ES
ENGINEERING-SCIENCE, INC.

600 BANCROFT WAY
BERKELEY, CA 94710
Tel: (415) 548-7970 Fax: (415) 548-7635

28 December 1990
Ref: NC222.04

Alameda County Environmental Health Services
Hazardous Materials
80 Swan Way, Suite 200
Oakland, CA 94621

Attention: Mr. Dennis Byrne

Subject: November 1990 (Fifth Consecutive Quarterly) Groundwater Monitoring Report, 1650 65th Street Site, Emeryville, California

91 JAN 10 PM 2:51

Dear Mr. Byrne:

INTRODUCTION

This letter report presents the hydrologic and hydrochemical results of November 1990 groundwater monitoring event conducted at the 1650 65th Street Site in Emeryville, California. Engineering-Science, Inc. (ES) completed a year of quarterly groundwater monitoring and has been retained by P. O. Partners to complete a second year of quarterly monitoring. This letter report presents findings for the fifth consecutive quarterly monitoring event. The previous four monitoring events occurred in August 1990, May 1900, February and October 1989 (Engineering-Science, 1990d, 1990c, 1990a, 1989a). The purpose of quarterly groundwater sampling is to provide a data set to evaluate seasonal variations and/or offsite source inputs on the groundwater quality and quantity.

There are seven groundwater monitoring wells and one extraction well on the site. Figure 1 shows the locations of all seven monitoring wells at the site. Extraction well EW-1 and monitoring well MW-2 are located in the excavation backfill of the former on-site Underground Fuel Storage Tank (UFST). Well MW-3 is located near the western property line, wells MW-4 and MW-6 are located near the southern property line. Wells MW-5 and MW-7 are located along the northern property line near the former UFSTs on the adjacent property. The groundwater monitoring event consists of measuring the groundwater elevation levels in all seven monitoring wells collecting water samples and analyzing them to determine groundwater quality.

In December 1990 an activated carbon groundwater treatment system was installed at extraction well EW-1 on the project site. This system was first started on 12 December 1990. Ongoing sampling of the discharge from the EW-1 treatment system is being conducted by ES under the direction of East Bay Municipal Water District, and will be discussed in a separate report. The location of the treatment system is shown on Figure 1.

SAMPLING PROTOCOLS

Groundwater samples were collected from the monitoring wells on 29 November 1990 following the Regional Water Quality Control Board (RWQCB) groundwater sampling guidelines. Before sampling, the static groundwater levels in all the wells were recorded using an electronic water level indicator to a precision of 0.01 feet.

The next step entailed the collection of groundwater samples. Each well was initially checked for the presence of free floating product. This was accomplished by collecting water from the top 6 inches using a quartz/Teflon bailer and inspecting it for free floating product, any odor, and/or oily sheen. Well MW-2 was observed to have free floating product less than one inch in thickness. Both wells EW-1 and MW-2 had a strong gasoline odor.

In order to sample for dissolved product, a minimum of three submerged well casing volumes were purged from each well prior to sampling. Field measurements of temperature, hydrogen ion index (pH) and electrical conductivity were recorded three times: prior to purging, after two well volumes had been removed from each well, and after three volumes had been removed from each well. Each time, the parameters were compared with previously recorded values to document stabilization. The purpose of recording temperature, pH, and EC readings was to ensure that a water sample representative of formation water was collected. Temperature, EC, and pH values in each of the wells, except MW-2 stabilized within the first three readings (initial, two casing volumes, and three casing volumes) thus water samples were subsequently collected. In the case of MW-2 the parameters were not measured due to the presence of floating product. Well MW-2 was purged of five submerged well casing volumes prior to collection of groundwater samples.

Groundwater purging and sampling was done using a clean quartz/Teflon bailer. Samples for total volatile hydrocarbons (gasoline and BTX&E) were collected in 40 ml glass containers specifically designed to prevent the loss of volatile components. Containers were preserved with hydrochloric acid per standard protocol for the method. Samples for total extractable hydrocarbons (diesel) were collected in 1000 ml glass amber bottles. All samples were labelled and chain-of-custody records were completed prior to placement of these containers in an iced cooler. After collection of water samples from individual wells, the sampling equipment was decontaminated by washing with a mild detergent/water solution followed by rinsing with deionized water. Appendix A contains the groundwater sampling notes, water levels recorded in each well and chain-of-custody records.

ANALYTICAL PARAMETERS

Groundwater samples collected from all wells were analyzed using EPA Method 8020 for BTX&E and Method 8015 for both gasoline and diesel. The analytical procedures followed are referenced with analytical results in Appendix B.

GROUNDWATER ELEVATIONS

Table 1 lists the historical groundwater levels for the last four quarterly monitoring events for each surveyed well. Water levels measured in the field were calculated with reference to USGS datum. The groundwater elevations in the surveyed wells were used to construct the water table isopleth map presented as Figure 2.

Water levels in each of the four surveyed wells declined since the last monitoring event in August 1990. Based on the water levels measured on 29 November 1990, the groundwater flow direction at the site was determined to be toward the southwest. This groundwater flow direction

TABLE 1

HISTORICAL GROUNDWATER LEVELS
(Feet Above Mean Sea Level)

	Quarterly Sampling Events			
Well ID	21 February 1990	25 May 1990	29 August 1990	29 November 1990
MW-2	4.03	3.92	4.03	3.76
MW-3	3.27	3.20	2.95	2.65
MW-4	3.61	3.66	3.74	3.50
MW-5	5.90	5.23	5.06	4.64
MW-6	NI	NS	NS	NS
MW-7	NI	NS	NS	NS
EW-1	NI	NS	NS	NS

Notes: All elevations w.r.t. USGS datum
NI = Well Not Installed
NS = Well Elevations Not Surveyed

is consistent with all previous water level data. All the wells recharged quickly except Well MW-7 which recharged after about 20 minutes.

ANALYTICAL RESULTS

Table 2 summarizes the historical groundwater sampling analytical results of the last five events (November 1989, February 1990, May 1990, August 1990 and November 1990) and the relevant state and federal drinking water standards.

Samples which contained gasoline above the detection limits were MW-2 (73,000 µg/l), MW-3 (900 µg/l), MW-5 (600 µg/l), MW-6 (1,200 µg/l) and EW-1 (47,000 µg/l). These values for gasoline are generally higher than levels detected in the previous sampling event, with the exception of MW-6, which was not previously analyzed for gasoline. All wells contained diesel above the detection limit; MW-2 (3500 µg/l), MW-3 (800 µg/l), MW-4 (700 µg/l), MW-5 (900 µg/l), MW-6 (1400 µg/l) MW-7 (800 µg/l) and EW-1 (3100 µg/l). The values for diesel held relatively steady since the last sampling event, with the exception of MW-6 and MW-7 which were both previously ND. Benzene was also detected in all wells; MW-2 (6,900 µg/l), MW-3 (3.4 µg/l), MW-4 (2.7 µg/l), MW-5 (69 µg/l), MW-6 (1.2 µg/l), MW-7 (54 µg/l) and EW-1 (6000 µg/l). Toluene concentrations above proposed Federal Maximum Contaminant Levels (MCL's)

were detected in only two wells; MW-2 (5900 µg/l) and EW-1 (3,400 µg/l). The same wells (MW-2 and EW-1) contained total xylenes and ethylbenzene above California MCLs.

Laboratory reporting limits of all compounds in all wells are listed in the laboratories report in Appendix B

SUMMARY

The groundwater elevations have fluctuated slightly since the August 1990 monitoring event. The groundwater flow direction is essentially the same, to the southwest.

Analytical results from the November 1990 sampling indicate no distinct overall trend in contaminant concentrations. Monitoring well MW-6 was sampled for the first time and showed minor trace levels of BTXE (1.2 µg/l) and TPH (2.6 mg/l). These concentrations should be reduced after the operation of the extraction well system which has a radius of capture which should extend to MW-6. Overall 11 samples had higher concentrations than the previous sampling event and 23 samples had lower concentrations while the remaining were either the same or not previously sampled. The majority of the increases were for gasoline and diesel while the majority of the decreases were for BTXE constituents. The indistinct trend may be associated with drought conditions that have resulted in a lowering of the groundwater table in November which in years of normal precipitation would be a month with typically higher groundwater levels due to winter recharge.

Very truly yours,

John Bridenbaugh

John Bridenbaugh, PE
Senior Engineer

Richard S. Makdisi

Richard S. Makdisi, R.G.
Project Director

RSM/AS/sls/dag/163-14.R3

Attachments

cc: Mr. Walt Kaczmarek, P.O. Partners

TABLE 2

HISTORICAL GROUNDWATER SAMPLING ANALYTICAL RESULTS
1650 - 65TH STREET PROPERTY, EMERYVILLE

Well ID	Sample Date	Total Petroleum Hydrocarbons (ug/L)		Aromatic Hydrocarbons (ug/L)					Purgeable Halocarbons (ug/L)	Lead (mg/L)
		Gasoline	Diesel	Benzene	Toluene	Xylenes (total)	Ethyl-Benzene	Total BTXE		
MW-2	Nov 89	100,000	NA	8,400	7,400	13,000	2,400	31,200	15*	0.05
	Feb 90	54,000	NA	7,800	5,600	8,400	1,600	23,400	32*	0.021
	May 90	40,000	NA	7,800	7,500	7,600	1,600	24,500	76*	0.025
	Aug 90	49,000	4,600	9,000	8,000	8,900	ND	25,900	40*	0.0059
	Nov 90	73,000	3,500	6,900	5,900	7,400	1,400	21,600	NA	NA
MW-3	Nov 89	130	NA	2.2	ND	3.0	ND	5.2	ND	ND
	Feb 90	ND	NA	2.5	ND	ND	ND	2.5	NA	0.011
	May 90	ND	ND	2	ND	ND	ND	2.0	ND	NA
	Aug 90	ND	800	4.4	2.9	5.4	ND	12.7	NA	NA
	Nov 90	900	800	3.4	ND	ND	ND	3.4	NA	NA
MW-4	Nov 89	200	NA	2.3	ND	ND	ND	2.3	ND	ND
	Feb 90	ND	NA	ND	ND	ND	ND	ND	NA	0.006
	May 90	ND	ND	1	ND	ND	ND	1	ND	NA
	Aug 90	ND	800	8.9	7.1	9.4	ND	25.4	NA	NA
	Nov 90	ND	700	2.7	ND	ND	ND	2.7	NA	NA
MW-5	Nov 89	ND	NA	74	ND	4.2	ND	78.2	ND	ND
	Feb 90	ND	NA	200	ND	ND	ND	200.0	NA	0.012
	May 90	ND	ND	110	ND	ND	ND	110.0	ND	NA
	Aug 90	ND	700	66	2.2	3.8	ND	72.0	NA	NA
	Nov 90	600	900	69	ND	ND	ND	69.0	NA	NA
MW-6	Nov 89	NI	NI	NI	NI	NI	NI	NI	NI	NI
	Feb 90	NI	NI	NI	NI	NI	NI	NI	NI	NI
	May 90	NA	ND	ND	ND	ND	ND	ND	ND	ND**
	Aug 90	NA	ND	NA	NA	NA	NA	NA	NA	ND**
	Nov 90	1200	1400	1.2	ND	ND	ND	1.2	NA	NA
MW-7	Nov 89	NI	NI	NI	NI	NI	NI	NI	NI	NI
	Feb 90	NI	NI	NI	NI	NI	NI	NI	NI	NI
	May 90	NA	600	240	ND	ND	ND	240.0	ND	ND**
	Aug 90	ND	ND	81	1.8	1.6	ND	84.40	ND	ND**
	Nov 90	ND	800	54	ND	ND	ND	54.0	NA	NA
EW-1	Nov 89	NI	NI	NI	NI	NI	NI	NI	NI	NI
	Feb 90	NI	NI	NI	NI	NI	NI	NI	NI	NI
	May 90	20,000	ND	7,500	4,500	6,300	1,000	19,300	68	ND**
	Aug 90	NA	3,500	6,000	4,200	4,600	ND	14,800	16*	ND**
	Nov 90	47,000	3,100	6,000	3,400	4,700	1,000	15,100	NA	NA
Drinking Water Standards				1^	2,000~	1,750^	680^		0.5^	5.0^

Notes: * = 1,2-Dichlorethane concentration (only 1,2-Dichloroethane detected)

^ = California Maximum Contaminant Level (MCL, California Code of Regulations, Title 22, Section 64435, current as of 3/31/90

~ = Proposed Federal Maximum Contaminant Level, Region 9 Environmental Protection Agency Drinking Water Standards and Health Advisory Tables Drinking Water Branch, June 1989

ND = Not Detected, NA = Not Analyzed, NI = Well Not Installed

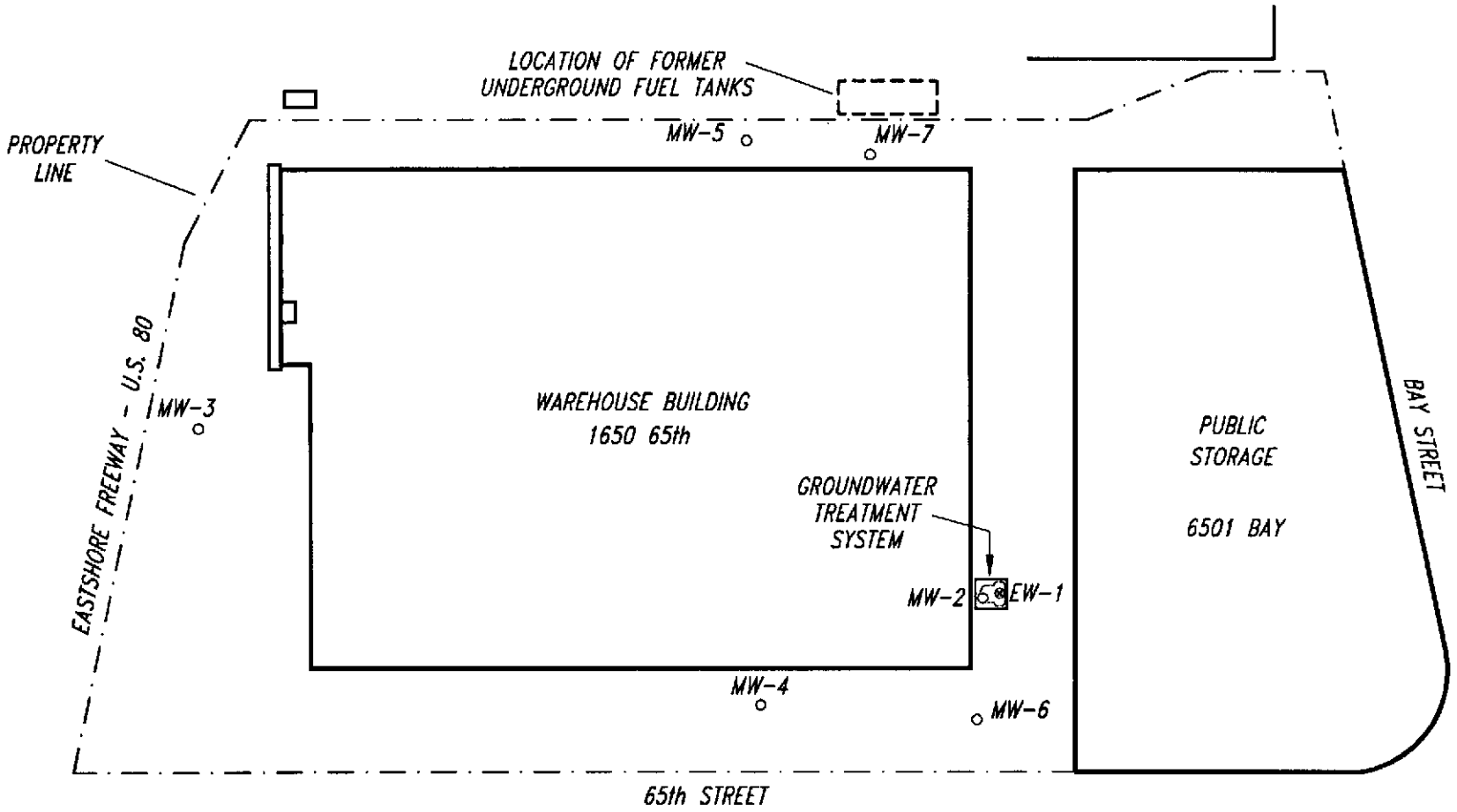
** = Organic lead

600-30.R1/ALL

SITE PLAN

1650 65th Street Property

Emeryville, California



ENGINEERING-SCIENCE

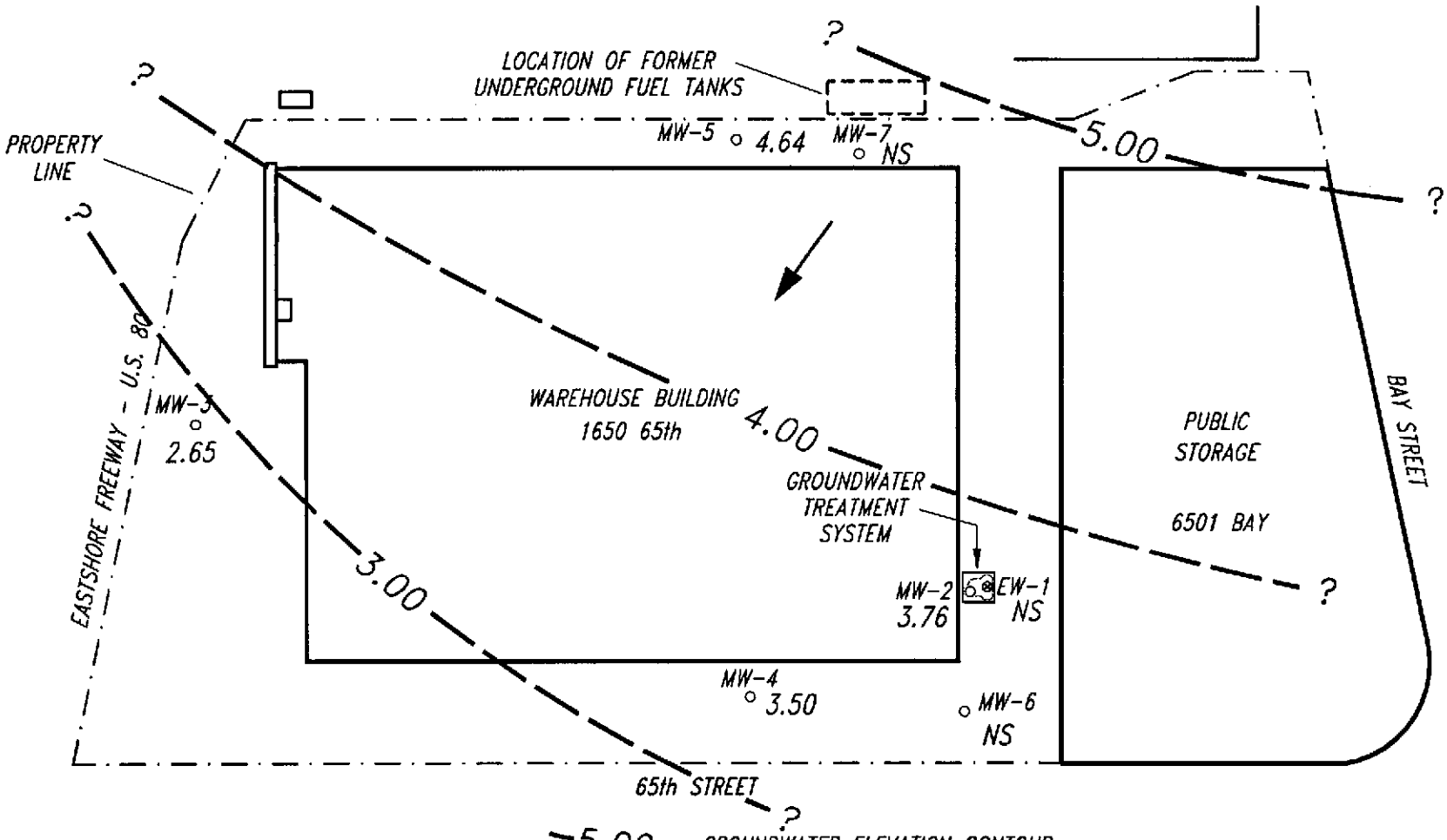
C107-06.R3 1/3/91

FIGURE 1

GROUNDWATER ELEVATION MAP

1650 65th Street Site, Emeryville, California

29 November 1990



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C155-12.R0 1/3/91

FIGURE 2

REFERENCES

Engineering-Science, Inc., 1987a, Underground Fuel Storage Tank Site Investigation near the Southeast Corner of the Warehouse Building, 1650 65th Street Property, Emeryville, California.

Engineering-Science, Inc., 1987b, Soil Remediation Plan for the Southeastern Corner of the 1650 65th Street Property, Emeryville, California.

Engineering-Science, Inc., 1988, Implementation of Soil Remedial Action Plan Report for United States Postal Service at 1650 65th Street, Emeryville, California.

Engineering-Science, Inc., 1989a, October 1989 Quarterly Groundwater Monitoring Results for the 1650 65th Street Property in Emeryville, California.

Engineering-Science, Inc., 1989b, November 1989 Groundwater Contamination Investigation, 1650 65th Street, Emeryville, California.

Engineering-Science, Inc., 1990a, February 1990 Second Quarterly Groundwater Monitoring Report 1650 65th Street, Emeryville, California.

Engineering-Science, Inc., 1990b, June 1990 Evaluation of Remedial Alternatives and Remedial Action Plan for the 1650 65th Street Property, Emeryville, California.

Engineering-Science, Inc., 1990c, June 1990 Third Quarterly Groundwater Monitoring Report 1650 65th Street, Emeryville, California.

Engineering-Science, Inc., 1990d, October 1990 Fourth Quarterly Groundwater Monitoring Report 1650 65th Street, Emeryville, California

APPENDIX A

GROUNDWATER MONITORING FIELD NOTES

WATER ELEVATION DATA
P.O. PARTNERS, BERKELEY

PERSONNEL: A. Singh & M. Friedman DATE: 29 NOVEMBER 1990

WELL ID	WATER LEVEL FROM T.O.C. (Feet)	WELL DEPTH FROM T.O.C (Feet)	WELL CASING DIA (Inches)	G.S. HEIGHT FROM T.O.C (Feet)	WELL CASING VOLUME (Gallons)	GALLONS/ CASING VOLUME (X3)	T.O.C. ELEV. USGS (Feet Above MSL)	WATER LEVEL USGS (Feet Above MSL)
EW-1	12.00	28.17	4.00	0.40	10.51	31.53	NS	NS
MW-2	11.99	27.00	2.00	0.63	9.76	29.27	15.75	3.76
MW-3	9.80	18.25	4.00	0.29	5.49	16.48	12.45	2.65
MW-4	8.74	15.88	4.00	0.36	4.64	13.92	12.24	3.50
MW-5	8.17	17.96	4.00	0.25	6.36	19.09	12.81	4.64
MW-6	9.10	18.50	4.00	0.10	6.11	18.33	NS	NS
MW-7	7.81	18.70	4.00	0.20	7.08	21.24	NS	NS

NOTES

1. T.O.C. = TOP OF CASING. ALL MEASUREMENTS IN FEET RELATIVE TO TOP OF CASING

2. 2" ID CASING = .16 GALLONS PER LINEAR CASING FOOT.

3. 4" ID CASING = 0.65 GALLONS PER LINEAR CASING FOOT.

4. NS = NOT SURVEYED

WLPONOV90

GROUNDWATER SAMPLING FIELD NOTES

ENGINEERING–SCIENCE, INCORPORATED

PROJECT/LOCATION: P.O. PARTNERS, BERKELEY
PROJECT NUMBER: NC222.13

PERSONNEL: M. Friedman & A. Singh
DATE: 11/29/90

WELL ID	SAMPLE DATE, TIME AND SAMPLER	WATER LEVEL BEFORE*, WELL DIAMETER AND DEPTH (FEET)	WATER LEVEL AFTER* (FEET)	GALLONS PER CASING VOLUME	WELL PURGING METHOD**	PUMP ON/OFF	TEMP. oC	SPECIFIC CONDUCT. (UMHOS/CM)	pH	TOTAL WATER PURGED (GALS.)	SAMPLE COLL. METHOD	ANALYSIS & PRESERVATIVE NO.& TYPE OF CONTAINERS	COMMENTS
MW-6	11/29/90 13:50 MF	9.1 4" 18.70	NR	6.2	B	N/A	21.0 19.0 19.3	6000 9000 10000	6.68 6.74 6.92	19	B	(a), (b)	Mod. recharge, no odor, no sheen, turbid.
MW-4	11/29/90 14:00 AS	8.74 4" 15.98	NR	4.6	B	N/A	20.6 20.3 19.9	9500 9500 9500	8.73 8.80 8.83	15	B	(a), (b)	Mod. recharge, slight odor, no sheen, turbid.
MW-3	11/29/90 14:35 AS/MF	9.80 4" 18.25	NR	5.5	B	NA	19.8 19.6 19.6	5000 5000 5000	8.47 8.27 8.26	16.5	B	(a), (b)	Mod. recharge, slight gas odor, no sheen, turbid.
MW-5	11/29/90 15:15 AS	8.17 4" 18.12	NR	6.5	B	N/A	16.8 15.9 16.4	2850 2750 2700	7.67 7.78 7.80	19.5	B	(a), (b)	Mod. recharge, no odor, no sheen, turbid.
MW-7	11/29/90 15:40 MF	7.81 4" 18.70	NR	7.1	B	N/A	16.8 16.5 16.0	2000 2100 2150	7.99 8.23 8.24	21.5	B	(a), (b)	Slow recharge, no odor, no sheen, turbid.

NOTES:

* *Water level from top of casing in feet.*

** *WW - Well Wizard; G - Grundfos Pump; B - Bailer*

(a) TPHG - Total Petrleum Hydrocarbons as Gasoline (3 40ml VOA vials).

(b) TPHD - Total Petrleum Hydrocarbons as Diesel (1 amber liter).

(c) EPA 602 - Purgable Aromatics (3 40ml VOA vials, or analyzed with TPHG).

(d) Well sampled at 80% recharge after purging it dry.

NA Not applicable

NR Not recorded

POFN1NOV

GROUNDWATER SAMPLING FIELD NOTES

ENGINEERING-SCIENCE, INCORPORATED

PROJECT/LOCATION: P.O. PARTNERS, BERKELEY
PROJECT NUMBER: NC222.13

PERSONNEL: M. Friedman & A. Singh
DATE: 11/29/90

WELL ID	SAMPLE DATE, TIME AND SAMPLER	WATER LEVEL BEFORE*, WELL DIAMETER AND DEPTH (FEET)	WATER LEVEL AFTER* (FEET)	GALLONS PER CASING VOLUME	WELL PURGING METHOD**	PUMP ON/OFF	TEMP. oC	SPECIFIC CONDUCT. (UMHOS/CM)	pH	TOTAL WATER PURGED (GALS.)	SAMPLE COLL. METHOD	ANALYSIS & PRESERVATIVE NO.& TYPE OF CONTAINERS	COMMENTS
MW-2	11/29/90 16:10 MF	11.99 2" 27.00	NR	2.2	B	N/A		No parameters taken due to sheen.		7	B	(a), (b)	Mod. recharge, definite odor and sheen, turbid.
EW-1	11/29/90 16:40 AS	12.00 4" 28.17	NR	10.5	B	N/A	17.2 18.1 17.6	3300 3500 3500	8.99 8.87 8.79	32	B	(a), (b)	Good recharge, slight odor, no sheen, turbid.

NOTES:

* *Water level from top of casing in feet.*
** *WW - Well Wizard; G - Grundfos Pump; B - Bailer*
(a) *TPHG - Total Petrleum Hydrocarbons as Gasoline (3 40ml VOA vials).*
(b) *TPHD - Total Petrleum Hydrocarbons as Diesel (1 amber liter).*
(c) *EPA 602 - Purgable Aromatics (3 40ml VOA vials, or analyzed with TPHG).*
(d) *Well sampled at 80% recharge after purging it dry.*
NA *Not applicable*
NR *Not recorded*

POFN2NOV

APPENDIX B

ANALYTICAL SAMPLING RESULTS AND CHAIN OF CUSTODY

[redacted] OF CUSTODY RECORD [redacted]

CLIENT:	PROJECT MANAGER:	PROJ. NO.:
ENGINEERING-SCIENCE, INC. BERKELEY	Clyde Wong	NC 222.13

PROJECT NAME / LOCATION: P.O. Partners

SAMPLER(S): (SIGNATURE) Ajay Singh, Michael Friedman

SAMPLE ID	DATE	TIME	MATRIX	SAMPLE LOCATION	NO. OF CONTAINERS	TPHG / BTXE	TPHD							REMARKS
												PRESERVED	TO BE COMPOSITED BY LAB	TURNAROUND TIME
						ANALYSES REQUIRED								
MW-6	11/29	13:50	Water	Well # MW-6	4	✓	✓							-01 ABCD
MW-4	11/29	14:00	"	Monitoring well # MW-4	4	✓	✓							-02 ABCD
MW-3	11/29	14:35	"	" " " MW-3	4	✓	✓							-03 ABCD
MW-5	11/29	15:15	"	" " " MW-5	4	✓	✓							-04 ABCD
MW-7	11/29	15:40	"	" " " MW-7	4	✓	✓							-05 ABCD
MW-2	11/29	16:10	"	" " " MW-2	4	✓	✓							-06 ABCD
EW-1	11/29	16:22	"	" " " EW-1	4	✓	✓							-07 ABCD
														T-4 (VOA)
														M-2 (DIESEL)

RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)	RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED BY: (SIGNATURE)
[redacted]	11/24 4:55				
RELINQUISHED BY: (SIGNATURE)	DATE/TIME	RECEIVED FOR LABORATORY BY: (SIGNATURE)	DATE/TIME	REMARKS	
			11/30 6:55		

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ENGINEERING-SCIENCE, INC.

BERKELEY LABORATORY
600 BANCROFT WAY
BERKELEY, CA 94710
Tel: (415) 841-7353

Report Date: 12/17/90

Work Order No.:2468

Client: Richard Makdisi
ES Berkeley/P.O.Partners Emeryville
600 Bancroft Way
Berkeley, CA. 94710

Date of Sample Receipt: 11/30/90

Your samples identified as:

MW-6
MW-4
MW-3
MW-5
MW-7
MW-2
EW-1

were analyzed for TPH diesel by modified EPA Method 8015,TPH gasoline and BTEX by EPA Method 8020.

The analytical reports for the samples listed above are attached.

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
Modified EPA 8015

Work Order NO.: 2468
Laboratory ID:2468-1
Client ID:MW-6
Date Collected:11-29-90

% Moisture:NA
Matrix:WATER
Level:NA
Units:mg/L

GASOLINE:

Dilution Factor: 1.0
Date Analyzed:12-4-90
Inst. Ser. #:VGC5-901026
QC Batch #:SWFB5901207A&B

Compound	Result	Reporting Limit
GASOLINE	1.2	0.5

ND-Not Detected
NA-Not Applicable

ANALYST: [signature]

GROUP LEADER: [signature]

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
Modified EPA 8015

Work Order NO.: 2468
Laboratory ID:2468-2
Client ID:MW-4
Date Collected:11-29-90

% Moisture:NA
Matrix:WATER
Level:NA
Units:mg/L

GASOLINE:

Dilution Factor: 1.0
Date Analyzed:12-4-90
Inst. Ser. #:VGC5-901026
QC Batch #:SWFB5901207A&B

Compound	Result	Reporting Limit
GASOLINE	ND	0.5

ND-Not Detected
NA-Not Applicable

ANALYST: AT

GROUP LEADER:

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
Modified EPA 8015

Work Order NO.: 2468
Laboratory ID:2468-3
Client ID:MW-3
Date Collected:11-29-90

% Moisture:NA
Matrix:WATER
Level:NA
Units:mg/L

GASOLINE:

Dilution Factor: 1.0
Date Analyzed:12-4-90
Inst. Ser. #:VGC5-901026
QC Batch #:SWFB5901207A&B

Compound	Result	Reporting Limit
GASOLINE	0.9	0.5

ND-Not Detected
NA-Not Applicable

ANALYST: RT

GROUP LEADER:

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
Modified EPA 8015

Work Order NO.: 2468
Laboratory ID:2468-4
Client ID:MW-5
Date Collected:11-29-90

% Moisture:NA
Matrix:WATER
Level:NA
Units:mg/L

GASOLINE:

Dilution Factor: 1.0
Date Analyzed:12-4-90
Inst. Ser. #:VGC5-901026
QC Batch #:SWFB5901207A&B

Compound	Result	Reporting Limit
GASOLINE	0.6	0.5

ND-Not Detected
NA-Not Applicable

ANALYST:

GROUP LEADER:

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
Modified EPA 8015

Work Order NO.: 2468
Laboratory ID:2468-5
Client ID:MW-7
Date Collected:11-29-90

% Moisture:NA
Matrix:WATER
Level:NA
Units:mg/L

GASOLINE:

Dilution Factor: 1.0
Date Analyzed:12-4-90
Inst. Ser. #:VGC5-901026
QC Batch #:SWFB5901207A&B

Compound	Result	Reporting Limit
GASOLINE	ND	0.5

ND-Not Detected
NA-Not Applicable

ANALYST: [signature]

GROUP LEADER: [signature]

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
Modified EPA 8015

Work Order NO.: 2468
Laboratory ID:2468-6
Client ID:MW-2
Date Collected:11-29-90

% Moisture:NA
Matrix:WATER
Level:NA
Units:mg/L

GASOLINE:

Dilution Factor: 50.0
Date Analyzed:12-7-90
Inst. Ser. #:VGC5-901026
QC Batch #:SWFB5901207A&B

Compound	Result	Reporting Limit
GASOLINE	73.0	25.0

ND-Not Detected
NA-Not Applicable

ANALYST: [signature]

GROUP LEADER: [signature]

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
Modified EPA 8015

Work Order NO.: 2468
Laboratory ID:2468-7
Client ID:EW-1
Date Collected:11-29-90

% Moisture:NA
Matrix:WATER
Level:NA
Units:mg/L

GASOLINE:

Dilution Factor: 50.0
Date Analyzed:12-7-90
Inst. Ser. #:VGC5-901026
QC Batch #:SWFB5901207A&B

Compound	Result	Reporting Limit
GASOLINE	47.0	25.0

ND-Not Detected
NA-Not Applicable

ANALYST:

GROUP LEADER:

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
Modified EPA 8015

Work Order NO.: 2468
Laboratory ID:2468-1
Client ID:MW-6
Date Collected:11-29-90

% Moisture:NA
Matrix:WATER
Level:NA
Units:mg/L

DIESEL:
Date Extracted:12-7-90
Dilution Factor: 1.0
Date Analyzed:12-7-90
Inst. Ser. #:EGC2-901128
QC Batch #:W90QCB009-DES

==========

Compound	Result	Reporting Limit
DIESEL	1.4	0.5

ND-Not Detected
NA-Not Applicable

ANALYST: AT

GROUP LEADER: SF

ES-ENGINEERING SCIENCE, INC.

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Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
Modified EPA 8015

Work Order NO.: 2468
Laboratory ID:2468-2
Client ID:MW-4
Date Collected:11-29-90

% Moisture:NA
Matrix:WATER
Level:NA
Units:mg/L

DIESEL:
Date Extracted:12-7-90
Dilution Factor: 1.0
Date Analyzed:12-7-90
Inst. Ser. #:EGC2-901128
QC Batch #:W90QCB009-DES

Compound	Result	Reporting Limit
DIESEL	0.7	0.5

ND-Not Detected
NA-Not Applicable

ANALYST: RT

GROUP LEADER: SA

ES-ENGINEERING SCIENCE, INC.

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Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
Modified EPA 8015

Work Order NO.: 2468
Laboratory ID:2468-3
Client ID:MW-3
Date Collected:11-29-90

% Moisture:NA
Matrix:WATER
Level:NA
Units:mg/L

DIESEL:
Date Extracted:12-7-90
Dilution Factor: 1.0
Date Analyzed:12-7-90
Inst. Ser. #:EGC2-901128
QC Batch #:W90QCB009-DES

==========

Compound	Result	Reporting Limit
DIESEL	0.8	0.5

ND-Not Detected
NA-Not Applicable

ANALYST: [signature]

GROUP LEADER: [signature]

ES-ENGINEERING SCIENCE, INC.

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GC ANALYTICAL REPORT
Analytical Method
Modified EPA 8015

Work Order NO.: 2468
Laboratory ID:2468-4
Client ID:MW-5
Date Collected:11-29-90

% Moisture:NA
Matrix:WATER
Level:NA
Units:mg/L

DIESEL:
Date Extracted:12-7-90
Dilution Factor: 1.0
Date Analyzed:12-7-90
Inst. Ser. #:EGC2-901128
QC Batch #:W90QCB009-DES

Compound	Result	Reporting Limit
DIESEL	0.9	0.5

ND-Not Detected
NA-Not Applicable

ANALYST: JT

GROUP LEADER:

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Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
Modified EPA 8015

Work Order NO.: 2468
Laboratory ID:2468-5
Client ID:MW-7
Date Collected:11-29-90

% Moisture:NA
Matrix:WATER
Level:NA
Units:mg/L

DIESEL:
Date Extracted:12-7-90
Dilution Factor: 1.0
Date Analyzed:12-7-90
Inst. Ser. #:EGC2-901128
QC Batch #:W90QCB009-DES

Compound	Result	Reporting Limit
DIESEL	0.8	0.5

ND-Not Detected
NA-Not Applicable

ANALYST:

GROUP LEADER:

ES-ENGINEERING SCIENCE, INC.

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Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
Modified EPA 8015

Work Order NO.: 2468
Laboratory ID:2468-6
Client ID:MW-2
Date Collected:11-29-90

% Moisture:NA
Matrix:WATER
Level:NA
Units:mg/L

DIESEL:
Date Extracted:12-7-90
Dilution Factor: 1.0
Date Analyzed:12-7-90
Inst. Ser. #:EGC2-901128
QC Batch #:W90QCB009-DES

Compound	Result	Reporting Limit
DIESEL	3.5	0.5

ND-Not Detected
NA-Not Applicable

ANALYST: [signature]

GROUP LEADER: [signature]

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Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
Modified EPA 8015

Work Order NO.: 2468
Laboratory ID:2468-7
Client ID:EW-1
Date Collected:11-29-90

% Moisture:NA
Matrix:WATER
Level:NA
Units:mg/L

DIESEL:
Date Extracted:12-7-90
Dilution Factor: 1.0
Date Analyzed:12-7-90
Inst. Ser. #:EGC2-901128
QC Batch #:W90QCB009-DES

Compound	Result	Reporting Limit
DIESEL	3.1	0.5

ND-Not Detected
NA-Not Applicable

ANALYST: LT

GROUP LEADER: SF

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Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
BTEX Aromatic Compounds by 8020

Work Order NO.: 2468 % Moisture:NA

Client ID:MW-6 Matrix:WATER
Level:NA

Laboratory ID:2468-1 Units:ug/L

Date Collected:11-29-90 Date Analyzed: 12-4-90

Dilution Factor: 1.0 Inst. Ser. #: VGC5-901129
QC Batch #: SWPB5901203A&B

Compound	Result	Reporting Limit
Benzene	1.2	1.0
Ethyl Benzene	ND	2.0
Toluene	ND	2.0
Xylenes (total)	ND	4.0

ND-Not Detected
NA-Not Applicable
D-Additional Dilution Factor

ANALYST: LT

GROUP LEADER:

ES-ENGINEERING SCIENCE, INC.

600 Bancroft Way
Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
BTEX Aromatic Compounds by 8020

Work Order NO.: 2468 % Moisture:NA

Client ID:MW-4 Matrix:WATER
Level:NA

Laboratory ID:2468-2 Units:ug/L

Date Collected:11-29-90 Date Analyzed: 12-4-90

Dilution Factor: 1.0 Inst. Ser. #: VGC5-901129
QC Batch #: SWPB5901203A&B

Compound	Result	Reporting Limit
Benzene	2.7	1.0
Ethyl Benzene	ND	2.0
Toluene	ND	2.0
Xylenes (total)	ND	4.0

ND-Not Detected
NA-Not Applicable
D-Additional Dilution Factor

ANALYST: JT

GROUP LEADER: SF

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GC ANALYTICAL REPORT
Analytical Method
BTEX Aromatic Compounds by 8020

Work Order NO.: 2468 % Moisture:NA

Client ID:MW-3 Matrix:WATER
Level:NA

Laboratory ID:2468-3 Units:ug/L

Date Collected:11-29-90 Date Analyzed: 12-4-90

Dilution Factor: 1.0 Inst. Ser. #: VGC5-901129
QC Batch #: SWPB5901203A&B

Compound	Result	Reporting Limit
Benzene	3.4	1.0
Ethyl Benzene	ND	2.0
Toluene	ND	2.0
Xylenes (total)	ND	4.0

ND-Not Detected
NA-Not Applicable
D-Additional Dilution Factor

ANALYST: JJ

GROUP LEADER: SF

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Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
BTEX Aromatic Compounds by 8020

Work Order NO.: 2468

% Moisture:NA

Client ID:MW-5

Matrix:WATER
Level:NA

Laboratory ID:2468-4

Units:ug/L

Date Collected:11-29-90

Date Analyzed: 12-4-90
Inst. Ser. #: VGC5-901129
QC Batch #: SWPB5901203A&B

Dilution Factor: 1.0

Compound	Result	Reporting Limit
Benzene	69.0	1.0
Ethyl Benzene	ND	2.0
Toluene	ND	2.0
Xylenes (total)	ND	4.0

ND-Not Detected
NA-Not Applicable
D-Additional Dilution Factor

ANALYST:

GROUP LEADER:

ES-ENGINEERING SCIENCE, INC.

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GC ANALYTICAL REPORT
Analytical Method
BTEX Aromatic Compounds by 8020

Work Order NO.: 2468

% Moisture:NA

Client ID:MW-7

Matrix:WATER
Level:NA

Laboratory ID:2468-5

Units:ug/L

Date Collected:11-29-90

Date Analyzed: 12-4-90
Inst. Ser. #: VGC5-901129
QC Batch #: SWPB5901203A&B

Dilution Factor: 1.0

Compound	Result	Reporting Limit
Benzene	54.0	1.0
Ethyl Benzene	ND	2.0
Toluene	ND	2.0
Xylenes (total)	ND	4.0

ND-Not Detected
NA-Not Applicable
D-Additional Dilution Factor

ANALYST: JT

GROUP LEADER: SF

ES-ENGINEERING SCIENCE, INC.

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Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
BTEX Aromatic Compounds by 8020

Work Order NO.: 2468 % Moisture:NA

Client ID:MW-2 Matrix:WATER
Level:NA

Laboratory ID:2468-6 Units:ug/L

Date Collected:11-29-90 Date Analyzed: 12-7-90

Dilution Factor: 1.0 Inst. Ser. #: VGC5-901129
QC Batch #: SWPB5901203A&B

Compound	Result	Reporting Limit
Benzene	6900.0	1.0
Ethyl Benzene	1400.0	2.0
Toluene	5900.0	2.0
Xylenes (total)	7400.0	4.0

ND-Not Detected
NA-Not Applicable
D-Additional Dilution Factor

ANALYST: [signature]

GROUP LEADER: [signature]

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Berkeley,CA 94710

GC ANALYTICAL REPORT
Analytical Method
BTEX Aromatic Compounds by 8020

Work Order NO.: 2468

% Moisture:NA

Client ID:EW-1

Matrix:WATER
Level:NA

Laboratory ID:2468-7

Units:ug/L

Date Collected:11-29-90

Date Analyzed: 12-7-90
Inst. Ser. #: VGC5-901129
QC Batch #: SWPB5901203A&B

Dilution Factor: 1.0

Compound	Result	Reporting Limit
Benzene	6000.0	1.0
Ethyl Benzene	1000.0	2.0
Toluene	3400.0	2.0
Xylenes (total)	4700.0	4.0

ND-Not Detected
NA-Not Applicable
D-Additional Dilution Factor

ANALYST: JT

GROUP LEADER: SF