CITY OF OAKLAND

DALZIEL BUILDING • 250 FRANK H. OGAWA PLAZA, SUITE 5301 • OAKLAND, CALIFORNIA 94612-2034

Public Works Agency
Environmental Services

FAX (510) 238-7286
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February 27, 2002

MAR 01 2002

Mr. Barney Chan
Alameda County Environmental Health Services
1131 Harbor Bay Parkway
Alameda, California 94502-6577

Subject: **Fourth Quarter 2001 Monitoring Report -**
City of Oakland Municipal Service Center
7101 Edgewater Drive Oakland, California

Dear Mr. Chan:

Enclosed are copies of the *Fourth Quarter 2001 Monitoring Report* prepared by our consultants, URS Corporation and Aquatus Environmental for the City of Oakland Municipal Service Center at 7101 Edgewater Drive.

Please call me at 238-6259, if you have any questions or require additional information.

Sincerely,

Joseph A. Cotton, R.G.
Environmental Program Specialist

cc: Diane Heinz, Port of Oakland, 530 Water St., Oakland, CA 94604
Xinggang Tong, URS Corporation, 500 12th St., Suite 200, Oakland, CA 94607

Aquatus Environmental
731 Talbot Avenue
Albany, CA 94706
Phone (510) 527-6299
Fax (510) 527-3009
aquatusenviro@earthlink.net

February 22, 2002

Mr. Joseph Cotton
City of Oakland, Public Works Agency
Environmental Services Division
250 Frank H. Ogawa Plaza, Ste. 5301
Oakland, California 94612-2034

MAR 01 2002

Re: **Fourth Quarter 2001 Monitoring Report**
City of Oakland, Municipal Services Center
7101 Edgewater Drive
Oakland, California

Dear Mr. Cotton:

As required by the Alameda County Department of Environmental Health (ACDEH), Aquatus Environmental has prepared this fourth quarter 2001 groundwater monitoring report for the above-referenced site. Morgan Environmental performed the groundwater monitoring activities, and URS Corporation prepared the groundwater elevation contour map this quarter.

Aquatus Environmental understands that the City of Oakland will forward a copy of this report to the ACDEH. Please call me if you have questions or comments regarding this report.

Sincerely,
AQUATUS ENVIRONMENTAL

Donna Bodine

Donna Bodine
Principal Environmental Engineer

Attachments: Fourth Quarter 2001 Monitoring Report

cc: Xinggang Tong- URS Corporation
Tom Morgan- Morgan Environmental

FOURTH QUARTER 2001 MONITORING REPORT

City of Oakland, Municipal Services Center
7101 Edgewater Drive
Oakland, California

February 22, 2002

Prepared for:

City of Oakland, Public Works Agency
Environmental Services Division
250 Frank H. Ogawa Plaza, Ste. 5301
Oakland, California 94612-2034

Prepared by:

Aquatus Environmental
731 Talbot Avenue
Albany, CA 94706

URS Corporation
500 12th Street, Ste 200
Oakland, CA 94607-4101

Donna Bodine
Principal Environmental Engineer

FOURTH QUARTER 2001 MONITORING REPORT

City of Oakland, Municipal Services Center
7101 Edgewater Drive
Oakland, California

February 22, 2002

INTRODUCTION

As required by the Alameda County Department of Environmental Health (ACDEH), Aquatus Environmental has prepared this fourth quarter 2001 groundwater monitoring report for the above-referenced site. URS Corporation has prepared the groundwater elevation contour map for this report. Described below are the fourth quarter 2001 monitoring activities, monitoring results, contaminant distributions in groundwater, corrective action activities, conclusions, recommendations, and anticipated first quarter 2002 activities.

FOURTH QUARTER 2001 MONITORING ACTIVITIES

Field Activities: On December 15, 2001, Morgan Environmental gauged and inspected site monitoring and tank pit backfill wells for separate-phase hydrocarbons (SPH) in accordance with the ACDEH-approved monitoring protocol presented Table A. Morgan Environmental collected samples from the following wells on December 15-December 16, 2001: MW-8, MW-9, MW-10, MW-11, MW-13, MW-14, MW-15 and MW-17. Monitoring well MW-16 was not sampled due to the presence of [illegible] SPH. Monitoring Well MW-12 was not sampled because it was inaccessible. Monitoring well locations are shown on Figure 1. Field data sheets are included as Appendix A.

Sample Analyses: The groundwater samples were analyzed for the following parameters:

- Total petroleum hydrocarbons (TPH) as gasoline (TPHg), diesel (TPHd), kerosene (TPHk), and motor oil (TPHmo) by United States Environmental Protection Agency (USEPA) Method 8015B.
- Benzene, toluene, ethylbenzene, total xylenes (BTEX) and methyl tertiary butyl ether (MTBE) by USEPA Method 8021.

The chemical analyses were performed by Caltest Analytical Laboratory (Caltest), of Napa, California, a California Department of Health Services-certified environmental laboratory.

Samples designated for TPHd, TPHk and TPHmo analyses were not filtered in the 4th quarter 2001, as has been performed since the 1st quarter 2001. In the 2nd quarter of 2001, Caltest spiked a clean matrix (laboratory control sample (LCS)) and a project sample (matrix spike (MS)) with diesel fuel prior to filtration through 0.45-micron synthetic membrane filters. In the 3rd quarter 2001, Caltest performed a LCS and MS for diesel using both 0.45-micron synthetic membrane filters and 0.7- micron glass fiber filters. Zero percent (0%) recoveries were reported for the LCS and MS samples in both the 2nd and 3rd

quarters. The percent recovery range for acceptable spike analyses is 36 percent to 102 percent (Caltest control limits for diesel spike analyses). Therefore, zero percent spike recoveries indicate that TPHd, TPHk and TPHmo results for filtered samples are highly uncertain. Diesel consists of a mixture of hydrocarbons, with a high percentage of its composition comprised of long, straight-chain or branched-chain alkanes. These alkanes may "stick" to the filter media, resulting in poor spike recoveries for diesel. As a result of the poor LCS/MS recoveries obtained for filtered samples in previous quarters, samples collected this quarter were not filtered before extraction and analysis. A potential alternative method for removing particulates from the groundwater samples prior to extraction is discussed in the Conclusions and Recommendations section of this report.

Table A – Well Sampling Protocol (Fourth Quarter 2001)
City of Oakland Municipal Services Center

Well	Quarter				Gauge Every Qtr	DO (field meter)	TPHg/ BTEX/ MTBE* (8015B/ 8021)	TPH d/k/mo (8015B) silica gel**	VOC (8260)	SVOC (8270)	metals	Comments
	1	2	3	4								
MW-1	X		X		X	X	X	X				
MW-2	X		X		X	X	X	X				
MW-5	X		X		X	X	X	X				
MW-6	X		X		X	X	X	X				SPH present
MW-7	X		X		X	X	X	X				
MW-8	X	X	X	X	X	X	X	X				
MW-9	X	X	X	X	X	X	X	X				
MW-10	X	X	X	X	X	X	X	X				
MW-11	X	X	X	X	X	X	X	X				
MW-12	X	X	X		X	X	X	X				
MW-13	X	X	X	X	X	X	X	X				
MW-14	X	X	X	X	X	X	X	X				
MW-15	X	X	X	X	X	X	X	X				
MW-16	X		X		X	X	X	X				SPH present
MW-17	X	X	X	X	X	X	X	X				
MW-18	Not gauged or sampled to date											
TBW-1	X		X	X	Gauge thickness of floating product							SPH present
TBW-3	X		X	X	Gauge thickness of floating product							SPH present
TBW-4	X		X	X	Gauge thickness of floating product							
TBW-5	X		X	X	Gauge thickness of floating product							SPH present
TBW-6	X		X		Gauge thickness of floating product							
Trip Blank	X	X	X	X	NA	NA	X					

DO = Dissolved Oxygen
NA = Not Applicable
* Positive results for MTBE will be confirmed by re-analysis using EPA Method 8260, except for MW-5
** Prior to analysis, the lab will perform a silica gel cleanup on the sample extract using EPA Method 3630C
Wells MW-3 and MW-4 were destroyed during the first quarter 1999
Metals: antimony, arsenic, beryllium, cadmium, chromium, copper, lead, nickel, selenium, silver, thallium, and zinc

MONITORING RESULTS

Shallow Groundwater Topography

Groundwater contours indicate flow towards San Leandro Bay and Damon Slough (Figure 1). Apparent groundwater flow directions are consistent with historical measurements. The magnitude of the gradient ranged from 0.001 in the north to 0.004 in the central portion of the site. Depth-to-water and groundwater elevation data are presented in Table 1.

Occurrence of Separate-Phase Hydrocarbons

Separate-phase hydrocarbons (SPH) were observed in monitoring wells MW-6 (0.07 ft), and in backfill wells TBW-1 (0.35 ft), TBW-3 (0.02 ft), and TBW-5 (0.36 ft). SPH in monitoring well MW-16 were not measured this quarter. Historically the SPH thickness in MW-16 has been less than or equal to 0.42 ft.

SPH thickness measurements in wells frequently may not be representative of true thicknesses in the formation(s) screened by the wells, and are typically several to many times thicker than those actually occurring in the deposits or formation(s) intercepted by the well screens[1,2]. This phenomena can also be exaggerated by fluctuating water tables. The extent of SPH is defined in the downgradient direction for each of these areas by other site wells. SPH removal activities are described below in the corrective action section.

Contaminant Distribution in Groundwater

The fourth quarter 2001 analytical results are summarized in Table 1. The laboratory analytical data reports are included as Appendix B. Historical data for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), Leaking Underground Fuel Tank (LUFT) metals, and other metals are provided in Table 2, Table 3, Table 4, and Table 5, respectively.

Benzene in Groundwater: The maximum benzene concentration detected this quarter was 15 micrograms per liter (µg/l) in offsite perimeter well MW-9. The concentration is below the acceptable risk thresholds

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[1] Wagner, R.B., Hampton, D.R., and Howell, J.A., *A New Tool to Determine The Actual Thickness of Free Product in a Shallow Aquifer*, Proceedings of the Conference on Petroleum Hydrocarbons and Organic Chemicals in Ground Water: Prevention, Detection and Restoration, 1989. Published by the National Water Well Association.

[2] Yaniga, P. M., *Hydrocarbon Retrieval and Apparent Hydrocarbon Thickness: Relationship to Recharging/Discharging Aquifer Conditions*, presented to the National Water Well Association and the American Petroleum Institute, Houston, TX, 1984.

for both the San Francisco Airport Ecological Protection Zone Tier I Standard[3] (71 µg/l) and the City of Oakland Risk-Based Tier I Standard[4] for inhalation of indoor air vapors (110 µg/l). This benzene concentration is also below the acceptable risk threshold of 46 µg/l for ecological toxicity established by the USEPA according to the San Francisco Bay Regional Water Quality Control Board (RWQCB-SFBR)[5]. Benzene was also detected in MW-10 at 2.4 µg/l, and in MW-11 at 1.7 µg/l, and was below the reporting limit of 0.5 µg/l for all other wells sampled this quarter.

MTBE in Groundwater: MTBE was not detected above the reporting limit (2 µg/l- 5 µg/l) in any samples this quarter. Historically, MTBE has been detected only in wells MW-5 and MW-6, which were not sampled this quarter.

TPHg in Groundwater: The maximum TPHg concentration detected was 210 µg/L in offsite perimeter well MW-9. TPHg was detected in Well MW-11 at 170 µg/L. TPHg was not detected above the reporting limit of 50 µg/l in the other monitoring wells sampled this quarter. The concentrations reported in MW-9 and MW-11 are below the San Francisco Airport Ecological Protection Zone Tier I Standard acceptable threshold of 3,700 µg/l.[6] ✓

TPHd in Groundwater: All TPHd concentrations were significantly higher than the concentrations reported last quarter because the samples were not filtered prior to analysis, as previously discussed. However, TPHd concentrations detected in offsite perimeter wells MW-13 and MW-14 were similar to the concentrations detected in these wells before sample filtration was initiated (prior to 1st quarter 2001). The maximum reported TPHd concentration during this quarter was 3,800 µg/L in offsite perimeter well MW-15. This concentration is above the San Francisco Airport Ecological Protection Zone Tier I Standard of 640 µg/l for middle distillates.[7] The other wells with TPHd concentrations above the Tier 1

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[3] Regional Water Quality Control Board, San Francisco Bay Region (RWQCB-SFBR) *Order No. 99-045* for a similar situation at the San Francisco International Airport. Staff comments dated July 16, 1998, signed by Mr. Steven Morse, Chief of the Toxics Cleanup Division, addressed to the SFIA Consolidated Tenant Group.

[4] Spence, L., and Gomez, M. *Oakland Risk-Based Corrective Action: Technical Background Document.* Urban Land Redevelopment Program Technical Advisory Committee. May 17, 1999.

[5] RWQCB-SFBR, *Application of Risk-Based Screening Levels and Decision Making to Sites with Impacted Soil and Groundwater*. Interim Final. August 2000.

[6] RWQCB-SFBR *Order No. 99-045* for a similar situation at the San Francisco International Airport. Staff comments dated July 16, 1998, signed by Mr. Steven Morse, Chief of the Toxics Cleanup Division, addressed to the SFIA Consolidated Tenant Group.

[7] Ibid.

standard include offsite perimeter wells MW-9 (1,400 µg/l), MW-13 (1,900 µg/l), MW-14 (1,110 µg/l), and MW-17 (940 µg/L). However, the TPHd concentrations reported this quarter are not representative of the dissolved phase. The actual dissolved TPHd concentrations in these wells are likely lower than their reported total TPHd concentrations.

TPHmo in Groundwater: All TPHmo concentrations were also significantly higher than the concentrations reported in previous quarters when the samples were filtered prior to analysis. However, concentrations reported for MW-13, MW-14, MW-15 and MW-17 are within the concentration range reported prior to initiation of filtration (1st quarter 2001). The highest TPHmo concentration was reported at 18,000 µg/L in offsite perimeter well MW-13. This concentration is above the San Francisco Airport Ecological Protection Zone Tier I Standard of 640 µg/l for residual fuels.[8] The other wells with TPHmo concentrations above the Tier 1 standard include offsite perimeter wells MW-8 (1,300 µg/l), MW-9 (4,100 µg/l), MW-10 (2,100 µg/l), MW-14 (3,000 µg/l), MW-15 (15,000 µg/l), and MW-17 (1,000 µg/l). However, the reported TPHmo concentrations are not representative of the dissolved phase. The actual dissolved TPHmo concentrations in these wells are likely lower than their reported total TPHmo concentrations.

Laboratory Quality Assurance and Quality Control (QA/QC): A thorough QA/QC review was performed on the analytical data to evaluate the quality and usability of the analytical results. The QA/QC review was performed in accordance with USEPA guidelines[9]. A summary of the parameters that were reviewed and the results is provided below.

Method Holding Times. Extraction and analysis holding times were reviewed to evaluate exceedances. There were no method holding times exceeded.

Blanks. Trip blank and laboratory method blank results were reviewed for detections of target analytes. There were no target analytes detected in the trip or method blanks, indicating that sample transportation and laboratory procedures were not a source of sample contamination.

Laboratory Control Samples. Laboratory Control Sample (LCS) recoveries were reviewed to evaluate analytical accuracy. The LCS recovery for TPHd was 70%. LCS recoveries for TPHg, BTEX and MTBE ranged from 89% to 110%. The LCS recoveries were within the laboratory control limits and indicate

[8] Ibid.

[9] USEPA. 1999. USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review. October.

acceptable analytical accuracy. LCS duplicate (LCSD) analyses were performed by the laboratory to evaluate analytical precision. The relative percent differences (RPDs) between LCS and LCSD results ranged from 0.7% to 7.5%. The RPDs were within laboratory control limits and indicate acceptable analytical precision.

Surrogates. Surrogate recoveries were reviewed to evaluate sample-specific accuracy. Surrogate recoveries for TPHd, TPHk andTPHmo analyses ranged from 75% to 123%. Surrogate recoveries for TPHg, BTEX and MTBE ranged from 95% to 112%. The surrogate recoveries were within laboratory control limits and indicate acceptable sample-specific accuracy.

False-Positive Petroleum Hydrocarbon Identification. The laboratory reported that the TPHd and TPHmo detections reported for all groundwater samples were due to the presence of unidentified petroleum hydrocarbons (PHCs). Upon review of the sample chromatograms with the laboratory, many samples were found to exhibit a pattern resembling weathered motor oil. Weathered diesel does not appear to be present in the wells sampled this quarter. The laboratory also reported that the TPHg concentrations reported for MW-9 and MW-11 were due to unidentified PHCs. Therefore, the TPHg concentrations for these samples only represent PHCs that eluted within the gasoline range, and do not match the laboratory gasoline standard.

In summary, the QA/QC review found the analytical data to be of acceptable quality with no limitations for use, with the exceptions of the TPHd, TPHmo and TPHg results discussed above.

Corrective Action Activities

Separate-Phase Hydrocarbon Removal: The weights of SPH removed this quarter, and since the fourth quarter 2000 are provided in Table B. An estimated 22.7 [redacted] 2[redacted]0. The active skimmer in TBW-5 was disassembled in anticipation of the of the dual-phase extraction (DPE) system installation.

Table B – SPH Removal Summary

Hydrocarbon Removal Method	Removal This Quarter (pounds)	Cumulative Removal (pounds)
Active Skimming (TBW-5)	0	597
Bailing/Socks (TBW-5)	0	132.4
Bailing/Socks (TBW-1)	5.4	19.2
Bailing/Socks (TBW-2)	6.2	11.2
Bailing/Socks (TBW-3)	4.5	14.1
Bailing/Socks (MW-6)	2.9	3.125
Bailing/Socks (MW-16)	3.7	6.7
Total SPH Removal	**22.7 Pounds**	**784 Pounds**

Dual-Phase Extraction System

In December 2001, Uribe and Associates installed twenty-two remediation and observation wells for the DPE system. Activities related to the DPE system will be discussed in subsequent monitoring reports.

CONCLUSIONS AND RECOMMENDATIONS

Aquatus Environmental offers the following conclusions and recommendations regarding the 4th quarter 2001 corrective action activities and analytical results, as well as additional laboratory procedures to be performed next quarter:

- An estimated 22.7 pounds of SPH was removed in the 4th quarter 2001, and an estimated 784 pounds of SBH have been removed to date since the 4th quarter 2000. Twenty-two DPE wells were installed in December 2001.

- All monitoring wells sampled this quarter were below the San Francisco Airport Ecological Protection Zone Tier I Standard acceptable threshold of 3,700 µg/l for TPHg. MW-9 was the only offsite with a TPHg concentration above the analyte reporting limit. MW-9 and MW-11 were the only two monitoring wells in which TPHg was detected, and these wells also had detections of BETX at low concentrations. Benzene was also detected in well MW-10 at 2.4 µg/l. All benzene concentrations are well below the ecological and human health standards cited in this report. MTBE was not detected above the analyte reporting limit in any wells that were sampled this quarter.

- TPHd concentrations are significantly higher than concentrations detected last quarter because the samples were not filtered prior to extraction and analysis. The samples were not filtered due to the results of the 2nd and 3rd quarter 2001 laboratory quality control analyses. TPHd concentrations detected in offsite perimeter wells MW-13 and MW-14 were similar to the concentrations detected in these wells before sample filtration was initiated (prior to 1st quarter 2001). Reported TPHd concentrations in most offsite perimeter wells were above the San Francisco Airport Ecological Protection Zone Tier I Standard of 640 µg/l for middle distillates. However, the TPHd concentrations reported this quarter are the total of the dissolved and particulate phases. The dissolved phase TPHd concentrations are likely lower.

- TPHmo concentrations are significantly higher than concentrations detected last quarter because the samples were not filtered prior to extraction and analysis. Concentrations reported for MW-13, MW-14, MW-15 and MW-17 were within the concentration range reported prior to filtration. Reported TPHmo concentrations in the offsite perimeter wells were above the San Francisco Airport Ecological Protection Zone Tier I Standard of 640 µg/l for residual fuels. However, TPHmo concentrations reported this quarter are the total of the dissolved and particulate phases. The dissolved TPHmo concentrations are likely lower.

- TPHd and TPHmo concentrations detected in perimeter offsite wells appear to be the result of local fill quality rather than offsite migration of dissolved petroleum hydrocarbons. Moderate and heavier range hydrocarbons may be adsorbed to extremely fine particles and colloids that were dislodged during sampling and occur as suspended solids in groundwater samples.

- Historical analytical results indicate that hydrocarbon attenuation is occurring at the site with evidence that both aerobic and anaerobic biodegradation are taking place. Hydrocarbon attenuation was described in prior monitoring reports.

- Aquatus Environmental recommends that the City of Oakland continue to investigate appropriate methods to separate the particulate fraction from the dissolved fraction for extractable range PHC analyses. Aquatus Environmental recommends that Caltest centrifuge the groundwater samples next quarter prior to extraction and analysis, to remove particulates. This methodology is an accepted protocol used to separate an extract from a soil (or other solid) sample during a Waste Extraction Test (WET) (CA Code of Regulations, Title 22).

  Three groundwater samples should be selected for an initial test, with concentrations that represent a range of TPHmo concentrations: MW-11 (300 µg/l), MW-9 (4,100 µg/l), and MW-15 (15,000 µg/l). Four liters of sample should be collected from these wells to provide sufficient volume to also obtain total (i.e., not centrifuged) concentrations and to perform laboratory quality control analyses on each sample. Prior to centrifuging, the samples should be spiked with diesel, motor oil, and the surrogate compound (ortho-terphenyl) to evaluate the accuracy of the procedure. Samples should be centrifuged in disposable glass amber bottles. If the matrix spike and surrogate recoveries for the three test samples are within acceptable ranges, indicating that the method has acceptable accuracy, the remainder of the groundwater samples should be centrifuged prior to extraction and analysis. The other groundwater samples should not be centrifuged if the results of the quality control analyses indicate that the spikes were not recovered within acceptable limits.

  Initial tests on the three groundwater samples should be performed and the results evaluated within five days of sample collection. This will allow the remaining groundwater samples to be centrifuged and/or extracted within the seven-day extraction holding time for USEPA 8015B. Caltest should continue to run all sample extracts through a silica gel column, to remove polar hydrocarbons prior to analysis. A memorandum should be provided to Caltest and Morgan Environmental to document the sampling and analytical procedures and protocols to be implemented.

ANTICIPATED FIRST QUARTER 2002 ACTIVITIES

Monitoring Activities

Morgan Environmental will gauge, measure observed SPH, and collect groundwater samples from site wells in accordance with the protocol presented in Appendix C.

Following field activities and laboratory analysis, Aquatus Environmental will tabulate the analytical data and prepare the quarterly monitoring report. URS Corporation will prepare the groundwater elevation contour map.

Corrective Action

The City of Oakland plans to redevelop the site monitoring wells in an attempt to reduce the turbidity of the groundwater samples. Presently, the turbidity is contributing to the TPHd and THPmo concentrations reported at the site.

ATTACHMENTS

Figure 1 - Groundwater Elevation Contours and Hydrocarbon Concentration Map
Table 1 – Groundwater Elevation Data and Analytical Results – Hydrocarbons
Table 2 – Groundwater Analytical Results - VOCs
Table 3 – Groundwater Analytical Results - SVOCs
Table 4 – Groundwater Analytical Results – LUFT Metals
Table 5 – Groundwater Analytical Results – Additional Metals
Appendix A - Field Data Sheets
Appendix B - Laboratory Analytical Reports/Correspondence
Appendix C – Well Sampling Protocol for 1st Quarter 2002

01/30/02

Groundwater Elevation Contour Map and Hydrocarbon Concentrations

December 15, 2001

EXPLANATION

- MW-1 ⊕ Monitoring well location
- RW-1 ⊕ Remediation well location
- TBW-1 ⊕ Tank Backfill Well
- MW-3 ⊠ Abandoned Well
- NS Not Sampled
- NSV Not Surveyed
- SPH Separate phase hydrocarbons detected in well, well not sampled
- * Anomalous groundwater elevation, not used in contouring
- ** SPH Historically detected in MW-16

⊠ MW-4

⊠ MW-3

WELL — Monitoring Well Designation
ELEV — Groundwater elevation, feet above mean sea level (msl)
TPHg / TPHd / TPHmo / BENZ — TPHg, TPHd, TPHmo and benzene concentrations in parts per billion (ppb)

0.004 — Approximate groundwater flow direction and gradient

Fence

3 — Groundwater elevation contour dashed where inferred

Base map provided by Cambria

EDGEWATER DRIVE

DAMON SLOUGH

MW-2 3.26 NS

MW-1 4.53 NS

MW-10 3.62 <50 410 2,100 2.4

TBW-6 5.53* NS

MW-12 NSV NS

TBW-5 1.13* SPH

TBW-1 NSV SPH

RW-1

TBW-2

MW-13 1.91 <50 1,900 18,000 <0.5

Public Works Building

911 Center

Admin.

Crafts and Storage

Storage

Above Ground Storage Tanks
NGV Fueling Station

MW-5 5.65 NS

Active USTs

Building No. 5

Former USTs

MW-7 5.08 NS

MW-11 5.34 170 200 300 1.7

TBW-3 NSV SPH

MW-6 3.40 SPH

MW-14 3.45 <50 1,110 3,000 <0.5

MW-9 3.02 210 1,400 4,100 15

MW-15 2.56 <50 3,800 15,000 <0.5

MW-16 NSV SPH**

MW-17 1.85 <50 940 1,000 <0.5

MW-8 2.94 <50 390 1,300 <0.5

SAN LEANDRO BAY

0 75 150 300
Scale (ft)

FIGURE 1

URS Corporation

Municipal Service Center
7101 Edgewater Drive
Oakland, California

Feb 01, 2002 - 11:37am
S:\Kevin Leeb\oakland msc-1.dwg

Table 1. Groundwater Elevation Data and Analytical Results - Hydrocarbons - City of Oakland Municipal Services Center, Oakland, CA

Sample ID/ Date	TOC Elev.	DTW	GW Elev.	BTEX Method	Notes	TPHd	TPHmo	TPHk	TPHg	Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE
						← µg/l →								
MW-1														
10/4/1989	10.20	---	---	8020		---	---	---	540	65	26	14	22	---
10/4/1989	10.20	---	---	8240		---	---	---	---	120	46	43	78	---
4/27/1993	10.20	---	---	8020		---	---	---	<1,000	<1.0	<1.0	<1.0	<1.0	---
4/19/1995	10.20	---	---	8020		---	---	---	3,200	880	15	23	21	---
7/27/1995	10.20	4.62	5.58	8020		---	---	---	980	130	3.6	1.4	5.6	---
11/20/95	10.20	6.08	4.12	8020		---	---	---	400	99	2.8	1.1	4.6	---
2/21/1996	10.20	4.62	5.58	8020		---	---	---	1,700	340	8.4	5.3	16	---
5/13/1996	10.20	4.33	5.87	8020		---	---	---	7,300	2,000	30	42	38	---
8/27/1996	10.20	5.25	4.95	8020		---	---	---	380	61	2.4	<0.5	4.2	---
2/23/1998	10.20	1.75	8.45	8020		<50	<500	<50	820	160	4.9	3	9.7	---
8/19/1998	10.20	4.78	5.42	8020	SGC	1,200	---	---	780	69	4.1	0.84	8.5	<5.0
11/11/98	10.20	5.64	4.56	---		---	---	---	---	---	---	---	---	---
2/23/1999	10.20	3.41	6.79	8020	SGC	1,200	1,600	<50	1,100	190	5	3	12	<5.0
5/27/1999	10.20	3.96	6.24	---		---	---	---	---	---	---	---	---	---
8/24/1999	10.20	4.92	5.28	8020	SGC	640	1,900	<50	370	37	0.9	<0.5	1.9	<5.0
11/22/99	10.20	5.46	4.74	---		---	---	---	---	---	---	---	---	---
1/18/2000	10.05	5.41	4.64	---		---	---	---	---	---	---	---	---	---
1/19/2000	---	---	---	8020	SGC	50	<200	<50	660	43	2.3	1.1	6	<5.0
5/11/2000	10.05	4.63	5.42	---		---	---	---	---	---	---	---	---	---
8/24/2000	10.05	5.07	4.98	---		---	---	---	---	---	---	---	---	---
8/25/2000	---	---	---	8020	SGC	340	<250	290	480	53	1.4	<0.5	2.9	<5.0
11/28/2000	10.05	5.60	4.45	--		---	---	---	---	---	---	---	---	---
2/27/2001	10.05	3.95	6.10	8020	Filtered+SGC	270	<250	<61	1,500	110	6.3	<1.5	9.9	<15
5/17/2001	10.05	4.00	6.05	---		---	---	---	---	---	---	---	---	---
8/16/2001	10.05	4.17	5.88		Filtered+SGC	280	<B200	<100	4,000	640	9.7	5.7	13	<5.0
12/15/2001	**10.05**	**5.52**	**4.53**	—		—	—	—	—	—	—	—	—	—
MW-2														
10/4/1989	10.47	---	---	8020		---	---	---	<30	<0.3	<0.3	<0.3	<0.3	---
10/4/1989	10.47	---	---	8240		---	---	---	---	2	<2.0	<2.0	<2.0	---
4/27/1993	10.47	---	---	8020		---	---	---	<1,000	<1.0	<1.0	<1.0	<1.0	---
4/19/1995	10.47	---	---	8020		---	---	---	<50	1.8	<0.5	<0.5	<0.5	---
7/27/1995	10.47	6.22	4.25	8020		---	---	---	<50	2.3	<0.5	<0.5	<0.5	---
11/20/95	10.47	7.49	2.98	8020		---	---	---	<50	2.2	<0.5	<0.5	<0.5	---
2/21/1996	10.47	6.68	3.79	8020		---	---	---	<50	1.7	<0.5	<0.5	0.5	---
5/13/1996	10.47	6.32	4.15	8020		---	---	---	---	2	<0.5	<0.5	<0.5	---
8/27/1996	10.47	6.84	3.63	8020		---	---	---	---	2.4	<0.5	<0.5	<0.5	---
2/24/1998	10.47	5.44	5.03	8020		<50	<500	<50	---	1.6	<0.5	<0.5	<0.5	---
8/19/1998	10.47	6.56	3.91	8020	SGC	330	---	---	<50	4.1	3.4	0.8	2.6	<5.0

Table 1.	Groundwater Elevation Data and Analytical Results - Hydrocarbons - City of Oakland Municipal Services Center, Oakland, CA													
Sample ID/ Date	TOC Elev.	DTW	GW Elev.	BTEX Method	Notes	TPHd	TPHmo	TPHk	TPHg	Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE
						← µg/l →								
11/11/98	10.47	7.37	3.10	---		---	---	---	---	---	---	---	---	---
2/23/1999	10.47	8.68	1.79	8020	SGC	200	900	<50	<50	3.5	0.6	0.6	1.2	<5.0
5/27/1999	10.47	5.20	5.27	---		---	---	---	---	---	---	---	---	---
8/24/1999	10.47	6.75	3.72	8020	SGC	140	700	<50	<50	2.6	<0.5	<0.5	<0.5	<5.0
11/22/99	10.47	7.58	2.89	---		---	---	---	---	---	---	---	---	---
1/18/2000	10.47	7.41	3.06	8020	SGC	60 a	660	<50	<50	2.1	<0.5	<0.5	<0.5	<5.0
5/11/2000	10.47	6.43	4.04	---		---	---	---	---	---	---	---	---	---
8/24/2000	10.47	8.91	1.56	8020	SGC	170	440	130	<50	2.4	<0.5	<0.5	<0.5	<5.0
11/28/2000	10.47	7.35	3.12	---		---	---	---	---	---	---	---	---	---
2/27/2001	10.47	6.70	3.77	8020	Filtered+SGC	<59	<240	<59	<50	3.6	<0.5	<0.5	<0.5	<5
5/17/2001	10.47	6.90	3.57	---		---	---	---	---	---	---	---	---	---
8/16/2001	10.47	6.95	3.52		Filtered+SGC	<50	B200	<100	<50	<0.5	<0.5	<0.5	<0.5	<5
12/15/2001	**10.47**	**7.21**	**3.26**	—		—	—	—	—	—	—	—	—	—
MW-3														
10/4/1989	---	---	---	8020		---	---	---	<30	<0.3	<0.3	<0.3	<0.3	---
10/4/1989	---	---	---	8240		---	---	---	---	<2.0	<2.0	<2.0	<2.0	---
2/23/1998	---	---	---	---		<50	<500	<50	---	---	---	---	---	---
11/11/98	---	5.83	---	---		---	---	---	---	---	---	---	---	---
2/23/1999	---	---	---	---	Submerged	---	---	---	---	---	---	---	---	---
5/27/1999	---	1.68	---	---		---	---	---	---	---	---	---	---	---
8/24/1999	---	4.76	---	---		---	---	---	---	---	---	---	---	---
11/22/99	---	6.46	---	---		---	---	---	---	---	---	---	---	---
11/22/99	---	---	---	---	Destroyed	---	---	---	---	---	---	---	---	---
MW-4														
10/4/1989	7.89	---	---	8020		---	---	---	<30	<0.3	<0.3	<0.3	<0.3	---
10/4/1989	7.89	---	---	8240		---	---	---	---	<2.0	<2.0	<2.0	<2.0	---
11/11/98	7.89	6.25	1.64	---		---	---	---	---	---	---	---	---	---
2/23/1999	7.89	3.10	4.79	---		---	---	---	---	---	---	---	---	---
5/27/1999	7.89	4.03	3.86	---		---	---	---	---	---	---	---	---	---
8/24/1999	7.89	5.07	2.82	---		---	---	---	---	---	---	---	---	---
11/22/99	7.89	6.32	1.57	---		---	---	---	---	---	---	---	---	---
11/22/99	---	---	---	---	Destroyed	---	---	---	---	---	---	---	---	---
MW-5														
12/13/91	11.15	---	---	8020		1,900	---	---	13,000	1,500	190	970	2,500	---
12/13/91	---	---	---	8020	Dup	---	---	---	16,000	1,400	180	870	2,500	---
12/13/91	11.15	---	---	8240		---	---	---	---	1,800	<250	1,000	3,800	---
12/13/91	---	---	---	8240	Dup	---	---	---	---	1,600	<250	980	3,500	---

Table 1.				Groundwater Elevation Data and Analytical Results - Hydrocarbons - City of Oakland Municipal Services Center, Oakland, CA										
Sample ID/ Date	**TOC Elev.**	**DTW**	**GW Elev.**	**BTEX Method**	**Notes**	**TPHd**	**TPHmo**	**TPHk**	**TPHg**	**Benzene**	**Toluene**	**Ethyl-benzene**	**Xylenes**	**MTBE**
						← µg/l →								
4/27/1993	11.15	---	---	8240		12,000	---	---	35,000	2,100	<1.0	1,800	2,700	---
4/19/1995	11.15	---	---	8240		880	4,700	---	14,000	490	51	610	1,200	---
7/27/1995	11.15	6.29	4.86	8240		590	5,000	---	22,000	1,300	54	1,500	2,400	---
11/20/95	11.15	6.98	4.17	8020		<50	<50	<50	8,900	430	31	610	880	---
2/21/1996	11.15	5.97	5.18	8020		480	<50	<50	1,000	540	65	700	970	---
5/13/1996	11.15	6.25	4.90	8020		<50	<50	<50	5,900	430	26	580	760	---
5/13/1996	---	---	---	8020	Dup	<50	<50	<50	7,300	360	22	49	640	---
8/27/1996	11.15	6.40	4.75	8020		2,000	<51	<51	6,600	430	27	600	650	---
8/27/1996	---	---	---	8020	Dup	6,600	<51	<51	6,300	410	25	580	620	---
2/23/1998	11.15	4.22	6.93	8020		<50	<500	<50	740	19	1.4	41	34	---
8/19/1998	11.15	6.14	5.01	8020		1,400	<250	1700	5,800	500	25	730	300	5,900
8/19/1998	11.15	6.14	5.01	8260	SGC	---	---	---	---	---	---	---	---	6,700
11/11/98	11.15	6.51	4.64	---		---	---	---	---	---	---	---	---	---
2/23/1999	11.15	3.59	7.56	8020	SGC	2,000	700	<50	6,700	300	26	800	690	1,600
5/27/1999	11.15	5.71	5.44	---		---	---	---	---	---	---	---	---	---
8/24/1999	11.15	6.02	5.13	8020	SGC	220	2,000	<50	2,100 e	190 e	5.5	340 e	78	380 e
11/22/99	11.15	6.16	4.99	---		---	---	---	---	---	---	---	---	---
1/18/2000	11.15	6.60	4.55	---		---	---	---	---	---	---	---	---	---
1/19/2000	---	---	---	8020	SGC	100	320	<50	3,000	66 e	6.3	400 e	90	300 E (1,300)
5/11/2000	11.15	5.62	5.53	---		---	---	---	---	---	---	---	---	---
8/24/2000	11.15	6.32	4.83	8020	SGC	4,800	560	6,600	12,000	220	21	430	91	1,200 (1,400)
11/28/2000	11.15	6.47	4.68	---		---	---	---	---	---	---	---	---	---
2/27/2001	11.15	4.40	6.75	8020	Filtered+SGC	230	<250	<61	6,300	150	7	350	55	830
5/17/2001	11.15	5.77	5.38	8020	Filtered+SGC	190	<200	<50	7,500	140	7	580	101	170
8/16/2001	11.15	4.87	6.28		Filtered+SGC	320	B500	<100	2,300	46	<5	110	24	850
12/15/2001	**11.15**	**5.50**	**5.65**	—		—	—	—	—	—	—	—	—	—
MW-6														
12/13/91	10.98	---	---	8020		520	---	---	780	110	2.7	<2.5	5.5	---
12/13/91	10.98	---	---	8240		---	---	---	---	95	5	<5	<5	---
4/27/1993	10.98	---	---	8020		<1,000	---	---	<1,000	430	4	5	10	---
4/19/1995	10.98	---	---	8020		6,700	---	---	5,700	40	<0.8	3.9	29	---
4/19/1995	---	---	---	8020	Dup	3,700	---	---	3,000	310	3.1	2.7	100	---
7/27/1995	10.98	7.09	3.89	8020		3,900	---	---	6,100	430	15	200	600	---
7/27/1995	---	---	---	8020	Dup	2,600	---	---	6,300	420	15	200	600	---
11/20/95	10.98	7.89	3.09	8020		850	---	---	6,800	160	4.6	8	240	---
11/20/95	---	---	---	8020	Dup	---	---	---	3,600	130	11	4.4	200	---
2/21/1996	10.98	7.40	3.58	8020	Filtered+SGC	1,700	---	---	2,800	230	2.8	3.8	44	---
2/21/1996	---	---	---	8020	Dup	2,500	---	---	2,200	280	3	4	4.6	---
5/13/1996	10.98	7.10	3.88	8020		400	<50	<50	3,100	430	12	5.2	67	---

Table 1.	Groundwater Elevation Data and Analytical Results - Hydrocarbons - City of Oakland Municipal Services Center, Oakland, CA												
Sample ID/ Date	**TOC Elev.**	**DTW**	**GW Elev.**	**BTEX Method**	**Notes**	**TPHd**	**TPHmo**	**TPHk**	**TPHg**	**Benzene**	**Toluene**	**Ethyl-benzene**	**Xylenes**	**MTBE**
						←				µg/l				→
8/27/1996	10.98	7.42	3.56	8020		3,100	---	---	4,200	300	9.3	110	110	---
8/19/1998	10.98	---	---	---	SPH: 0.125 ft	---	---	---	---	---	---	---	---	---
11/11/1998	10.98	7.09	3.93	---	SPH: 0.05 ft	---	---	---	---	---	---	---	---	---
2/23/1999	10.98	7.31	3.67	---	SPH: NM	---	---	---	---	---	---	---	---	---
5/27/1999	10.98	6.91	4.25	---	SPH: 0.20 ft	---	---	---	---	---	---	---	---	---
8/24/1999	10.98	7.46	3.72	---	SPH: 0.03 ft	---	---	---	---	---	---	---	---	---
11/22/99	10.98	7.96	3.15	---	SPH: 0.16 ft	---	---	---	---	---	---	---	---	---
1/18/2000	10.98	8.08	3.05	---	SPH: 0.19 ft	---	---	---	---	---	---	---	---	---
5/11/2000	10.98	7.52	4.47	---	SPH: 0.01 ft	---	---	---	---	---	---	---	---	---
8/24/2000	10.98	7.50	3.53	---	SPH: 0.06 ft	---	---	---	---	---	---	---	---	---
11/28/2000	10.98	6.39	4.62	---	SPH: 0.04 ft	---	---	---	---	---	---	---	---	---
2/26/2001	10.98	7.80	3.50	8020	SPH: 0.40 ft, f	820	<240	<60	6,100	181	<5	14.2	<5	<50
2/26/2001	---	---	---	8260B		---	---	---	---	270	3	9	3	(19)
5/17/2001	10.98	7.57	3.66	---	SPH: 0.32 ft	---	---	---	---	---	---	---	---	---
8/16/2001	10.98	7.75	3.49		SPH: 0.32 ft, f	740	B200	<100	4,200	360	4.6	13	12	14
12/15/2001	**10.98**	**7.58**	**3.40**	**—**	**SPH: 0.07 ft**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**—**	**—**
MW-7														
12/13/91	11.51	---	---	8020		<50	---	---	<50	<0.5	<0.5	<0.5	<0.5	---
12/13/91	11.51	---	---	8240		---	---	---	---	<5	<5	<5	<5	---
4/27/1993	11.51	---	---	8240		<1,000	---	---	<1,000	<1.0	<1.0	<1.0	<1.0	---
4/19/1995	11.51	---	---	8240		<50	<1,000	---	<50	<2.0	<2.0	<2.0	<2.0	---
7/27/1995	11.51	6.87	4.64	8240		<50	<1,000	---	<50	<2.0	<2.0	<2.0	<2.0	---
11/20/95	11.51	8.48	3.03	8020		<50	---	---	<50	<0.5	<0.5	<0.5	1.5	---
2/21/1996	11.51	6.29	5.22	8020		<50	---	---	<50	<0.5	<0.5	<0.5	<0.5	---
5/13/1996	11.51	6.95	4.56	8020		<50	---	---	---	<0.5	<0.5	<0.5	<0.5	---
8/27/1996	11.51	6.80	4.71	8020		---	---	---	---	<0.5	<0.5	<0.5	<0.5	---
8/19/1998	11.51	6.88	4.63	---		---	---	---	---	---	---	---	---	---
11/11/98	11.51	7.40	4.11	---		---	---	---	---	---	---	---	---	---
2/23/1999	11.51	5.57	5.94	8020		<50	<200	<50	80	<0.5	<0.5	<0.5	1	<5.0
5/27/1999	11.51	6.56	4.95	---		---	---	---	---	---	---	---	---	---
8/24/1999	11.51	6.29	5.22	8020	SGC	<50	<200	<50	<50	<0.5	<0.5	<0.5	<0.5	5
11/22/99	11.51	6.80	4.71	---		---	---	---	---	---	---	---	---	---
1/18/2000	11.51	7.31	4.20	---		---	---	---	---	---	---	---	---	---
1/19/2000	11.51	---	---	8020	SGC	<50	<200	<50	54	1.5	1.5	2.4	3.8	<5.0
5/11/2000	11.51	6.41	5.10	---		---	---	---	---	---	---	---	---	---
8/24/2000	11.51	7.11	4.40	8020		<50	<250	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
11/28/2000	11.51	7.30	4.21	---		---	---	---	---	---	---	---	---	---
2/27/2001	11.51	5.75	5.76	8020	Filtered+SGC	<50	<200	<50	<50	<0.5	<0.5	<0.5	<0.5	<5
5/17/2001	11.51	6.65	4.86	---		—	—	—	—	—	—	—	—	—

Table 1.	Groundwater Elevation Data and Analytical Results - Hydrocarbons - City of Oakland Municipal Services Center, Oakland, CA												
Sample ID/ Date	**TOC Elev.**	**DTW**	**GW Elev.**	**BTEX Method**	**Notes**	**TPHd**	**TPHmo**	**TPHk**	**TPHg**	**Benzene**	**Toluene**	**Ethyl-benzene**	**Xylenes**	**MTBE**
						←				µg/l				→
8/16/2001	11.51	5.97	5.54		Filtered+SGC	<50	B600	<100	<50	<0.5	<0.5	<0.5	<0.5	<5
12/15/2001	**11.51**	**6.43**	**5.08**	**---**		**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**
MW-8														
11/20/96	12.22	---	---	8020		880	---	---	<50	0.66	<0.5	<0.5	<0.5	---
11/20/97	12.22	9.59	2.63	8020		200	---	---	<50	<0.5	<0.5	<0.5	<0.5	2
2/24/1998	12.22	8.42	3.80	8020		<50	<500	<50	<50	<0.5	<0.5	<0.5	<0.5	---
6/8/1998	12.22	9.57	2.65	8020		1,200	1,000	<50	<50	<0.5	<0.5	<0.5	<0.5	---
8/19/1998	12.22	9.49	2.73	8020	SGC	<50	<250	<50	<50	1.6	3.4	1	2.8	<5.0
11/11/98	12.22	9.64	2.58	8020	SGC	<50	<200	<50	<50	0.9	0.8	0.6	2.3	<5.0
2/23/1999	12.22	11.53	0.69	8020		700	1,500	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
5/27/1999	12.22	9.65	2.57	8020		<50	<200	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
8/24/1999	12.22	9.62	2.60	8020	SGC	70	<200	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
11/22/99	12.22	9.64	2.58	8020	SGC	57	<200	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
1/18/2000	12.22	8.31	3.91	8020	SGC	<50	<200	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
5/11/2000	12.22	9.69	2.53	8020	SGC	<50	<200	<50	<50	<0.5	1.3	<0.5	2.1	<5.0
8/24/2000	12.22	9.40	2.82	---		---	---	---	---	---	---	---	---	---
8/25/2000	---	---	---	8020	SGC	85	<250	<50	<50					
11/28/2000	12.22	9.40	2.83	8020	SGC	<50	910	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
2/27/2001	12.22	9.50	2.72	8020	Filtered+SGC	<50	<200	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
5/17/2001	12.22	9.71	2.51	---		---	---	---	---	---	---	---	---	---
5/18/2001	---	---	---	8020	Filtered+SGC	<50	<200	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
8/16/2001	12.22	9.80	2.42		Filtered+SGC	<50	<200	<100	<50	<0.5	<0.5	<0.5	<0.5	<5
12/15/2001	**12.22**	**9.28**	**2.94**	**8021**	**SGC**	**390**	**1,300**	**<50**	**<50**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<5**
MW-9														
11/20/96	10.77	---	---	8020		1,900	---	---	240	21	0.81	1.8	2.2	---
11/20/97	10.77	7.91	2.86	8020		---	---	---	300	20	<0.5	<0.5	1.8	<1.0
2/24/1998	10.77	6.11	4.66	8020		<50	<500	<50	2,200	540	5.6	1.6	4.9	---
6/8/1998	10.77	7.14	3.63	8020		1,800	890	<50	840	450	6.1	3.3	5.3	---
8/19/1998	10.77	7.88	2.89	8020	SGC	190	<250	160	740	370	8.6	0.99	7.3	<5.0
11/11/98	10.77	8.23	2.54	8020	SGC	<50	230	<50	700	130	4.3	<0.5	3.9	<5.0
2/23/1999	10.77	6.65	4.12	8020		1,100	3,700	<50	1,100	620	9.7	1.5	7.7	<5.0
5/27/1999	10.77	7.70	3.07	8020	SGC	70	300	<50	950	470	11	1.5	9.2	<5.0
8/24/1999	10.77	8.12	2.65	8020	SGC	890	1,700	<50	290	45	2.8	<0.5	3	<5.0
11/22/99	10.77	8.33	2.44	8020	SGC	1,000	6,000	<50	170	12	1.8	<0.5	2	<5.0
1/18/2000	10.77	8.63	2.14	8020	SGC	200 a	2,300	<50	160	5.7	1.9	0.6	4.2	<5.0
5/11/2000	10.77	7.70	3.07	8020	SGC	180 a	980	<100	1,050	280	7.0	<2.5	5.9	<25
8/24/2000	10.77	8.31	2.46	---		---	---	---	---	---	---	---	---	---
8/25/2000	---	---	---	8020	SGC	580	2,200	170	180	23	2.4	<0.5	2.7	<5.0

Table 1.	Groundwater Elevation Data and Analytical Results - Hydrocarbons - City of Oakland Municipal Services Center, Oakland, CA												
Sample ID/ Date	**TOC Elev.**	**DTW**	**GW Elev.**	**BTEX Method**	**Notes**	**TPHd**	**TPHmo**	**TPHk**	**TPHg**	**Benzene**	**Toluene**	**Ethyl-benzene**	**Xylenes**	**MTBE**
						←				µg/l				→
11/28/2000	10.77	8.45	2.32	8020	SGC	200	1,600	<50	130	1.9	<0.5	<0.5	<0.5	<5.0
11/28/2000	10.77	8.45	2.32	---	Filtered+SGC	<50	<200	<50	---	---	---	---	---	---
2/26/2001	10.77	6.40	4.37	8020	Filtered+SGC	120	<200	<50	142	33	1.8	<0.5	<0.5	<5.0
5/17/2001	10.77	9.88	0.89	---		---	---	---	---	---	---	---	---	---
5/18/2001	---	---	---	8020	Filtered+SGC	<50	<200	<50	74	4.6	<0.5	<0.5	<0.5	<5.0
8/16/2001	10.77	8.05	2.72		Filtered+SGC	<50	<200	<100	70	0.62	<0.5	<0.5	<0.5	<5
12/16/2001	**10.77**	**7.75**	**3.02**	**8021**	**SGC**	**1,400**	**4,100**	**<50**	**210**	**15**	**1.6**	**<0.5**	**2.2**	<5
MW-10														
11/20/96	10.59	---	---	8020		940	---	---	<50	49	0.59	0.54	1.2	---
11/20/97	10.59	7.70	2.89	8020		---	---	---	<50	<0.5	<0.5	<0.5	<0.5	---
2/24/1998	10.59	4.39	6.20	8020		<50	<500	<50	<50	<0.5	<0.5	<0.5	<0.5	---
6/8/1998	10.59	6.94	3.65	8020		500	<500	<50	<50	7.3	<0.5	<0.5	<0.5	---
8/19/1998	10.59	6.99	3.60	8020	SGC	240	520	110	<50	<0.5	<0.5	<0.5	<0.5	<5.0
11/11/98	10.59	7.57	3.02	8020	SGC	<50	<200	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
2/23/1999	10.59	5.51	5.08	8020		170	1,200	<50	<50	1.3	<0.5	<0.5	<0.5	<5.0
5/27/1999	10.59	6.72	3.87	8020	SGC	<50	<200	<50	350	170	1.5	0.5	2.3	<5.0
8/24/1999	10.59	7.27	3.32	8020	SGC	140	300	<50	380	160 e	<0.5	<0.5	2.6	<5.0
11/22/99	10.59	7.71	2.88	8020	SGC	570	3,400	<50	110	5.1	<0.5	<0.5	0.72	<5.0
1/18/2000	10.59	7.77	2.82	---		---	---	---	---	---	---	---	---	---
1/19/2000	---	---	---	8020	SGC	120 a,b	1,200	<50	100	<0.5	<0.5	0.8	<0.5	<5.0
5/11/2000	10.59	7.00	3.59	8020	SGC	110 a	990	<50	145	1.62	0.5	0.5	0.9	<5.0
8/24/2000	10.59	7.31	3.28	---		---	---	---	---	---	---	---	---	---
8/25/2000	---	---	---	8020	SGC	430	1,300	110	<50	1.0	<0.5	<0.5	<0.5	<5.0
11/28/2000	10.59	7.90	2.69	8020	SGC	220	1,500	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
2/27/2001	10.59	5.80	4.79	8020	Filtered+SGC	85	<230	<57	<50	1.3	<0.5	<0.5	<0.5	<5.0
5/17/2001	10.59	6.27	4.32	---		---	---	---	---	---	---	---	---	---
5/18/2001	---	---	---	8020	Filtered+SGC	<50	<200	<50	<50	0.7	<0.5	<0.5	<0.5	<5.0
8/16/2001	10.59	8.75	1.84		Filtered+SGC	<50	<200	<100	<50	<0.5	<0.5	<0.5	<0.5	<5
12/16/2001	**10.59**	**6.97**	**3.62**	**8021**	**SGC**	**410**	**2,100**	**<50**	**<50**	**2.4**	**<0.5**	**<0.5**	**<0.5**	**<5**

Table 1.	Groundwater Elevation Data and Analytical Results - Hydrocarbons - City of Oakland Municipal Services Center, Oakland, CA													
Sample ID/ Date	**TOC Elev.**	**DTW**	**GW Elev.**	**BTEX Method**	**Notes**	**TPHd**	**TPHmo**	**TPHk**	**TPHg**	**Benzene**	**Toluene**	**Ethyl-benzene**	**Xylenes**	**MTBE**
						← µg/l →								
MW-11														
1/18/2000	11.60	7.08	4.52	---		---	---	---	---	---	---	---	---	---
1/19/2000	---	---	---	8020	SGC	<50	500	<50	220	<0.5	<0.5	<0.5	<0.5	<5.0
5/11/2000	11.60	5.95	5.65	8020	SGC	<50	430	<50	600	23	2.1	18	15	<5.0
8/24/2000	11.60	6.58	5.02	8020		<50	<250	<50	110	5.9	<0.5	0.73	0.64	<5.0
11/28/2000	11.60	6.91	4.69	8020	SGC	<50	<200	<50	180	4	<0.5	1.9	<0.5	<5.0
2/27/2001	11.60	5.65	5.95	8020	Filtered+SGC	86	<240	<60	720	29	5.2	38	36	<5.0
5/17/2001	11.60	6.85	4.75	8020	Filtered+SGC	<50	<200	<50	720	36	3.4	15	18	9.7
8/16/2001	11.60	6.01	5.59		Filtered+SGC	<50	B500	<100	110	4.8	<0.5	1.4	<0.5	<5
12/15/2001	**11.60**	**6.26**	**5.34**	**8021**	**SGC**	**200**	**300**	**<50**	**170**	**1.7**	**0.6**	**2.4**	**1.8**	**<2**
MW-12														
1/18/2000	10.43	8.11	2.32	---		---	---	---	---	---	---	---	---	---
1/19/2000	---	---	---	8020	SGC	1,800 a	11,000	<50	200	<0.5	3.4	1.5	8.4	<5.0
5/11/2000	10.43	6.78	3.65	8020	SGC	2,400 a	4,900	<100	370	<0.5	<0.5	<0.5	0.9	<5.0
8/24/2000	10.43	7.56	2.87	---		---	---	---	---	---	---	---	---	---
8/25/2000	---	---	---	8020	SGC	3,500	5,000	3,700	170	<0.5	<0.5	<0.5	<0.5	<5.0
11/28/2000	10.43	8.13	2.30	8020	SGC	2,100	14,000	<50	290	<0.5	<0.5	<0.5	<0.5	<5.0
11/28/2000	10.43	8.13	2.30	---	Filtered+SGC	50	<200	<50	---	---	---	---	---	---
2/27/2001	10.43	6.00	4.43	8020	Filtered+SGC	320	<250	66	110	1.4	<0.5	<0.5	<0.5	<5.0
5/17/2001	10.43	7.01	3.42	8020	Filtered+SGC	<50	<200	<50	220	<0.5	<0.5	<0.5	<0.5	<5.0
8/16/2001	10.43	8.47	1.96		Filtered+SGC	200	B300	<100	160	<0.5	<0.5	<0.5	<0.5	<5
MW-13														
1/18/2000	11.34	9.63	1.71	8020	SGC	8,800 a	120,000	<50	<50	<0.5	0.8	<0.5	<0.5	<5.0
5/11/2000	11.34	10.12	1.22	8020	SGC	11,000 a	110,000	<500	70	1.6	5.4	1.2	7.6	<5.0
8/24/2000	11.34	10.22	1.12	---		---	---	---	---	---	---	---	---	---
8/25/2000	---	---	---	8020	SGC	3,100	13,000	1,200	<50	<0.5	<0.5	<0.5	<0.5	<5.0
11/28/2000	11.34	10.50	0.84	8020	SGC	2,400	36,000	<1300	<50	<0.5	<0.5	<0.5	<0.5	<5.0
11/28/2000	11.34	10.50	0.84	---	Filtered+SGC	280	1,100	<50	---	---	---	---	---	---
2/26/2001	11.34	9.60	1.74	8020	Filtered+SGC	100	<260	<64	<50	<0.5	<0.5	<0.5	<0.5	<5.0
5/17/2001	11.34	10.10	1.24	---		---	---	---	---	---	---	---	---	---
5/18/2001	---	---	---	8020	Filtered+SGC	<50	<200	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
8/16/2001	11.34	10.50	0.84		Filtered+SGC	<50	B300	<100	<50	<0.5	<0.5	<0.5	<0.5	<5
12/16/2001	**11.34**	**9.43**	**1.91**	**8021**	**SGC**	**1,900**	**18,000**	**<250**	**<50**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<5**

Table 1.	Groundwater Elevation Data and Analytical Results - Hydrocarbons - City of Oakland Municipal Services Center, Oakland, CA													
Sample ID/ Date	**TOC Elev.**	**DTW**	**GW Elev.**	**BTEX Method**	**Notes**	**TPHd**	**TPHmo**	**TPHk**	**TPHg**	**Benzene**	**Toluene**	**Ethyl-benzene**	**Xylenes**	**MTBE**
						← µg/l →								
MW-14														
1/18/2000	10.05	7.37	2.68	8020	SGC	1,700 a	22,000	<50	120	<0.5	<0.5	<0.5	<0.5	<5.0
5/11/2000	10.05	6.73	3.32	8020	SGC	360 a	4,300	<100	120	<0.5	<0.5	0.5	<0.5	<5.0
8/24/2000	10.05	7.30	2.75	---		---	---	---	---	---	---	---	---	---
8/25/2000	---	---	---	8020	SGC	1,000	3,100	460	90	6.3	<0.5	<0.5	<0.5	<5.0
11/28/2000	10.05	7.40	2.65	8020	SGC	380	6,400	<250	140	7.4	<0.5	<0.5	<0.5	<5.0
11/28/2000	10.05	7.40	2.65	---	Filtered+SGC	<50	<200	<50	---	---	---	---	---	---
2/26/2001	10.05	6.20	3.85	8020	Filtered+SGC	150	<230	<58	73	2.3	<0.5	<0.5	<0.5	<5.0
5/17/2001	10.05	7.74	2.31	---		---	---	---	---	---	---	---	---	---
5/18/2001	---	---	---	8020	Filtered+SGC	120	<200	<50	100	11	<0.5	<0.5	<0.5	<5.0
8/16/2001	10.05	7.85	2.20		Filtered+SGC	<50	<200	<100	60	<0.5	<0.5	<0.5	<0.5	<5
12/16/2001	**10.05**	**6.60**	**3.45**	**8021**	**SGC**	**1,110**	**3,000**	**<50**	**<50**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<5**
MW-15														
1/18/2000	12.36	10.56	1.80	8020	SGC	12,000 a	89,000	<50	110	3.8	2.1	1	4.6	<5.0
5/11/2000	12.36	10.03	2.33	8020	SGC	120 a	590	<50	90	0.9	0.9	<0.5	3.3	<5.0
8/24/2000	12.36	10.22	2.14	---		---	---	---	---	---	---	---	---	---
8/25/2000	---	---	---	8020	SGC	1,900	8,600	1,000	<50	1.9	<0.5	<0.5	1.5	<5.0
11/28/2000	12.36	10.30	2.06	8020	SGC	2,500	36,000	<1300	80	1.7	<0.5	<0.5	1.6	<5.0
11/28/2000	12.36	10.30	2.06	---	Filtered+SGC	73	<200	<50	---	---	---	---	---	---
2/26/2001	12.36	9.30	3.06	8020	Filtered+SGC	190	<240	<60	55	0.6	<0.5	<0.5	0.5	<5.0
5/17/2001	12.36	10.09	2.27	---		---	---	---	---	---	---	---	---	---
5/18/2001	---	---	---	8020	Filtered+SGC	210	<230	<57	66	1.5	<0.5	<0.5	2.1	<5.0
8/16/2001	12.36	10.20	2.16		Filtered+SGC	<50	B500	<100	<50	<0.5	<0.5	<0.5	2.4	<5
12/16/2001	**12.36**	**9.80**	**2.56**	**8021**	**SGC**	**3,800**	**15,000**	**<250**	**<50**	**<0.5**	**<0.5**	**<0.5**	**2**	**<5**
MW-16														
1/18/2000	13.57	10.22	3.43	---	SPH: 0.1 ft	---	---	---	---	---	---	---	---	---
5/11/2000	13.57	13.31	0.27	---	SPH: 0.01 ft	---	---	---	---	---	---	---	---	---
8/24/2000	13.57	8.91	4.66	---	SPH: NM	---	---	---	---	---	---	---	---	---
11/28/2000	13.57	13.05	0.86	---	SPH: 0.42 ft	---	---	---	---	---	---	---	---	---
2/26/2001	13.57	13.10	0.79	---	SPH: 0.40 ft	---	---	---	---	---	---	---	---	---
5/17/2001	13.57	12.62G	---	---	SPH: NM	---	---	---	---	---	---	---	---	---
8/16/2001	13.57	11.94G	---	---	SPH: NM	---	---	---	---	---	---	---	---	---
12/15/2001	13.57	NM	---	---	SPH: NM	---	---	---	---	---	---	---	---	---

Table 1.	Groundwater Elevation Data and Analytical Results - Hydrocarbons - City of Oakland Municipal Services Center, Oakland, CA													
Sample ID/ Date	**TOC Elev.**	**DTW**	**GW Elev.**	**BTEX Method**	**Notes**	**TPHd**	**TPHmo**	**TPHk**	**TPHg**	**Benzene**	**Toluene**	**Ethyl-benzene**	**Xylenes**	**MTBE**
						← µg/l →								
MW-17														
1/18/2000	9.86	5.35	4.51	8020	SGC	850 a	21,000	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
5/11/2000	9.86	9.85	0.01	8020	SGC	150 a	2,900	<100	<50	<0.5	<0.5	<0.5	<0.5	<5.0
8/24/2000	9.86	8.59	1.27	---		---	---	---	---	---	---	---	---	---
8/25/2000	---	---	---	8020	SGC	190	610	71	<50	0.58	<0.5	<0.5	<0.5	<5.0
11/28/2000	9.86	9.25	0.61	8020	SGC	<250	2,400	<250	<50	<0.5	<0.5	<0.5	<0.5	<5.0
11/28/2000	9.86	9.25	0.61	---	Filtered+SGC	<50	<200	<50	---	---	---	---	---	---
2/26/2001	9.86	9.40	0.46	8020	Filtered+SGC	<50	<200	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
5/17/2001	9.86	8.32	1.54	---		---	---	---	---	---	---	---	---	---
5/18/2001	---	---	---	8020	Filtered+SGC	<50	<200	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
8/16/2001	9.86	10.35	-0.49		Filtered+SGC	<50	B400	<100	<50	<0.5	<0.5	<0.5	<0.5	<5.0
12/16/2001	**9.86**	**8.01**	**1.85**	**8021**	**SGC**	**940**	**1,000**	**<50**	**<50**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<5.0**
TBW-1														
2/23/1999	---	6.25	---	---	SPH: 0.10 ft	---	---	---	---	---	---	---	---	---
5/27/1999	---	5.29	---	---	SPH: 0.01 ft	---	---	---	---	---	---	---	---	---
8/24/1999	---	6.99	---	---	SPH: 0.18 ft	---	---	---	---	---	---	---	---	---
11/22/99	---	---	---	---	Inaccessible	---	---	---	---	---	---	---	---	---
1/18/2000	---	---	---	---	Inaccessible	---	---	---	---	---	---	---	---	---
5/11/2000	---	6.90	---	---	SPH: 0.10 ft	---	---	---	---	---	---	---	---	---
8/24/2000	---	7.12	---	---	SPH: NM	---	---	---	---	---	---	---	---	---
11/28/2000	---	7.75	---	---	SPH: 0.36 ft	---	---	---	---	---	---	---	---	---
2/27/2001	---	9.06	---	---	SPH: 0.51 ft	---	---	---	---	---	---	---	---	---
5/17/2001	---	6.98	---	---	SPH:0.28 ft	---	---	---	---	---	---	---	---	---
8/16/2001	---	6.62	---	---	SPH:0.66 ft, f	1,100	B700	<100	17,000	2,100	75	730	850	<1
12/15/2001	**---**	**6.86**	**---**	**---**	**SPH:0.35 ft**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**
TBW-3														
8/19/1998	---	2.67	---	8020	SGC	810,000	---	---	920	3.2	<0.5	<0.5	0.77	<10
8/19/1998	---	2.67	---	8260		---	---	---	---	---	---	---	---	<5.0
2/23/1999	---	1.25	---	8020		3,800	3,000	<50	110	1.6	<0.5	<0.5	<0.5	<5.0
5/27/1999	---	---	---	---	DTW: NM	---	---	---	---	---	---	---	---	---
8/24/1999	---	3.25	---	---	SPH globules	---	---	---	---	---	---	---	---	---
11/22/99	---	3.68	---	---		---	---	---	---	---	---	---	---	---
1/18/2000	9.92	3.73	6.19	---	SPH globules	---	---	---	---	---	---	---	---	---
5/11/2000	9.92	2.07	7.85	---		---	---	---	---	---	---	---	---	---
8/24/2000	9.92	2.82	7.10	---	SPH: sheen	44,000	13,000	34,000	570	4.7	<0.5	<0.5	<0.5	<5.0
11/28/2000	---	---	---	---		---	---	---	---	---	---	---	---	---
2/27/2001	9.92	1.29	8.63	8020	Filtered+SGC	560	<230	<57	120	1.5	<0.5	<0.5	<0.5	<5.0
5/17/2001	9.92	2.47	7.45	---		---	---	---	---	---	---	---	---	---

Table 1.	Groundwater Elevation Data and Analytical Results - Hydrocarbons - City of Oakland Municipal Services Center, Oakland, CA												
Sample ID/ Date	**TOC Elev.**	**DTW**	**GW Elev.**	**BTEX Method**	**Notes**	**TPHd**	**TPHmo**	**TPHk**	**TPHg**	**Benzene**	**Toluene**	**Ethyl-benzene**	**Xylenes**	**MTBE**
						←				µg/l				→
8/16/2001	9.92	1.81	8.11		Filtered+SGC	1,500	B400	<100	180	<0.5	<0.5	<0.5	<0.5	<1
12/15/2001	—	**2.52**	—	—	**SPH: 0.02 ft**	—	—	—	—	—	—	—	—	—
TBW-4														
2/27/2001	---	1.35	---	8020	Filtered+SGC	410	<230	<57	250	1.9	<0.5	<0.5	<0.5	<5.0
5/17/2001	---	2.52	---	---		---	---	---	---	---	---	---	---	---
8/16/2001	---	1.88	---	---	Filtered+SGC	2,600	B700	<100	390.00	<0.5	<0.5	<0.5	<0.5	<5
TBW-5														
2/23/1999	---	9.72	---	---	SPH: 1.45 ft	---	---	---	---	---	---	---	---	---
5/27/1999	---	7.03	---	---	SPH: 1.13 ft	---	---	---	---	---	---	---	---	---
8/24/1999	---	6.52	---	---	SPH: 1.33 ft	---	---	---	---	---	---	---	---	---
11/22/99	---	8.31	---	---	SPH: 1.29 ft	---	---	---	---	---	---	---	---	---
1/18/2000	10.22	6.20	4.74	---	SPH: 0.90 ft	---	---	---	---	---	---	---	---	---
5/11/2000	10.22	9.41	1.05	---	SPH: 0.30 ft	---	---	---	---	---	---	---	---	---
8/24/2000	10.22	9.62	0.81	---	SPH: 0.26 ft	---	---	---	---	---	---	---	---	---
11/28/2000	10.22	10.25	0.34	---	SPH: 0.46 ft	---	---	---	---	---	---	---	---	---
2/27/2001	10.22	9.06	1.45	---	SPH: 0.36 ft	---	---	---	---	---	---	---	---	---
5/17/2001	10.22	8.75	1.47	---	SPH: 0.67 ft	---	---	---	---	---	---	---	---	---
8/16/2001	10.22	8.32	2.51	8,020.00	SPH: 0.76 ft, f	550	B400	<100	30,000	2,900	100	1,500	5,100	<1
12/15/2001	**10.22**	**9.09**	**1.13**	—	**SPH: 0.36 ft**	—	—	—	—	—	—	—	—	—
TBW-6														
2/23/1999	---	2.09	---	8020		160	600	<50	60	<0.5	<0.5	<0.5	<0.5	<5.0
5/27/1999	---	3.31	---	---		---	---	---	---	---	---	---	---	---
8/24/1999	---	7.29	---	8020	SGC	180	400	<50	130	<0.5	<0.5	<0.5	<0.5	<5.0
11/22/99	---	4.37	---	---		---	---	---	---	---	---	---	---	---
1/18/2000	9.49	3.83	5.66	---		---	---	---	---	---	---	---	---	---
1/19/2000	---	---	---	8020	SGC	55 c	<200	<50	170	0.6	<0.5	<0.5	<0.5	<5.0
5/11/2000	9.49	2.51	6.98	---		---	---	---	---	---	---	---	---	---
8/24/2000	9.49	4.34	5.15	---		---	---	---	---	---	---	---	---	---
8/25/2000	---	---	---	8020	SGC	320	<250	200	<50	<0.5	<0.5	<0.5	<0.5	<5.0
11/28/2000	9.49	4.74	4.75	---		---	---	---	---	---	---	---	---	---
2/27/2001	9.49	2.30	7.19	8020	Filtered+SGC	<57	<230	<57	<50	<0.5	<0.5	<0.5	<0.5	<5.0
5/17/2001	9.49	3.35	6.14	---		---	---	---	---	---	---	---	---	---
8/16/2001	9.49	3.85	5.64		Filtered+SGC	<50	<200	<100	<50	<0.5	<0.5	<0.5	<0.5	<5
12/15/2001	**9.49**	**3.96**	**5.53**	---		---	---	---	---	---	---	---	---	---

Table 1. Groundwater Elevation Data and Analytical Results - Hydrocarbons - City of Oakland Municipal Services Center, Oakland, CA

Sample ID/ Date	TOC Elev.	DTW	GW Elev.	BTEX Method	Notes	TPHd	TPHmo	TPHk	TPHg	Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE
						←			µg/l					→
Trip Blank														
8/19/1998	---	---	---	8020		---	---	---	<50	<0.5	<0.5	<0.5	<0.5	<5.0
11/22/99	---	---	---	8020		---	---	---	<50	<0.5	<0.5	<0.5	<0.5	<5.0
11/28/2000	---	---	---	8020		---	---	---	<50	<0.5	<0.5	<0.5	<0.5	<5.0
2/27/2001	---	---	---	8020	Filtered+SGC	---	---	---	<50	<0.5	<0.5	<0.5	<0.5	<5.0
5/17/2001	---	---	---	8020	SGC	---	---	---	<50	<0.5	<0.5	<0.5	<0.5	<5.0
12/16/2001				**8021**		---	---	---	**<50**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<5.0**

Notes

All concentrations in micrograms per liter (µg/l)

--- = not measured/analyzed

TOC = Top of casing

DTW = Depth to water

DTP = Depth to product (SPH)

Filtered = 0.45 micron glass membrane filter

GW = Groundwater

Groundwater Elevation corrected for the presence of free product according to the calculation: GW Elevation = TOC - DTW + (0.8 x SPH thickness)

BTEX = Benzene, toluene, ethylbenzene, and xylenes - analyzed by EPA Method 8020 or 8240/8260

TPHd = Total petroleum hydrocarbons quantitated as diesel - analyzed by Modified EPA Method 8015

TPHmo = Total petroleum hydrocarbons quantitated as motor oil - analyzed by Modified EPA Method 8015

TPHk = Total petroleum hydrocarbons quantitated as kerosene - analyzed by Modified EPA Method 8015

TPHg = Total petroleum hydrocarbons quantitated as gasoline - analyzed by Modified EPA Method 8015

MTBE = methyl tert-butyl ether - analyzed by EPA Method 8020 or 8260. Confirmation 8260 results shown in parentheses

DUP = Duplicate sample

SPH = Separate-phase hydrocarbons; measured thickness

SGC = Silica gel cleanup based on Method 3630B prior to TPHd, TPHk, or TPHmo analysis, following CRWQCB February 16, 1999 memorandum

NM = Not measured

TBW = Tank backfill well

a = The analytical laboratory reviewed the data and noted that petroleum hydrocarbons quantified in the diesel range are actually the front end of the motor oil pattern

b = The analytical laboratory reviewed the data and noted that the quantitation in the diesel range show no diesel pattern; the response looks like lower carbon chain compounds close to the gasoline range

c = The analytical laboratory reviewed the data and noted that there is no pattern related to diesel range; the peaks are small and random

e = Results are estimated due to concentrations exceeding the calibration ranged

f = Filtration with 0.45 micron glass membrane filter and silica gel treatment

g = Depth to product, depth to water could not be determined

B = Results flagged with "**B**" indicate motor oil was detected in the method blank

Table 2. Groundwater Analytical Results - VOCs by EPA Method 8260 - City of Oakland Municipal Services Center, Oakland, California

Sample ID/ Date	Benzene	n-Butyl-benzene	sec-Butyl-benzene	tert-Butyl-benzene	Chloro-ethane	Chloro-form	Methyl Chloride	1,2-DCA	cis-1,2-DCE	1,2-DCP	Ethyl-benzene	Isopropyl-benzene	p-Isopropyl-toluene	MTBE	Napthalene	n-Propyl-benzene	Toluene	1,2,4-TMB	1,3,5-TMB	Xylenes
MW-5																				
2/27/2001	180	9	4	ND	3	ND	ND	7	ND	3	260	23	6	1,100	43	68	7	1	11	53
MW-6																				
2/27/2001	270	11	3	ND	<1	ND	ND	7	ND	<1	9	6	1	19	62	21	3	1	<1	3
8/20/2001	E280	14	<1	<1	<1	3	2	<1	<1	<1	11	4	<1	14	E82	14	4	<1	<1	9
TBW-1																				
8/20/2001	E530	30	<1	54	<1	4	10	<1	2	<1	E540	36	54	<1	E300	E120	79	E430	<1	E790
TBW-3																				
8/20/2001	10	<1	<1	<1	<1	<1	<1	<1	<1	<1	6	<1	<1	<1	5	<1	<1	<1	<1	3
TBW-5																				
8/20/2001	E620	<1	<1	E160	<1	3	<1	<1	<1	<1	E730	40	E160	<1	E450	E140	E110	<1	<1	E3100

Notes

All concentrations in micrograms per liter (mg/l), E = estimated concentration

µg/l = micrograms per liter

VOCs = Volatile organic compounds by EPA Method 8260. Sample not subject to SCG or filtration prior to analysis.

1,2-DCA = 1,2-dichloroenthane

1,2-DCP = 1,2-dichloropropane

MTBE = methyl tertiary-butyl ether

1,2,4-TMB = 1,2,4-trimethylbenzene

1,3,5-TMB = 1,3,5-trimethylbenzene

[File]

Table 3. Groundwater Analytical Results - SVOCs by EPA Method 8270
City of Oakland Municipal Services Center, Oakland, California

Sample ID/ Date	Naphthalene	Pyrene	Other SVOCs
	<---------- µg/L ---------->		
MW-6			
2/27/2001	19	ND	ND
8/20/2001	52	<5	39
MW-9			
11/28/2000	ND	ND	ND
MW-13			
11/28/2000	ND	10	ND
MW-17			
11/28/2000	ND	ND	ND
TBW-1			
8/20/2001	140	8	387
TBW-3			
8/20/2001	<5	<5	5
TBW-5			
8/20/2001	220	<5	73

Notes

All concentrations in micrograms per liter (µg/l)

SVOCs = Semi-volatile organic compounds by EPA Method 8270.

Samples not subject to filtration or silica gel cleanup prior to analysis.

Table 4. Groundwater Analytical Results - LUFT Metals - City of Oakland Municipal Services Center, Oakland, California

Sample ID/ Date	Cadmium	Chromium	Lead	Nickel	Zinc	Notes
	<----------	----------	mg/l ----------	----------	---------->	
MW-2						
8/19/1998	---	---	<100	---	---	a
MW-6						
2/28/2001	<0.001	0.035	0.23	0.046	0.19	non-filtered
8/16/2001	<0.001	0.020	0.12	0.032	0.11	
TBW-1						
8/16/2001	<0.001	0.017	0.042	0.034	0.10	
TBW-3						
8/16/2001	<0.001	0.008	0.01	0.019	<0.02	
TBW-5						
8/16/2001	<0.001	<0.005	0.01	0.008	0.03	

Abbreviations and Notes:

LUFT metals by EPA Method 6010. Samples filtered in lab prior to analysis, unless noted otherwise.

mg/l = milligrams per liter

--- = not measured/analyzed

a = Analyzed for organic lead

Table 5. Groundwater Analytical Results - Additional Metals - City of Oakland Municipal Services Center, Oakland, California

Sample ID/ Date	Antimony	Arsenic	Beryllium	Copper	Selenium	Silver	Thallium
	<---------- mg/l ---------->						
MW-6							
8/16/2001	<0.01	0.033	<0.001	0.025	<0.01	<0.003	<0.01
TBW-1							
8/16/2001	<0.01	0.015	<0.001	0.017	<0.01	<0.003	<0.01
TBW-3							
8/16/2001	<0.01	0.009	<0.001	0.008	<0.01	<0.003	<0.01
TBW-5							
8/16/2001	<0.01	0.020	<0.001	<0.005	<0.01	<0.003	<0.01

Abbreviations and Notes:

metals by EPA Method 6010. Samples filtered in lab prior to analysis, unless noted otherwise.

mg/l = milligrams per liter

Appendix A

Field Data Sheets

WATER SAMPLE LOG

Project Name: Oakland Municipal Service Center
Project Number:
Well Number: MW-8
Well Location: 7101 Edgewater Drive, Oakland, CA 94621

Date: 12/15/2001
Sampler: T. Morgan/ A. West
Weather: 63 degrees, sunny

Well Construction

Date Completed: 10-96
Total Depth of Well: 15.15'
Diameter: 2"
Well Elevation and Reference: 12.22' TOC

Sampling Equipment & Cleaning

Sampler Type: Teflon Bailer
Method of Cleaning: Alconox and D.I. Water
Pump/Bailer Type: Teflon Bailer
Method of Cleaning: Alconox and D.I. Water
pH Meter: Beckman
Conductivity Meter: Yellow Springs Instr.
Comments: Hanna D.O Meter

Ground Water Levels:

Initial: 9.28' bgs
Final: 12.44' bgs
Reference Point: Top of Casing
Well Volume of Water: 0.94 gallons

SAMPLING MEASUREMENTS

Time	Discharge (gal.) Per Time Period	Discharge (gal.) Cumulative	pH	Temp (°F)	Spec. Conductance (mmhos/cm) Field	Spec. Conductance (mmhos/cm) Dissolved Oxygen	Color/ Turbidity (NTU)	Odor
7:50	start	0	7.53	18.7	4250		Clear	None
	10	2	7.69	18.4	4300		Very Cloudy / >100	None
	20	5	7.71	19.2	4300		Very Cloudy / >100	None
	30	7	7.69	19.1	4300		Very Cloudy / >100	None
8:30	40	10	7.69	19.2	4300	0.89 mg/l	Very Cloudy / >100	None

SAMPLE ANALYSIS

Sample ID	Date	Time	Analysis	Container	Preservative	Comments
MW-8	12/15/2001	8:30	TPHg/BTEX/MTBE	3 VOAs	HCL	
	12/15/2001	8:30	TPHd/lc/mo	1 L Amber	None	

Total Discharge: 10 gallons
Casing Volumes Removed: 11
Method of Disposal: Off-Site Disposal/Recycling

Comments:

MORGAN
Environmental Services

WATER SAMPLE LOG		
OAKLAND MUNICIPAL SERVICE CENTER		
Project No.	Date	Well
	DECEMBER 2001	MW-8

spread\MW-8 (MSC)

WATER SAMPLE LOG

Project Name: Oakland Municipal Service Center
Project Number:
Well Number: MW-9
Well Location: 7101 Edgewater Drive, Oakland, CA 94621

Date: 12/16/2001
Sampler: A West/T. Morgan
Weather: 63 degrees, sunny

Well Construction

Date Completed: 10-96
Total Depth of Well: 14.18' bgs
Diameter: 2"
Well Elevation and Reference: 10.77'

Ground Water Levels:

Initial: 7.75' bgs
Final: 8.86' bgs
Reference Point: Top of Casing
Well Volume of Water: 1.02 gallons

Sampling Equipment & Cleaning

Sampler Type: Teflon Bailer
Method of Cleaning: Alconox and D.I. Water
Pump/Bailer Type: Teflon Bailer
Method of Cleaning: Alconox and D.I. Water
pH Meter: Beckman
Conductivity Meter: Yellow Springs Instr.
Comments: Hanna D.O. Meter

SAMPLING MEASUREMENTS

Time	Discharge (gal.) Per Time Period	Discharge (gal.) Cumulative	pH	Temp (°F)	Spec. Conductance (mmhos/cm) Field	Spec. Conductance (mmhos/cm) Dissolved Oxygen	Color/ Turbidity (NTU)	Odor
12:35	start	0	7.53	18.5	>5000		Sightly Cloudy/ >100	None
	10	2	7.69	18.9	>5000		Very Cloudy/ >100	None
	20	5	7.71	19.1	>5000		Very Cloudy/ >100	None
	30	7	7.69	19.1	>5000		Very Cloudy/ >100	None
1:15	40	10	7.69	19.2	>5000	0.97mg/l	Very Cloudy/ >100	None

SAMPLE ANALYSIS

Sample ID	Date	Time	Analysis	Container	Preservative	Comments
MW-9	12/16/2001	1:15	TPHg/BTEX/MTBE	3 VOAs	HCL	
	12/16/2001	1:15	TPHd/k/mo	1 L Amber	None	

Total Discharge: 10 gallons
Casing Volumes Removed: 10
Method of Disposal: Off-Site Disposal/Recycling

Comments: Purge Water Very Cloudy

MORGAN *Environmental Services*	WATER SAMPLE LOG		
	OAKLAND MUNICIPAL SERVICE CENTER		
	Project No.	Date	Well
		DECEMBER 2001	MW-9

spread\MW-9 (MSC)

WATER SAMPLE LOG

Project Name: Oakland Municipal Service Center
Project Number:
Well Number: MW-10
Well Location: 7101 Edgewater Drive, Oakland, CA 94621

Date: 12/16/2001
Sampler: A West/T. Morgan
Weather: 63 degrees, sunny

Well Construction

Date Completed: 11-96
Total Depth of Well: 15.00' bgs
Diameter: 2"
Well Elevation and Reference: 10.59'

Sampling Equipment & Cleaning

Sampler Type: Teflon Bailer
Method of Cleaning: Alconox and D.I. Water
Pump/Bailer Type: Teflon Bailer
Method of Cleaning: Alconox and D.I. Water
pH Meter: Beckman
Conductivity Meter: Yellow Springs Instr.
Comments: Hanna D.O. Meter

Ground Water Levels:

Initial: 6.97' below TOC
Final: 7.33'
Reference Point: Top of Casing
Well Volume of Water: 1.28 gallons

SAMPLING MEASUREMENTS

Time	Discharge (gal.)		pH	Temp (°F)	Spec. Conductance (mmhos/cm)		Color/ Turbidity (NTU)	Odor
	Per Time Period	Cumulative			Field	Dissolved Oxygen		
9:30	start	0	7.35	18.5	>5000		Sightly Cloudy/ >100	None
	10	2	7.27	19.1	>5000		Very Cloudy/ >100	None
	20	4	7.23	19.3	>5000		Very Cloudy/ >100	None
	30	6	7.23	19.4	>5000		Very Cloudy/ >100	None
10:02	40	8	7.23	19.4	>5000	1.27mg/l	Very Cloudy/ >100	None

SAMPLE ANALYSIS

Sample ID	Date	Time	Analysis	Container	Preservative	Comments
MW-10	12/16/2001	10:02	TPHg/BTEX/MTBE	3 VOAs	HCL	
	12/16/2001	10:02	TPHd/k/mo	1 L Amber	None	

Total Discharge: 8 gallons
Casing Volumes Removed: 6.2
Method of Disposal: Off-Site Disposal/Recycling

Comments: Purge Water Very Cloudy

MORGAN
Environmental Services

WATER SAMPLE LOG		
OAKLAND MUNICIPAL SERVICE CENTER		
Project No.	Date	Well
	DECEMBER 2001	MW-10

spread\MW-10 (MSC)

WATER SAMPLE LOG

Project Name: Oakland Municipal Service Center
Project Number:
Well Number: MW-11
Well Location: 7101 Edgewater Drive, Oakland, CA 94621

Date: 12/15/2001
Sampler: A West/T. Morgan
Weather: 63 degrees, sunny

Well Construction

Date Completed: 1-2000
Total Depth of Well: 19.46' bgs
Diameter: 2"
Well Elevation and Reference: 11.60' TOC

Ground Water Levels:

Initial: 6.26' bgs
Final: 7.02' bgs
Reference Point: Top of Casing
Well Volume of Water: 2.11 gallons

Sampling Equipment & Cleaning

Sampler Type: Teflon Bailer
Method of Cleaning: Alconox and D.I. Water
Pump/Bailer Type: Teflon Bailer
Method of Cleaning: Alconox and D.I. Water
pH Meter: Beckman
Conductivity Meter: Yellow Springs Instr.
Comments: Hanna D.O. Meter

SAMPLING MEASUREMENTS

Time	Discharge (gal.)		pH	Temp (°F)	Spec. Conductance (mmhos/cm)		Color/ Turbidity (NTU)	Odor
	Per Time Period	Cumulative			Field	Dissolved Oxygen		
9:20	start	0	7.18	18.7	2500		Slightly Cloudy/ >100	None
	10	2	7.23	18.9	2600		Mod. Cloudy/ >100	None
	20	5	7.22	19.1	2700		Mod. Cloudy/ >100	None
	30	7	7.23	19.1	2700		Mod. Cloudy/ >100	None
10:00	40	10	7.25	19.1	2700	2.03 mg/l	Mod. Cloudy/ >100	None

SAMPLE ANALYSIS

Sample ID	Date	Time	Analysis	Container	Preservative	Comments
MW-11	12/15/2001	10:00	TPHg/BTEX/MTBE	3 VOAs	HCL	
	12/15/2001	10:00	TPHd/k/mo	1 L Amber	None	

Total Discharge: 10 gallons
Casing Volumes Removed: 4.7
Method of Disposal: Off-Site Disposal/Recycling

Comments: Water sample moderately turbid, with bubbles in sample and strong rxn to HCL preservative.

MORGAN
Environmental Services

WATER SAMPLE LOG		
OAKLAND MUNICIPAL SERVICE CENTER		
Project No.	Date	Well
	DECEMBER 2001	MW-11

spread\MW-11 (MSC)

WATER SAMPLE LOG

Project Name: Oakland Municipal Service Center
Project Number:
Well Number: MW-13
Well Location: 7101 Edgewater Drive, Oakland, CA 94621

Date: 12/16/2001
Sampler: A West/T. Morgan
Weather: 63 degrees, sunny

Well Construction

Date Completed: 1-2000
Total Depth of Well: 20.18' bgs
Diameter: 2"
Well Elevation and Reference: 11.34' TOC

Ground Water Levels:

Initial: 9.43' bgs
Final: 10.02' bgs
Reference Point: Top of Casing
Well Volume of Water: 1.72 gallons

Sampling Equipment & Cleaning

Sampler Type: Teflon Bailer
Method of Cleaning: Alconox and D.I. Water
Pump/Bailer Type: Teflon Bailer
Method of Cleaning: Alconox and D.I. Water
pH Meter: Beckman
Conductivity Meter: Yellow Springs Instr.
Comments: Hanna D.O. Meter

SAMPLING MEASUREMENTS

Time	Discharge (gal.)		pH	Temp (°F)	Spec. Conductance (mmhos/cm)		Color/ Turbidity (NTU)	Odor
	Per Time Period	Cumulative			Field	Dissolved Oxygen		
10:05	start	0	7.29	18.7	4500		Clear	None
	10	2	7.29	18.6	4500		Very Cloudy/>100	None
	20	5	7.31	18.6	4500		Very Cloudy/>100	None
	30	7	7.31	18.7	4500		Very Cloudy/>100	None
10:45	40	9	7.31	18.5	4500	0.89 mg/l	Very Cloudy/>100	None

SAMPLE ANALYSIS

Sample ID	Date	Time	Analysis	Container	Preservative	Comments
MW-13	12/16/2001	10:45	TPHg/BTEX/MTBE	3 VOAs	HCL	
	12/16/2001	10:45	TPHd/k/mo	1 L Amber	None	

Total Discharge: 9 gallons
Casing Volumes Removed: 5.2
Method of Disposal: Off-Site Disposal/Recycling

Comments: Purge Water Very Cloudy

MORGAN *Environmental Services*	WATER SAMPLE LOG		
	OAKLAND MUNICIPAL SERVICE CENTER		
	Project No.	Date	Well
		DECEMBER 2001	MW-13

spread\MW-13 (MSC)

WATER SAMPLE LOG

Project Name: Oakland Municipal Service Center
Project Number:
Well Number: MW-14
Well Location: 7101 Edgewater Drive, Oakland, CA 94621

Date: 12/16/2001
Sampler: A West/T. Morgan
Weather: 63 degrees, sunny

Well Construction

Date Completed: 1-2000
Total Depth of Well: 14.70' bgs
Diameter: 2"
Well Elevation and Reference: 10.05' TOC

Sampling Equipment & Cleaning

Sampler Type: Teflon Bailer
Method of Cleaning: Alconox and D.I. Water
Pump/Bailer Type: Teflon Bailer
Method of Cleaning: Alconox and D.I. Water
pH Meter: Beckman
Conductivity Meter: Yellow Springs Instr.
Comments: Hanna D.O. Meter

Ground Water Levels:

Initial: 6.60' bgs
Final: 7.21' bgs
Reference Point: Top of Casing
Well Volume of Water: 1.3 gallons

SAMPLING MEASUREMENTS

Time	Discharge (gal.)		pH	Temp (°F)	Spec. Conductance (mmhos/cm)		Color/ Turbidity (NTU)	Odor
	Per Time Period	Cumulative			Field	Dissolved Oxygen		
11:00	start	0	7.29	18.9	>5000		Slightly Cloudy/>100	None
	10	2	7.29	19.8	>5000		Very Cloudy/>100	None
	20	5	7.28	18.9	>5000		Very Cloudy/>100	None
	30	7	7.28	19.2	>5000		Very Cloudy/>100	None
11:40	40	9	7.28	19.2	>5000	0.83 mg/l	Very Cloudy/>100	None

SAMPLE ANALYSIS

Sample ID	Date	Time	Analysis	Container	Preservative	Comments
MW-14	12/16/2001	11:40	TPHg/BTEX/MTBE	3 VOAs	HCL	
	12/16/2001	11:40	TPHd/k/mo	1 L Amber	None	

Total Discharge: 9 gallons
Casing Volumes Removed: 6.9
Method of Disposal: Off-Site Disposal/Recycling

Comments: Purge Water Very Cloudy

MORGAN *Environmental Services*	WATER SAMPLE LOG		
	OAKLAND MUNICIPAL SERVICE CENTER		
	Project No.	Date	Well
		DECEMBER 2001	MW-14

spread\MW-14 (MSC)

WATER SAMPLE LOG

Project Name: Oakland Municipal Service Center
Project Number:
Well Number: MW-15
Well Location: 7101 Edgewater Drive, Oakland, CA 94621

Date: 12/16/2001
Sampler: A West/T. Morgan
Weather: 63 degrees, sunny

Well Construction

Date Completed: 1-2000
Total Depth of Well: 21.84' bgs
Diameter: 2"
Well Elevation and Reference: 12.36' TOC

Ground Water Levels:

Initial: 9.80' bgs
Final: 10.11' bgs
Reference Point: Top of Casing
Well Volume of Water: 1.9 gallons

Sampling Equipment & Cleaning

Sampler Type: Teflon Bailer
Method of Cleaning: Alconox and D.I. Water
Pump/Bailer Type: Teflon Bailer
Method of Cleaning: Alconox and D.I. Water
pH Meter: Beckman
Conductivity Meter: Yellow Springs Instr.
Comments: Hanna D.O. Meter

SAMPLING MEASUREMENTS

Time	Discharge (gal.)		pH	Temp (°F)	Spec. Conductance (mmhos/cm)		Color/ Turbidity (NTU)	Odor
	Per Time Period	Cumulative			Field	Dissolved Oxygen		
2:20	start	0	7.29	19.5	>5000		Clear/<100	Sulfur
	10	2	7.41	19.8	>5000		Clear/<100	Sulfur
	20	5	7.42	19.7	>5000		Clear/<100	Sulfur
	30	7	7.43	19.6	>5000		Clear/<100	Sulfur
3:00	40	9	7.43	19.6	>5000	0.89 mg/l	Clear/<100	Sulfur

SAMPLE ANALYSIS

Sample ID	Date	Time	Analysis	Container	Preservative	Comments
MW-15	12/16/2001	3:00	TPHg/BTEX/MTBE	3 VOAs	HCL	
	12/16/2001	3:00	TPHd/k/mo	1 L Amber	None	

Total Discharge: 9 gallons
Casing Volumes Removed: 4.7
Method of Disposal: Off-Site Disposal/Recycling

Comments: Water sample very cloudy, with strong sulfur odor. Bubbles in sample and strong rxn to HCL preserv.

MORGAN *Environmental Services*	WATER SAMPLE LOG		
	OAKLAND MUNICIPAL SERVICE CENTER		
	Project No.	Date	Well
		DECEMBER 2001	MW-15

spread\MW-15 (MSC)

WATER SAMPLE LOG

Project Name: Oakland Municipal Service Center
Project Number:
Well Number: MW-17
Well Location: 7101 Edgewater Drive, Oakland, CA 94621

Date: 12/16/2001
Sampler: A West/T. Morgan
Weather: 63 degrees, sunny

Well Construction

Date Completed: 1-2000
Total Depth of Well: 20.16' bgs
Diameter: 2"
Well Elevation and Reference: 9.86' TOC

Ground Water Levels:

Initial: 8.01' bgs
Final: 8.53' bgs
Reference Point: Top of Casing
Well Volume of Water: 1.9 gallons

Sampling Equipment & Cleaning

Sampler Type: Teflon Bailer
Method of Cleaning: Alconox and D.I. Water
Pump/Bailer Type: Teflon Bailer
Method of Cleaning: Alconox and D.I. Water
pH Meter: Beckman
Conductivity Meter: Yellow Springs Instr.
Comments: Hanna D.O. Meter

SAMPLING MEASUREMENTS

Time	Discharge (gal.)		pH	Temp (°F)	Spec. Conductance (mmhos/cm)		Color/ Turbidity (NTU)	Odor
	Per Time Period	Cumulative			Field	Dissolved Oxygen		
4:20	start	0	7.7	18.8	>5000		Clear/<100	Sulfur
	10	2	7.68	18.9	>5000		Clear/<100	Sulfur
	20	5	7.69	18.5	>5000		Clear/<100	Sulfur
	30	7	7.77	18.5	>5000		Clear/<100	Sulfur
5:00	40	10	7.76	18.4	>5000	0.45 mg/l	Clear/<100	Sulfur

SAMPLE ANALYSIS

Sample ID	Date	Time	Analysis	Container	Preservative	Comments
MW-17	12/16/2001	5:00	TPHg/BTEX/MTBE	3 VOAs	HCL	
	12/16/2001	5:00	TPHd/k/mo	1 L Amber	None	

Total Discharge: 10 gallons
Casing Volumes Removed: 5.2
Method of Disposal: Off-Site Disposal/Recycling

Comments: Water sample has strong sulfur odor.

MORGAN
Environmental Services

WATER SAMPLE LOG		
OAKLAND MUNICIPAL SERVICE CENTER		
Project No.	Date	Well
	DECEMBER 2001	MW-17

MORGAN ENVIRONMENTAL

OAKLAND MUNICIPAL SERVICE CENTER 4TH QUARTER 2001 WATER DEPTH MEASUREMENTS						
Well ID	**Time**	**Top of Casing Elevation**	**Depth to Water (Feet)**	**Depth to Product (Feet)**	**Total Well Depth (Feet)**	**Comments**
TBW-1	10:00	----	6.86	6.51	10.50	SPH=0.35' (Plume C)
TBW-3	11:10	----	2.52	2.50	10.50	SPH=0.02' (Plume A)
TBW-5	10:15	10.22	9.09	8.73	9.70	SPH=0.36' (Plume D)
TBW-6	10:20	9.49	3.96	----	12.15	
MW-1	10:40	10.05	5.52	----	15.60	
MW-2	10:55	10.47	7.21	----	15.50	
MW-5	11:30	11.15	5.50	----	14.30	
MW-6	11:45	10.98	7.58	7.51	14.00	SPH=0.07' (Plume B)
MW-7	12:00	11.51	6.43	----	14.27	
MW-8	12:15	12.22	9.28	----	15.15	
MW-9	12:25	10.77	7.75	----	14.18	
MW-10	12:35	10.59	6.97	----	15.00	
MW-11	12:50	11.60	6.26	----	19.46	Effervescent Water Sample
MW-12	---	10.43	Inaccessible	----	----	Not Measured-Inaccessible

MORGAN ENVIRONMENTAL

OAKLAND MUNICIPAL SERVICE CENTER
4TH QUARTER 2001
WATER DEPTH MEASUREMENTS

Well ID	Time	Top of Casing Elevation	Depth to Water (Feet)	Depth to Product (Feet)	Total Well Depth (Feet)	Comments
MW-13	1:35	11.34	9.43	----	20.18	
MW-14	1:50	10.05	6.60	----	14.70	
MW-15	2:10	12.36	9.80	----	21.84	Effervescence in Water Sample Strong Sulfur Odor
MW-16	---	13.57	Not Measured	See Comments	----	Historical SPH Thickness=0.4'
MW-17	2:00	9.86	8.01	----	20.16	Strong Sulfur Odor

4th QUARTER 2001 SEPARATE PHASE HYDROCARBON (SPH) REMOVAL

Well ID	WEIGHT OF SPH REMOVED THIS QUARTER	REMOVAL METHOD	COMMENTS
TBW-1	5.4 pounds	Absorbent Sock	
TBW-2	6.2 pounds	Absorbent Sock	
TBW-3	4.5 pounds	Passive Skimmer	
MW-16	3.7 pounds	Absorbent Sock	
TBW-5	0	Active Skimmer	
MW-6	2.9 pounds	Passive Skimmer	

Measured By: T. Morgan/ D. Allan West

Date: December 15, 2001

Appendix B

Laboratory Analytical Reports/Correspondence

Amended CASE NARRATIVE

Client: Morgan Environmental
Project: City of Oakland Municipal Service Center
Order #: B120560
Date: January 17, 2002

This report has been amended from the original report. Reporting limits for kerosene have been included and the sample dates for samples -7 and –8 have been changed to reflect what is on the COC.

Sample control
On December 17, 2001, Caltest received 8 samples and a tripblank for analyses. Samples were received cold sealed and intact.

Extractable TPH by 8015 B
The samples were extracted and analyzed within hold time. Sample extracts were passed through a silica gel column prior to analyses on the GC. The GC was calibrated using diesel, kerosene, and motor oil; the samples were compared to standards. If sample patterns did not match the pattern of the standards, the results were reported for the samples using diesel range and motor oil range. Matrix spikes are reported, but they are not from this project. Only 1 amber liter per sample was received. All QC parameters were within QAPP QC specifications.

BTEX (EPA 8021) and gasoline (EPA 8015 B)
The samples were analyzed within hold time. MTBE was included in the calibration of the GC; all samples were ND for MTBE. Hydrocarbon pattern did not match gasoline standard; results were quantitated in the gasoline range using the gasoline standard. Matrix spikes could not be performed; LCS and LCSD were run with the batch. All QC parameters were within QAPP QC specifications.

If you have any questions please call me or another project manager at Caltest (707) 258-4000.

Sincerely,
Caltest Analytical Laboratory

William Svoboda
Project Manager

NELAP Certification 1103CA

Caltest
ANALYTICAL LABORATORY

ENVIRONMENTAL ANALYSES

ELAP Certification 1664

LAB ORDER No.: B120560

REPORT of ANALYTICAL RESULTS

Report Date: 01 FEB 2002
Received Date: 17 DEC 2001

Client:
Morgan Environmental
2433 Poplar Street
Oakland, CA 94607

Project: CITY OF OAKLAND MUNICIPAL SERVICE CENTER

Sampled by: TOM MORGAN

Lab Number	Sample Identification	Matrix	Sampled Date/Time
B120560-1	MW-15	AQUEOUS	16 DEC 01 15:00
B120560-2	MW-13	AQUEOUS	16 DEC 01 10:45
B120560-3	MW-14	AQUEOUS	16 DEC 01 11:40
B120560-4	MW-10	AQUEOUS	16 DEC 01 10:02
B120560-5	MW-9	AQUEOUS	16 DEC 01 13:15
B120560-6	MW-17	AQUEOUS	16 DEC 01 17:00
B120560-7	MW-11	AQUEOUS	15 DEC 01 10:00
B120560-8	MW-8	AQUEOUS	15 DEC 01 08:30
B120560-9	TRIPBLANK	AQUEOUS	19 DEC 01

William Svoboda
Project Manager

CAHorn
Christine Horn
Laboratory Director

CALTEST authorizes this report to be reproduced only in its entirety.
Results are specific to the sample as submitted and only to the parameters reported.
All analyses performed by EPA Methods or Standard Methods (SM) 18th Ed. except where noted.
Results of 'ND' mean not detected at or above the listed Reporting Limit (R.L.).
'D.F.' means Dilution Factor and has been used to adjust the listed Reporting Limit (R.L.).
Acceptance Criteria for all Surrogate recoveries are defined in the QC Spike Data Reports.
Caltest collects samples in compliance with CFR 40, EPA Methods, Cal. Title 22, and Standard Methods.

1885 North Kelly Road • Napa, California 94558
(707) 258-4000 • Fax: (707) 226-1001 • e-mail: caltest@caltestlab.com

ORGANIC ANALYTICAL RESULTS

LAB ORDER No.: B120560

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: B120560-1							
SAMPLE ID: MW-15							
SAMPLED: 16 DEC 01 15:00							
METHOD: EPA 8015B							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				5	01.02.02	T010342TPH	1,2,3,4
Diesel Fuel	ND	250.	ug/L				
TPH-Extractable, quantitated as diesel	3800.	250.	ug/L				
Motor Oil	ND	1000.	ug/L				
TPH-Extractable, quantitated as Motor Oil	15000.	1000.	ug/L				
Surrogate o-Terphenyl	123.		%				
Kerosene	ND	250.	ug/L				
LAB NUMBER: B120560-1 (continued)							
SAMPLE ID: MW-15							
SAMPLED: 16 DEC 01 15:00							
METHOD: EPA 8015B/8021							
AROMATIC HYDROCARBONS AND TOTAL PURGEABLE PETROLEUM HYDROCARBONS				1	12.20.01	V010126G9A	5
Total Petroleum Hydrocarbons - Gasoline	ND	50.	ug/L				
TPH-Purgeable, quantitated as gasoline	ND	50.	ug/L				
Benzene	ND	0.5	ug/L				
Toluene	ND	0.5	ug/L				
Ethylbenzene	ND	0.5	ug/L				
Xylenes (Total)	2.	0.5	ug/L				
Methyl tert-Butyl Ether (MTBE)	ND	5.	ug/L				
Surrogate 4-Bromofluorobenzene [FID]	111.		%				
Surrogate 4-Bromofluorobenzene [PID]	101.		%				

1) Sample Preparation on 12-20-01 using EPA 3510
2) Sample diluted to bring concentration of target analyte(s) within the working range of the instrument, resulting in increased reporting limits.
3) An unidentified petroleum hydrocarbon was present in the sample. An approximate concentration has been calculated based on Diesel #2 standards.
4) An unidentified petroleum hydrocarbon mixture was present in the sample. An approximate concentration has been calculated based on motor oil standards.
5) Sample Preparation on 12-20-01 using EPA 5030

ORGANIC ANALYTICAL RESULTS

LAB ORDER No.: B120560

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: B120560-2							
SAMPLE ID: MW-13							
SAMPLED: 16 DEC 01 10:45							
METHOD: EPA 8015B							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				5	01.02.02	T010342TPH	1,2,3,4
Diesel Fuel	ND	250.	ug/L				
TPH-Extractable, quantitated as diesel	1900.	250.	ug/L				
Motor Oil	ND	1000.	ug/L				
TPH-Extractable, quantitated as Motor Oil	18000.	1000.	ug/L				
Surrogate o-Terphenyl	112.		%				
Kerosene	ND	250.	ug/L				
LAB NUMBER: B120560-2 (continued)							
SAMPLE ID: MW-13							
SAMPLED: 16 DEC 01 10:45							
METHOD: EPA 8015B/8021							
AROMATIC HYDROCARBONS AND TOTAL PURGEABLE PETROLEUM HYDROCARBONS				1	12.20.01	V010126G9A	5
Total Petroleum Hydrocarbons - Gasoline	ND	50.	ug/L				
TPH-Purgeable, quantitated as gasoline	ND	50.	ug/L				
Benzene	ND	0.5	ug/L				
Toluene	ND	0.5	ug/L				
Ethylbenzene	ND	0.5	ug/L				
Xylenes (Total)	ND	0.5	ug/L				
Methyl tert-Butyl Ether (MTBE)	ND	5.	ug/L				
Surrogate 4-Bromofluorobenzene [FID]	107.		%				
Surrogate 4-Bromofluorobenzene [PID]	101.		%				

1) Sample Preparation on 12-20-01 using EPA 3510
2) Sample diluted to bring concentration of target analyte(s) within the working range of the instrument, resulting in increased reporting limits.
3) An unidentified petroleum hydrocarbon was present in the sample. An approximate concentration has been calculated based on Diesel #2 standards.
4) An unidentified petroleum hydrocarbon mixture was present in the sample. An approximate concentration has been calculated based on motor oil standards.
5) Sample Preparation on 12-20-01 using EPA 5030

ORGANIC ANALYTICAL RESULTS

LAB ORDER No.: B120560

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: B120560-3							
SAMPLE ID: MW-14							
SAMPLED: 16 DEC 01 11:40							
METHOD: EPA 8015B							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1	12.25.01	T010342TPH	1,2,3
Diesel Fuel	ND	50.	ug/L				
TPH-Extractable, quantitated as diesel	1100.	50.	ug/L				
Motor Oil	ND	200.	ug/L				
TPH-Extractable, quantitated as Motor Oil	3000.	200.	ug/L				
Surrogate o-Terphenyl	83.		%				
Kerosene	ND	50.	ug/L				
LAB NUMBER: B120560-3 (continued)							
SAMPLE ID: MW-14							
SAMPLED: 16 DEC 01 11:40							
METHOD: EPA 8015B/8021							
AROMATIC HYDROCARBONS AND TOTAL PURGEABLE PETROLEUM HYDROCARBONS				1	12.20.01	V010126G9A	4
Total Petroleum Hydrocarbons - Gasoline	ND	50.	ug/L				
TPH-Purgeable, quantitated as gasoline	ND	50.	ug/L				
Benzene	ND	0.5	ug/L				
Toluene	ND	0.5	ug/L				
Ethylbenzene	ND	0.5	ug/L				
Xylenes (Total)	ND	0.5	ug/L				
Methyl tert-Butyl Ether (MTBE)	ND	5.	ug/L				
Surrogate 4-Bromofluorobenzene [FID]	105.		%				
Surrogate 4-Bromofluorobenzene [PID]	100.		%				
LAB NUMBER: B120560-4							
SAMPLE ID: MW-10							
SAMPLED: 16 DEC 01 10:02							
METHOD: EPA 8015B							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1	12.25.01	T010342TPH	1,2,3
Diesel Fuel	ND	50.	ug/L				

1) Sample Preparation on 12-20-01 using EPA 3510
2) An unidentified petroleum hydrocarbon was present in the sample. An approximate concentration has been calculated based on Diesel #2 standards.
3) An unidentified petroleum hydrocarbon mixture was present in the sample. An approximate concentration has been calculated based on motor oil standards.
4) Sample Preparation on 12-20-01 using EPA 5030

ORGANIC ANALYTICAL RESULTS

LAB ORDER No.: B120560

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: B120560-4 (continued)							
SAMPLE ID: MW-10							
SAMPLED: 16 DEC 01 10:02							
METHOD: EPA 8015B							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS (continued)				1	12.25.01	T010342TPH	
TPH-Extractable, quantitated as diesel	410.	50.	ug/L				
Motor Oil	ND	200.	ug/L				
TPH-Extractable, quantitated as Motor Oil	2100.	200.	ug/L				
Surrogate o-Terphenyl	78.		%				
Kerosene	ND	50.	ug/L				
LAB NUMBER: B120560-4 (continued)							
SAMPLE ID: MW-10							
SAMPLED: 16 DEC 01 10:02							
METHOD: EPA 8015B/8021							
AROMATIC HYDROCARBONS AND TOTAL PURGEABLE PETROLEUM HYDROCARBONS				1	12.20.01	V010126G9A	1
Total Petroleum Hydrocarbons - Gasoline	ND	50.	ug/L				
TPH-Purgeable, quantitated as gasoline	ND	50.	ug/L				
Benzene	2.4	0.5	ug/L				
Toluene	ND	0.5	ug/L				
Ethylbenzene	ND	0.5	ug/L				
Xylenes (Total)	ND	0.5	ug/L				
Methyl tert-Butyl Ether (MTBE)	ND	5.	ug/L				
Surrogate 4-Bromofluorobenzene [FID]	100.		%				
Surrogate 4-Bromofluorobenzene [PID]	97.		%				
LAB NUMBER: B120560-5							
SAMPLE ID: MW-9							
SAMPLED: 16 DEC 01 13:15							
METHOD: EPA 8015B							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1	12.25.01	T010342TPH	2,3,4
Diesel Fuel	ND	50.	ug/L				

1) Sample Preparation on 12-20-01 using EPA 5030
2) Sample Preparation on 12-20-01 using EPA 3510
3) An unidentified petroleum hydrocarbon was present in the sample. An approximate concentration has been calculated based on Diesel #2 standards.
4) An unidentified petroleum hydrocarbon mixture was present in the sample. An approximate concentration has been calculated based on motor oil standards.

ORGANIC ANALYTICAL RESULTS

LAB ORDER No.: B120560

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: B120560-5 (continued)							
SAMPLE ID: MW-9							
SAMPLED: 16 DEC 01 13:15							
METHOD: EPA 8015B							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS (continued)				1	12.25.01	T010342TPH	
TPH-Extractable, quantitated as diesel	1400.	50.	ug/L				
Motor Oil	ND	200.	ug/L				
TPH-Extractable, quantitated as Motor Oil	4100.	200.	ug/L				
Surrogate o-Terphenyl	91.		%				
Kerosene	ND	50.	ug/L				
LAB NUMBER: B120560-5 (continued)							
SAMPLE ID: MW-9							
SAMPLED: 16 DEC 01 13:15							
METHOD: EPA 8015B/8021							
AROMATIC HYDROCARBONS AND TOTAL PURGEABLE PETROLEUM HYDROCARBONS				1	12.20.01	V010126G9A	1,2
Total Petroleum Hydrocarbons - Gasoline	ND	50.	ug/L				
TPH-Purgeable, quantitated as gasoline	210.	50.	ug/L				
Benzene	15.	0.5	ug/L				
Toluene	1.6	0.5	ug/L				
Ethylbenzene	ND	0.5	ug/L				
Xylenes (Total)	2.2	0.5	ug/L				
Methyl tert-Butyl Ether (MTBE)	ND	5.	ug/L				
Surrogate 4-Bromofluorobenzene [FID]	106.		%				
Surrogate 4-Bromofluorobenzene [PID]	101.		%				

1) Sample Preparation on 12-20-01 using EPA 5030
2) An unidentified petroleum hydrocarbon was present in the sample. An approximate concentration has been calculated based on gasoline standards.

ORGANIC ANALYTICAL RESULTS

LAB ORDER No.: B120560

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: B120560-6							
SAMPLE ID: MW-17							
SAMPLED: 16 DEC 01 17:00							
METHOD: EPA 8015B							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1	12.25.01	T010342TPH	1,2,3
Diesel Fuel	ND	50.	ug/L				
TPH-Extractable, quantitated as diesel	940.	50.	ug/L				
Motor Oil	ND	200.	ug/L				
TPH-Extractable, quantitated as Motor Oil	1000.	200.	ug/L				
Surrogate o-Terphenyl	81.		%				
Kerosene	ND	50.	ug/L				
LAB NUMBER: B120560-6 (continued)							
SAMPLE ID: MW-17							
SAMPLED: 16 DEC 01 17:00							
METHOD: EPA 8015B/8021							
AROMATIC HYDROCARBONS AND TOTAL PURGEABLE PETROLEUM HYDROCARBONS				1	12.20.01	V010126G9A	4
Total Petroleum Hydrocarbons - Gasoline	ND	50.	ug/L				
TPH-Purgeable, quantitated as gasoline	ND	50.	ug/L				
Benzene	ND	0.5	ug/L				
Toluene	ND	0.5	ug/L				
Ethylbenzene	ND	0.5	ug/L				
Xylenes (Total)	ND	0.5	ug/L				
Methyl tert-Butyl Ether (MTBE)	ND	5.	ug/L				
Surrogate 4-Bromofluorobenzene [FID]	106.		%				
Surrogate 4-Bromofluorobenzene [PID]	105.		%				
LAB NUMBER: B120560-7							
SAMPLE ID: MW-11							
SAMPLED: 15 DEC 01 10:00							
METHOD: EPA 8015B							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1	12.25.01	T010342TPH	1,2,3
Diesel Fuel	ND	50.	ug/L				

1) Sample Preparation on 12-20-01 using EPA 3510
2) An unidentified petroleum hydrocarbon was present in the sample. An approximate concentration has been calculated based on Diesel #2 standards.
3) An unidentified petroleum hydrocarbon mixture was present in the sample. An approximate concentration has been calculated based on motor oil standards.
4) Sample Preparation on 12-20-01 using EPA 5030

ORGANIC ANALYTICAL RESULTS

LAB ORDER No.: B120560

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: B120560-7 (continued)							
SAMPLE ID: MW-11							
SAMPLED: 15 DEC 01 10:00							
METHOD: EPA 8015B							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS (continued)				1	12.25.01	T010342TPH	
TPH-Extractable, quantitated as diesel	200.	50.	ug/L				
Motor Oil	ND	200.	ug/L				
TPH-Extractable, quantitated as Motor Oil	300.	200.	ug/L				
Surrogate o-Terphenyl	80.		%				
Kerosene	ND	50.	ug/L				
LAB NUMBER: B120560-7 (continued)							
SAMPLE ID: MW-11							
SAMPLED: 15 DEC 01 10:00							
METHOD: EPA 8015B/8021							
AROMATIC HYDROCARBONS AND TOTAL PURGEABLE PETROLEUM HYDROCARBONS				1	12.21.01	V010126G9A	1,2
Total Petroleum Hydrocarbons - Gasoline	ND	50.	ug/L				
TPH-Purgeable, quantitated as gasoline	170.	50.	ug/L				
Benzene	1.7	0.5	ug/L				
Toluene	0.6	0.5	ug/L				
Ethylbenzene	2.4	0.5	ug/L				
Xylenes (Total)	1.8	0.5	ug/L				
Methyl tert-Butyl Ether (MTBE)	ND	2.	ug/L				
Surrogate 4-Bromofluorobenzene [FID]	112.		%				
Surrogate 4-Bromofluorobenzene [PID]	108.		%				

1) Sample Preparation on 12-20-01 using EPA 5030
2) An unidentified petroleum hydrocarbon was present in the sample. An approximate concentration has been calculated based on gasoline standards.

ORGANIC ANALYTICAL RESULTS

LAB ORDER No.: B120560

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: B120560-8							
SAMPLE ID: MW-8							
SAMPLED: 15 DEC 01 08:30							
METHOD: EPA 8015B							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1	12.25.01	T010342TPH	1,2,3
Diesel Fuel	ND	50.	ug/L				
TPH-Extractable, quantitated as diesel	390.	50.	ug/L				
Motor Oil	ND	200.	ug/L				
TPH-Extractable, quantitated as Motor Oil	1300.	200.	ug/L				
Surrogate o-Terphenyl	75.		%				
Kerosene	ND	50.	ug/L				
LAB NUMBER: B120560-8 (continued)							
SAMPLE ID: MW-8							
SAMPLED: 15 DEC 01 08:30							
METHOD: EPA 8015B/8021							
AROMATIC HYDROCARBONS AND TOTAL PURGEABLE PETROLEUM HYDROCARBONS				1	12.21.01	V010126G9A	4
Total Petroleum Hydrocarbons - Gasoline	ND	50.	ug/L				
TPH-Purgeable, quantitated as gasoline	ND	50.	ug/L				
Benzene	ND	0.5	ug/L				
Toluene	ND	0.5	ug/L				
Ethylbenzene	ND	0.5	ug/L				
Xylenes (Total)	ND	0.5	ug/L				
Methyl tert-Butyl Ether (MTBE)	ND	5.	ug/L				
Surrogate 4-Bromofluorobenzene [FID]	110.		%				
Surrogate 4-Bromofluorobenzene [PID]	108.		%				
LAB NUMBER: B120560-9							
SAMPLE ID: TRIPBLANK							
SAMPLED: 19 DEC 01							
METHOD: EPA 8015B/8021							
AROMATIC HYDROCARBONS AND TOTAL PURGEABLE PETROLEUM HYDROCARBONS				1	12.21.01	V010126G9A	4
Total Petroleum Hydrocarbons - Gasoline	ND	50.	ug/L				

1) Sample Preparation on 12-20-01 using EPA 3510
2) An unidentified petroleum hydrocarbon was present in the sample. An approximate concentration has been calculated based on Diesel #2 standards.
3) An unidentified petroleum hydrocarbon mixture was present in the sample. An approximate concentration has
4) Sample Preparation on 12-20-01 using EPA 5030

ORGANIC ANALYTICAL RESULTS

LAB ORDER No.: B120560

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: B120560-9 (continued)							
SAMPLE ID: TRIPBLANK							
SAMPLED: 19 DEC 01							
METHOD: EPA 8015B/8021							
AROMATIC HYDROCARBONS AND TOTAL PURGEABLE PETROLEUM HYDROCARBONS (continued)				1	12.21.01	V010126G9A	
TPH-Purgeable, quantitated as gasoline	ND	50.	ug/L				
Benzene	ND	0.5	ug/L				
Toluene	ND	0.5	ug/L				
Ethylbenzene	ND	0.5	ug/L				
Xylenes (Total)	ND	0.5	ug/L				
Methyl tert-Butyl Ether (MTBE)	ND	5.	ug/L				
Surrogate 4-Bromofluorobenzene [FID]	107.		%				
Surrogate 4-Bromofluorobenzene [PID]	105.		%				

... notes continued from prior page ...
been calculated based on motor oil standards.

NELAP Certification 1103CA

ELAP Certification 1664

Caltest
ANALYTICAL LABORATORY
ENVIRONMENTAL ANALYSES

LAB ORDER No.: B120560

SUPPLEMENTAL QUALITY CONTROL (QC) DATA REPORT

Report Date: 01 FEB 2002
Received Date: 17 DEC 2001

Client:
Morgan Environmental
2433 Poplar Street
Oakland, CA 94607

Project: CITY OF OAKLAND MUNICIPAL SERVICE CENTER

QC Batch ID	Method	Matrix
T010342TPH	8015B	AQUEOUS
V010126G9A	8015B/8021	AQUEOUS

William Svoboda
Project Manager

CAHorn
Christine Horn
Laboratory Director

Results are specific to the sample as submitted and only to the parameters reported.
All analyses performed by EPA Methods or Standard Methods (SM) 18th Ed. except where noted.
Results of 'ND' mean not detected at or above the listed Reporting Limit (R.L.).
Analyte Spike Amounts reported as 'NS' mean not spiked and will not have recoveries reported.
'RPD' means Relative Percent Difference and RPD Acceptance Criteria is stated as a maximum.
'NC' means not calculated for RPD or Spike Recoveries.

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METHOD BLANK ANALYTICAL RESULTS

LAB ORDER No.: B120560

ANALYTE	RESULT	R.L.	UNITS	ANALYZED	NOTES
QC BATCH: T010342TPH					
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				12.24.01	
Diesel Fuel	ND	50.	ug/L		
TPH-Extractable, quantitated as diesel	ND	50.	ug/L		
Motor Oil	ND	200.	ug/L		
TPH-Extractable, quantitated as Motor Oil	ND	200.	ug/L		
Surrogate o-Terphenyl	93.		%		
QC BATCH: V010126G9A					
AROMATIC HYDROCARBONS AND TOTAL PURGEABLE PETROLEUM HYDROCARBONS				12.20.01	
Total Petroleum Hydrocarbons - Gasoline	ND	50.	ug/L		
TPH-Purgeable, quantitated as gasoline	ND	50.	ug/L		
Benzene	ND	0.5	ug/L		
Toluene	ND	0.5	ug/L		
Ethylbenzene	ND	0.5	ug/L		
Xylenes (Total)	ND	0.5	ug/L		
Methyl tert-Butyl Ether (MTBE)	ND	5.	ug/L		
Surrogate 4-Bromofluorobenzene [FID]	101.		%		
Surrogate 4-Bromofluorobenzene [PID]	99.		%		

LABORATORY CONTROL SAMPLE ANALYTICAL RESULTS

LAB ORDER No.: B120560

ANALYTE	SPIKE AMOUNT	SPIKE\DUP RESULT	SPK\DUP %REC	ACCEPTANCE %REC \RPD	REL% DIFF	ANALYZED	NOTES
QC BATCH: T010342TPH							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS						12.24.01	
Diesel Fuel	1000	704.\	70\	36-102\			
Surrogate o-Terphenyl	100	84.5\	84\	50-150\			
QC BATCH: V010126G9A							
AROMATIC HYDROCARBONS AND TOTAL PURGEABLE PETROLEUM HYDROCARBONS						12.20.01	
Total Petroleum Hydrocarbons - Gasoline	550.	588.\606.	107\110	50-130\	3.0		
Benzene	6.69	7.18\7.29	107\109	50-130\	1.5		
Toluene	39.1	38.1\39.1	97\100	50-130\	2.6		
Ethylbenzene	9.20	9.91\9.98	108\108	50-130\	0.7		
Xylenes (Total)	47.4	48.0\48.5	101\102	49-129\	1.0		
Methyl tert-Butyl Ether (MTBE)	11.1	11.6\12.5	105\113		7.5		
Surrogate 4-Bromofluorobenzene [FID]	10.0	9.84\8.90	98\89	50-130\			
Surrogate 4-Bromofluorobenzene [PID]	10.0	9.50\10.2	95\102	50-130\			

LAB ORDER No.: B120560

MATRIX SPIKE ANALYTICAL RESULTS

ANALYTE	ORIGINAL RESULT	SPIKE AMOUNT	SPIKE\DUP RESULT	SPK\DUP %REC	ACCEPTANCE %REC \RPD	REL% DIFF	ANALYZED	NOTES
QC BATCH: T010342TPH								
QC SAMPLE LAB NUMBER: B120528-4								
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS							12.24.01	
TPH-Extractable, quantitated as diesel	60.	2170.	1790.\1470.	80\65	40-140\25	20.		
Surrogate o-Terphenyl	67.%	217.	182.\134.	84\62	50-150\			

Caltest ANALYTICAL LABORATORY

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SAMPLE CHAIN OF CUSTODY

PAGE 1 OF 1

LAB ORDER #: 120560

PROJECT #/ PROJECT NAME: CITY OF OAKLAND MUNICIPAL SERVICE CENTER

P.O. #:

CLIENT: MORGAN ENVIRONMENTAL SERVICES

REPORT TO: TOM MORGAN

ADDRESS: 2433 POPLAR STREET, CITY: OAKLAND STATE: CA ZIP: 94607

BILLING ADDRESS: SAME

PHONE #: (510) 2670134 FAX PHONE: (510) 2670140 SAMPLER (PRINT & SIGN NAME): TOM MORGAN / D. WEST

ANALYSES REQUESTED

TURN-AROUND TIME: [X] STANDARD [ ] RUSH

DUE DATE:

CALTEST #	DATE SAMPLED	TIME SAMPLED	MATRIX	CONTAINER AMOUNT/TYPE	PRESERVATIVE	SAMPLE IDENTIFICATION SITE	CLIENT LAB #	COMP. or GRAB	TPHg/BTEX/MTBE 8015/8020	TPHd/k/md(8015) w/silica gel cleanup	REMARKS
	12-16-1	3:00	AQ	1 L Amb(AL) 3 VOAs	HCL	MW-15	1		X	X	Any positive detection of MTBE will be confirmed by EPA 8260. Subject TPHd/k/ to silica gel treatment/cleanu
	12-16-1	10:45	AQ	1 L Amb(AL) 3 VOAs	HCL	MW-13	2		X	X	
	12-16-1	11:40	AQ	1 L Amb(AL) 3 VOAs	HCL	MW-14	3		X	X	
	12-16-1	10:02	AQ	1 L Amb(AL) 3 VOA's	HCL	MW-10	4		X	X	
	12-16-1	1:15	AQ	1 L Amb(AL) 3 VOAs	HCL	MW-9	5		X	X	
	12-16-1	5:00	AQ	1 L Amb(AL) 3 VOAs	HCL	MW-17	6		X	X	
	12-15-1	10:00	AQ	1 L Amb(AL) 3 VOAs	HCL	MW-11	7		X	X	
	12-15-1	8:30	AQ	1 L Amb(AL) 3 VOAs	HCL	MW-8	8		X	X	
	CALTEST LAB PREP.		"	"	HCL	TRIP BLANK	9		X		

By submittal of sample(s), client agrees to abide by the Terms and Conditions set forth on the reverse of this document.

RELINQUISHED BY	DATE/TIME	RECEIVED BY	RELINQUISHED BY	DATE/TIME	RECEIVED BY
	12-17-01 12:50			12/17/01 1655	

FOR LAB USE ONLY

Samples: WC MICRO BIO AA 8V VOA pH? Y/N TEMP: 4°C SEALED? Y/N INTACT: Y/N

BO: BIO WC AA

CO: AA 8V VOA

SIL: HP PT QT VOA

W/HNO3 H2SO4 NaOH

PIL: HNO3 H2SO4 NaOH HCL

COMMENTS:

MATRIX: AQ = Aqueous Nondrinking Water, Digested Metal FE = Low R.L.s, Aqueous Nondrinking Water, Digested Metals, DW = Drinking Water; SL = Soil, Sludge, Solid; FP = Free Produc

CONTAINER TYPES: AL = Amber Liter; AHL = 500 ml Amber; PT = Pint (Plastic); QT=Quart (Plastic); HG = Half Gallon (Plastic); SJ = Soil Jar; B4 = 4 oz. BACT; BT = Brass Tube, VOA = 40 mL VOA; OTC = Other Type Container

P [redacted] PR [redacted] M [redacted] F [redacted]

Appendix C

Well Sampling Protocol for First Quarter 2002

Appendix C – Well Sampling Protocol (First Quarter 2002)
City of Oakland Municipal Services Center

Well	Quarter				Gauge Every Qtr	DO (field meter)	TPHg/ BTEX/ MTBE* (8015B/ 8021)	TPH d/k/mo (8015B) silica gel**	VOC (8260)	SVOC (8270)	metals	Comments
	1	2	3	4								
MW-1	X				X	X	X	X				
MW-2	X				X	X	X	X				
MW-5	X				X	X	X	X				
MW-6					X	X	X	X				SPH present
MW-7	X				X	X	X	X				
MW-8	X				X	X	X	X				
MW-9	X				X	X	X	X				
MW-10	X				X	X	X	X				
MW-11	X				X	X	X	X				
MW-12	X				X	X	X	X				
MW-13	X				X	X	X	X				
MW-14	X				X	X	X	X				
MW-15	X				X	X	X	X				
MW-16					X	X	X	X				SPH present
MW-17	X				X	X	X	X				
MW-18	Developed to monitor a utility trench, not sampled to date											
TBW-1	X				Gauge thickness of separate-phase hydrocarbons							
TBW-3	X				Gauge thickness of separate-phase hydrocarbons							
TBW-4	X				Gauge thickness of separate-phase hydrocarbons							
TBW-5	X				Gauge thickness of separate-phase hydrocarbons							
TBW-6	X				Gauge thickness of separate-phase hydrocarbons							
Trip Blank	X				NA	NA	X					

DO = Dissolved Oxygen
* Positive results for MTBE will be confirmed by re-analysis using EPA Method 8260, except for MW-5
** Samples will be centrifuged prior to extraction to remove particulates if laboratory quality control analyses are acceptable for the three test samples. Prior to analysis, the laboratory will run the sample extracts through a silica gel column per EPA Method 3630C.
Wells MW-3 and MW-4 were destroyed during the first quarter 1999
Metals: antimony, arsenic, beryllium, cadmium, chromium, copper, lead, nickel, selenium, silver, thallium, and zinc