



June 10, 2003

Project 53087.7

Mr. Jeff Christoff  
Blue Print Service Company  
149 Second Street  
San Francisco, California 94105

Alameda County  
JUN 17 2003  
Environmental Health

**Quarterly Groundwater Remediation and Monitoring Report  
January through April 1, 2003  
BPS Reprographic Services Facility  
1700 Jefferson Street  
Oakland, California**

Dear Mr. Christoff:

MACTEC Engineering and Consulting, Inc., (formerly Harding ESE) presents this quarterly status letter-report on the groundwater monitoring and remedial activities at the BPS Reprographic Services (BPS) facility located at 1700 Jefferson Street in Oakland, California (Plate 1). This letter-report covers the period from January 1 through April 1, 2003, and was prepared to satisfy the quarterly groundwater monitoring requirements of the Alameda County Department of Health Care Services (ACHCS). The First Quarter 2003 sampling event did not occur until April 1, 2003 due to administrative issues that have since been resolved.

**BACKGROUND**

Three underground gasoline storage tanks were removed from the property in 1987 and a preliminary soil and groundwater investigation indicated that a release of fuel into the subsurface had occurred. Three groundwater-monitoring wells (MW-1, MW-2, and MW-3) were installed on the property to evaluate the distribution of petroleum hydrocarbons in the groundwater and to determine the direction of groundwater flow. Free phase hydrocarbon (FPH) was found in MW-1. Groundwater level measurements indicated that the local groundwater gradient was in a north to northwest direction.

In November 1987, monitoring well MW-2 was abandoned to facilitate the construction of the present BPS facility and, in January 1988, two additional wells, MW-1A and MW-4, were installed as groundwater extraction wells. MACTEC also installed one offsite monitoring well, MW-5, in August 1988 and a second offsite well, MW-6, in April 1996. The monitoring well locations are shown on Plate 1.

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In 1992, a groundwater extraction system was constructed at the site to remove FPH from the groundwater surface. Groundwater was extracted from MW-1A and MW-4 and passed through an oil-water separator that removed the FPH. The water was then drawn into a 3,000-gallon bioreactor tank for treatment by hydrocarbon reducing microbes. Air and nutrients were supplied to the water within the bioreactor to facilitate microbial growth. The treated water from the bioreactor was pumped in batches of approximately 500 gallons through three granular activated carbon vessels before discharge under a wastewater discharge permit from the East Bay Utility District to the sanitary sewer. The treatment system processed approximately 1,385,490 gallons of groundwater and an estimated 5,062 pounds of FPH were recovered.

By 1999, the oil-water separator was no longer recovering FPH and FPH was no longer present in any of the groundwater monitoring wells. Dissolved hydrocarbon concentrations were decreasing and MACTEC requested approval from The County to terminate groundwater extraction and to modify the remediation technique to *insitu*-bioremediation using an oxygen-releasing compound (ORC™). ORC™ is manufactured and distributed by Regenesys, Inc.; its purpose is to increase the concentration of dissolved oxygen (DO) in the groundwater and to augment the ability of naturally occurring microbial organisms in the groundwater to biodegrade the dissolved petroleum hydrocarbons. The County approved this plan in a letter dated September 28, 1999, following the submittal of an ORC™ calculation sheet and a Groundwater Monitoring Plan, dated September 23, 1999.

MACTEC implemented the *in situ* remediation technique by placing ORC™ in treatment wells: MW-1A, MW-3, MW-4, and MW-5 on September 29, 1999. The ORC™ is contained in fabric "socks" which release oxygen over time until the compound's oxygen releasing potential is depleted. MACTEC installed five socks in each treatment well at the approximate depth of the well's screened interval. As described in the Groundwater Monitoring Plan, the ORC™ socks are removed from the treatment wells two weeks before each quarterly groundwater monitoring event, then replaced after sampling is complete.

The Groundwater Monitoring Plan outlined procedures for groundwater sampling using a non-purge method approved by the Regional Water Quality Control Board in a letter dated January 31, 1997. The first quarter that the new Groundwater Monitoring Plan was implemented, sampling included duplicate sampling using both the purge and non-purge methods (see MACTEC's quarterly report, dated October 25, 1999).

During the Fourth Quarter 2002 groundwater monitoring event MACTEC removed the ORC™ socks from the treatment wells per a request from the ACHCS in a September 27, 2002 letter to BPS. The ACHCS suggested that contaminant concentrations may not be accurate due to the presence of the ORC™ socks and requested the socks be removed and DO allowed to return to back ground levels. Additionally, the ACHCS suggested in the same letter that the ORC™ socks appear to be ineffective as contaminant concentrations continue to be high in MW-1 and MW-5.

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During the ORC™ socks removal effort from MW-5 it was discovered that the socks were stuck. ORC™ socks can become stuck in monitoring wells when the well casing has become disturbed or bent. This can typically be caused by even minor seismic occurrences in the area of the well. The ORC™ socks remain stuck in MW-5 despite three removal attempts including attempts incorporating an industrial winch and tripod. A work plan is currently under review incorporating a drill rig to attempt removal of the ORC™ socks.

### **FIRST QUARTER 2003 GROUNDWATER SAMPLING AND ANALYSIS**

On April 1, 2003, MACTEC conducted the quarterly groundwater monitoring of MW-1, MW-3, and MW-6 (Plate 1) using both the non-purge sampling method outlined in the Groundwater Monitoring Plan and using the purge and sample method as described in the September 27, 2003 ACHCS letter. Prior to sampling, MACTEC measured the depth to groundwater from the top of casing (TOC) of wells MW-1, MW-3 and MW-6 using an electronic water level indicator. These measurements are displayed on Plate 2 and tabulated in Table 2.

To collect the pre-purge groundwater samples, MACTEC raised dedicated Teflon tubing contained in each well until the submerged end of the tubing was 2 to 4 feet below the groundwater surface and connected the dry end of the tubing to a peristaltic pump with silicon tubing. New silicon tubing was used to sample each well. After removing an approximate volume of groundwater equal to the volume capacity of the Teflon tubing, MACTEC measured the groundwater's conductivity, pH, DO, turbidity and temperature and collected a sample in laboratory provided 40-milliliter vials. The groundwater parameter measurements are presented in Table 1.

Monitoring well samples were collected according to methods described in the September 27, 2003 ACHCS letter and typical well purging protocol as described in *Ground-Water Sampling Preparations and Purging Methods at Water-Supply Wells and Monitoring Wells* dated September 1999 by Jacob Gibs and F.D. Wilde. This document was provided as a reference for groundwater monitoring procedures by the ACHCS case worker.

Immediately after sample collection, MACTEC labeled and stored the samples in a cooler with ice. The groundwater samples were kept chilled until submitted to Sequoia Analytical Laboratory (Sequoia), a California state-certified laboratory (CA ELAP Certificate #2374), under chain-of-custody protocol for the following analyses:

- Total petroleum hydrocarbons as gasoline (TPHg) in accordance with EPA Method 8015 modified.
- Benzene, toluene, ethylbenzene, and total xylenes (BTEX) in accordance with EPA Method 8020.

- Methyl tertiary butyl ether (MTBE) in accordance with EPA Method 8020 with confirmation of detections by EPA Method 8260.
- Ethylene Dichloride (EDC) by EPA Method 8260.

The analytical results for TPH-g, BTEX and MTBE are displayed on Plates 3 and 4. Historical analytical results for TPH-g, BTEX and MTBE are shown on Table 3. Analytical results for samples collected pre and post purge during the First Quarter 2003 groundwater monitoring event are displayed on Table 4b. Historical analytical results for Tert-amyl methyl ether (TAME), Tert-butyl alcohol (TBA), Di-isopropyl ether (DIPE), Ethylene Dibromide (EDB), Ethyl tert Butyl Ether (ETBE) and EDC are displayed on Table 5. The certified analytical reports (CARs) are presented in the Appendix A.

## DISCUSSION

As shown in Table 2 and on Plate 5, the groundwater surface elevation decreased an average of 0.35 feet across the site as compared to last quarter's measurements. Using the groundwater elevations from MW-1, MW-3 and MW-6 as measured on April 1, 2003, groundwater contours were created and are shown on Plate 2. Based on the groundwater elevations, the groundwater gradient ranges from 0.005 to 0.008 ft/ft from the southwest to the west. At the time MW-5 was constructed, the groundwater flow direction was reportedly north to northwest, and MW-5 was considered a downgradient well. However, presumably because of the construction of new buildings in the immediate vicinity, which extend below the groundwater surface, recent groundwater monitoring has indicated the groundwater flow has typically been in a west to southwest direction.

Table 3 displays a summary of historical groundwater sample results through September 29, 1999, when the typical purge and sample protocol was terminated. Plate 3 present the sample results from this quarter's sampling event. Table 4a and Plate 4 display historical groundwater sample results since instituting *in situ* bioremediation and a non-purge sampling protocol.

As shown on Plate 3 and Table 4a, concentrations of TPH-g, BTEX and MTBE remained within the range of historical values for all the wells sampled. TPH-g ranged from non-detectable with a detection limit of 0.05 mg/l (MW-6) to 16 mg/l (MW-1). Benzene ranged from non-detectable with a detection limit of 0.05 ug/l (MW-6) to 4,500 ug/l (MW-1). Toluene ranged from non-detectable with a detection limit of 0.05 ug/l (MW-6) to 6,000 ug/l (MW-1). Ethylbenzene ranged from non-detectable with a detection limit of 0.05 ug/l (MW-6) to 680 ug/l (MW-1). Total Xylenes ranged from non-detectable with a detection limit of 0.05 ug/l (MW-6) to 3,100 ug/l (MW-1). MTBE was not detected in samples from any of the groundwater monitoring wells this quarter with detection limits ranging from 1 ug/l (MW-3) to 120 ug/L (MW-1). A laboratory provided trip blank consisting of organic free water was transported to and from the Site with the samples described above. The trip blank was analyzed for TPH-g, BTEX and

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MTBE with the groundwater samples using EPA Method 8015M/8020M. The CARS reported no analytes of concern were present in the trip blank equal to or above their respective detection limits.

Historical analytical results for TAME, TBA, DIPE, EDB, ETBE and EDC are displayed on Table 5. As described in the ACHCS September 27, 2002 letter to BPS these analyses were performed per ACHCS request during the Fourth Quarter 2002 monitoring event. None of these analytes were detected in any of the groundwater samples collected from MW-1, MW-3, MW-5 and MW-6 except for EDC. EDC was detected in the samples collected from MW-1 at a concentration of 370 ug/L and MW-5 at a concentration of 220 ug/l. As a result of the detection of EDC an analysis was performed for EDC in the groundwater sample from MW-1 during the First Quarter 2003 event. EDC was not detected in this sample at a detection limit of 120 ug/L. As described above MW-5 could not be sampled this quarter due to obstruction by the stuck ORCs.

As described above, the ORC™ socks were removed from all treatment wells during the Fourth Quarter 2002 monitoring event per ACHCS request. The ORC™ socks were removed to allow the DO concentrations in each well to return to background levels. Prior to sampling during the First Quarter 2003 event, DO was monitored in each well. DO concentrations in MW-1 and MW-3 appear to be within typical DO concentration range for groundwater. DO concentrations in MW-6 as well as non-treatment wells could not be monitored due to equipment failure and will be monitored during the next event. It can be reasonably assumed that due to the length of time (approximately 4 months) the treatment wells have been with out ORC™ socks that DO had returned to back ground levels before sampling occurred. The cross-gradient location of MW-5 with respect to the remaining wells, the location of the ORC™ socks in the well (stuck primarily above groundwater), the most recent DO reading from this well (0.42 mg/L) and the age of the stuck socks (depleted) indicate that the socks in MW-5 do not influence DO content in the remaining wells.

As described above contaminant concentrations monitored during the First Quarter 2003 event are within historical ranges. This suggests that contaminant concentrations in MW-1 and MW-3 are not influenced by the presence of ORC™ socks. There does appear to be a slight increasing trend in BTEX concentrations in MW-3 over the last four events beginning in June of 2002 compared to analytical results from two years previous. However, as this well was being used as a treatment well up until the most recent event, the presence of ORC™ socks appears unrelated to this trend. The impact of ORC™ socks on contaminant concentrations in the remaining wells will be evaluated as the data becomes available.

Pre and post purge samples as well as DO and turbidity were collected for comparison as requested in the ACHCS September 27, 2002 letter. Table 4b displays pre and post purge samples collected from MW-1, MW-3 and MW-6. Pre and post purge DO and turbidity measurements are displayed on the groundwater sampling data sheets under Attachment B. The ACHCS September 27, 2002 letter indicates that if no

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statistical difference exists between purge and no purge chemical concentrations and monitoring parameters that purging activities may be omitted. This evaluation is currently being performed and will be presented in the next quarterly report.

### RECOMMENDATIONS

MACTEC recommends continued quarterly monitoring utilizing the procedures outlined in the ACHCS September 27, 2002 letter. MACTEC recommends analysis of the ORC™ socks effectiveness as prescribed by the ACHCS before continuing their use at the site. Additionally, MACTEC recommends removing the ORC™ socks from MW-5. As groundwater is below the stuck socks, the well is not useful as a monitoring point while they remain.

MACTEC recommends that Blue Print Services send a copy of this report to the following address:

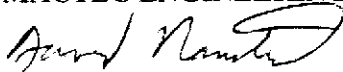
Mr. Don Hwang  
Alameda County  
Environmental Health Services  
1131 Harbor Bay Parkway, Suite 250  
Alameda, California, 94502-6577


While under contract to BPS, MACTEC will continue to provide quarterly groundwater monitoring and reporting as required by The County.

If you have any questions, please contact the undersigned at (415) 278-2118.

Sincerely,

**MACTEC ENGINEERING AND CONSULTING, INC.**

  
David S. Nanstad  
Project Engineer

  
Basil Falcone, REA No. 07666  
Senior Environmental Scientist  
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4 copies submitted

Attachments: Table 1 – Groundwater Parameters  
Table 2 – Groundwater Elevation Data  
Table 3 – Historical Groundwater Monitoring Analytical Results - Using Purge Method  
Table 4a – Groundwater Monitoring Analytical Results – Non-Purge Method  
Table 4b – Groundwater Monitoring Analytical Results – Comparison of Non-Purge and Purge Methods  
Table 5 – Groundwater Monitoring Analytical Results – EPA Method 8260  
Plate 1 – Site Map  
Plate 2 – Groundwater Contours, First Quarter 2003  
Plate 3 – TPH-g, BTEX and MTBE Concentrations in Groundwater, First Quarter 2003  
Plate 4 – BTEX and DO Results  
Plate 5 – Groundwater Elevation Data  
Appendix A – Laboratory Reports  
Appendix B – Groundwater Sampling Forms  
Table B1. Sample Location/Sample Description Cross-Reference

**Table 1. Groundwater Parameters  
BPS Reprographic Services Facility  
1700 Jefferson Street  
Oakland, California**

<b>Dissolved Oxygen (mg/L)</b>	<b>MW-1</b>	<b>MW-3</b>	<b>MW-5</b>	<b>MW-6</b>
9/29/1999	2.90	1.70	0.40	1.80
11/5/1999	4.00	10.30	4.00	2.80
11/22/1999	1.80	2.40	2.00	3.20
1/28/2000	2.90	8.40	3.60	2.20
2/11/2000	2.50	2.30	1.80	3.50
5/12/2000	2.00	7.40	2.40	1.70
5/30/2000	1.90	2.60	1.80	3.20
9/1/2000	2.90	3.40	2.30	2.70
9/15/2000	2.00	1.80	2.20	3.80
11/9/2000	NA	5.00	5.30	NA
11/17/2000	3.10	4.20	3.40	6.00
3/15/2001	2.00	7.00	1.40	2.10
4/2/2001	1.00	0.78	2.00	0.99
6/1/2001	0.22	0.24	6.62	0.32
6/28/2001	0.32	0.56	0.53	0.71
8/16/2001	0.48	6.52	1.61	0.78
8/30/2001	0.33	0.40	0.23	0.46
12/14/2001	0.03	3.76	2.22	0.16
12/26/2001	0.16	0.28	0.19	0.21
4/10/2002	0.55	0.63	0.20	0.37
4/23/2002	0.30	0.35	0.90	0.45
6/3/2002	0.38	5.16	4.32	0.65
6/14/2002	0.29	0.34	0.38	0.31
8/5/2002	0.33	0.28	0.40	0.39
8/14/2002	0.34	0.28	0.42	0.63
12/6/2002	1.00	0.90	NA	0.62
12/27/2002	0.94	0.96	NA	1.24
4/1/2003	0.30	1.06	NA	NA <sup>1</sup>
<b>REDOX (mvolts)</b>				
5/30/2000	-322	197	-128	203
9/15/2000	-269	3	-89	206
11/17/2000	64	178	296	230
4/2/2001	-194	26	-36	102
6/28/2001	-310	-283	-360	107
8/30/2001	NA	NA	NA	NA
12/26/2001	12	11	11	11
4/23/2002	3	62	-299	158
6/14/2002	0	245	-215	254
8/20/2002	-294	-315	-238	228
12/27/2002	-315	-357	NA	-12
4/1/2003	-82	-75	NA	172
<b>Temperature (deg F)</b>				
9/29/1999	67.0	72.6	67.7	73.8
11/22/1999	66.4	62.9	65.0	69.8
2/11/2000	61.3	63.2	62.0	68.5
5/30/2000	77.7	74.8	76.3	76.2
9/15/2000	64.4	64.3	64.7	67.0
11/17/2000	54.5	58.1	68.1	65.9
4/2/2001	63.5	64.9	66.2	66.4
6/28/2001	73.0	71.2	74.7	74.3
8/30/2001	74.8	77.6	78.3	78.7
12/26/2001	65.7	65.8	65.8	65.1
4/23/2002	64.4	69.8	37.1	71.6
6/14/2002	66.7	67.5	66.7	68.0
8/20/2002	64.6	67.6	66.2	68.0
12/27/2002	41.7	42.5	NA	41.7
4/1/2003	64.6	67.6	NA	68.0



**Table 1. Groundwater Parameters  
BPS Reprographic Services Facility  
1700 Jefferson Street  
Oakland, California**

<b>pH</b>	<b>MW-1</b>	<b>MW-3</b>	<b>MW-5</b>	<b>MW-6</b>
9/29/1999	8.39	8.53	8.43	8.44
11/22/1999	6.86	8.42	6.84	6.79
2/11/2000	6.80	6.94	6.83	6.72
5/30/2000	7.02	7.35	7.54	7.56
9/15/2000	7.06	7.54	6.76	6.62
11/17/2000	7.37	7.69	7.12	7.34
4/2/2001	6.98	6.61	7.07	6.96
6/28/2001	6.90	6.74	6.78	6.83
8/30/2001	7.85	7.91	7.9	8.41
12/26/2001	6.23	6.91	7.11	6.72
4/23/2002	6.90	6.95	6.94	6.86
6/14/2002	7.05	7.24	7.08	6.89
8/20/2002	NA	6.89	NA	6.91
12/27/2002	6.33	6.41	NA	6.49
4/1/2003	6.90	7.08	NA	6.70
<b>Specific Conductance (µS/cm)</b>				
9/29/1999	976	880	1,577	966
11/22/1999	1,004	1,500	1,352	1,038
2/11/2000	992	1,327	1,275	1,149
5/30/2000	845	1,020	758	924
9/15/2000	800	917	989	1,009
11/17/2000	785	970	742	886
4/2/2001	725	365	839	821
6/28/2001	1080	704	876	1021
8/30/2001	924	1015	975	931
12/26/2001	848	496	333	891
4/23/2002	922	601	848	977
6/14/2002	932	767	810	961
8/20/2002	1015	809	891	985
12/27/2002	956	791	NA	903
4/1/2003	1128	800	NA	1021

**Note:**

Baseline dissolved oxygen measurement taken on 09/29/99, prior to initial installation of oxygen releasing compound

mg/l = milligrams per liter

mvolts = millivolts

deg F = degrees Fahrenheit

µS/cm = micro-ohms per centimeter

NA = Not Available

1 = indicates data not available due to equipment malfunction

**Table 2. Groundwater Elevation Data  
BPS Reprographic Services Facility  
1700 Jefferson Street  
Oakland, California**

Date Sampled	MW-1 TOC Elev.   32.36		MW-3 TOC Elev.   31.77		MW-5 TOC Elev.   30.56		MW-6 TOC Elev.   31.26		Average Change Since Preceding Quarter
	Water Level	Water Elevation	Water Level	Water Elevation	Water Level	Water Elevation	Water Level	Water Elevation	
3/6/1996	NM	--	24.79	6.98	23.53	7.03	NA	--	
6/11/1996	FP	--	25.60	6.17	23.78	6.78	25.16	6.10	-0.53
9/19/1996	FP	--	26.09	5.68	24.48	6.08	25.76	5.50	-0.60
12/23/1996	FP	--	FP	--	24.83	5.73	25.88	5.38	-0.23
3/27/1997	FP	--	FP	--	23.82	6.74	24.78	6.48	1.06
6/4/1997	26.41	5.95	25.11	6.66	23.92	6.64	24.60	6.66	0.04
9/26/1997	26.80	5.56	25.41	6.36	24.29	6.27	24.80	6.46	-0.32
12/22/1997	26.00	6.36	24.91	6.86	24.02	6.54	24.71	6.55	0.42
3/31/1998	26.06	6.30	24.05	7.72	22.78	7.78	23.75	7.51	0.75
6/18/1998	25.60	6.76	23.71	8.06	22.51	8.05	23.22	8.04	0.40
8/28/1998	25.45	6.91	23.70	8.07	22.74	7.82	22.23	9.03	0.23
12/2/1998	24.92	7.44	23.60	8.17	23.16	7.40	23.72	7.54	-0.32
3/10/1999	24.90	7.46	22.65	9.12	22.82	7.74	23.54	7.72	0.37
6/30/1999	25.53	6.83	23.07	8.70	22.41	8.15	23.04	8.22	-0.04
9/29/1999	24.23	8.13	23.03	8.74	22.81	7.75	23.42	7.84	0.14
11/22/1999	24.33	8.03	23.68	8.09	22.88	7.68	23.64	7.62	-0.26
2/11/2000	24.38	7.98	23.74	8.03	22.74	7.82	23.67	7.59	0.00
5/30/2000	23.57	8.79	22.97	8.80	21.73	8.83	22.82	8.44	0.86
9/15/2000	23.85	8.51	23.12	8.65	22.14	8.42	23.10	8.16	-0.28
11/16/2000	24.14	8.22	23.40	8.37	22.39	8.17	23.41	7.85	-0.28
4/2/2001	23.40	8.96	23.40	8.37	22.07	8.49	23.33	7.93	0.29
6/28/2001	23.58	8.78	23.17	8.60	22.15	8.41	23.15	8.11	0.04
8/30/2001	24.00	8.36	23.35	8.42	22.35	8.21	23.35	7.91	-0.25
12/26/2001	24.18	8.18	23.54	8.23	22.49	8.07	23.27	7.99	-0.11
4/23/2002	NA	NA	22.89	8.88	21.07	9.49	22.89	8.37	0.82
6/14/2002	23.41	8.95	22.85	8.92	21.80	8.76	22.81	8.45	-0.20
8/20/2002	23.85	8.51	23.11	8.66	22.14	8.42	23.15	8.11	-0.31
12/27/2002	24.10	8.26	23.34	8.43	*NA	*NA	23.41	7.85	-0.24
4/1/2003	23.75	8.61	22.90	8.87	*NA	*NA	23.16	8.10	0.35

TOC Elev. = top of casing elevation

NM = not monitored

FP = free product

-- = no data collected

NA = not available

\* This data not available due to ORC socks stuck in well

**Table 3. Historical Groundwater Monitoring Analytical Results - Using Purge Method**  
**BPS Reprographic Services Facility**  
**1700 Jefferson Street**  
**Oakland, California**

TPH <sub>g</sub> (mg/L)	Date Sampled																										
	8/1/1991	9/30/1992	2/20/1993	1/13/1994	4/13/1994	6/29/1994	12/8/1994	4/3/1995	6/27/1995	9/15/1995	12/13/1995	3/6/1996	6/11/1996	9/19/1996	12/23/1996	3/27/1997	6/4/1997	9/26/1997	12/23/1997	3/11/1998	6/18/1998	9/28/1998	12/2/1998	3/16/1999	6/30/1999	9/29/1999	
MW-1	FP	FP	FP	FP	FP	FP	FP	NA	NA	NA	NA	NA	FP	FP	FP	FP	68	59	41	44	32	26	26	26	18	21	
MW-1A	350	FP	FP	FP	FP	170	95	190	67	53	32	62	200	140	100	FP	66	54	73	66	51	50	35	41	30	18	NA
MW-3	74	FP	FP	FP	FP	39	4,600	31	20	6.2	19	7	16	6	FP	83	47	32	32	16	17	3.2	9.5	7.9	5.0	5.0	
MW-4	86	FP	FP	FP	FP	16	92	35	13	14	11	110	260	95	FP	33	24	41	48	NA	25	48	10	11	8.8	NA	
MW-5	120	31	74	80	63	64	59	31	41	50	45	51	48	48	43	44	35	36	39	39	48	17	16	15	23	7.7	31
MW-6	--	--	--	--	--	--	--	--	--	--	--	--	ND(0.05)	ND(0.05)	ND(0.05)	ND(0.05)	ND(0.05)	ND(0.05)	ND(0.05)	ND(0.05)	ND(0.05)	ND(0.05)	ND(0.05)	ND(0.05)	ND(0.05)	ND(0.05)	ND(0.05)
Benzene (µg/L)																											
MW-1	FP	FP	FP	FP	FP	FP	FP	NA	NA	NA	NA	NA	FP	FP	FP	FP	2,200	6,000	8,800	8,300	1,100	8,600	9,200	8,200	7,900	9,200	
MW-1A	17,000	FP	FP	FP	FP	17,000	16,000	13,000	11,000	8,900	9,900	14,000	18,000	16,000	FP	12,000	11,000	10,000	10,000	9,100	11,000	1,100	8,500	2,300	6,400	NA	
MW-3	1,600	FP	FP	FP	FP	3,200	1,500	1,100	1,100	270	70	220	120	170	43	FP	8,500	610	640	690	180	84	39	86	31	120	
MW-4	1,500	FP	FP	FP	FP	1,500	1,700	1,700	1,300	2,200	630	2,600	6,600	9,900	FP	2,600	2,600	2,900	6,000	NA	2,000	9,700	1,700	2,300	1,800	NA	
MW-5	20,000	13,000	16,000	19,000	14,000	29,000	13,000	15,000	12,000	1,600	13,000	15,000	12,000	12,000	11,000	8,900	7,900	13,000	10,000	9,500	5,400	8,400	14,000	5,200	9,600		
MW-6	--	--	--	--	--	--	--	--	--	--	--	--	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.30)	ND(0.30)	ND(0.30)	ND(0.30)	ND(0.30)	ND(0.30)	ND(0.30)	
Toluene (µg/L)																											
MW-1	FP	FP	FP	FP	FP	FP	FP	NA	NA	NA	NA	NA	FP	FP	FP	FP	14,000	4,500	3,000	3,000	3,700	3,800	2,300	4,300	5,900	5,800	10,000
MW-1A	31,000	FP	FP	FP	FP	31,000	21,000	21,000	13,000	9,900	9,200	11,000	22,000	28,000	22,000	FP	15,000	12,000	16,000	16,000	11,000	15,000	830	11,000	1,900	7,800	NA
MW-3	4,600	FP	FP	FP	FP	2,900	4,200	2,300	550	140	480	170	270	30	FP	13,000	6,000	5,300	3,400	3,400	1,300	1,100	85	540	330	340	
MW-4	6,200	FP	FP	FP	FP	2,500	790	4,100	3,400	1,600	2,100	470	3,400	19,000	19,000	FP	6,500	3,200	5,000	11,000	NA	460	11,000	610	2,100	3,000	NA
MW-5	14,000	5,900	5,000	8,200	3,500	5,400	3,800	2,200	2,100	2,700	2,100	2,800	2,900	4,500	2,200	1,100	560	270	500	460	310	160	120	500	270	710	
MW-6	--	--	--	--	--	--	--	--	--	--	--	--	ND(0.3)	ND(0.3)	ND(0.3)	ND(0.3)	ND(0.3)	ND(0.3)	ND(0.3)	ND(0.3)	ND(0.30)	ND(0.30)	ND(0.30)	ND(0.30)	ND(0.30)	ND(0.30)	
Bibenzene (µg/L)																											
MW-1	FP	FP	FP	FP	FP	FP	FP	NA	NA	NA	NA	NA	FP	FP	FP	FP	1,500	1,600	1,400	1,400	550	730	830	870	950	1,200	
MW-1A	3,000	FP	FP	FP	FP	2,100	1,500	1,400	910	500	710	790	2,700	2,800	2,100	FP	1,400	1,000	1,400	1,100	870	31	720	1,600	660	NA	
MW-3	670	FP	FP	FP	FP	380	6,000	580	180	68	140	49	68	15	FP	2,400	910	860	870	490	430	25	250	200	230	230	
MW-4	1,000	FP	FP	FP	FP	520	51	310	280	77	110	14	760	3,700	2,000	FP	540	140	330	380	NA	ND(15)	890	ND(15)	88	150	NA
MW-5	1,900	1,400	1,800	1,400	1,500	2,800	1,800	2,800	1,400	2,000	16,000	2,000	2,000	2,300	2,700	1,900	1,500	1,500	1,900	2,000	420	1,100	1,500	1,800	1,100	1,100	
MW-6	--	--	--	--	--	--	--	--	--	--	--	--	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	ND(0.5)	0.3	ND(0.5)	ND(0.30)	ND(0.30)	ND(0.30)	ND(0.30)	ND(0.30)	ND(0.30)	
Xylenes (µg/L)																											
MW-1	FP	FP	FP	FP	FP	FP	FP	NA	NA	NA	NA	NA	FP	FP	FP	FP	11,000	8,600	6,600	4,300	3,000	2,100	2,800	3,500	2,500	5,500	
MW-1A	22,000	FP	FP	FP	FP	14,000	12,000	11,000	9,800	6,300	6,800	5,300	22,000	19,000	14,000	FP	100	7,200	8,500	12,000	6,800	5,800	3,900	6,700	2,300	4,100	NA
MW-3	4,300	FP	FP	FP	FP	4,300	95,000	4,800	1,700	500	1,700	440	1,500	300	FP	16,000	5,900	5,900	5,200	3,700	3,800	360	2,300	1,800	1,300	1,300	
MW-4	7,300	FP	FP	FP	FP	3,200	3,400	5,400	5,800	1,800	2,100	1,800	10,000	28,000	13,000	FP	5,300	3,500	4,800	8,200	NA	6,400	5,000	2,300	1,600	2,700	NA
MW-5	4,900	2,600	2,700	2,700	2,100	4,500	2,900	4,500	1,600	2,100	1,900	2,400	2,700	4,800	6,500	2,800	1,700	1,300	1,700	2,200	850	900	840	1,100	690	1,100	
MW-6	--	--	--	--	--	--	--	--	--	--	--	--	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)	ND(2)
MTBB (µg/L)																											
MW-1	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	FP	FP	ND(500)	ND(500)	300	420	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(50)	ND(250)
MW-1A	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,800	ND(500)	ND(500)	1,900	300	ND(50)	ND(50)	ND(50)	ND(50)	ND(25)	NA
MW-3	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	FP	FP	ND(500)	ND(500)	ND(300)	350	ND(25)	ND(50)	ND(50)	ND(50)	ND(25)	10
MW-4	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	1,400	ND(100)	ND(500)	270	NA	ND(50)	ND(50)	ND(50)	ND(25)	NA	
MW-5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	800	300	ND(100)	ND(500)	ND(1000)	350	ND(100)	ND(50)	ND(50)	ND(25)	NA
MW-6	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TPH<sub>g</sub> = total petroleum hydrocarbons as gasoline  
 MTBB = methyl t-butyl ether  
 (mg/l) milligrams per liter  
 (µg/l) micrograms per liter

ND = Not detected above reporting level in parentheses  
 NA = Not analyzed  
 FP = Free Product - well not sampled  
 -- = Well did not exist at date indicated

**Table 4a. Groundwater Monitoring Analytical Results - Non-Purge Method  
BPS Reprographic Services Facility  
1700 Jefferson Street  
Oakland, California**

	9/29/1999	11/22/1999	2/11/2000	5/30/2000	9/15/2000	11/16/2000	4/2/2001	6/28/2001	8/30/2001	12/26/2001	4/24/2002	6/14/2002	8/20/2002	12/27/2002	4/1/2003
<b>TPH (mg/L)</b>															
MW-1	14	24	19	19	20	18	19	39	31	34	35	35	26	28	16
MW-3	4.1	3.1	0.54	0.49	1.5	1.3	0.17	4.9	3.1	0.95	300	4.6	4.9	4	5.9
MW-5	10	30	23	19	24	1.8	15	3.6	34	1.9	9.4	1.7	3.2	*6.2	NA <sup>4</sup>
MW-6	ND<0.5	ND<0.05	ND<0.05	ND<0.05	ND<0.05	ND<0.05	ND<0.05	ND<0.05	ND<0.05	0.066	ND<0.05	ND<0.05	ND<0.05	ND<0.05	ND<0.05
<b>Benzene (µg/L)</b>															
MW-1	6,200	4,900	4,100	5,700	4,100	3,500	4,700	5,200	5,600	5,300	4,900	5400	4100	4,500	4500
MW-3	180	6.5	8.3	11	28	20	9	150	42	8	11	130	330	110	370
MW-5	14,000	11,000	12,000	9,900	3,800	470	7,400	300	8,300	300	2,300	110	320	*2200	NA <sup>4</sup>
MW-6	ND<0.3	ND<0.3	ND<0.3	ND<0.3	ND<0.3	ND<0.30	ND<0.30	ND<0.50	ND<0.50	3.6	ND<0.50	ND<0.50	ND<0.50	ND<0.5	ND<0.5
<b>Toluene (µg/L)</b>															
MW-1	5,900	5,000	4,800	8,400	5,700	4,300	5,200	4,200	5,100	5,200	6,000	6,800	4700	5,000	6000
MW-3	340	33	20	5.6	14	34	6.2	240	48	5.2	4.8	470	170	280	150
MW-5	470	3,400	4,500	6,900	3,000	220	3,000	11	3,000	110	130	ND<2.5	8.6	*140	NA <sup>4</sup>
MW-6	ND<0.3	ND<0.3	ND<0.3	ND<0.3	ND<0.3	ND<0.30	ND<0.30	2.9	ND<0.50	3.6	ND<0.50	ND<0.50	ND<0.50	ND<0.05	ND<0.05
<b>Ethylbenzene (µg/L)</b>															
MW-1	620	730	530	730	540	640	570	660	560	630	740	870	620	660	680
MW-3	130	27	2.4	0.45	2.6	25	1.4	38	26	1.1	0.72	91	40	57	44
MW-5	1,100	1,500	1,200	1,200	460	39	1000	16	1,400	55	300	7.2	22	*160	NA <sup>4</sup>
MW-6	ND<0.3	ND<0.3	ND<0.3	ND<0.3	ND<0.3	ND<0.30	ND<0.30	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<0.5	ND<0.5
<b>Total Xylenes (µg/L)</b>															
MW-1	3,500	3,500	2,800	3,500	2,700	3,200	2,600	3,900	2,500	2,400	3,100	3500	2700	3,000	3100
MW-3	580	260	28	17	160	28	8.1	160	210	7	1.4	390	150	260	230
MW-5	600	2,500	1,300	2,600	1,200	100	2,200	15	2,600	120	270	ND<2.5	19	*250	NA <sup>4</sup>
MW-6	ND<0.6	ND<0.6	ND<0.6	ND<0.6	ND<0.6	ND<0.60	ND<0.30	2.7	ND<0.50	8.7	ND<0.50	ND<0.50	ND<0.50	ND<0.5	ND<0.5
<b>MTBE (µg/L) (EPA Method 8020)</b>															
MW-1	ND<250	ND<100	6.6	ND<5.0 <sup>1</sup>	ND<12 <sup>1,2</sup>	ND<40 <sup>1,2</sup>	50 <sup>1</sup>	8.5 <sup>1</sup>	ND<100 <sup>1,2</sup>	ND<120	ND<120	ND<250	ND<120	ND<120	ND<120
MW-3	14	ND<1.0	31	ND<5.0 <sup>1</sup>	ND<5 <sup>1</sup>	ND<5 <sup>1</sup>	77 <sup>1</sup>	ND<2 <sup>1</sup>	ND<1.2 <sup>1</sup>	ND<0.50 <sup>1</sup>	ND<0.50 <sup>1</sup>	ND<0.50 <sup>1</sup>	ND<5 <sup>1</sup>	19	ND<1.0 <sup>1</sup>
MW-5	ND<100	ND<100	6.6	ND<200	ND<10 <sup>1,2</sup>	ND<5 <sup>1</sup>	ND<50 <sup>1</sup>	4.4 <sup>1</sup>	ND<50 <sup>1</sup>	ND<10 <sup>1</sup>	ND<50	ND<0.50 <sup>1</sup>	ND<0.50 <sup>1</sup>	*ND(25)	NA <sup>4</sup>
MW-6	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	ND<1.0	5 <sup>1,3</sup>	17 <sup>1</sup>	ND<2.5	ND<2.5	ND<2.5	ND<2.5	ND<2.5	ND<2.5	ND<2.5

mg/l = milligrams per liter

µg/l = micrograms per liter

ND = Not detected above the reporting limit following the less than sign

MTBE = methyl t-butyl ether

1 Result of MTBE confirmation by EPA Method 8260.

2 Reporting limits elevated due to matrix interference.

3 Detection limit = 5 µg/L, backup sample analyzed after hold time had a result of ND<5 µg/L.

4 Data not available on April 1, 2003 sampling date due ORC sock obstruction in well (see report for details)

\* = Fourth Quarter 2002 analytical data for MW-5 collected on January 3, 2003

**Table 4b. Groundwater Monitoring Analytical Results - Comparison of Non-Purge and Purge Methods  
BPS Reprographic Services Facility  
1700 Jefferson Street  
Oakland, California**

	Pre-Purge 4/1/2003	Post-Purge 4/1/2003
<b>TPHg (mg/L) (ppm)</b>		
MW-1	16	23
MW-3	5.9	6.6
*MW-5	NA <sup>2</sup>	NA <sup>2</sup>
MW-6	ND<0.05	ND<0.05
<b>Benzene (µg/L)</b>		
MW-1	4500	5100
MW-3	370	240
*MW-5	NA <sup>2</sup>	NA <sup>2</sup>
MW-6	ND<0.5	ND<0.5
<b>Toluene (µg/L)</b>		
MW-1	6000	6900
MW-3	150	200
*MW-5	NA <sup>2</sup>	NA <sup>2</sup>
MW-6	ND<0.05	ND<0.05
<b>Ethylbenzene (µg/L)</b>		
MW-1	680	840
MW-3	44	63
*MW-5	NA <sup>2</sup>	NA <sup>2</sup>
MW-6	ND<0.5	ND<0.5
<b>Xylenes (µg/L)</b>		
MW-1	3100	4100
MW-3	230	220
*MW-5	NA <sup>2</sup>	NA <sup>2</sup>
MW-6	ND<0.5	ND<0.5
<b>MTBE (µg/L) (EPA Method 8020)</b>		
MW-1	ND<120	ND<120
MW-3	ND<1.0 <sup>1</sup>	ND<2.5 <sup>1</sup>
*MW-5	NA <sup>2</sup>	NA <sup>2</sup>
MW-6	ND<2.5	ND<2.5
<b>Ethylene Dichloride (µg/L) (EPA Method 8260)</b>		
MW-1	ND<120	ND<120
MW-3	NA	NA
*MW-5	NA	NA
MW-6	NA	NA

mg/l = milligrams per liter

µg/l = micrograms per liter

ND = Not detected above the reporting limit following the less than sign

NA = Not Available

MTBE = methyl t-butyl ether

<sup>1</sup> Result of MTBE confirmation by EPA Method 8260.

<sup>2</sup> Data not available on April 1 sampling date due ORC socks stuck in well

\* = Analytical data collected for MW-5 on January 3, 2003

**Table 5. Groundwater Monitoring Analytical Results**  
**EPA Method 8260**  
**BPS Reprographic Services Facility**  
**1700 Jefferson Street**  
**Oakland, California**

	12/27/2002	4/1/2003
<b>tert Amyl Methyl Ether (µg/L)</b>		
MW-1	ND<250	NA
MW-3	ND<25	NA
*MW-5	ND<100	NA
MW-6	ND<1	NA
<b>Ethyl tert Butyl Ether (µg/L)</b>		
MW-1	ND<250	NA
MW-3	ND<25	NA
*MW-5	ND<100	NA
MW-6	ND<1	NA
<b>Di-isopropyl Ether (µg/L)</b>		
MW-1	ND<250	NA
MW-3	ND<25	NA
*MW-5	ND<100	NA
MW-6	ND<1	NA
<b>tert Butyl Alcohol (µg/L)</b>		
MW-1	ND<5000	NA
MW-3	ND<500	NA
*MW-5	ND<2000	NA
MW-6	ND<20	NA
<b>Ethylene Dibromide (µg/L)</b>		
MW-1	ND<120	NA
MW-3	ND<12	NA
*MW-5	ND<50	NA
MW-6	ND<0.5	NA
<b>Ethylene Dichloride (µg/L)</b>		
MW-1	370	ND<120
MW-3	ND<12	NA
*MW-5	220	NA
MW-6	ND<0.5	NA



µg/l = micrograms per liter

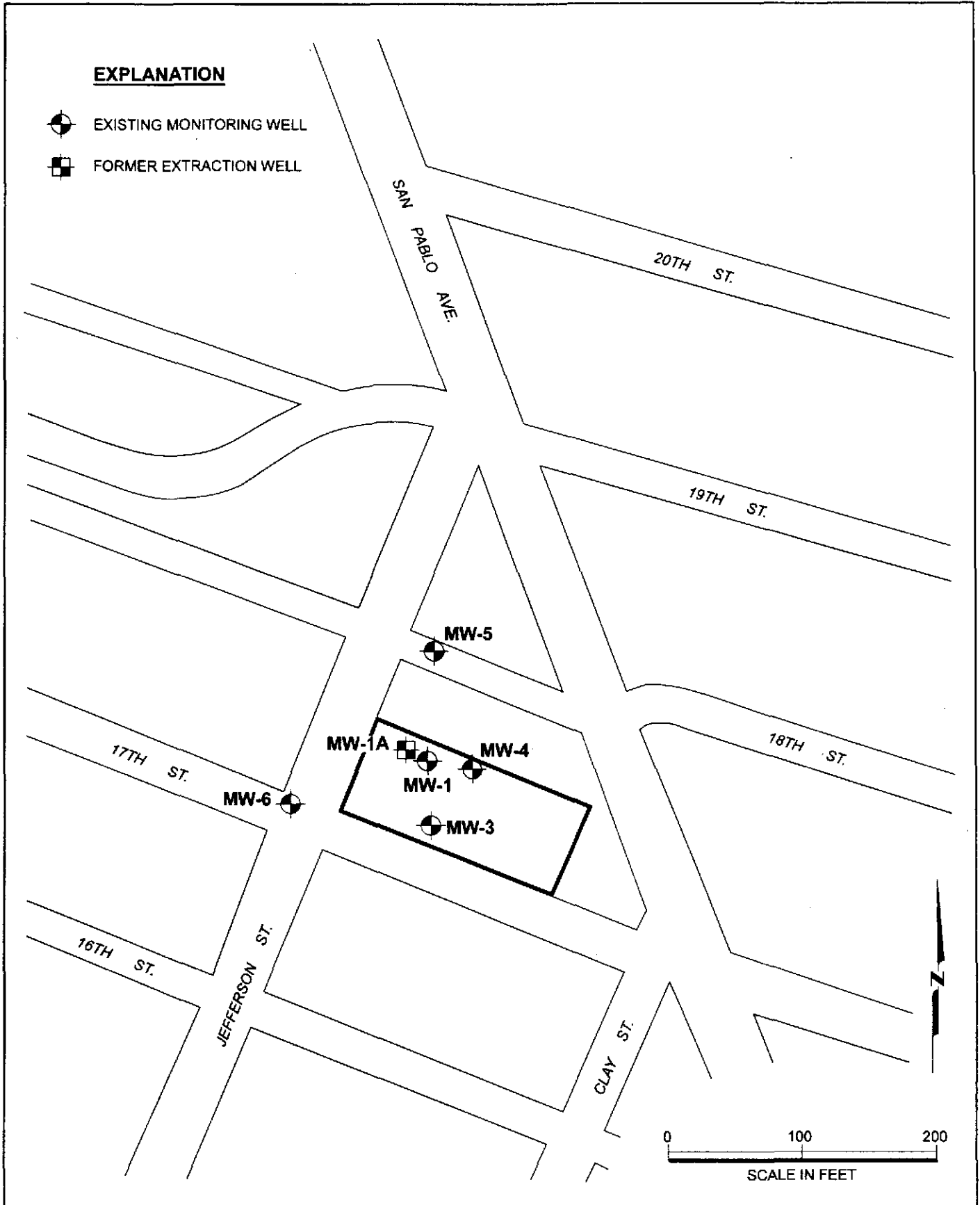
ND = Not detected above the reporting limit

NA = Not Available/MW-1 is the only well currently sampled for Ethylene Dichloride (see report for details)

\* = Analytical data collected for MW-5 on January 3, 2003

**EXPLANATION**

-  EXISTING MONITORING WELL
-  FORMER EXTRACTION WELL



**MACTEC**

Site Map  
First Quarter 2003  
1700 Jefferson Street  
BPS Reprographic Services Facility  
Oakland, California

PLATE

**1**

DRAWN CN	PROJECT NUMBER 53087 007	APPROVED <i>[Signature]</i>	DATE 6/03	REVISED DATE
-------------	-----------------------------	--------------------------------	--------------	--------------

**EXPLANATION**



EXISTING MONITORING WELL



FORMER EXTRACTION WELL

8.76

WATER LEVEL ELEVATION (FEET MSL)  
MEASURED ON APRIL 1, 2003

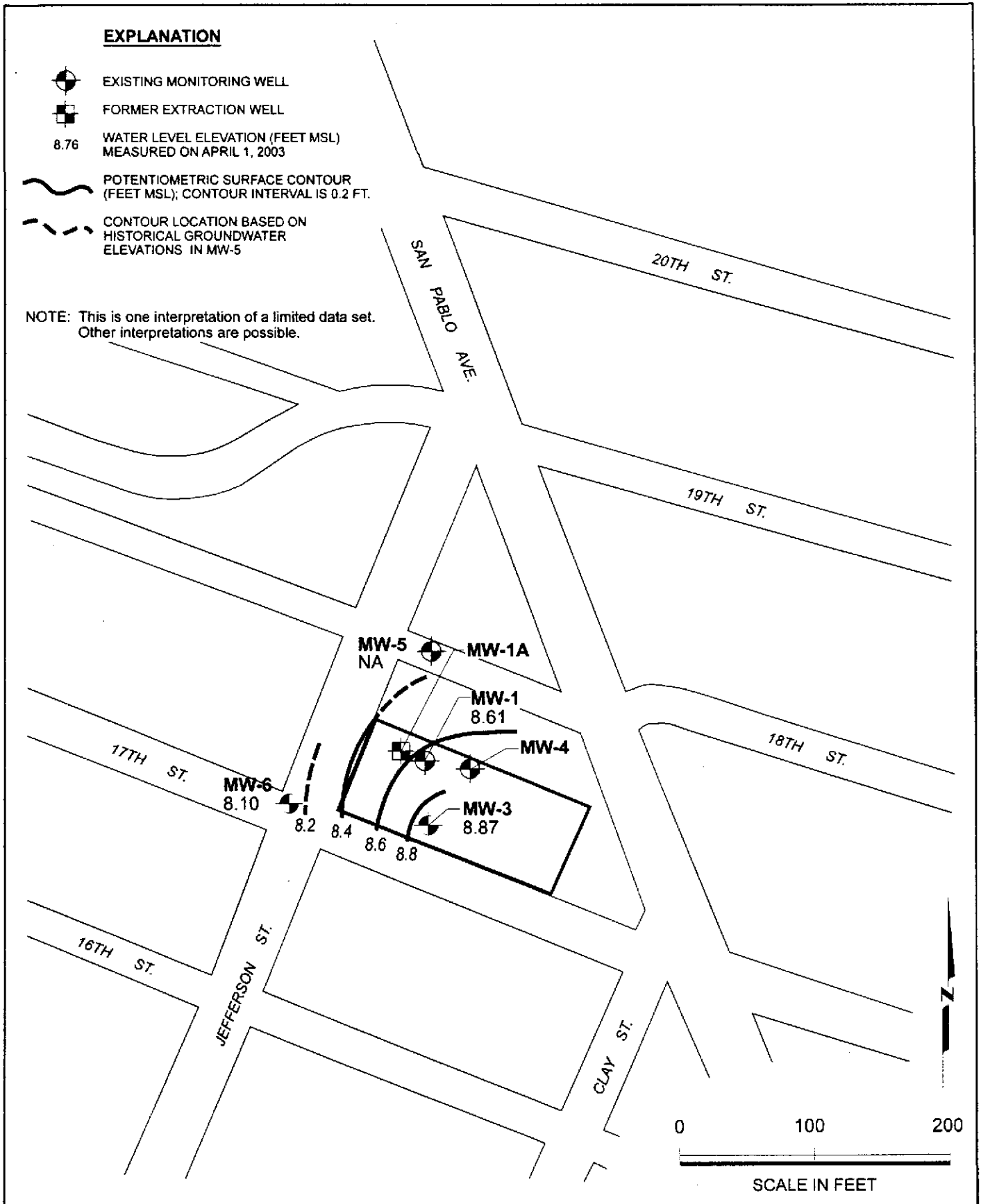


POTENTIOMETRIC SURFACE CONTOUR  
(FEET MSL); CONTOUR INTERVAL IS 0.2 FT.



CONTOUR LOCATION BASED ON  
HISTORICAL GROUNDWATER  
ELEVATIONS IN MW-5

NOTE: This is one interpretation of a limited data set.  
Other interpretations are possible.



**MACTEC**

Groundwater Contours  
First Quarter 2003  
1700 Jefferson Street  
BPS Reprographic Services Facility  
Oakland, California

PLATE

**2**

DRAWN  
CN

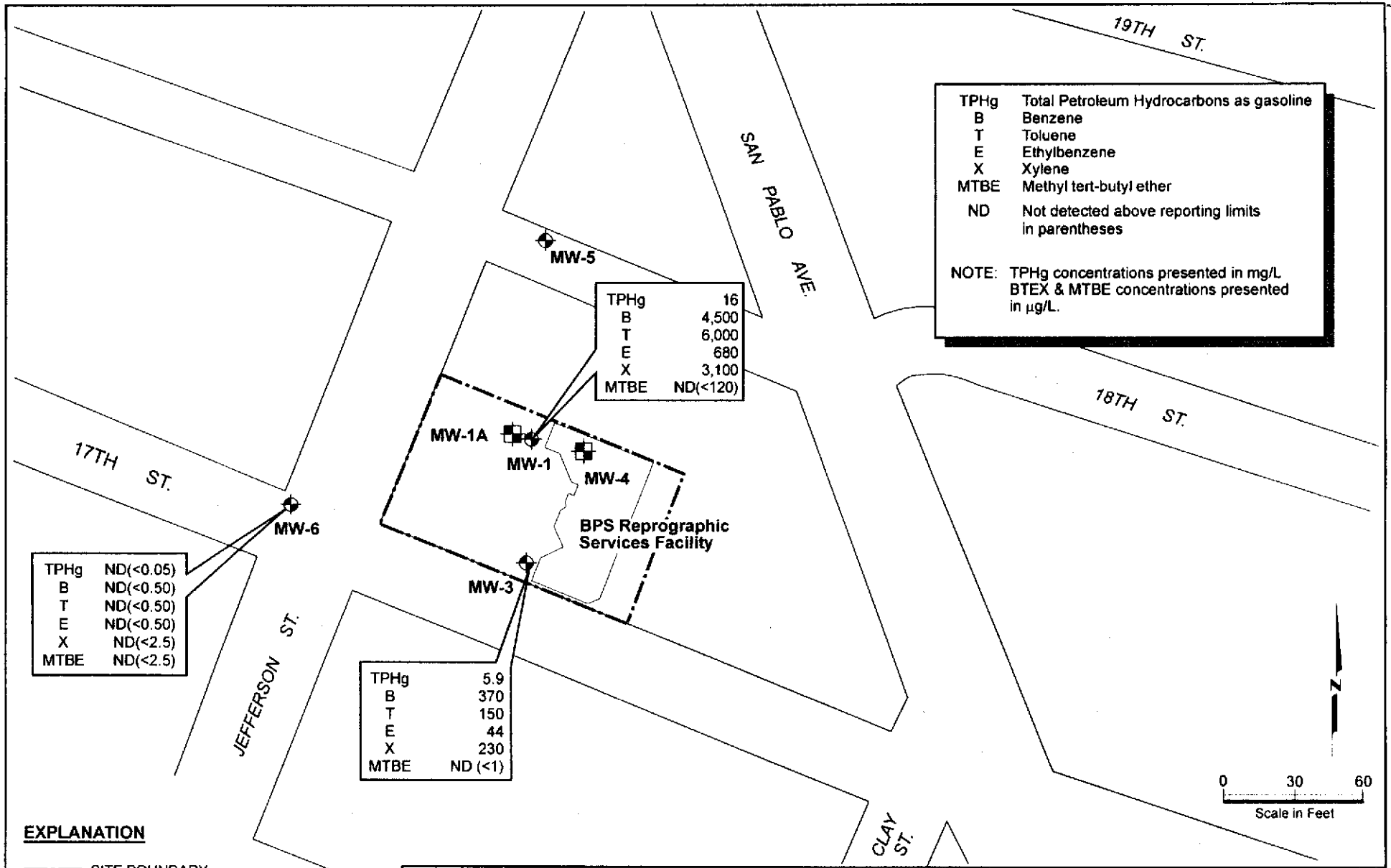
PROJECT NUMBER  
53087 007

APPROVED

DATE  
6/03

REVISED DATE





TPHg Total Petroleum Hydrocarbons as gasoline  
 B Benzene  
 T Toluene  
 E Ethylbenzene  
 X Xylene  
 MTBE Methyl tert-butyl ether  
 ND Not detected above reporting limits in parentheses

NOTE: TPHg concentrations presented in mg/L  
 BTEX & MTBE concentrations presented in µg/L.

TPHg	16
B	4,500
T	6,000
E	680
X	3,100
MTBE	ND(<120)

TPHg	ND(<0.05)
B	ND(<0.50)
T	ND(<0.50)
E	ND(<0.50)
X	ND(<2.5)
MTBE	ND(<2.5)

TPHg	5.9
B	370
T	150
E	44
X	230
MTBE	ND (<1)

**EXPLANATION**

- SITE BOUNDARY
- ⚡ MONITORING WELL
- ⊕ FORMER EXTRACTION WELL
- mg/L MILIGRAMS PER LITER
- µg/L MICROGRAMS PER LITER



**MACTEC**

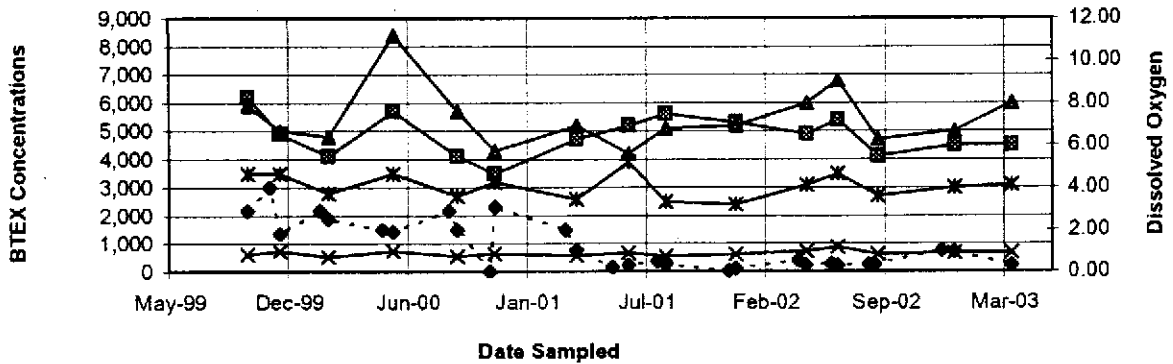
DRAWN CN PROJECT NUMBER 53087 007

TPHg, BTEX, and MTBE Concentrations in Groundwater PLATE  
 First Quarter 2003  
 1700 Jefferson Street  
 BPS Reprographic Services Facility  
 Oakland, California

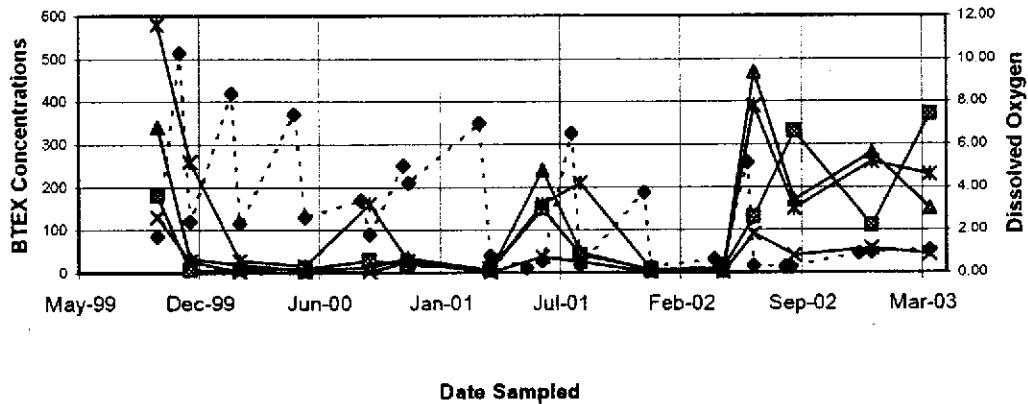
APPROVED *[Signature]* DATE 6/03 REVISED DATE

**3**

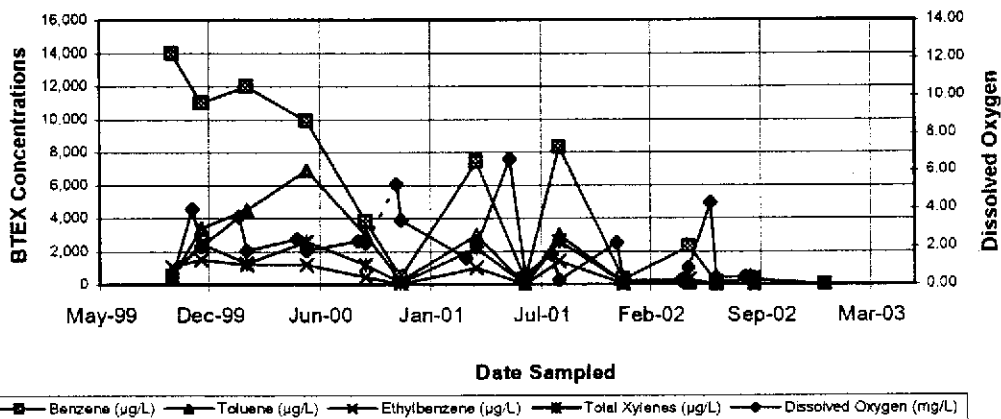
MW-1



MW-3



MW-5



Benzene (µg/L)
  Toluene (µg/L)
  Ethylbenzene (µg/L)
  Total Xylenes (µg/L)
  Dissolved Oxygen (mg/L)



**MACTEC**

**Historical BTEX and DO Results**  
 First Quarter 2003  
 BPS Reprographic Services Facility  
 1700 Jefferson Steet  
 Oakland, California

Plate

**4**

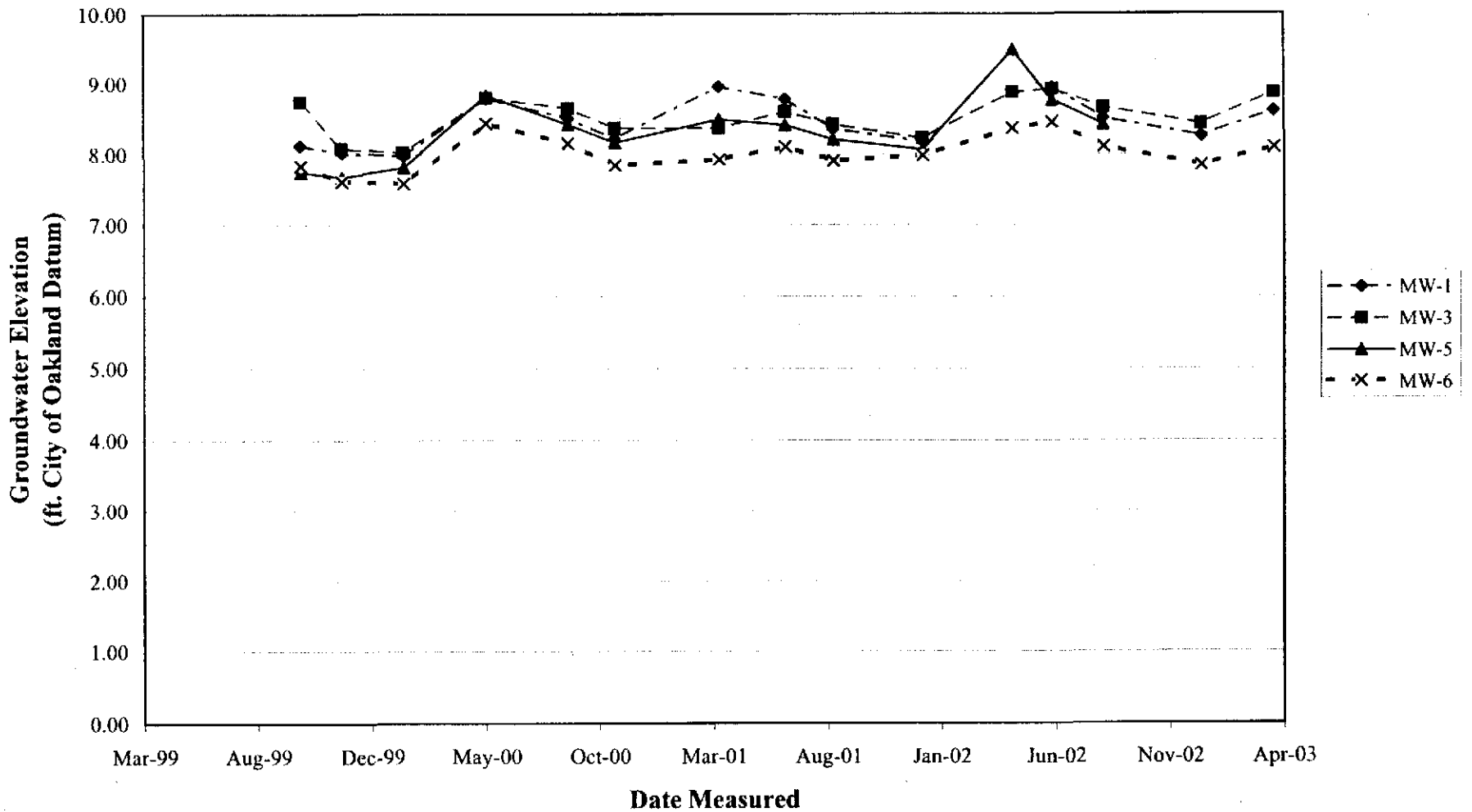
Drawn by  
DSN

JOB NUMBER  
53087.007

APPROVED  
*[Signature]*

DATE  
4/30/2003

REVISION DATE



**Groundwater Elevation Data**

First Quarter 2003  
 BPS Reprographic Services Facility  
 1700 Jefferson Street  
 Oakland, California

Plate

**5**

DRAWN	JOB NUMBER	APPROVED	DATE	REVISION DATE
DSN	53087.007		6/3/2003	

**APPENDIX A**  
**LABORATORY REPORTS**



17 April, 2003

David Nanstad  
MACTEC E&C - SF  
28 2nd Street, Suite 700  
San Francisco, CA 94105

RE: BPS Services, Oakland, CA  
Sequoia Work Order: P304049

Enclosed are the results of analyses for samples received by the laboratory on 04/01/03 18:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Michelle M. Wiita  
Project Manager

CA ELAP Certificate #2374



MACTEC E&C - SF  
28 2nd Street, Suite 700  
San Francisco CA, 94105

Project: BPS Services, Oakland, CA  
Project Number: 53087.004  
Project Manager: David Nanstad

P304049  
Reported:  
04/17/03 14:14

**ANALYTICAL REPORT FOR SAMPLES**

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
53087-1A	P304049-01	Water	04/01/03 16:28	04/01/03 18:30
53087-1B	P304049-02	Water	04/01/03 17:05	04/01/03 18:30
53087-2A	P304049-03	Water	04/01/03 15:32	04/01/03 18:30
53087-2B	P304049-04	Water	04/01/03 16:05	04/01/03 18:30
53087-4A	P304049-05	Water	04/01/03 13:55	04/01/03 18:30
53087-4B	P304049-06	Water	04/01/03 14:25	04/01/03 18:30
53087-5	P304049-07	Water	04/01/03 14:40	04/01/03 18:30



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**Reported:**  
 04/17/03 14:14

**Total Petroleum Hydrocarbons as Gasoline and BTEX by EPA 8015B/8021B**  
**Sequoia Analytical - Petaluma**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>53087-2A (P304049-03) Water Sampled: 04/01/03 15:32 Received: 04/01/03 18:30</b>									
Gasoline Range Organics	5900	500	ug/l	10	3040082	04/03/03	04/03/03	EPA 8015B/8021B	
Benzene	370	5.0	"	"	"	"	"	"	
Toluene	150	5.0	"	"	"	"	"	"	
Ethylbenzene	44	5.0	"	"	"	"	"	"	
Xylenes (total)	230	5.0	"	"	"	"	"	"	
Methyl tert-butyl ether	35	25	"	"	"	"	"	"	QR-04
Surrogate: a,a,a-Trifluorotoluene		105 %		65-135	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		90 %		65-135	"	"	"	"	
<b>53087-2B (P304049-04) Water Sampled: 04/01/03 16:05 Received: 04/01/03 18:30</b>									
Gasoline Range Organics	6600	500	ug/l	10	3040082	04/03/03	04/03/03	EPA 8015B/8021B	
Benzene	240	5.0	"	"	"	"	"	"	
Toluene	200	5.0	"	"	"	"	"	"	
Ethylbenzene	63	5.0	"	"	"	"	"	"	
Xylenes (total)	220	5.0	"	"	"	"	"	"	
Methyl tert-butyl ether	63	25	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		105 %		65-135	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		88 %		65-135	"	"	"	"	
<b>53087-4A (P304049-05) Water Sampled: 04/01/03 13:55 Received: 04/01/03 18:30</b>									
Gasoline Range Organics	ND	50	ug/l	1	3040082	04/03/03	04/03/03	EPA 8015B/8021B	
Benzene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	2.5	"	"	"	"	"	"	
Surrogate: a,a,a-Trifluorotoluene		102 %		65-135	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		89 %		65-135	"	"	"	"	

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**Total Petroleum Hydrocarbons as Gasoline and BTEX by EPA 8015B/8021B**
**Sequoia Analytical - Petaluma**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>53087-4B (P304049-06) Water Sampled: 04/01/03 14:25 Received: 04/01/03 18:30</b>									
Gasoline Range Organics	ND	50	ug/l	1	3040082	04/03/03	04/03/03	EPA 8015B/8021B	
Benzene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	2.5	"	"	"	"	"	"	
<i>Surrogate: a,a,a-Trifluorotoluene</i>		103 %		65-135	"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		89 %		65-135	"	"	"	"	
<b>53087-5 (P304049-07) Water Sampled: 04/01/03 14:40 Received: 04/01/03 18:30</b>									
Gasoline Range Organics	ND	50	ug/l	1	3040082	04/03/03	04/03/03	EPA 8015B/8021B	
Benzene	ND	0.50	"	"	"	"	"	"	
Toluene	ND	0.50	"	"	"	"	"	"	
Ethylbenzene	ND	0.50	"	"	"	"	"	"	
Xylenes (total)	ND	0.50	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	2.5	"	"	"	"	"	"	
<i>Surrogate: a,a,a-Trifluorotoluene</i>		102 %		65-135	"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		89 %		65-135	"	"	"	"	





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Reported:  
04/17/03 14:14

**Volatile Organic Compounds by EPA Method 8260B**  
**Sequoia Analytical - Petaluma**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>53087-1A (P304049-01) Water Sampled: 04/01/03 16:28 Received: 04/01/03 18:30</b>									
1,2-Dichloroethane	ND	120	ug/l	250	3040356	04/15/03	04/15/03	EPA 8260B	
Gasoline	16000	12000	"	"	"	"	"	"	
Benzene	4500	120	"	"	"	"	"	"	
Ethylbenzene	680	120	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	120	"	"	"	"	"	"	
Toluene	6000	120	"	"	"	"	"	"	
Xylenes (total)	3100	120	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		91 %	84-122	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		87 %	74-135	"	"	"	"	"	
Surrogate: Toluene-d8		98 %	84-119	"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		93 %	86-119	"	"	"	"	"	
<b>53087-1B (P304049-02) Water Sampled: 04/01/03 17:05 Received: 04/01/03 18:30</b>									
1,2-Dichloroethane	ND	120	ug/l	250	3040356	04/15/03	04/15/03	EPA 8260B	
Gasoline	23000	12000	"	"	"	"	"	"	
Benzene	5100	120	"	"	"	"	"	"	
Ethylbenzene	840	120	"	"	"	"	"	"	
Methyl tert-butyl ether	ND	120	"	"	"	"	"	"	
Toluene	6900	120	"	"	"	"	"	"	
Xylenes (total)	4100	120	"	"	"	"	"	"	
Surrogate: Dibromofluoromethane		88 %	84-122	"	"	"	"	"	
Surrogate: 1,2-Dichloroethane-d4		86 %	74-135	"	"	"	"	"	
Surrogate: Toluene-d8		97 %	84-119	"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		94 %	86-119	"	"	"	"	"	

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**Volatile Organic Compounds by EPA Method 8260B**  
**Sequoia Analytical - Petaluma**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>53087-2A (P304049-03) Water</b>									<b>HT-04, R-05</b>
Sampled: 04/01/03 15:32 Received: 04/01/03 18:30									
Methyl tert-butyl ether	ND	1.0	ug/l	2	3040374	04/15/03	04/16/03	EPA 8260B	
Surrogate: Dibromofluoromethane		103 %	84-122		"	"	"	"	
<b>53087-2B (P304049-04) Water</b>									<b>HT-04, R-05</b>
Sampled: 04/01/03 16:05 Received: 04/01/03 18:30									
Methyl tert-butyl ether	ND	2.5	ug/l	5	3040374	04/15/03	04/16/03	EPA 8260B	
Surrogate: Dibromofluoromethane		99 %	84-122		"	"	"	"	



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**Total Petroleum Hydrocarbons as Gasoline and BTEX by EPA 8015B/8021B - Quality Control**  
**Sequoia Analytical - Petaluma**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 3040082 - EPA 5030, waters**

**Blank (3040082-BLK1)**

Prepared & Analyzed: 04/03/03

Gasoline Range Organics	ND	50	ug/l							
Benzene	ND	0.50	"							
Toluene	ND	0.50	"							
Ethylbenzene	ND	0.50	"							
Xylenes (total)	ND	0.50	"							
Methyl tert-butyl ether	ND	2.5	"							
<i>Surrogate: a,a,a-Trifluorotoluene</i>	314		"	300		105	65-135			
<i>Surrogate: 4-Bromofluorobenzene</i>	269		"	300		90	65-135			

**Laboratory Control Sample (3040082-BS1)**

Prepared & Analyzed: 04/03/03

Gasoline Range Organics	2380	50	ug/l	2750		87	65-135			
Benzene	40.3	0.50	"	36.5		110	65-135			
Toluene	197	0.50	"	203		97	65-135			
Ethylbenzene	46.6	0.50	"	47.0		99	65-135			
Xylenes (total)	220	0.50	"	236		93	65-135			
Methyl tert-butyl ether	64.2	2.5	"	56.0		115	65-135			
<i>Surrogate: a,a,a-Trifluorotoluene</i>	333		"	300		111	65-135			
<i>Surrogate: 4-Bromofluorobenzene</i>	283		"	300		94	65-135			

**Matrix Spike (3040082-MS1)**

Source: P304049-05

Prepared & Analyzed: 04/03/03

Gasoline Range Organics	2340	50	ug/l	2750	21	84	65-135			
Benzene	39.7	0.50	"	36.5	ND	109	65-135			
Toluene	204	0.50	"	203	0.13	100	65-135			
Ethylbenzene	47.4	0.50	"	47.0	ND	101	65-135			
Xylenes (total)	221	0.50	"	236	ND	94	65-135			
Methyl tert-butyl ether	69.5	2.5	"	56.0	ND	124	65-135			
<i>Surrogate: a,a,a-Trifluorotoluene</i>	343		"	300		114	65-135			
<i>Surrogate: 4-Bromofluorobenzene</i>	281		"	300		94	65-135			



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**Total Petroleum Hydrocarbons as Gasoline and BTEX by EPA 8015B/8021B - Quality Control**  
**Sequoia Analytical - Petaluma**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 3040082 - EPA 5030, waters</b>										
<b>Matrix Spike Dup (3040082-MSD1)</b>										
		<b>Source: P304049-05</b>			<b>Prepared &amp; Analyzed: 04/03/03</b>					
Gasoline Range Organics	2330	50	ug/l	2750	21	84	65-135	0.4	20	
Benzene	39.5	0.50	"	36.5	ND	108	65-135	0.5	20	
Toluene	199	0.50	"	203	0.13	98	65-135	2	20	
Ethylbenzene	46.6	0.50	"	47.0	ND	99	65-135	2	20	
Xylenes (total)	219	0.50	"	236	ND	93	65-135	0.9	20	
Methyl tert-butyl ether	64.1	2.5	"	56.0	ND	114	65-135	8	20	
<i>Surrogate: a,a,a-Trifluorotoluene</i>	328		"	300		109	65-135			
<i>Surrogate: 4-Bromofluorobenzene</i>	276		"	300		92	65-135			



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**Volatile Organic Compounds by EPA Method 8260B - Quality Control**  
**Sequoia Analytical - Petaluma**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 3040356 - EPA 5030 waters**

**Blank (3040356-BLK1)**

Prepared & Analyzed: 04/15/03

1,2-Dichloroethane	ND	0.50	ug/l							
Gasoline	ND	50	"							
Benzene	ND	0.50	"							
Ethylbenzene	ND	0.50	"							
Methyl tert-butyl ether	ND	0.50	"							
Toluene	ND	0.50	"							
Xylenes (total)	ND	0.50	"							
<i>Surrogate: Dibromofluoromethane</i>	4.20		"	5.00		84	84-122			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	3.91		"	5.00		78	74-135			
<i>Surrogate: Toluene-d8</i>	4.85		"	5.00		97	84-119			
<i>Surrogate: 4-Bromofluorobenzene</i>	4.61		"	5.00		92	86-119			

**Laboratory Control Sample (3040356-BS1)**

Prepared & Analyzed: 04/15/03

Benzene	1.01	0.50	ug/l	1.00		101	81-118			
Methyl tert-butyl ether	0.866	0.50	"	1.00		87	79-118			
Toluene	1.12	0.50	"	1.00		112	84-119			
<i>Surrogate: Dibromofluoromethane</i>	4.28		"	5.00		86	84-122			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	3.81		"	5.00		76	74-135			
<i>Surrogate: Toluene-d8</i>	4.84		"	5.00		97	84-119			
<i>Surrogate: 4-Bromofluorobenzene</i>	4.60		"	5.00		92	86-119			

**Laboratory Control Sample (3040356-BS2)**

Prepared & Analyzed: 04/15/03

Gasoline	605	50	ug/l	500		121	65-135			
<i>Surrogate: Dibromofluoromethane</i>	4.21		"	5.00		84	84-122			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	4.00		"	5.00		80	74-135			
<i>Surrogate: Toluene-d8</i>	4.97		"	5.00		99	84-119			
<i>Surrogate: 4-Bromofluorobenzene</i>	4.66		"	5.00		93	86-119			



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**Volatile Organic Compounds by EPA Method 8260B - Quality Control**  
**Sequoia Analytical - Petaluma**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 3040356 - EPA 5030 waters**

**Laboratory Control Sample Dup (3040356-BSD1)**

Prepared & Analyzed: 04/15/03

Benzene	0.976	0.50	ug/l	1.00		98	81-118	3	20	
Methyl tert-butyl ether	0.889	0.50	"	1.00		89	79-118	3	20	
Toluene	1.13	0.50	"	1.00		113	84-119	0.9	20	
<i>Surrogate: Dibromofluoromethane</i>	4.26		"	5.00		85	84-122			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	4.00		"	5.00		80	74-135			
<i>Surrogate: Toluene-d8</i>	4.90		"	5.00		98	84-119			
<i>Surrogate: 4-Bromofluorobenzene</i>	4.63		"	5.00		93	86-119			

**Laboratory Control Sample Dup (3040356-BSD2)**

Prepared & Analyzed: 04/15/03

Gasoline	597	50	ug/l	500		119	65-135	1	35	
<i>Surrogate: Dibromofluoromethane</i>	4.23		"	5.00		85	84-122			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	3.92		"	5.00		78	74-135			
<i>Surrogate: Toluene-d8</i>	4.96		"	5.00		99	84-119			
<i>Surrogate: 4-Bromofluorobenzene</i>	4.67		"	5.00		93	86-119			

**Batch 3040374 - EPA 5030 waters**

**Blank (3040374-BLK1)**

Prepared & Analyzed: 04/15/03

Methyl tert-butyl ether	ND	0.50	ug/l							
<i>Surrogate: Dibromofluoromethane</i>	4.35		"	4.50		97	84-122			

**Laboratory Control Sample (3040374-BS1)**

Prepared & Analyzed: 04/15/03

Methyl tert-butyl ether	4.76	0.50	ug/l	5.00		95	79-118			
<i>Surrogate: Dibromofluoromethane</i>	4.30		"	4.50		96	84-122			

**Laboratory Control Sample Dup (3040374-BSD1)**

Prepared: 04/15/03 Analyzed: 04/16/03

Methyl tert-butyl ether	6.10	0.50	ug/l	5.00		122	79-118	25	20	Q-LIM, QR-07
<i>Surrogate: Dibromofluoromethane</i>	4.76		"	4.50		106	84-122			

Sequoia Analytical - Petaluma

*The results in this report apply to the samples analyzed in accordance with the chain of custody document. Unless otherwise stated, results are reported on a wet weight basis. This analytical report must be reproduced in its entirety.*



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### Notes and Definitions

- HT-04 This sample was analyzed beyond the EPA recommended holding time. The results may still be useful for their intended purpose.
- Q-LIM The percent recovery was outside of the control limits. The samples results may still be useful for their intended purpose.
- QR-04 Primary and confirmation results varied by greater than 40% RPD. The results may still be useful for their intended purpose.
- QR-07 The RPD was outside control limits. The results may still be useful for their intended purpose.
- R-05 The sample was diluted due to the presence of high levels of non-target analytes resulting in elevated reporting limits.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference





**APPENDIX B**

**GROUNDWATER SAMPLING FORMS**

**Table B1. Sample Location/Sample Description Cross-Reference**  
**BPS Reprographic Services Facility**  
**1700 Jefferson Street**  
**Oakland, California**

Well/Sample Number	Client Sample ID
MW-1 Pre-Purge	53087-1A
MW-1 Post-Purge	53087-1B
MW-3 Pre-Purge	53087-2A
MW-3 Post-Purge	53087-2B
MW-6 Pre-Purge	53087-4A
MW-6 Post-Purge	53087-4B
Field Blank	53087-5



## SAMPLE COLLECTION LOG

**PROJECT NAME:** BPE GW Monitoring      **SAMPLE LOCATION:** MW-1  
**PROJECT NO.:** 53087.004      **SAMPLER:** Jason House  
**DATE:** 4/1/03      **PROJECT MANAGER:** David Vanstad

<b>CASING DIAMETER</b>	<b>SAMPLE TYPE</b>	<b>WELL VOLUMES PER UNIT</b>
2" _____	Ground Water <u>X</u>	Well Casing
4" <u>X</u>	Surface Water _____	I.D. (inches)      Gal/Ft.
Other _____	Treat. Influent _____	2.0      0.1632
	Treat. Effluent _____	4.0      0.6528
	Other _____	6.0      1.4690

**DEPTH TO PRODUCT:** 0 (ft.)      **PRODUCT THICKNESS:** 0 (ft.)      **MINIMUM PURGE VOLUME**  
**DEPTH TO WATER:** 23.75 (ft.)      **WATER COLUMN:** 7.92 (ft.)      (3 OR 4 WCV): 15.5 (gal)  
**DEPTH OF WELL:** 31.67 (ft.)      **WELL CASING VOL.:** 5.17 (gal)      **ACTUAL VOLUME PURGED:** 15.5 (gal)

TIME	VOLUME (gal)	pH (Units)	E.C. (Micromhos)	Temperature (°F)	Turbidity (NTU)	Other, DO/ REDOX
16:25	0	6.82	1160	18.03	248	0.95/60.8
16:35	5	7.09	1170	18.00	476	0.97/71.2
16:45	10	6.85	1160	18.01	490	1.27/85.2
16:55	15.5	6.90	1128	18.11	526	0.30/81.9

**OVM READING** NA

**PURGE METHOD**

Displacement Pump       Other \_\_\_\_\_  
 Bailer (Teflon/PVC/SS)       Submersible Pump

**SAMPLE METHOD**

Bailer (Teflon/PVC/SS)       Dedicated Tubing  
 Bailer (Disposable)       Other \_\_\_\_\_

**NUMBER OF CONTAINERS** 3      **TYPES OF CONTAINERS:** 40ml VOA w/ HCL

SAMPLES COLLECTED	ID	TIME	DATE	LAB	ANALYSES
SAMPLE	53087-1B	17:05	4/1/03	Synova Analytical	TPH-g, BTEX w/MSD
DUPLICATE					Ethyl & Dichloride
SPLIT					
FIELD BLANK					

**COMMENTS:** Pre-purge sample # - 53087-1A - collected @ 16:28  
also 5 min. 1 (3) three 40ml VOA - (HCL)

**SAMPLER (sign):** \_\_\_\_\_

**DATE:** 4/1/03

**SAMPLE COLLECTION LOG**

PROJECT NAME: BPE GW Monitoring SAMPLE LOCATION: MW-2  
 PROJECT NO.: 53087.004 SAMPLER: Jason House  
 DATE: 4/1/03 PROJECT MANAGER: David Nausstad

CASING DIAMETER: 2" \_\_\_\_\_ 4" X Other \_\_\_\_\_  
 SAMPLE TYPE: Ground Water X Surface Water \_\_\_\_\_  
 Treat. Influent \_\_\_\_\_ Treat. Effluent \_\_\_\_\_ Other \_\_\_\_\_  
 WELL VOLUMES PER UNIT:  
 Well Casing I.D. (inches) Gal/Ft.  
 2.0 0.1632  
 4.0 0.6528  
 6.0 1.4690

DEPTH TO PRODUCT: 0 (ft.) PRODUCT THICKNESS: 0 (ft.) MINIMUM PURGE VOLUME  
 DEPTH TO WATER: 22.90 (ft.) WATER COLUMN: 8.25 (ft.) (3 OR 4 WCV): 16.16 (gal)  
 DEPTH OF WELL: 31.15 (ft.) WELL CASING VOL.: 5.38 (gal) ACTUAL VOLUME PURGED: 16.5 (gal)

TIME	VOLUME (gal)	pH (Units)	E.C. (Micromhos)	Temperature (°F)	Turbidity (NTU)	Other: DO/
15:30	0	6.94	642	19.86	146	REDOX
15:45	5	6.80	709	19.83	276	2.66/31.7
15:50	11	7.11	780	19.85	300	6.71/58.0
16:00	16.5	7.08	800	17.80	280	0.55/79.0

OVM READING NA

**PURGE METHOD**

Displacement Pump \_\_\_\_\_ Other \_\_\_\_\_  
 Bailer (Teflon/PVC/SS) \_\_\_\_\_ Submersible Pump \_\_\_\_\_

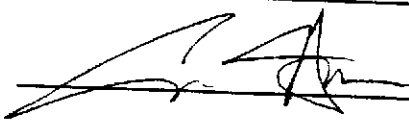
**SAMPLE METHOD**

Bailer (Teflon/PVC/SS) \_\_\_\_\_  Dedicated Tubing  
 Bailer (Disposable) \_\_\_\_\_ Other \_\_\_\_\_

NUMBER OF CONTAINERS 3 TYPES OF CONTAINERS: 40ml VOA w/ HCl

SAMPLES COLLECTED	ID	TIME	DATE	LAB	ANALYSES
SAMPLE	53087-2B	16:05	4/1/03	Sequoia Analytical	TPH-g, BTEX w/ MTEE
DUPLICATE					
SPLIT					
FIELD BLANK					

COMMENTS: Prepare sample # - 53087-2A - collected @ 15:32  
also submitted (3) three 40ml VOA w/ HCl.

SAMPLER (sign):  DATE: 4/1/03



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A MACTEC COMPANY

SAMPLE COLLECTION LOG

PROJECT NAME: BPS-6W Monitoring SAMPLE LOCATION MW-6
PROJECT NO.: 53087-004 SAMPLER: Jason House
DATE: 4/1/03 PROJECT MANAGER David Nansstad

Table with columns: CASING DIAMETER, SAMPLE TYPE, WELL VOLUMES PER UNIT. Includes rows for 2", 4", and Other casing diameters and Ground Water, Surface Water, Treat. Influent, Treat. Effluent, and Other sample types.

DEPTH TO PRODUCT: 0 (ft.) PRODUCT THICKNESS: 0 (ft.) MINIMUM PURGE VOLUME
DEPTH TO WATER: 23.16 (ft.) WATER COLUMN: 9.42 (ft.) (3 OR 4 WCV): 4.61 (gal)
DEPTH OF WELL: 32.58 (ft.) WELL CASING VOL.: 1.54 (gal) ACTUAL VOLUME PURGED: 5 (gal)

Table with columns: TIME, VOLUME (gal), pH (Units), E.C. (Micromhos), Temperature (°F), Turbidity (NTU), Other: DO/REDOX. Contains data for times 13:55, 14:05, 14:15, and 14:20.

OVM READING NA

PURGE METHOD

SAMPLE METHOD

Displacement Pump Other
X Bailer (Teflon/PVC/SS) Submersible Pump Bailer (Teflon/PVC/SS) X Dedicated Tubing
Bailer (Disposable) Other

NUMBER OF CONTAINERS 3 TYPES OF CONTAINERS: VOA (40ml) w/ HCL

Table with columns: SAMPLES COLLECTED, ID, TIME, DATE, LAB, ANALYSES. Includes rows for SAMPLE, DUPLICATE, SPLIT, and FIELD BLANK.

COMMENTS: Pre-purge sample # - 53087-4A - collected @ 13:55
also submitted (3) three 40ml VOA w/ HCL. Pa meter was not as reliable as
they could be, due to various source for purging.

SAMPLER (sign): [Signature] DATE: 4/1/03

Groundwater Monitoring Data Sheet

City Blue  
1700 Jefferson Street  
Oakland, CA

Well Number	Date	Time	Water Depth First Reading (TOC)	Water Depth Second Reading (TOC)	Cap	Lock	Casing	Box/Lid	Well Diameter	Comments
MW-1	4/1/03	16:15	23.75	23.75	✓	None	✓	✓	4"	
MW-3		15:00	22.40	22.40	✓	None	✓	✓	4"	
MW-5		13:00	NA	NA	✓	None	✓	✓	2"	ORC's stuck in well
MW-6		13:40	23.16	23.16	✓	None	✓	✓	2"	Lid Bolt's are stripped

MW-1A Diameter: 4 inches