04/24/89	990	--	--
08/14/89	770	210	980
02/15/91	1,000	94	510
03/02/93	620	17	1,700
XYLENES (µg/L)			
04/24/89	730	--	--
08/14/89	440	14	2,600
02/15/91	340	20	2,600
03/02/93	260	19	4,500

-- = well not installed at time of sampling

ATTACHMENT 4

MARCH 2, 1993 LABORATORY ANALYTICAL RESULTS, CHAIN-OF-CUSTODY AND WELL SAMPLING LOGS

ANAMETRIX INC
Environmental & Analytical Chemistry

Part of INCHCAPE ENVIRONMENTAL

REPORT

MR. WILLIAM COPELAND
WOODWARD-CLYDE CONSULTANTS
500 12TH STREET, SUITE 100
OAKLAND, CA 94607-4014

Workorder # : 9303031
Date Received : 03/02/93
Project ID : 8910084A
Purchase Order: N/A

The following samples were received at Anametrix, Inc. for analysis :

ANAMETRIX ID	CLIENT SAMPLE ID
9303031- 1	MW-18
9303031- 2	MW-19
9303031- 3	MW-5

This report consists of 4 pages not including the cover letter, and is organized in sections according to the specific Anametrix laboratory group or section which performed the analysis(es) and generated the data. The Report Summary that precedes each section will help you determine which Anametrix group is responsible for those test results, and will bear the signatures of the department supervisor and the chemist who have reviewed the analytical data. Please refer all questions to the department supervisor who signed the form.

Anametrix is certified by the California Department of Health Services (DHS) to perform environmental testing under Certificate Number 1234. A detailed list of the approved fields of testing can be obtained by calling our office, or the DHS Environmental Laboratory Accreditation Program at (415)540-2800.

If you have any further questions or comments on this report, please give us a call as soon as possible. Thank you for using Anametrix.

Sarah Schoen, Ph.D.
Laboratory Director

3-11-93
Date

REPORT SUMMARY
ANAMETRIX, INC. (408)432-8192

MR. WILLIAM COPELAND
WOODWARD-CLYDE CONSULTANTS
500 12TH STREET, SUITE 100
OAKLAND, CA 94607-4014

Workorder # : 9303031
Date Received : 03/02/93
Project ID : 8910084A
Purchase Order: N/A
Department : GC
Sub-Department: TPH

SAMPLE INFORMATION:

ANAMETRIX SAMPLE ID	CLIENT SAMPLE ID	MATRIX	DATE SAMPLED	METHOD
9303031- 1	MW-18	WATER	03/02/93	TPHg/BTEX
9303031- 2	MW-19	WATER	03/02/93	TPHg/BTEX
9303031- 3	MW-5	WATER	03/02/93	TPHg/BTEX

REPORT SUMMARY
ANAMETRIX, INC. (408)432-8192

MR. WILLIAM COPELAND
WOODWARD-CLYDE CONSULTANTS
500 12TH STREET, SUITE 100
OAKLAND, CA 94607-4014

Workorder # : 9303031
Date Received : 03/02/93
Project ID : 8910084A
Purchase Order: N/A
Department : GC
Sub-Department: TPH

QA/QC SUMMARY :

- No QA/QC problems encountered for these samples.

Cheryl Bachman 3/11/93
Department Supervisor Date

Lucia Shen 3/11/93
Chemist Date

ANALYSIS DATA SHEET - TOTAL PETROLEUM HYDROCARBONS
(GASOLINE WITH BTEX)
ANAMETRIX, INC. - (408) 432-8192

Anametrix W.O.: 9303031
Matrix : WATER
Date Sampled : 03/02/93

Project Number : 8910084A
Date Released : 03/10/93

COMPOUNDS	Reporting Limit (ug/L)	Sample I.D.# MW-18 -01	Sample I.D.# MW-19 -02	Sample I.D.# MW-5 -03	Sample I.D.# BM0501E3 BLANK
Benzene	0.5	11	10000	4400	ND
Toluene	0.5	26	1100	170	ND
Ethylbenzene	0.5	17	1700	620	ND
Total Xylenes	0.5	19	4500	260	ND
TPH as Gasoline	50	3200	46000	32000	ND
% Surrogate Recovery		94%	89%	105%	98%
Instrument I.D.		HP21	HP21	HP21	HP21
Date Analyzed		03/05/93	03/05/93	03/05/93	03/05/93
RLMF		10	250	250	1

ND - Not detected at or above the practical quantitation limit for the method.
TPHg - Total Petroleum Hydrocarbons as gasoline is determined by GCFID using modified EPA Method 8015 following sample purge and trap by EPA Method 5030.
BTEX - Benzene, Toluene, Ethylbenzene, and Total Xylenes are determined by modified EPA Method 8020 following sample purge and trap by EPA Method 5030.
RLMF - Reporting Limit Multiplication Factor.

Anametrix control limits for surrogate p-Bromofluorobenzene recovery are 61-139%

All testing procedures follow California Department of Health Services (Cal-DHS) approved methods.

Analyst 3/11/93 Date

Supervisor 3/11/93 Date

TOTAL VOLATILE HYDROCARBON LABORATORY CONTROL SAMPLE REPORT
EPA METHOD 5030 WITH GC/PID
ANAMETRIX, INC. (408) 432-8192

Sample I.D. : LAB CONTROL SAMPLE
Matrix : WATER
Date Sampled : N/A
Date Analyzed : 03/05/93

Anametrix I.D.: LCSW0305
Analyst : IS
Supervisor : [illegible]
Date Released : 03/11/93
Instrument ID : HP21

COMPOUND	SPIKE AMT. (ug/L)	LCS (ug/L)	REC LCS	%REC LIMITS
Benzene	10.0	10.2	102%	52-133
Toluene	10.0	10.7	107%	57-136
Ethylbenzene	10.0	10.7	107%	56-139
TOTAL Xylenes	10.0	11.5	115%	61-139
P-BFB			85%	61-139

* Limits established by Anametrix, Inc.

9303031 (18)

Woodward-Clyde Consultants
500 12th Street, Suite 100, Oakland, CA 94607-4014
(510) 893-3600

Chain of Custody Record

PROJECT NO. 8910084A

SAMPLERS: (Signature) S. A...

	DATE	TIME	SAMPLE NUMBER	Sample Matrix (S)oil, (W)ater, (A)ir	ANALYSES: EPA Method	EPA Method	EPA Method	EPA Method BDIS - not	TPH-gas	BTEX					Number of Containers	REMARKS (Sample preservation, handling procedures, etc.)
(1)	3/2	2:35	MW-18	W				✓	✓	✓					3	
(2)	"	1139	MW-19	"				✓	✓	✓					3	
(3)	"	1203	MW-5	"				✓	✓	✓					3	

Results to Bill Copeland 510/874-3192

TOTAL NUMBER OF CONTAINERS: 9

RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)	RELINQUISHED BY: (Signature)	DATE/TIME	RECEIVED BY: (Signature)
S. A...	3/2 1630 ~~1715~~	J. L. Kamps	J. L. Kamps	3/2 18:10	

METHOD OF SHIPMENT:	SHIPPED BY: (Signature)	COURIER: (Signature)	RECEIVED FOR LAB BY: (Signature)	DATE/TIME
				3/2/93 18:10

Sample No.

WATER SAMPLE LOG

Sample No. MW-5

Project No.: 8910084A Date: 3/2/93

Project Name: 9TH & JEFFERSON

Sample Location: MW-5

Well Description: 2" SCH 40 PVC

Weather Conditions: SUNNY, COOL, PARTLY CLOUDY

Observations / Comments:

Quality Assurance

Sampling Method: TEFLON BAILER

Method to Measure Water Level: SOUNDER

Pump Lines: New / Cleaned Bailer Lines: New / (Cleaned)

Method of cleaning Pump / Bailer: ALCONOX RINSE

pH Meter No.: 217256 Calibrated 3/2 7.00/10.0

Specific Conductance Meter No.: 13750 Calibrated 3/2 1000uS

Comments:

Sampling Measurements

Water Level (below MP) at Start: 22.93 End: 25.35

Measuring Point (MP): NOTCH AT TOP OF CASING

Time	Discharge (gallons)	pH	Temp. (°C)	Specific Conductance (µmhos / cm)	Turbidity	Color	Odor	Comments
12:18	0.5	6.8	20	700		CLOUDY		SILTY
12:35	4.5	6.8	21.5	650		BRN		"
12:40	7.0	6.8	20.5	680		"		"
12:50	10.0	6.8	21.0	690		"		"
1203	14.0	6.8	20.5	690		"		"

Total Discharge: 14.5 Casing Volumes Removed:

Method of disposal of discharged water: 55 GAL DRUM

Number and size of sample containers filled: 3 - 40 ml VOA's

Collected by: SHE

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500 12th Street, Suite 100, Oakland, CA 94607-4014
(415) 893-3600

Sample No.

WATER SAMPLE LOG

Sample No. MW-18

Project No. : 8910084A Date: 3/2/93

Project Name: 9TH & JEFFERSON

Sample Location: 9TH & JEFFERSON MW-18 EAST SIDE OF LOT

Well Description: 2" SCH 40 PVC

Weather Conditions: SUNNY, COOL, PARTLY CLOUDY

Observations / Comments:

Quality Assurance

Sampling Method: TEFLON BAILER

Method to Measure Water Level: SOUNDER

Pump Lines: New / Cleaned Bailer Lines: New / (Cleaned)

Method of cleaning Pump / Bailer: ALCONOX RINSE

pH Meter No.: 217256 Calibrated 3/2 7.0/10.0

Specific Conductance Meter No.: 13750 Calibrated 3/2 2=Dunks

Comments:

Sampling Measurements

Water Level (below MP) at Start: 23.71 End: 23.73

Measuring Point (MP): NOTCH AT TOP OF CASING

Time	Discharge (gallons)	pH	Temp. (°C)	Specific Conductance (µmhos / cm)	Turbidity	Color	Odor	Comments
1:50	1	6.9	20	420		BRN		SILTY
2:04	5.0	6.9	20	482		"		"
2:13	10.0	6.9	20.3	470		"		"
2:24	13	6.9	20	470		"		"
2:30	15	6.9	20.3	550		"		"
2:35	17	6.9	20	550		"		"

Total Discharge: 17 Casing Volumes Removed:

Method of disposal of discharged water: 55 GAL DRUM

Number and size of sample containers filled: 3 - 40 mL VOAs

Collected by: S. ARR

Woodward-Clyde Consultants
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WATER SAMPLE LOG

Sample No. MW-19

Project No.: 8910084 A Date: 3/2/93

Project Name: 9TH & JEFFERSON

Sample Location: MW-19 N.E CORNER OF PARKING LOT

Well Description: 2" SCH 40

Weather Conditions: SUNNY & COOL ; PARTY CLOUDY

Observations / Comments:

Quality Assurance

Sampling Method: TEFLON BAILER

Method to Measure Water Level: SOUNDER

Pump Lines: New / Cleaned Bailer Lines: New / (Cleaned)

Method of cleaning Pump / Bailer: ALCONOX RINSE

pH Meter No.: 217256 Calibrated 3/2 7.00/10.

Specific Conductance Meter No.: 13750 Calibrated 3/2 2500uMHOS

Comments: FREE PRODUCT 1/4" AT START

Sampling Measurements

Water Level (below MP) at Start: 23.50 End: 24.65

Measuring Point (MP): NOTCH AT TOP OF CASING

Time	Discharge (gallons)	pH	Temp. (°C)	Specific Conductance (µmhos / cm)	Turbidity	Color	Odor	Comments
10:53	2.5	8.1	19	420		GRN		FREE PROD
11:01	5.0	6.9	22	439		"		" "
11:19	9.0	6.7	20.5	468		"		NO FREE PROD
11:30	11.5	6.8	20	455		"		" " "
11:39	15.0	6.8	20	460		"		" " "

Total Discharge: 15 G Casing Volumes Removed:

Method of disposal of discharged water: 55 GAL DRUM

Number and size of sample containers filled: 3 - 40 mL VOA

Collected by: SAS

Woodward-Clyde Consultants
500 12th Street, Suite 100, Oakland, CA 94607-4014
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