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All-America City
1993

CITY OF OAKLAND

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

Public Works Agency
Environmental Services

(510) 238-6688
FAX (510) 238-7286
TDD (510) 238-7644

July 17, 2002

JUL 23 2002

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

Subject: **First Quarter 2002 Monitoring Report -**
City of Oakland Municipal Service Center
7101 Edgewater Drive Oakland, California

Dear Mr. Chan:

Enclosed are copies of the *First Quarter 2002 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

RO 243

July 15, 2002

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

Subject: First Quarter 2002 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 first quarter 2002 groundwater monitoring report for the above-referenced site. Morgan Environmental Services performed the groundwater monitoring activities.

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: First Quarter 2002 Monitoring Report

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

FIRST QUARTER 2002 MONITORING REPORT

JUL 2 3 2002

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

July 15, 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

Donna Bodine

Donna Bodine
Principal Environmental Engineer

FIRST QUARTER 2002 MONITORING REPORT

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

July 15, 2002

INTRODUCTION

As required by the Alameda County Department of Environmental Health (ACDEH), Aquatus Environmental has prepared this first quarter 2002 groundwater monitoring report for the City of Oakland Municipal Services Center. Described below are the first quarter 2002 monitoring activities, monitoring results, contaminant distributions in groundwater, corrective action activities, conclusions, recommendations, and anticipated second quarter 2002 activities.

FIRST QUARTER 2002 MONITORING ACTIVITIES

Field Activities: On April 3, 2002, Morgan Environmental Services (Morgan) gauged and inspected site monitoring and tank pit backfill wells for separate-phase hydrocarbons (SPH) in accordance with the ACDEH-approved monitoring protocol shown in Table A. Morgan collected samples from the following wells on April 5, April 8 and April 9, 2002: MW-1, MW-2, MW-5, MW-7, MW-8, MW-9, MW-10, MW-11, MW-12, MW-13, MW-14, MW-15 and MW-17. Monitoring wells MW-6 and MW-16 were not sampled due to the presence of SPH. 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), and motor oil (TPHmo) by United States Environmental Protection Agency (USEPA) Method 8015B. A silica gel cleanup was performed for TPHd and TPHmo (USEPA Method 3630C).

- Benzene, toluene, ethylbenzene, total xylenes (BTEX) and methyl tertiary butyl ether (MTBE) by USEPA Method 8021.

Caltest Analytical Laboratory (Caltest), of Napa, CA, a California Department of Health Services-certified environmental laboratory, performed the chemical analyses. This quarter, Caltest inadvertently did not analyze the groundwater samples for TPH as kerosene, as is typically performed. Project requirements have been updated in the Caltest's project file to prevent future missed analyses.

In an effort to identify sound analytical protocols to remove solids from samples designated for TPH-extractables analysis (i.e., TPHd, TPHmo, TPH as kerosene), Caltest performed a benchscale test to evaluate how centrifuging three groundwater samples would affect the analytical results and the laboratory

quality control data. Samples from wells MW-9, MW-11 and MW-15 were used for the benchscale test. The rationale for selecting the samples for the test is discussed in the Fourth Quarter 2001 Groundwater Monitoring Report. In addition, a memorandum summarizing required field and laboratory procedures for the centrifuge tests is provided in Appendix B. Centrifuging the samples was investigated in an effort to reduce the turbidity of the groundwater samples because it was proposed that the solids were contributing to the TPH concentrations reported for the samples. Filtering the samples through 0.45-micron synthetic membrane filters was previously performed, and was discontinued because the associated quality control data were found to be unacceptable.

To conduct the centrifuge tests, samples were spilt into two 500-mL disposable glass amber bottles and centrifuged at 1,200 RPM for 20 minutes each. The samples were decanted, leaving solids in the bottle. Visual observations by the analyst indicated the centrifuge process removed most of the fine particulates from the samples. The decanted liquid was then extracted, run through a silica gel column, and analyzed for TPHd and TPHmo. For each sample, diesel, motor oil and ortho-terphenyl were added as matrix spikes or the surrogate compound to evaluate the accuracy of the analytical procedures. Aliquots of MW-9, MW-11 and MW-15 were also extracted, run through a silica gel column, and analyzed without centrifuging (i.e., standard procedures), for comparison to the centrifuge results.

Table A – 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

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 0.02 in the north to 0.027 in the southern 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 only observed in on-site monitoring well MW-6 (0.11 ft.). Historically, SPH has also been measured in off-site well MW-16, and on-site wells TBW-1, TBW-3,TBW-5 and TBW-6.

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 first quarter 2002 analytical results are summarized in Table 1. The laboratory analytical data reports are included as Appendix C. 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 367 micrograms per liter (µg/l) in offsite perimeter well MW-9. This concentration is higher than historic concentrations and above the acceptable risk thresholds for both the San Francisco Airport Ecological

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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.

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 concentration also exceeds 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]. The elevated concentrations in some of the wells may have been caused by the well redevelopments, which occurred in January and February 2002. The process of repeat surging and pumping may have mobilized oily deposits within the well casing and sand packing.

Benzene was also detected in MW-2 at 2.9 µg/l, MW-5 at 110 µg/l, and in MW-10 at 1.1 µg/l, and MW-11 at 8.9 µg/l. The concentrations are consistent with historic concentrations for these wells.

MTBE in Groundwater: MTBE was detected in MW-5 at 166 µg/L. MTBE was not detected above the reporting limit of 5 µg/l in any other samples this quarter. Historically MTBE has only been detected in wells MW-5 and MW-6. MW-6 was not sampled this quarter due to the presence of SPH.

TPHg in Groundwater: The maximum TPHg concentration detected was 8,000 µg/l in well MW-5. The highest concentration detected in an offsite perimeter well was 1,498 µg/l in well MW-9. This concentration is significantly higher than historic concentrations in MW-9, possibly due to the well redevelopment. In addition, the laboratory indicated the results for MW-9 do not match the laboratory gasoline standard, and were only quantified as being in the gasoline range. TPHg was also detected in well MW-1 at 2,000 µg/l , MW-11 at 330 µg/l, MW-12 at 180 µg/l, MW-14 at 250 µg/l, and MW-17 at 60 µg/l. The concentrations are generally consistent with historic data, however TPHg was detected for the first time in MW-17. (In addition, ethylbenzene was detected in MW-17 at 1.6 µg/l for the first time.)

The lab indicated for the following samples, that the results do not match the laboratory gasoline standard: MW-1, MW-5, MW-12 and MW-17. Except for MW-5, the TPHg concentrations are below the San

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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.

Francisco Airport Ecological Protection Zone Tier I Standard acceptable threshold of 3,700 µg/l.[6]

TPHd in Groundwater: Many TPHd concentrations were significantly lower than the concentrations reported last quarter, possibly due to well redevelopment. The maximum reported TPHd concentration during this quarter was 1,100 µg/L in well MW-1. 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 standard include offsite perimeter wells MW-9 (870 µg/l), MW-13 (900 µg/l), MW-14 (870 µg/l), and MW-15 (1,000 µg/l). The laboratory indicated that the results for all samples do not match the laboratory diesel standard, and represent only hydrocarbons in the diesel range. A discussion of the centrifuge bench scale test results for TPHd is provided in a subsequent section.

TPHmo in Groundwater: Most TPHmo concentrations were also significantly lower than concentrations reported last quarter. The highest TPHmo concentration was reported at 1,400 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 residual fuels.[8] The other wells with TPHmo concentrations above the Tier 1 standard include MW-1 (1,000 µg/l), and offsite perimeter wells MW-9 (1,000 µg/l), MW-13 (900 µg/l), MW-14 (1,100 µg/l), and MW-15 (1,400 µg/l). The laboratory indicated that the results for all samples do not match the laboratory motor oil standard, and represent only hydrocarbons in the motor oil range. A discussion of the centrifuge bench scale test results for TPHmo is provided in the following section.

Evaluation of Centrifuge Bench Scale Test Results

A comparison between TPHd and TPHmo sample results for MW-9, MW-11, MW-15 from the centrifuge and standard analyses is provided in Table B. The difference between individual paired results was evaluated by calculating the relative percent difference (RPD) between the results. The RPD is expressed as follows:

$$\text{RPD}\,(\%) = \frac{|\text{Standard Procedure Result} - \text{Centrifuge Result}|}{\frac{1}{2}(\text{Standard Procedure Result} + \text{Centrifuge Result})} \times 100\%$$

RPDs are used by the analytical laboratory to evaluate the analytical precision for duplicate results.

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[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.

[8] Ibid.

Therefore, paired standard procedure and centrifuge results that were within acceptable precision limits (25% used for this evaluation) are not considered to be significantly different.

Table B - Comparison Between Standard Procedure and Centrifuge Test Results- TPHd and TPHmo

Sample	Standard Procedure (µg/L)	Centrifuge (µg/L)	RPD
MW-11			
Diesel	160	150	6.5%
Motor Oil	< 200	< 200	--
MW-9			
Diesel	870	770	12.2%
Motor Oil	1,000	1,000	0.0%
MW-15			
Diesel	1,000	1,200	18.2%
Motor Oil	1,400	1,800	25.0%

Based on the RPDs (range 0% - 25%), there does not appear to be a real difference between the samples that were centrifuged and the samples analyzed under normal procedures. The greatest difference between standard procedure and centrifuge results was observed in sample MW-15. In this case, the centrifuge results were actually ***higher*** than the standard procedure results. The laboratory analyst indicated that a significant amount of solids were removed from all samples during the centrifuge process. Consequently, it does not appear that these solids were significantly contributing to the TPHd and TPHmo concentrations in the samples. Moreover, as discussed in more detail in the laboratory QA/QC section, the QC analyses for the centrifuge tests generally did not indicate acceptable analytical accuracy. Therefore, centrifuging is not recommended for the groundwater samples. Aquatus Environmental recommends that TPH-extractable samples are analyzed using standard procedures only, which includes a silica gel cleanup to remove polar hydrocarbons from the extract prior to analysis.

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]. The results of the QA/QC review are summarized below.

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

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) and LCS duplicate (LCSD) recoveries were reviewed to evaluate analytical accuracy. The recoveries for TPHd/mo analysis ranged from 75% to 82%. LCS recoveries for TPHg, BTEX and MTBE ranged from 88% to 124%. The LCS recoveries were within the laboratory control limits and indicate acceptable analytical accuracy.

LCS duplicate (LCSD) analyses were performed by the laboratory to evaluate analytical precision using RPDs. The RPD for TPHd/mo was 5.4%. The RPDs for TPHg, BTEX and MTBE ranged from 1% to 14%. The RPDs indicate acceptable analytical precision.

Matrix Spike Samples. Matrix Spikes (MSs) were performed for the centrifuge tests and standard procedures for samples used in the centrifuge tests only to evaluate the accuracy of the procedure as well as matrix effects. MS recoveries for TPHd ranged from 20% to 73%. The MS recovery for sample MW-15 was below the control limits of 34% to 136%. MS recoveries for TPHmo ranged from 0% and 40%. There are no established control limits for motor oil spikes, therefore, the diesel control limits were used for comparison. Recoveries for MW-15 for both the standard and centrifuge test were below the control limits.

Surrogates. Surrogate recoveries were reviewed to evaluate sample-specific accuracy. Surrogate recoveries for TPHd/mo standard analyses ranged from 83% to 120%. Surrogate recoveries for TPHg, BTEX and MTBE ranged from 82% to 101%. The surrogate recoveries were within laboratory control limits and indicate acceptable sample-specific accuracy.

Surrogate recoveries for the centrifuge tests ranged from 15% to 75%. The recoveries for MW-9 (30%) and MW-15 (16%) were below the control limits of 40% to 140%. In addition, surrogate recoveries for several centrifuge test matrix spike samples were below the laboratory control limits. The low recoveries would suggest a low bias to the analytical results. A summary of the spike recoveries for the centrifuge tests is provided below:

Sample	Standard	Centrifuge	Centrifuge Diesel spike conc = 1,000 µg/L	Centrifuge Motor oil spike conc = 2,000 µg/L
MW-11				
Surrogate	87%	48%	75%	NC**
Diesel	56%	--	57%	--
Motor Oil	--	--	--	NC**
MW-9				
Surrogate	85%	30%	57%	36%
Diesel	63%	--	73%	--
Motor Oil	40%	--	--	40%
MW-15				
Surrogate	92%	16%	29%	15%
Diesel	40%	--	20%	--
Motor Oil	20%	--	--	0%

**NC = Not Completed. Analysis was incomplete due to breakage of the sample container.
Control Limits:
Surrogate (o-terphenyl) = 40% - 140%
Diesel = 34% - 136%
Motor Oil = None established

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. In addition, some samples do exhibit a pattern resembling weathered diesel. A summary of the chromatogram interpretations is provided below, and sample chromatograms are included with the analytical data reports:

Evaluation of Chromatograms for TPH-Extractables First QTR 2002	
Sample I.D.	Chromatogram Interpretation
MW-1	Weathered diesel, weathered volatiles, possibly weathered motor oil
MW-10	Can't tell from small scale. Last QTR. was weathered motor oil
MW-11	Looks different from last quarter when detects were in the motor oil range. What's in the diesel range is probably gasoline.
MW-12	Weathered motor oil, cannot identify petroleum in diesel range.
MW-13	Can't tell due to small scale. Last QTR was weathered motor oil. Can barely see what's in the diesel range.
MW-14	Looks like weathered motor oil. Similar to last QTR, with more in the diesel range (but not diesel) .
MW-15	Looks like last QTR (weathered motor oil) possibly degrading into diesel range as it weathers.
MW-17	Looks like last QTR. Doesn't resemble weathered diesel or motor oil.
MW-2	Possibly weathered motor oil, uncertain about diesel range.
MW-5	Weathered diesel. Uncertain about motor oil range (lab standard is not imposed). Could possibly be weathered motor oil.
MW-7	Does not look like weathered diesel
MW-8	Maybe weathered diesel, or could be a light motor oil
MW-9	Looks like weathered motor oil (same as last QTR). Possibly weathered diesel in diesel range (or gasoline), but scale is too small to tell.

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 centrifuge results. Many surrogate, diesel and motor oil spike recoveries were below laboratory control limits, indicating a low bias to the analytical results and poor analytical accuracy when compared to standard procedures. As such, it is not recommended that samples are centrifuges prior to extraction and analysis. Only the results for standard procedures are reported in Table 1.

Corrective Action Activities

As previously discussed, all newly installed remediation wells and existing monitoring wells were redeveloped in January and February 2002 by repeat surging and pumping in an effort to reduce the turbidity of the groundwater samples.

The dual phase extraction (DPE) pilot test commenced at the site on May 13, 2002. Three groundwater storage units, each with a storage capacity of 21,000 gallons, were placed at free-product plumes B, C, and D to store effluent groundwater and free-product generated during the pilot tests. Effluent is discharged from the storage tank through two 2,000-pound (4,000 lbs. total) carbon chambers placed in series prior to discharge into the on-site storm water system. If deemed necessary, free-product will be skimmed directly from the storage tank and recycled to minimize carbon loading and prolong life of the carbon treatment vessels. Extracted vapors generated during the pilot test were treated through two 400-pound carbon vessels placed in series or by thermal oxidizer. Both NPDES water and BAAQMD air discharge permits were obtained for the site prior to DPE pilot test activities.

CONCLUSIONS AND RECOMMENDATIONS

Aquatus Environmental offers the following conclusions and recommendations regarding the 1st quarter 2002 analytical results:

- SPH was only observed in one well this quarter, MW-6. However, historically SPH has also been measured in off-site well MW-16, and on-site wells TBW-1, TBW-3,TBW-5 and TBW-6.

- The well redevelopment that occurred in January and February 2002 may have been responsible for various concentrations being significantly higher or lower than concentrations reported last quarter and/or historically and the reduction in free-product in wells.

- The TPHg concentration in MW-5 (8,000 µg/l) was above the San Francisco Airport Ecological Protection Zone Tier I Standard acceptable threshold of 3,700 µg/l for TPHg. In addition, TPHg was detected in MW-9 at a concentration much higher than historic concentrations, possibly due to the well redevelopment.

- The maximum benzene concentration detected this quarter was in MW-9 (367 µg/l), and was above the San Francisco Airport Ecological Protection Zone Tier I Standard (71 µg/l); the City of Oakland Risk-Based Tier I Standard for inhalation of indoor air vapors (110 µg/l); and acceptable risk

threshold ecological toxicity established by the USEPA (46 µg/l). The MW-9 result is significantly higher than historic concentrations. MTBE was only detected in well MW-5.

- Several TPHd and TPHmo concentrations are significantly lower than concentrations detected last quarter. However, several wells still have TPHd and/or TPHmo concentrations that are above the Ecological Protection Zone Tier I Standard of 640 µg/l for middle distillates and residual fuels.

- The results of the centrifuge tests indicated that the procedure, although removing a good deal of solids from the samples, did not significantly reduce the sample TPHd and TPHmo concentrations. Moreover, many of the quality control analyses for the centrifuge tests did not indicate acceptable analytical accuracy. Therefore, Aquatus Environmental recommends that only standard procedures are used for TPH-extractables analyses, which includes a silica get cleanup of the extracts prior to analysis.

- 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.

ANTICIPATED FIRST QUARTER 2002 ACTIVITIES

The City of Oakland's consultant will gauge, measure observed SPH, and collect groundwater samples from site wells in accordance with the protocol presented in Appendix D. Following field activities and laboratory analysis, the consultant will tabulate the analytical data and prepare the quarterly monitoring report.

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 – Memorandum Summarizing Requirements for Field and Laboratory Procedures for Centrifuge Tests
Appendix C - Laboratory Analytical Reports
Appendix D – Well Sampling Protocol for 2nd Quarter 2002

DATE:

Groundwater Elevation Contour Map and Hydrocarbon Concentrations 1st Quarter 2002

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
- ** — TPHmo result suspect due to TPHmo detected in blank sample

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)

0.010 — Approximate groundwater flow direction and gradient

Fence

3.0 — Groundwater elevation contour dashed where inferred

MW-4

MW-3

EDGEWATER DRIVE

DAMON SLOUGH

MW-2
4.45
<50
200
400
2.9

MW-10
4.08
<50
220
300
1.1

MW-1
6.27
2,000
1,100
1,000
320

TBW-6
6.98*
NS

TBW-5
NSV
SPH

TBW-1
NSV
SPH

MW-5
6.00
8,000
480
260
110

MW-11
6.13
330
160
<200
8.9

MW-7
5.34
<50
80
<200
<0.5

TBW-3
NSV
SPH

MW-6
4.06
SPH

MW-12
3.78
180
500
500
<0.5

MW-13
1.10
<50
440
900
<0.5

MW-14
3.47
250
870
1,100
<0.5

MW-9
3.27
1,498
870
1,000
367

MW-15
2.38
<50
1,000
1,400
<0.5

MW-16
NSV
SPH**

MW-17
0.10
60
590
880
<0.5

MW-8
2.67
<50
440
800
<0.5

911 Center
Admin.
Public Works Building
Crafts and Storage
Building No. 5
Active USTs
Former USTs
Former USTs
Former USTs
Storage
Above Ground Storage Tanks NGV Fueling Station
RW-1
TBW-2
TBW-4

4.0 5.0 6.0 3.0 2.0 1.0 1.0 2.0 3.0 2.0 1.0 2.0 1.0 6.0 5.0 4.0 3.0

0.02 0.007

0 75 150 300
Scale (ft)

SAN LEANDRO BAY

FIGURE
1

Municipal Service Center
7101 Edgewater Drive
Oakland, CA

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	—		—	—	—	—	—	—	—	—	—
4/9/2002	**10.05**	**3.78**	**6.27**	**8021**	**SGC**	**1,100**	**1,000**	**—**	**2,000**	**320**	**5.38**	**3.08**	**6.24**	**<5**
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	—		—	—	—	—	—	—	—	—	—
4/5/2002	**10.47**	**6.02**	**4.45**	**8021**	**SGC**	**200**	**400**	**—**	**<50**	**2.9**	**<0.5**	**<0.5**	**<0.5**	**<5**
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	—	—	—	—	—	—	—	—	—

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-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	---
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	---		---	---	---	---	---	---	---	---	---
4/9/2002	**11.15**	**5.15**	**6.00**	**8021**	**SGC**	**480**	**260**	**---**	**8,000**	**110**	**5.95**	**650**	**53.9**	**166**
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	---

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Sample ID/ Date	TOC Elev.	DTW	GW Elev.	BTEX Method	Notes	TPHd	TPHmo	TPHk	TPHg	Benzene	Toluene	Ethyl-benzene	Xylenes	MTBE
						←				µg/l				→
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	—
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	—	—	—	—	—	—	—	—	—
4/3/2002	**10.98**	**6.92**	**4.06**	—	**SPH: 0.11 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

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Sample ID/ Date	**TOC Elev.**	**DTW**	**GW Elev.**	**BTEX Method**	**Notes**	**TPHd**	**TPHmo**	**TPHk**	**TPHg**	**Benzene**	**Toluene**	**Ethyl-benzene**	**Xylenes**	**MTBE**
						← µg/l →								
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	—		—	—	—	—	—	—	—	—	—
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	—		—	—	—	—	—	—	—	—	—
4/8/2002	**11.51**	**6.17**	**5.34**	**8021**	**SGC**	**80**	**<200**	**—**	**<50**	**<0.5**	**0.5**	**0.60**	**<0.5**	<5
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
4/8/2002	**12.22**	**9.55**	**2.67**	**8021**	**SGC**	**440**	**800**	**—**	**<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

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 →								
8/24/1999	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
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
4/5/2002	**10.77**	**7.50**	**3.27**	**8021**	**SGC**	**870**	**1,000**	—	**1,498**	**367**	**11**	**2.1**	**7.8**	**<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
4/8/2002	**10.59**	**6.51**	**4.08**	**8021**	**SGC**	**220**	**300**	—	**<50**	**1.1**	**<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
4/5/2002	**11.60**	**5.47**	**6.13**	**8021**	**SGC**	**160**	**<200**	**—**	**330**	**8.9**	**2.0**	**6.9**	**8.7**	**<5**
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	8020	Filtered+SGC	200	B300	<100	160	<0.5	<0.5	<0.5	<0.5	<5
4/8/2002	**10.43**	**6.65**	**3.78**	**8021**	**SGC**	**500**	**500**	**—**	**180**	**<0.5**	**<0.5**	**0.7**	**<1.5**	**<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
4/8/2002	**11.34**	**10.24**	**1.10**	**8021**	**SGC**	**440**	**900**	**—**	**<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
4/9/2002	**10.05**	**6.58**	**3.47**	**8021**	**SGC**	**870**	**1,100**	**---**	**250**	**<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
4/5/2002	**12.36**	**9.58**	**2.78**	**8021**	**SGC**	**1,000**	**1,400**	**---**	**<50**	**<0.5**	**<0.5**	**<0.5**	**2.3**	**<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	---	---	---	---	---	---	---	---	---
4/3/2002	**13.57**	**12.88**	**0.69**	**---**		**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**

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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
4/9/2002	**9.86**	**9.76**	**0.10**	**8021**	**SGC**	**590**	**880**	**---**	**60**	**<0.5**	**<0.5**	**1.6**	**<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	---	---	---	---	---	---	---	---	---
4/3/2002	**---**	**6.14**	**---**	**---**	**SPH: None**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**	**---**
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

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				→
5/17/2001	9.92	2.47	7.45	---		---	---	---	---	---	---	---	---	---
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	---	---	---	---	---	---	---	---	---
4/3/2002	---	**1.5**	---	---	**SPH: None**	---	---	---	---	---	---	---	---	---
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	---	---	---	---	---	---	---	---	---
4/3/2002	**Well has active remediation unit/recovery**													
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	---		---	---	---	---	---	---	---	---	---
4/3/2002	**9.49**	**2.51**	**6.98**	---		---	---	---	---	---	---	---	---	---

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
4/5/2002	—	—	—	**8021**	**Trip Blank 1**	—	—	—	**<50**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<5**
4/5/2002	—	—	—	**8021**	**Trip Blank 2**	—	—	—	**<50**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<5**

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 EPA Method 8015B

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

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

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

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

SOLINSI INVESTIGATES 122

MORGAN ENVIRONMENTAL SERVICES

OAKLAND MUNICIPAL SERVICE CENTER: 7101 EDGEWATER DRIVE
WELL DEPTH MEASUREMENTS

Well ID	Time	Product Depth	Water Depth	Product Thickness	Well Depth	Comments
TBW-1	1755	NONE	6.14	NONE	10.07	Plume C
TBW-3	1555	NONE	1.5	NONE	10.50	Plume A
TBW-5	WELL	HAS ACTIVE	REMEDIATION	UNIT /	RECOVERY	Plume D
TBW-6	1000	NONE	2.51	NONE	12.01	
MW-1	1150	NONE	3.78	NONE	15.6	
MW-2	1115	NONE	6.02	NONE	15.5	
MW-5	1345	NONE	5.15	NONE	14.3	
MW-6	1300	NONE	6.92	0.11	14.29	Plume B
MW-7	1340	NONE	6.17	NONE	14.27	
MW-8	1020	NONE	9.55	NONE	15.15	
MW-9	1000	NONE	7.5	NONE	14.84	
MW-10	9:38	NONE	6.51	NONE	15.2	
MW-11	1350	NONE	5.47	NONE	19.45	
MW-12	1225	NONE	6.65	NONE	14.72	
MW-13	947	NONE	10.24	NONE	20.36	
MW-14	955	NONE	6.58	NONE	14.7	
MW-15	1010	NONE	9.58	NONE	20.5	
MW-16	1030	NONE	12.88	NONE	14.18	Plume B
MW-17	1015	NONE	9.76	NONE	18.15	
MW-18	1530	NONE	6.34	NONE	12.01	
	1550	NONE	1.43	NON	9.70	

Measured By: I. STREIR / H. UNTZ

Date: 3 APRIL 2002

WATER SAMPLE LOG

Project Name: Oakland Municipal Service Center
Project Number: 1737
Well Number: MW-1
Well Location: 7101 Edgewater Drive, Oakland, CA 94621

Date: 4/9/2007
Sampler: J. SEIK
Weather: 56° CLOUDY

Well Construction

Date Completed: N/A
Total Depth of Well: 15.60
Diameter: 2"

Sampling Equipment & Cleaning

Sampler Type: TEFLON BAILER
Method of Cleaning: LIQUI-NOX / DI H2O / HEXANE
Pump/Bailer Type: TEFLON BAILER
Method of Cleaning: LIQUI-NOX / DI H2O / HEXANE
pH Meter: YSI 6920
Conductivity Meter: YSI 6920
Comments: MULTI PARAMETER WATER QUALITY METER pH, TEMP, DO, TURBIDITY

Ground Water Levels:

Initial: 3.53
Final: 14.7
Reference Point: TOP OF CASING
Well Volume of Water: 1.93

SAMPLING MEASUREMENTS

Time	Discharge (gal.) Per Time Period	Discharge (gal.) Cumulative	pH	Temp °C	Spec. Conductance (mmhos/cm) Field	Spec. Conductance (mmhos/cm) Dissolved Oxygen	Color/ Turbidity (NTU)	Odor
1300	start	0	6.05	17.62		10.29	YELLOW	SLIGHT
1330	STOP	3.8					137.0	NIL
WELL	FOAMING & NOT							
RECHARGING								

SAMPLE ANALYSIS

Sample ID	Date	Time	Analysis	Container	Preservative	Comments
MW-1	4/9/07	1415		VOA	HCL	3 EA
MW-1	4/9/07	1415		AMBER LITER	NONE	2 EA

Total Discharge: 3.8 GALLONS
Casing Volumes Removed:
Method of Disposal: PUMPED ONSITE

Comments: HIGH TIDE, WELL NOT RECHARGING

MORGAN *Environmental Services*	WATER SAMPLE LOG		
	OAKLAND MUNICIPAL SERVICE CENTER		
	Project No.	Date	Well
	1737		

WATER SAMPLE LOG

Project Name: Oakland Municipal Service Center
Project Number: 1332
Well Number: MW-2
Well Location: 7101 Edgewater Drive, Oakland, CA 94621

Date: 4/5/02
Sampler: J. CREIR
Weather: 58° MISTY

Well Construction

Date Completed: N/A
Total Depth of Well: 15.50
Diameter: 2"

Sampling Equipment & Cleaning

Sampler Type: TEFLON BAILER
Method of Cleaning: LIQUI-NOX/DI H2O/HEXANE
Pump/Bailer Type: TEFLON BAILER
Method of Cleaning: LIQUI-NOX/DI H2O/HEXANE
pH Meter: YSI 6920
Conductivity Meter: YSI 6920
Comments: MULTI PARAMETER WATER QUALITY METER pH, TEMP, DO, TURBIDITY

Ground Water Levels:

Initial: 6.05
Final: 6.25
Reference Point: TOP OF CASING
Well Volume of Water: 1.5

SAMPLING MEASUREMENTS

Time	Discharge (gal.) Per Time Period	Discharge (gal.) Cumulative	pH	Temp °C	Spec. Conductance (mmhos/cm) Field	Spec. Conductance (mmhos/cm) Dissolved Oxygen	Color/ Turbidity (NTU)	Odor
1325	start	0	5.86	18.2		6.98	BROWN/690	NONE
1335	STOP	15.2						

SAMPLE ANALYSIS

Sample ID	Date	Time	Analysis	Container	Preservative	Comments
MW-2	4/5/02	1345		VOA	HCL	3 EA
MW-2	4/5/02	1345		AMBER	NONE	2 EA
				OTHER		

Total Discharge: 15.2
Casing Volumes Removed: 10
Method of Disposal: DRUMED ONSITE

Comments:

MORGAN Environmental Services	WATER SAMPLE LOG		
	OAKLAND MUNICIPAL SERVICE CENTER		
	Project No.	Date	Well
	1332		

spread\MW-8 (MSC)

WATER SAMPLE LOG

Project Name: Oakland Municipal Service Center
Project Number: 1232
Well Number: MW-5
Well Location: 7101 Edgewater Drive, Oakland, CA 94621

Date: 4/9/02
Sampler: J. SAEIR
Weather: 55° CLOUDY

Well Construction

Date Completed: N/A
Total Depth of Well: 14.50
Diameter: 2"

Sampling Equipment & Cleaning

Sampler Type: TEFLON BAILER
Method of Cleaning: LIQUI-NOX / DI H2O / HEXANE
Pump/Bailer Type: TEFLON BAILER
Method of Cleaning: LIQUI-NOX / DI H2O / HEXANE
pH Meter: YSI 6920
Conductivity Meter: YSI 6920
Comments: MULTI PARAMETER WATER QUALITY METER pH, TEMP, DO, TURBIDITY

Ground Water Levels:

Initial: 5.30
Final: 5.73
Reference Point: TOP OF CASING
Well Volume of Water: 1.44

SAMPLING MEASUREMENTS

Time	Discharge (gal.) Per Time Period	Discharge (gal.) Cumulative	pH	Temp °C	Spec. Conductance (mmhos/cm) Field	Spec. Conductance (mmhos/cm) Dissolved Oxygen	Color/ Turbidity (NTU)	Odor
1435	start	0	6.19	16.89		10.11	YELLOW / 78.8 GRAY	NONE
1440	STOP	14.4						

SAMPLE ANALYSIS

Sample ID	Date	Time	Analysis	Container	Preservative	Comments
MW-5	4/9/02	1455		VOA	HCL	3 EA
MW-5	4/9/02	1455		AMBER LITER	NONE	2 EA

Total Discharge: 14.4
Casing Volumes Removed: 10
Method of Disposal: DRUMED ONSITE

Comments:

MORGAN Environmental Services	WATER SAMPLE LOG		
	OAKLAND MUNICIPAL SERVICE CENTER		
	Project No.	Date	Well
	1232		

WATER SAMPLE LOG

Project Name: Oakland Municipal Service Center
Project Number: 1737
Well Number: MW-7
Well Location: 7101 Edgewater Drive, Oakland, CA 94621

Date: 4/9/02
Sampler: J. SEIK
Weather: 53° OVERCAST

Well Construction

Date Completed: N/A
Total Depth of Well: 14.27
Diameter: 2"

Sampling Equipment & Cleaning

Sampler Type: TEFLON BAILER
Method of Cleaning: LIQUI-NOX / DI H2O / HEXANE
Pump/Bailer Type: TEFLON BAILER
Method of Cleaning: LIQUI-NOX / DI H2O / HEXANE
pH Meter: YSI 6920
Conductivity Meter: YSI 6920
Comments: MULTI PARAMETER WATER QUALITY METER pH, TEMP, DO, TURBIDITY

Ground Water Levels:

Initial: 6.28
Final: 6.91
Reference Point: TOP OF CASING
Well Volume of Water: 1.27

SAMPLING MEASUREMENTS

Time	Discharge (gal.) Per Time Period	Discharge (gal.) Cumulative	pH	Temp °C	Spec. Conductance (mmhos/cm) Field	Spec. Conductance (mmhos/cm) Dissolved Oxygen	Color/ Turbidity (NTU)	Odor
0920	start	0	5.81	17.47		4.10	BROWN / 1544	NONE
0930		5.5						
0940		7.9						
0950		10						
10:05		12.6						

SAMPLE ANALYSIS

Sample ID	Date	Time	Analysis	Container	Preservative	Comments
MW-7	4/9/02	10:15		VOA	HCL	3 EA
MW-7	4/9/02	10:16		AMBER LITER	NONE	2 EA

Total Discharge: 12.7 GAL
Casing Volumes Removed: 10
Method of Disposal: POURED ONSITE

Comments: TURBIDITY FOULED O2 PROBE

MORGAN Environmental Services	WATER SAMPLE LOG		
	OAKLAND MUNICIPAL SERVICE CENTER		
	Project No.	Date	Well
	1737		

spread\MW-8 (MSC)

WATER SAMPLE LOG

Project Name: Oakland Municipal Service Center
Project Number: 1237
Well Number: MW-8
Well Location: 7101 Edgewater Drive, Oakland, CA 94621

Date: 4/9/02
Sampler: J. SEIK
Weather: 48° CLOUDY

Well Construction

Date Completed: N/A
Total Depth of Well: 15.15
Diameter: 2"

Sampling Equipment & Cleaning

Sampler Type: TEFLON BAILER
Method of Cleaning: LIQUI-NOX / DI H2O / HEXANE
Pump/Bailer Type: TEFLON BAILER
Method of Cleaning: LIQUI-NOX / DI H2O / HEXANE
pH Meter: YSI 6920
Conductivity Meter: YSI 6920
Comments: MULTI PARAMETER WATER QUALITY METER pH, TEMP, DO, TURBIDITY

Ground Water Levels:

Initial: 9.70
Final: 12.95
Reference Point: TOP OF CASING
Well Volume of Water: .87

SAMPLING MEASUREMENTS

Time	Discharge (gal.) Per Time Period	Discharge (gal.) Cumulative	pH	Temp °C	Spec. Conductance (mmhos/cm) Field	Spec. Conductance (mmhos/cm) Dissolved Oxygen	Color/ Turbidity (NTU)	Odor
1120	start	0	6.35	16.19		7.35	YELLOW / 225	NONE
1130		3.5						
1150		5.0						
1210		6.0						
1230		8.7						

SAMPLE ANALYSIS

Sample ID	Date	Time	Analysis	Container	Preservative	Comments
MW-8	4/9/02			VOA	HCL	3 EA
MW-8	4/9/02			AMBER	NONE	2 EA
				OTHER		

Total Discharge: 8.7
Casing Volumes Removed: 10
Method of Disposal: DRUMMED ONSITE

Comments:

MORGAN Environmental Services	WATER SAMPLE LOG		
	OAKLAND MUNICIPAL SERVICE CENTER		
	Project No.	Date	Well
	1237		

WATER SAMPLE LOG

Project Name: Oakland Municipal Service Center
Project Number: 1737
Well Number: MW-9
Well Location: 7101 Edgewater Drive, Oakland, CA 94621

Date: 4/5/02
Sampler: J. CREIK
Weather: 59° OVERCAST

Well Construction

Date Completed: N/A
Total Depth of Well: 14.00
Diameter: 2"

Sampling Equipment & Cleaning

Sampler Type: TEFLON BAILER
Method of Cleaning: LIQUI-NOX / DI H2O / HEXANE
Pump/Bailer Type: TEFLON BAILER
Method of Cleaning: LIQUI-NOX / DI H2O / HEXANE
pH Meter: YSI 6920
Conductivity Meter: YSI 6920
Comments: MULTI PARAMETER WATER QUALITY METER pH, TEMP, DO, TURBIDITY

Ground Water Levels:

Initial: 7.14
Final: 9.58
Reference Point: TOP OF CASING
Well Volume of Water: 1.09

SAMPLING MEASUREMENTS

Time	Discharge (gal.) Per Time Period	Discharge (gal.) Cumulative	pH	Temp °C	Spec. Conductance (mmhos/cm) Field	Spec. Conductance (mmhos/cm) Dissolved Oxygen	Color/ Turbidity (NTU)	Odor
1042	start	0	6.50	17.29		42.0	BROWN/409.2	SULFUR
1050		2						
1056		5.48						

SAMPLE ANALYSIS

Sample ID	Date	Time	Analysis	Container	Preservative	Comments
MW-9	4/5/02	1105		VOA	HCL	3 EA
MW-9	4/5/02	1105		AMBER	NONE	5 EA
				LITER		

Total Discharge: 5.48
Casing Volumes Removed: 5
Method of Disposal: GROUND ONSITE

Comments:

MORGAN Environmental Services	WATER SAMPLE LOG		
	OAKLAND MUNICIPAL SERVICE CENTER		
	Project No.	Date	Well
	1737		

spread\MW-8 (MSC)

WATER SAMPLE LOG

Project Name: Oakland Municipal Service Center
Project Number: 1737
Well Number: MW-10
Well Location: 7101 Edgewater Drive, Oakland, CA 94621

Date: 4/8/02
Sampler: L.M./E.R.
Weather: 50° CLOUDY

Well Construction

Date Completed: N/A
Total Depth of Well: 19.85
Diameter: 2"

Sampling Equipment & Cleaning

Sampler Type: TEFLON BAILER
Method of Cleaning: LIQUI-NOX DI H2O/HEXANE
Pump/Bailer Type: TEFLON BAILER
Method of Cleaning: LIQUI-NOX DI H2O/HEXANE
pH Meter: YSI 6920
Conductivity Meter: YSI 6920
Comments: MULTI PARAMETER WATER QUALITY METER pH, TEMP, DO, TURBIDITY

Ground Water Levels:

Initial: 6.61
Final: 7.34
Reference Point: TOP OF CASING
Well Volume of Water: 1.33

SAMPLING MEASUREMENTS

Time	Discharge (gal.) Per Time Period	Discharge (gal.) Cumulative	pH	Temp °C	Spec. Conductance (mmhos/cm) Field	Spec. Conductance (mmhos/cm) Dissolved Oxygen	Color/ Turbidity (NTU)	Odor
1031	start	0	6.25	16.04		3.85	BLACK / 1315.1	SULFUR
1035		5.5						
1045		10						
1053		13.3						

SAMPLE ANALYSIS

Sample ID	Date	Time	Analysis	Container	Preservative	Comments
MW-10	4/8/02	11:05		VOA	HCL	3 EA
MW-10	4/8/02	11:05		AMBER	NONE	2 EA
				OTHER		

Total Discharge: 13.3
Casing Volumes Removed: 10
Method of Disposal: DRUMED ONSITE

Comments: WATER BLACK

MORGAN Environmental Services	WATER SAMPLE LOG		
	OAKLAND MUNICIPAL SERVICE CENTER		
	Project No.	Date	Well
	1737		

spread\MW-8 (MSC)

WATER SAMPLE LOG

Project Name: Oakland Municipal Service Center
Project Number: 1737
Well Number: MW-11
Well Location: 7101 Edgewater Drive, Oakland, CA 94621

Date: 4/5/02
Sampler: J. SEIR
Weather: 68° OVERCAST

Well Construction

Date Completed: N/A
Total Depth of Well: 19.45
Diameter: 2"

Sampling Equipment & Cleaning

Sampler Type: TEFLON BAILER
Method of Cleaning: LIQUI-NOX / DI H2O / HEXANE
Pump/Bailer Type: TEFLON BAILER
Method of Cleaning: LIQUI-NOX / DI H2O / HEXANE
pH Meter: YSI 6920
Conductivity Meter: YSI 6920
Comments: MULTI PARAMETER WATER QUALITY METER pH, TEMP, DO, TURBIDITY

Ground Water Levels:

Initial: 5.55
Final: 7.67
Reference Point: TOP OF CASING
Well Volume of Water: 2.22

SAMPLING MEASUREMENTS

Time	Discharge (gal.) Per Time Period	Discharge (gal.) Cumulative	pH	Temp °C	Spec. Conductance (mmhos/cm) Field	Spec. Conductance (mmhos/cm) Dissolved Oxygen	Color/ Turbidity (NTU)	Odor
0900	start	0	6.11	17.44		74.1	CLEAR/69.1	SLIGHT
0905		11.12						

SAMPLE ANALYSIS

Sample ID	Date	Time	Analysis	Container	Preservative	Comments
MW-11	4/5/02			VOA	HCL	3 EA
MW-11	4/5/02			AMBER	NONE	5 EA
				LITER		

Total Discharge: 11.12
Casing Volumes Removed: 5
Method of Disposal: DRUMED ONSITE

Comments: WATER HIGH MARK

MORGAN Environmental Services	WATER SAMPLE LOG		
	OAKLAND MUNICIPAL SERVICE CENTER		
	Project No.	Date	Well
	1737		

WATER SAMPLE LOG

Project Name: Oakland Municipal Service Center
Project Number: 1737
Well Number: MW-12
Well Location: 7101 Edgewater Drive, Oakland, CA 94621

Date: 4/8/02
Sampler: J. BEAR
Weather: 58° CLOUDY

Well Construction

Date Completed: N/A
Total Depth of Well: 14.75
Diameter: 2"

Sampling Equipment & Cleaning

Sampler Type: TEFLON BAILER
Method of Cleaning: LIQUI-NOX / DI H2O / HEXANE
Pump/Bailer Type: TEFLON BAILER
Method of Cleaning: LIQUI-NOX / DI H2O / HEXANE
pH Meter: YSI 6920
Conductivity Meter: YSI 6920
Comments: MULTI PARAMETER WATER QUALITY METER pH, TEMP, DO, TURBIDITY

Ground Water Levels:

Initial: 6.19
Final: 6.71
Reference Point: TOP OF CASING
Well Volume of Water: 13.6

SAMPLING MEASUREMENTS

Time	Discharge (gal.) Per Time Period	Discharge (gal.) Cumulative	pH	Temp °C	Spec. Conductance (mmhos/cm) Field	Spec. Conductance (mmhos/cm) Dissolved Oxygen	Color/ Turbidity (NTU)	Odor
1303	start	0	6.5	17.4		3.24	SILT/BLACK	NONE
1307		13.6						

SAMPLE ANALYSIS

Sample ID	Date	Time	Analysis	Container	Preservative	Comments
MW-12	4/8/02	1315		VOA	HCL	3 EA
MW-12	4/8/02	1315		AMBER LITER	NONE	2 EA

Total Discharge: 13.6
Casing Volumes Removed: 10
Method of Disposal: GROUND ONSITE

Comments: TURBIDITY TO HIGH TO READ ACCURATELY

MORGAN Environmental Services	WATER SAMPLE LOG		
	OAKLAND MUNICIPAL SERVICE CENTER		
	Project No.	Date	Well
	1737		

spread\MW-8 (MSC)

WATER SAMPLE LOG

Project Name: Oakland Municipal Service Center
Project Number: 1737
Well Number: MW-13
Well Location: 7101 Edgewater Drive, Oakland, CA 94621

Date: 4/18/02
Sampler: J. SEIK
Weather: 60° PARTY CLOUDY

Well Construction

Date Completed: N/A
Total Depth of Well: 20.05
Diameter: 2"

Sampling Equipment & Cleaning

Sampler Type: TEFLON BAILER
Method of Cleaning: LIQUI-NOX / DI H2O / HEXANE
Pump/Bailer Type: TEFLON BAILER
Method of Cleaning: LIQUI-NOX / DI H2O / HEXANE
pH Meter: YSI 6920
Conductivity Meter: YSI 6920
Comments: MULTI PARAMETER WATER QUALITY METER pH, TEMP, DO, TURBIDITY

Ground Water Levels:

Initial: 10.21
Final: 12.04
Reference Point: TOP OF CASING
Well Volume of Water: 1.57

SAMPLING MEASUREMENTS

Time	Discharge (gal.) Per Time Period	Discharge (gal.) Cumulative	pH	Temp °C	Spec. Conductance (mmhos/cm) Field	Spec. Conductance (mmhos/cm) Dissolved Oxygen	Color/ Turbidity (NTU)	Odor
1500	start	0	6.32	17.95		5.61	BROWN/HEAVY	
1510		4.1						
1520		7.5						
1530		10.0						
1540		12.0						

SAMPLE ANALYSIS

Sample ID	Date	Time	Analysis	Container	Preservative	Comments
MW-13	4/18/02	1610		VOA	HCL	3 EA
MW-13	4/18/02	1610		AMBER LITER	NONE	2 EA

Total Discharge: 15.7
Casing Volumes Removed: 10
Method of Disposal: DRUMED ONSITE

Comments: 1530 14.5
1535 15.7

MORGAN *Environmental Services*	WATER SAMPLE LOG		
	OAKLAND MUNICIPAL SERVICE CENTER		
	Project No.	Date	Well
	1737		

WATER SAMPLE LOG

Project Name: Oakland Municipal Service Center
Project Number: 1258
Well Number: MW-14
Well Location: 7101 Edgewater Drive, Oakland, CA 94621

Date: 4/9/02
Sampler: L. JOE JR
Weather: 55° MISTY

Well Construction

Date Completed: N/A
Total Depth of Well: 14.7
Diameter: 2"

Sampling Equipment & Cleaning

Sampler Type: TEFLON BAILER
Method of Cleaning: LIQUI-NOX / DI H2O / HEXANE
Pump/Bailer Type: TEFLON BAILER
Method of Cleaning: LIQUI-NOX / DI H2O / HEXANE
pH Meter: YSI 6820
Conductivity Meter: YSI 6820
Comments: MULTI PARAMETER WATER QUALITY METER pH, TEMP, DO, TURBIDITY

Ground Water Levels:

Initial: 6.68
Final: 7.07
Reference Point: TOP OF CASING
Well Volume of Water: 1.28

SAMPLING MEASUREMENTS

Time	Discharge (gal.) Per Time Period	Discharge (gal.) Cumulative	pH	Temp °C	Spec. Conductance (mmhos/cm) Field	Spec. Conductance (mmhos/cm) Dissolved Oxygen	Color/ Turbidity (NTU)	Odor
1100	start	0	6.82	17.32		17.10	DARK / 739.2	SULFIDE
1105		12.8						

SAMPLE ANALYSIS

Sample ID	Date	Time	Analysis	Container	Preservative	Comments
MW-14	4/9/02	1110		VOA	HCL	3 EA
MW-14	4/9/02	1110		AMBER LITER	NONE	2 EA

Total Discharge: 12.8
Casing Volumes Removed: 10
Method of Disposal: DRUMED ONSITE

Comments:

MORGAN Environmental Services	WATER SAMPLE LOG		
	OAKLAND MUNICIPAL SERVICE CENTER		
	Project No.	Date	Well
	1258		

WATER SAMPLE LOG

Project Name: Oakland Municipal Service Center
Project Number: 1737
Well Number: MW-15
Well Location: 7101 Edgewater Drive, Oakland, CA 94621

Date: 4/5/02
Sampler: J. SEIR
Weather: 63° MOSTLY CLOUDY

Well Construction

Date Completed: N/A
Total Depth of Well: 20.25
Diameter: 2"

Sampling Equipment & Cleaning

Sampler Type: TEFLON BAILER
Method of Cleaning: LIQUI-NOX / DI H2O / HEXANE
Pump/Bailer Type: TEFLON BAILER
Method of Cleaning: LIQUI-NOX / DI H2O / HEXANE
pH Meter: YSI 6820
Conductivity Meter: YSI 6820
Comments: MULTI PARAMETER WATER QUALITY METER pH, TEMP, DO, TURBIDITY

Ground Water Levels:

Initial: 9.91
Final: 9.80
Reference Point: TOP OF CASING
Well Volume of Water: 1.63

SAMPLING MEASUREMENTS

Time	Discharge (gal.) Per Time Period	Discharge (gal.) Cumulative	pH	Temp °C	Spec. Conductance (mmhos/cm) Field	Spec. Conductance (mmhos/cm) Dissolved Oxygen	Color/ Turbidity (NTU)	Odor
1135	start	0	6.7	20.8		5.55	BLACK / HEAD	SULFUR
1140		4.1						
1144		8.19						

SAMPLE ANALYSIS

Sample ID	Date	Time	Analysis	Container	Preservative	Comments
MW-15	4/5/02	1201		VOA	HCL	3 EA
MW-15	4/5/02	1201		AMBER LITER	NONE	5 EA

Total Discharge: 8.19
Casing Volumes Removed: 5
Method of Disposal: DRUMED ONSITE

Comments: TURBIDITY WOULD NOT STABILIZE

MORGAN
Environmental Services

WATER SAMPLE LOG
OAKLAND MUNICIPAL SERVICE CENTER

Project No.	Date	Well
1737		

WATER SAMPLE LOG

Project Name: Oakland Municipal Service Center
Project Number: 1737
Well Number: MW-17
Well Location: 7101 Edgewater Drive, Oakland, CA 94621

Date: 4/9/02
Sampler: J. REIK
Weather: 50° MISTY

Well Construction

Date Completed: N/A
Total Depth of Well: 18.00
Diameter: 2"

Sampling Equipment & Cleaning

Sampler Type: TEFLON BAILER
Method of Cleaning: LIQUI-NOX (DI H2O) HEXANE
Pump/Bailer Type: TEFLON BAILER
Method of Cleaning: LIQUI-NOX (DI H2O) HEXANE
pH Meter: YSI 6820
Conductivity Meter: YSI 6820
Comments: MULTI PARAMETER WATER QUALITY METER pH, TEMP, DO, TURBIDITY

Ground Water Levels:

Initial: 8.09
Final: 7.86
Reference Point: TOP OF CASING
Well Volume of Water: 1.58

SAMPLING MEASUREMENTS

Time	Discharge (gal.) Per Time Period	Discharge (gal.) Cumulative	pH	Temp °C	Spec. Conductance (mmhos/cm) Field	Spec. Conductance (mmhos/cm) Dissolved Oxygen	Color/ Turbidity (NTU)	Odor
1020	start	0	6.47	16.53		24.23	CLEAR/169.3	SLIGHT
1023		15.8						

SAMPLE ANALYSIS

Sample ID	Date	Time	Analysis	Container	Preservative	Comments
MW-17	4/9/02	1050		VOA	HCL	3 EA
MW-17	4/9/02	1030		AMBER	NONE	2 EA
				CLEAR		

Total Discharge: 15.8
Casing Volumes Removed: 10
Method of Disposal: DRUMED ONSITE

Comments:

MORGAN
Environmental Services

WATER SAMPLE LOG
OAKLAND MUNICIPAL SERVICE CENTER

Project No.	Date	Well
1737		

spread\MW-S (MSC)

Appendix B

Memorandum Summarizing Field and Laboratory Requirements for Centrifuge Tests

Aquatus Environmental **Memorandum**

Date:	March 22, 2002
To:	Tom Morgan (Morgan Environmental Services), Bill Svoboda (Caltest Analytical Laboratory)
Cc:	Joseph Cotton (City of Oakland), Xinggang Tong (URS)
From:	Donna Bodine (Aquatus Environmental) DB
Subject:	City of Oakland Municipal Services Center 1st QTR 02 Groundwater Monitoring, Centrifuge Tests (TPH Extractables), Requirements for Field and Laboratory Procedures

This quarter, Caltest will investigate a method to remove particulates from groundwater samples before running total petroleum hydrocarbon (TPH)-extractable analyses (diesel/motor oil/kerosene). The samples will be centrifuged before extraction and analysis to reduce sample turbidity. 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). The objective is to evaluate if centrifuging the samples reduces turbidity effectively, and if the procedure can be performed within acceptable quality control limits. Groundwater samples representing different concentration ranges have been selected to evaluate matrix effects.

This memorandum summarizes field and laboratory procedures, scheduling and deliverables required to perform and evaluate the centrifuge tests. The Field Procedures section also includes other QC requirements for the quarterly monitoring.

Field Procedures

TPH-gasoline/BTEX/MTBE (EPA Method 8015B/8021B):

- One set (3 40-mL VOAs) of Trip Blanks should be placed in each cooler containing VOAs. If more than one cooler is used for VOAs, label each set of Trip Blanks sequentially. You may need to augment the sample ID already on the labels. Include each Trip Blank (Trip Blank 1, Trip Blank 2, etc.) on the chain-of-custody form.

TPH-Extractables (EPA Method 8015B)

- Centrifuge Tests- Table 1 provides the volumes required from each well selected for the tests. If sampling occurs over a two-day period, sample MW-9, MW-11 and MW-15 on the first day. Arrange for sample pickup by the next morning at the latest. A same-day pickup is best because the laboratory will need to turn around results quickly.
- Other Wells- Caltest requested that 2 liters of sample are collected from each well. This is a 1-L increase from last quarter. Collect 2 liters of sample from each of the following wells: MW-1, MW-2, MW-5, MW-7, MW-8, MW-10, MW-12, MW-13, MW-14, and MW-17.

Table 1

Monitoring Wells	Rationale for Selecting Sample (Concentration range is relative)	Total Sample Volume Required per Well	Rationale for Sample Volume
MW-11	Low concentration 4th QTR 01 concentrations: diesel 200 ug/L, motor oil 300 ug/L	5 1-L Glass Amber Bottles	• 2 L – Normal extraction and analysis (no centrifuge) • 1 L – Centrifuge, no spike • 1 L – Centrifuge, spike with diesel and ortho-terphenyl (surrogate) • 1 L – Centrifuge, spike with motor oil and ortho-terphenyl (surrogate)
MW-9	Moderate concentration 4th QTR 01 concentrations: diesel 1,400 ug/L, motor oil 4,100 ug/L		
MW-15	High concentration 4th QTR 01 concentrations: diesel 3,800 ug/L, motor oil 15,000 ug/L		

Laboratory Procedures

Caltest will perform the following procedures for the centrifuge test:

- Four TPH-extractable analyses will be performed for each sample (see Table 1):
  1. Normal extraction and analysis (no centrifuge). Spike the sample with the surrogate and perform a LCS/LCSD with the batch.
  2. Centrifuge, extraction/analysis, no spikes (to obtain the sample concentration)
  3. Centrifuge, extraction/analysis, spike with diesel and o-terphenyl (spike before centrifuge)
  4. Centrifuge, extraction/analysis, spike with motor oil and o-terphenyl (spike before centrifuge)
- Spikes will be added to each sample in appropriate concentrations to evaluate analytical accuracy. See Table 1 for last quarter's sample concentrations.
- Samples will be centrifuged in disposable glass amber bottles.
- The capacity of the centrifuge is 500 mL. Therefore, Caltest will centrifuge the 1-L samples in 2 500-mL aliquots. The aliquots will be recombined before sample extraction.
- Caltest will perform a LCS/LCSD for each analytical batch. In addition, Caltest will spike the LSC/LSCDs with the surrogate.

Laboratory Schedule and Deliverable Requirements

- The prescribed holding time for TPH-extractables requires extraction within 14 days of sample collection. As such, decisions about the data need to be made quickly, so as not to exceed the holding time for the ten additional groundwater samples.
- Bill Svoboda will fax the sample results and quality control data to Donna Bodine and Joseph Cotton.

- If the quality control results for the centrifuge tests are acceptable, Caltest will centrifuge, extract and analyze the remaining 10 groundwater samples within holding time. If the quality control results are not acceptable, the remaining 10 samples will not be centrifuged prior to extraction.
- Caltest will summarize the centrifuge test methods (e.g., apparatus, centrifuge time) in the case narrative that is submitted with the final laboratory report. The final laboratory report has a standard turn around time.

Other Scheduling and Communication

- The tentative dates for sampling are March 25, 2002 or March 26, 2002. Tom will confirm the sampling schedule with Donna. Donna will notify Bill if the schedule changes.
- Tom will let Donna know if he wants her to schedule the sample pickup(s). Or he will let her know when the pickup has been scheduled.
- Tom or Joseph will notify Donna if any deviations have been made to the field procedures.
- Bill will notify Donna if any deviations have been made to the laboratory protocols and schedule provided in this memorandum.

Appendix C

Laboratory Analytical Reports

May 29, 2002

CASE NARRATIVE for Lab order # C040219

On April 5, 2002 Caltest received 4 samples for analyses. Analyses included gasoline (purgeable hydrocarbons) and BTEX and MTBE. Samples were also analyzed for extractable hydrocarbons; this includes diesel and motor oil; however, the instrument was not calibrated for kerosene quantification at the time of these analyses.

Samples –1, -2, -3, -4 were all extracted and analyzed per standard extraction protocol. Surrogate results for all samples were within acceptable ranges.

Samples –5, -6, -7 had surrogates added to the samples and then were split into two bottles and centrifuged*. With an acceptable range of 50-130%, none of these samples had surrogate recoveries with in laboratory control limits; the results of these samples were similar to the comparable samples that had not been centrifuged.

Samples –9, -10, -11 had surrogates and 1000ppb of diesel added to the samples and then were split into two bottles and centrifuged*. The surrogate and the spiked diesel recoveries were within lab control limits for samples MW-11 and MW-9.

Samples –13, -14, -15 had surrogates and 2000ppb of motor oil added to the samples and then were split into two bottles and centrifuged*. The percent recovery for the surrogates were outside lab control limits for all three samples; Caltest does not have any established control limits for motor oil.

*Centrifuge Method:
Samples were injected with their spike and surrogates and shaken to homogenize the sample. The sample was split into two 500ml glass bottles and centrifuged at 1200RPM for 20 min. The samples were decanted, leaving the solids in the bottle. The liquid portion was measured, extracted, concentrated and analyzed. The results reported are from the liquid portion only. No analyses or measurements of the solids were performed.

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

NELAP Certification 01103CA

ELAP Certification 1664

Caltest
ANALYTICAL LABORATORY
ENVIRONMENTAL ANALYSES

LAB ORDER No.: C040219
(Amended) Page 1 of 11

REPORT of ANALYTICAL RESULTS

Report Date: 23 MAY 2002
Received Date: 05 APR 2002

Client:
City Of Oakland
250 Frank Ogawa Plaza Suite 5301
Oakland, CA 94612

Project: OAKLAND MUNI SERVICE CENTER

Sampled by: J. SPEAR

Lab Number	Sample Identification	Matrix	Sampled Date/Time
C040219-1	MW-11	AQUEOUS	05 APR 02 09:20
C040219-2	MW-9	AQUEOUS	05 APR 02 11:05
C040219-3	MW-15	AQUEOUS	05 APR 02 12:01
C040219-4	MW-2	AQUEOUS	05 APR 02 13:45
C040219-5	MW-11	AQUEOUS	05 APR 02 09:20
C040219-6	MW-9	AQUEOUS	05 APR 02 11:05
C040219-7	MW-15	AQUEOUS	05 APR 02 12:01
C040219-9	MW-11	AQUEOUS	05 APR 02 09:20
C040219-10	MW-9	AQUEOUS	05 APR 02 11:05
C040219-11	MW-15	AQUEOUS	05 APR 02 12:01
C040219-13	MW-11	AQUEOUS	05 APR 02 09:20
C040219-14	MW-9	AQUEOUS	05 APR 02 11:05
C040219-15	MW-15	AQUEOUS	05 APR 02 12:01
C040219-17	TRIP BLANK 2	AQUEOUS	05 APR 02
C040219-18	TRIP BLANK 1	AQUEOUS	05 APR 02

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.).
'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 (Amended)

LAB ORDER No.: C040219

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: C040219-1							
SAMPLE ID: MW-11							
SAMPLED: 05 APR 02 09:20 -NORMAL EXTRACTION (DB)							
METHOD: EPA 8015M							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1	04.15.02	T020098TPH	1,2
Diesel Fuel	ND	50.	ug/L				
TPH-Extractable, quantitated as diesel	160.	50.	ug/L				
Motor Oil	ND	200.	ug/L				
TPH-Extractable, quantitated as Motor Oil	ND	200.	ug/L				
Surrogate o-Terphenyl	87.		%				
LAB NUMBER: C040219-1 (continued)							
SAMPLE ID: MW-11							
SAMPLED: 05 APR 02 09:20							
METHOD: EPA 8015/8020A							
AROMATIC HYDROCARBONS AND TOTAL PURGEABLE PETROLEUM HYDROCARBONS				1	04.16.02	V020028G9A	3
Total Petroleum Hydrocarbons - Gasoline	330.	50.	ug/L				
TPH-Purgeable, quantitated as gasoline	ND	50.	ug/L				
Benzene	8.9	0.5	ug/L				
Toluene	2.0	0.5	ug/L				
Ethylbenzene	6.9	0.5	ug/L				
Xylenes (Total)	8.7	0.5	ug/L				
Methyl tert-Butyl Ether (MTBE)	ND	5.	ug/L				
Surrogate 4-Bromofluorobenzene [FID]	97.		%				
Surrogate 4-Bromofluorobenzene [PID]	99.		%				

1) Sample Preparation on 04-09-02 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) Sample Preparation on 04-16-02 using EPA 5030

ORGANIC ANALYTICAL RESULTS (Amended)

LAB ORDER No.: C040219

LAB NUMBER: C040219-2
SAMPLE ID: MW-9 NORMAL EXTRACTION (DB)
SAMPLED: 05 APR 02 11:05
METHOD: EPA 8015M

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1	04.15.02	T020098TPH	1,2,3
Diesel Fuel	ND	50.	ug/L				
TPH-Extractable, quantitated as diesel	870.	50.	ug/L				
Motor Oil	ND	200.	ug/L				
TPH-Extractable, quantitated as Motor Oil	1000.	200.	ug/L				
Surrogate o-Terphenyl	85.		%				

LAB NUMBER: C040219-2 (continued)
SAMPLE ID: MW-9
SAMPLED: 05 APR 02 11:05
METHOD: EPA 8015/8020A

AROMATIC HYDROCARBONS AND TOTAL PURGEABLE PETROLEUM HYDROCARBONS					04.16.02	V020028G9A	4,5,6
Total Petroleum Hydrocarbons - Gasoline	ND	250.	ug/L	5			
TPH-Purgeable, quantitated as gasoline	1498.	250.	ug/L	5			
Benzene	367.	10.	ug/L	20			
Toluene	11.	0.5	ug/L	1			
Ethylbenzene	2.1	0.5	ug/L	1			
Xylenes (Total)	7.8	0.5	ug/L	1			
Methyl tert-Butyl Ether (MTBE)	ND	5.	ug/L	1			
Surrogate 4-Bromofluorobenzene [FID]	99.		%	1			
Surrogate 4-Bromofluorobenzene [PID]	99.		%	1			

1) Sample Preparation on 04-09-02 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 04-16-02 using EPA 5030
5) Sample diluted to bring concentration of target analyte(s) within the working range of the instrument, resulting in increased reporting limits.
6) An unidentified petroleum hydrocarbon was present in the sample. An approximate concentration has been calculated based on gasoline standards.

ORGANIC ANALYTICAL RESULTS (Amended)

LAB ORDER No.: C040219

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: C040219-3 NORMAL EXTRACTION (DB)							
SAMPLE ID: MW-15							
SAMPLED: 05 APR 02 12:01							
METHOD: EPA 8015M							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1	04.15.02	T020098TPH	1,2,3
Diesel Fuel	ND	50.	ug/L				
TPH-Extractable, quantitated as diesel	1000.	50.	ug/L				
Motor Oil	ND	200.	ug/L				
TPH-Extractable, quantitated as Motor Oil	1400.	200.	ug/L				
Surrogate o-Terphenyl	92.		%				
LAB NUMBER: C040219-3 (continued)							
SAMPLE ID: MW-15							
SAMPLED: 05 APR 02 12:01							
METHOD: EPA 8015/8020A							
AROMATIC HYDROCARBONS AND TOTAL PURGEABLE PETROLEUM HYDROCARBONS				1	04.17.02	V020028G9A	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)	2.3	0.5	ug/L				
Methyl tert-Butyl Ether (MTBE)	ND	5.	ug/L				
Surrogate 4-Bromofluorobenzene [FID]	96.		%				
Surrogate 4-Bromofluorobenzene [PID]	95.		%				

1) Sample Preparation on 04-09-02 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 04-16-02 using EPA 5030

ORGANIC ANALYTICAL RESULTS (Amended)

LAB ORDER No.: C040219

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: C040219-4 NORMAL EXTRACTION (DB)							
SAMPLE ID: MW-2							
SAMPLED: 05 APR 02 13:45							
METHOD: EPA 8015M							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1	04.15.02	T020098TPH	1,2,3
Diesel Fuel	ND	50.	ug/L				
TPH-Extractable, quantitated as diesel	200.	50.	ug/L				
Motor Oil	ND	200.	ug/L				
TPH-Extractable, quantitated as Motor Oil	400.	200.	ug/L				
Surrogate o-Terphenyl	83.		%				
LAB NUMBER: C040219-4 (continued)							
SAMPLE ID: MW-2							
SAMPLED: 05 APR 02 13:45							
METHOD: EPA 8015/8020A							
AROMATIC HYDROCARBONS AND TOTAL PURGEABLE PETROLEUM HYDROCARBONS				1	04.16.02	V020028G9A	4
Total Petroleum Hydrocarbons - Gasoline	ND	50.	ug/L				
TPH-Purgeable, quantitated as gasoline	ND	50.	ug/L				
Benzene	2.9	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]	91.		%				
Surrogate 4-Bromofluorobenzene [PID]	92.		%				

1) Sample Preparation on 04-09-02 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 04-16-02 using EPA 5030

ORGANIC ANALYTICAL RESULTS (Amended)

LAB ORDER No.: C040219

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: C040219-5							
SAMPLE ID: MW-11							
SAMPLED: 05 APR 02 09:20							
METHOD: EPA 8015M							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1	04.15.02	T020098TPH	1,2
Diesel Fuel	ND	50.	ug/L				
TPH-Extractable, quantitated as diesel	150.	50.	ug/L				
Motor Oil	ND	200.	ug/L				
TPH-Extractable, quantitated as Motor Oil	ND	200.	ug/L				
Surrogate o-Terphenyl	48.		%				
LAB NUMBER: C040219-6							
SAMPLE ID: MW-9							
SAMPLED: 05 APR 02 11:05							
METHOD: EPA 8015M							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1	04.15.02	T020098TPH	1,2,3
Diesel Fuel	ND	50.	ug/L				
TPH-Extractable, quantitated as diesel	770.	50.	ug/L				
Motor Oil	ND	200.	ug/L				
TPH-Extractable, quantitated as Motor Oil	1000.	200.	ug/L				
Surrogate o-Terphenyl	30.		%				

1) Sample Preparation on 04-09-02 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.

ORGANIC ANALYTICAL RESULTS (Amended)

LAB ORDER No.: C040219

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: C040219-7							
SAMPLE ID: MW-15							
SAMPLED: 05 APR 02 12:01							
METHOD: EPA 8015M							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1	04.15.02	T020098TPH	1,2,3,4
Diesel Fuel	ND	50.	ug/L				
TPH-Extractable, quantitated as diesel	1200.	100.	ug/L				
Motor Oil	ND	200.	ug/L				
TPH-Extractable, quantitated as Motor Oil	1800.	400.	ug/L				
Surrogate o-Terphenyl	6.		%				
LAB NUMBER: C040219-9							
SAMPLE ID: MW-11							
SAMPLED: 05 APR 02 09:20							
METHOD: EPA 8015M							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1	04.16.02	T020098TPH	1,2,3
Diesel Fuel	ND	50.	ug/L				
TPH-Extractable, quantitated as diesel	720.	50.	ug/L				
Motor Oil	ND	200.	ug/L				
TPH-Extractable, quantitated as Motor Oil	300.	200.	ug/L				
Surrogate o-Terphenyl	75.		%				

1) Sample Preparation on 04-09-02 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 volumes altered in prep in an effort to reduce matrix effects resulting in (a) higher reporting limit(s).

ORGANIC ANALYTICAL RESULTS (Amended)

LAB ORDER No.: C040219

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: C040219-10							
SAMPLE ID: MW-9							
SAMPLED: 05 APR 02 11:05							
METHOD: EPA 8015M							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1	04.16.02	T020098TPH	1,2,3
Diesel Fuel	ND	50.	ug/L				
TPH-Extractable, quantitated as diesel	1500.	50.	ug/L				
Motor Oil	ND	200.	ug/L				
TPH-Extractable, quantitated as Motor Oil	1500.	200.	ug/L				
Surrogate o-Terphenyl	57.		%				
LAB NUMBER: C040219-11							
SAMPLE ID: MW-15							
SAMPLED: 05 APR 02 12:01							
METHOD: EPA 8015M							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1	04.16.02	T020098TPH	1,2,3
Diesel Fuel	ND	50.	ug/L				
TPH-Extractable, quantitated as diesel	1400.	50.	ug/L				
Motor Oil	ND	200.	ug/L				
TPH-Extractable, quantitated as Motor Oil	1800.	200.	ug/L				
Surrogate o-Terphenyl	29.		%				

1) Sample Preparation on 04-09-02 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.

ORGANIC ANALYTICAL RESULTS (Amended)

LAB ORDER No.: C040219

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: C040219-13							
SAMPLE ID: MW-11							
SAMPLED: 05 APR 02 09:20							
METHOD: EPA 8015M							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1	04.16.02	T020098TPH	1,2
Diesel Fuel	ND	50.	ug/L				
TPH-Extractable, quantitated as diesel	ND	100.	ug/L				
Motor Oil	ND	200.	ug/L				
TPH-Extractable, quantitated as Motor Oil	ND	400.	ug/L				
Surrogate o-Terphenyl	16.		%				
LAB NUMBER: C040219-14							
SAMPLE ID: MW-9							
SAMPLED: 05 APR 02 11:05							
METHOD: EPA 8015M							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1	04.16.02	T020098TPH	1,3,4
Diesel Fuel	ND	50.	ug/L				
TPH-Extractable, quantitated as diesel	1000.	50.	ug/L				
Motor Oil	ND	200.	ug/L				
TPH-Extractable, quantitated as Motor Oil	1500.	200.	ug/L				
Surrogate o-Terphenyl	36.		%				

1) Sample Preparation on 04-09-02 using EPA 3510
2) Sample volumes altered in prep in an effort to reduce matrix effects resulting in (a) higher reporting limit(s).
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 (Amended)

LAB ORDER No.: C040219

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: C040219-15							
SAMPLE ID: MW-15							
SAMPLED: 05 APR 02 12:01							
METHOD: EPA 8015M							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1	04.16.02	T020098TPH	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	1800.	200.	ug/L				
Surrogate o-Terphenyl	15.		%				
LAB NUMBER: C040219-17							
SAMPLE ID: TRIP BLANK 2							
SAMPLED: 05 APR 02							
METHOD: EPA 8015/8020A							
AROMATIC HYDROCARBONS AND TOTAL PURGEABLE PETROLEUM HYDROCARBONS				1	04.17.02	V020028G9A	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]	85.		%				
Surrogate 4-Bromofluorobenzene [PID]	87.		%				
LAB NUMBER: C040219-18							
SAMPLE ID: TRIP BLANK 1							
SAMPLED: 05 APR 02							
METHOD: EPA 8015/8020A							
AROMATIC HYDROCARBONS AND TOTAL PURGEABLE PETROLEUM HYDROCARBONS				1	04.17.02	V020028G9A	4
Total Petroleum Hydrocarbons - Gasoline	ND	50.	ug/L				

1) Sample Preparation on 04-09-02 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.

ORGANIC ANALYTICAL RESULTS (Amended)

LAB ORDER No.: C040219

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: C040219-18 (continued)							
SAMPLE ID: TRIP BLANK 1							
SAMPLED: 05 APR 02							
METHOD: EPA 8015/8020A							
AROMATIC HYDROCARBONS AND TOTAL PURGEABLE PETROLEUM HYDROCARBONS (continued)				1	04.17.02	V020028G9A	
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]	86.		%				
Surrogate 4-Bromofluorobenzene [PID]	85.		%				

... notes continued from prior page ...
4) Sample Preparation on 04-16-02 using EPA 5030

LAB ORDER No.: C040219

SUPPLEMENTAL QUALITY CONTROL (QC) DATA REPORT

Report Date: 23 MAY 2002
Received Date: 05 APR 2002

Client:
City Of Oakland
250 Frank Ogawa Plaza Suite 5301
Oakland, CA 94612

Project: OAKLAND MUNI SERVICE CENTER

QC Batch ID	Method	Matrix
T020098TPH	8015M	AQUEOUS
V020028G9A	8015/8020A	AQUEOUS

William Svoboda
Project Manager

CAHorn
Christine Horn
Laboratory Director

LAB ORDER No.: C040219

METHOD BLANK ANALYTICAL RESULTS

ANALYTE	RESULT	R.L.	UNITS	ANALYZED	NOTES
QC BATCH: T020098TPH					
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				04.15.02	
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	86.		%		
QC BATCH: V020028G9A					
AROMATIC HYDROCARBONS AND TOTAL PURGEABLE PETROLEUM HYDROCARBONS				04.16.02	
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]	86.		%		
Surrogate 4-Bromofluorobenzene [PID]	87.		%		

LAB ORDER No.: C040219

LABORATORY CONTROL SAMPLE ANALYTICAL RESULTS

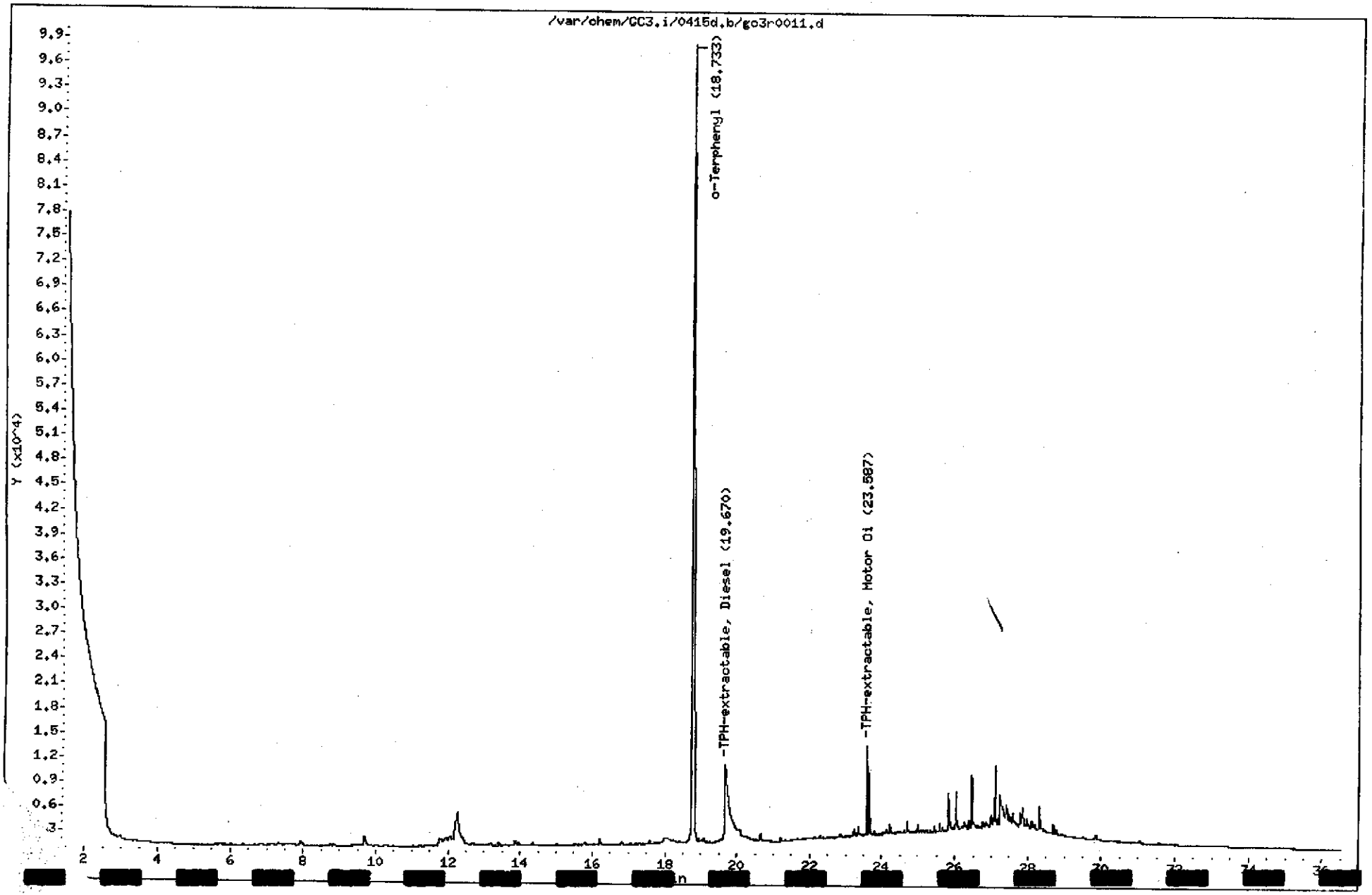
ANALYTE	SPIKE AMOUNT	SPIKE\DUP RESULT	SPK\DUP %REC	ACCEPTANCE %REC \RPD	REL% DIFF	ANALYZED	NOTES
QC BATCH: T020098TPH							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS						04.15.02	
Diesel Fuel	1000	766.\817.	77\82	36-102\32	6.4		
Surrogate o-Terphenyl	100	85.9\91.1	86\91	50-150\			
QC BATCH: V020028G9A							
AROMATIC HYDROCARBONS AND TOTAL PURGEABLE PETROLEUM HYDROCARBONS						04.16.02	
Total Petroleum Hydrocarbons - Gasoline	550.	615.\590.	112\107	50-130\	4.1		
Benzene	6.4	7.17\6.99	112\109	50-130\	2.5		
Toluene	38.6	43.6\40.7	113\105	50-130\	6.9		
Ethylbenzene	9.2	11.4\10.6	124\115	50-130\	7.3		
Xylenes (Total)	46.2	53.1\49.2	115\106	49-129\	7.6		
Surrogate 4-Bromofluorobenzene [FID]	10.0	8.95\8.82	90\88	50-130\			
Surrogate 4-Bromofluorobenzene [PID]	10.0	10.9\10.4	109\104	50-130\			

MW-2 Normal Extraction

Data File: /var/chem/GC3.i/0415d.b/go3r0011.d
Date : 15-APR-2002 21:23
Client ID:
Sample Info: C040219-4:;1X
Volume Injected (uL): 1000.0
Column phase: HXT-1

Instrument: GC3.i

Operator: MDT
Column diameter: 0.53

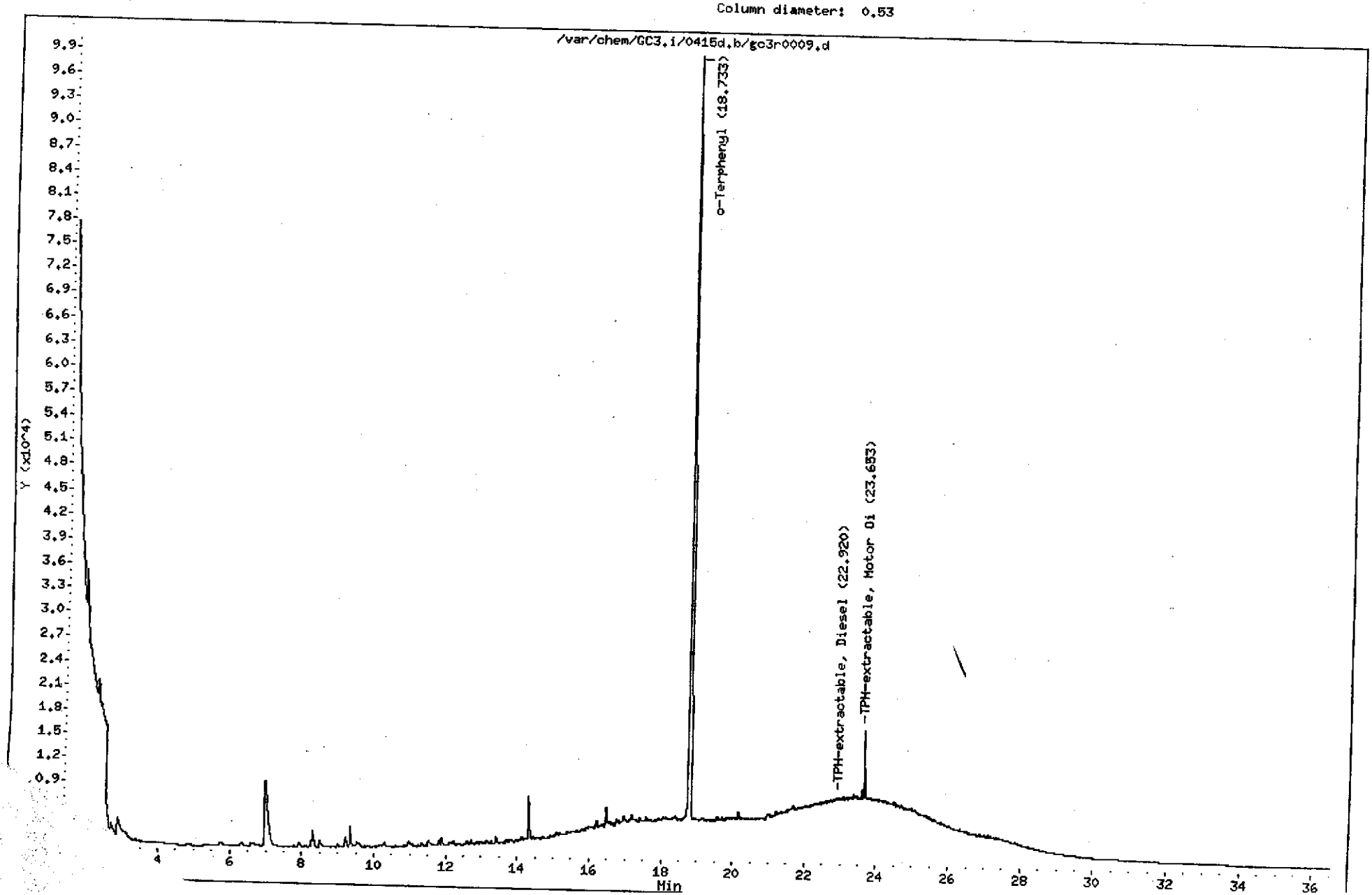


MW-9 Normal extraction

Data File: /var/chem/GC3.i/0415d.b/go3r0009.d
Date : 15-APR-2002 19:50
Client ID:
Sample Info: C040219-2;;1X
Volume Injected (uL): 1000.0
Column phase: MXT-1

Instrument: GC3.i

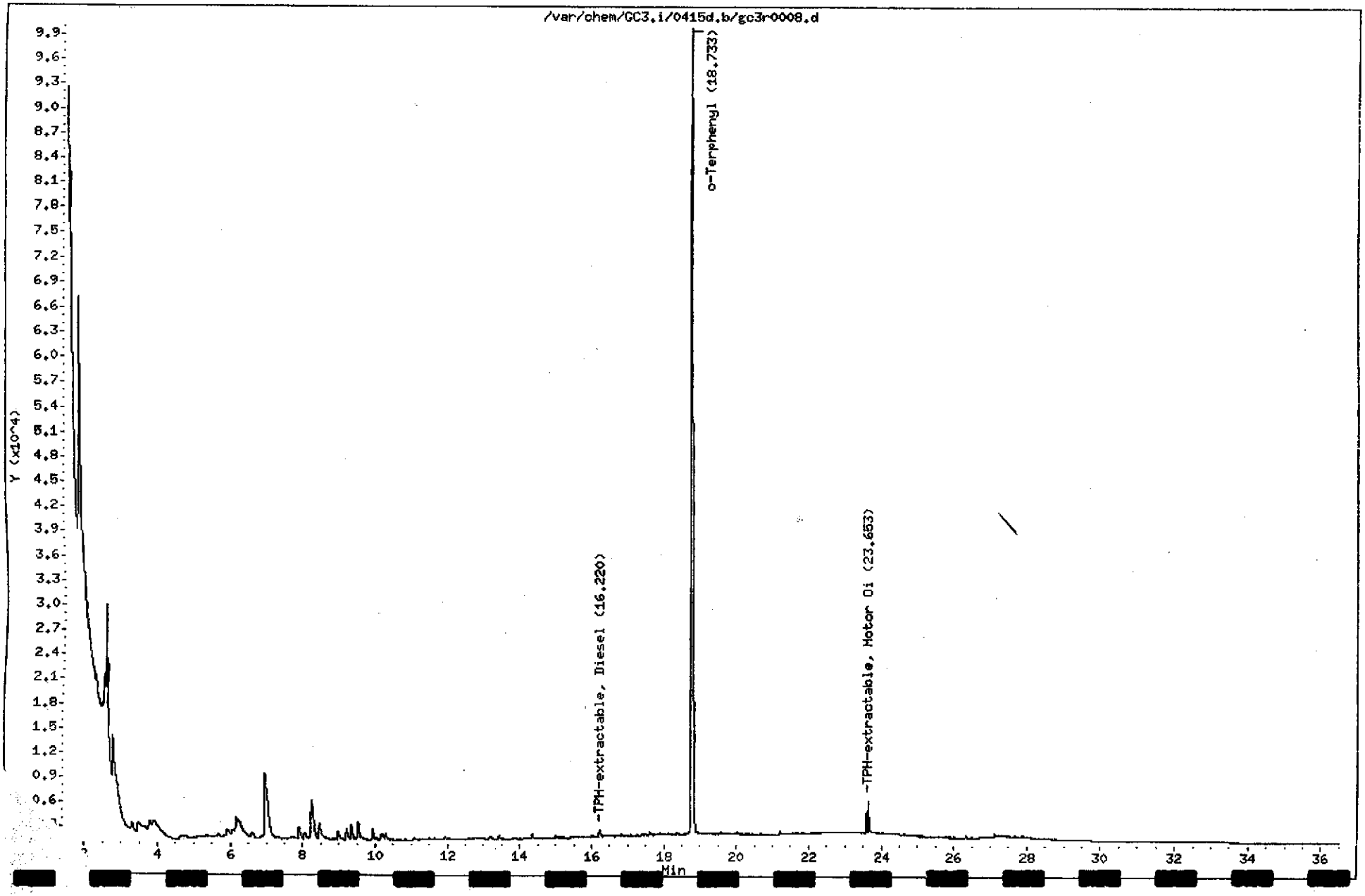
Operator: MDT
Column diameter: 0.53



MW-11 normal extraction

Data File: /var/chem/GC3.i/0415d.b/go3r0008.d
Date : 15-APR-2002 19:04
Client ID:
Sample Info: C040219-1;;1X
Volume Injected (uL): 970.0
Column phase: MXT-1

Instrument: GC3.i
Operator: MDT
Column diameter: 0.53

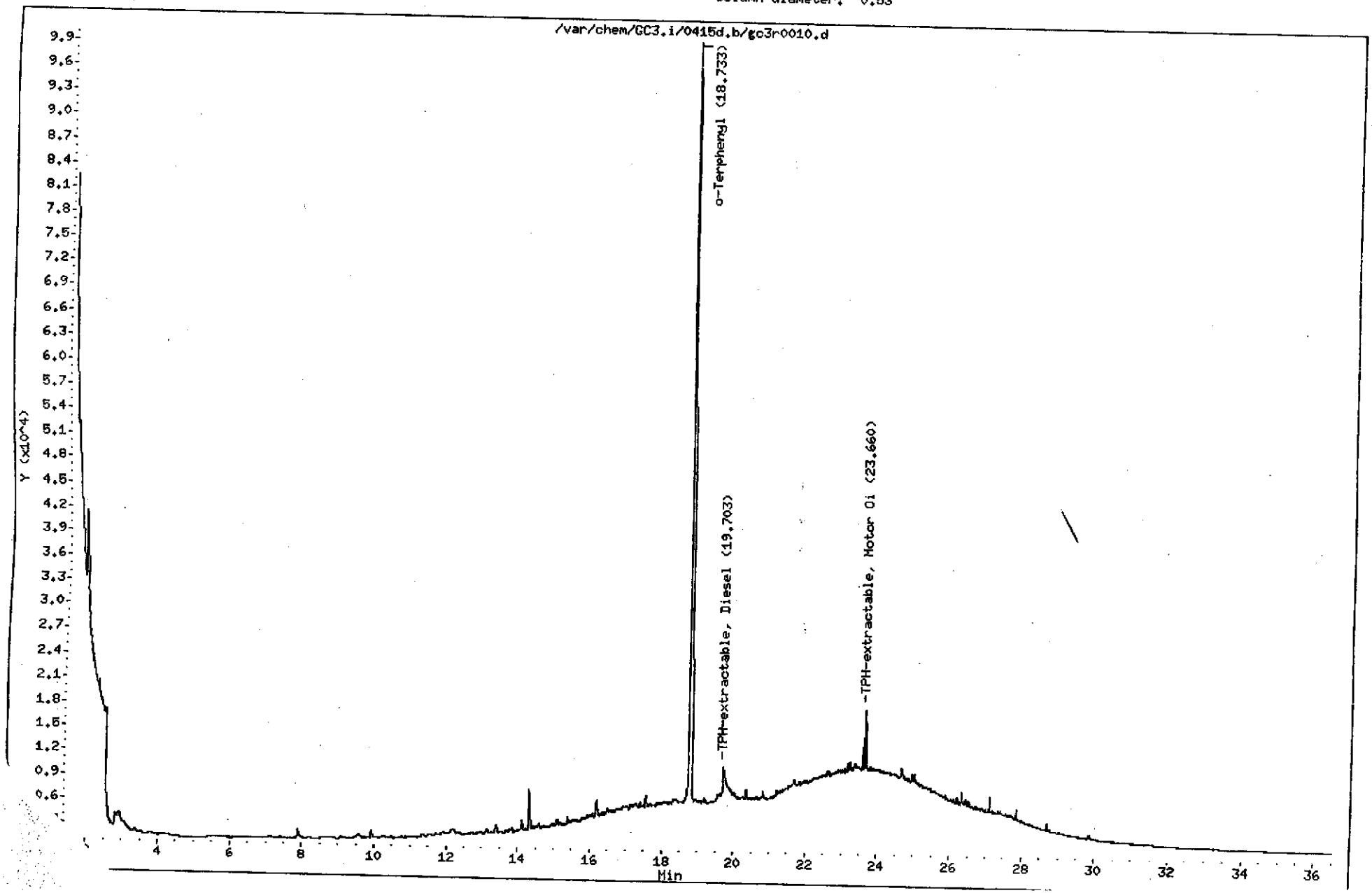


MW-15 Normal Extraction

Data File: /var/chem/GC3.i/0415d.b/gc3r0010.d
Date : 15-APR-2002 20:37
Client ID:
Sample Info: C040219-3;;1X
Volume Injected (uL): 1000.0
Column phase: MXT-1

Instrument: GC3.i

Operator: MDT
Column diameter: 0.53



Caltest ANALYTICAL LABORATORY

1885 N. KELLY ROAD • NAPA, CA 94558 • (707) 258-4000 • Fax (707) 226-1001 • www.caltestlab.com

SAMPLE CHAIN OF CUSTODY

PAGE 1 OF 2

LAB ORDER #: 0040719

PROJECT #/ PROJECT NAME: OAKLAND MUNI SERVICE CENTER

P.O. #:

REPORT TO:

CLIENT: CITY OF OAKLAND

ADDRESS: 250 FRANK OGAWA PLAZA SUITE 5301 CITY: STATE: CA ZIP: 94612

BILLING ADDRESS: SAME

PHONE #: 510-261-0154 FAX PHONE: 510-261-0140

SAMPLER (PRINT & SIGN NAME): J. SPEIR

ANALYSES REQUESTED: TPH-EXTRACT 8015, TPH-G, BTEX, MTBE

TURN-AROUND TIME: ☐ STANDARD ☐ RUSH

DUE DATE:

CALTEST #	DATE SAMPLED	TIME SAMPLED	MATRIX	CONTAINER AMOUNT/TYPE	PRESERVATIVE	SAMPLE IDENTIFICATION SITE	CLIENT LAB #	COMP. or GRAB	TPH-EXTRACT 8015	TPH-G, BTEX, MTBE	REMARKS
1	4/5/02	0920	WATER	AMBER LITERS	NONE	MW-11		GRAB	X		5 ONE LITER BOTTLES
↓	4/5/02	0920	H2O	VOA/3	HCL	MW-11 *		GRAB		X	3 VOAS w/ HCL
2	4/5/02	1105	H2O	AMBER LITER/5	NONE	MW-9		GRAB	X		5 ONE LITER BOTTLES
↓	4/5/02	1105	H2O	VOA/3	HCL	MW-9 *		GRAB		X	3 VOAS w/ HCL
-18				VOA/3	HCL	TRIP BLANKS 1					TRIP BLANK

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
J. SPEIR	4/5/02 1505			4/5/02 1715	

Samples: WC____ MICRO____ BIO____ AA____ SV____ VOA____ pH? Y/N TEMP: 4.0 SEALED: Y/N INTACT: Y/N

BD: BIO____ WC____ AA____

CC: AA____ SV____ VOA____

SIL: HP____ PT____ QT____ VOA____

W/HNO3____ H2SO4____ NaOH____

PIL: HNO3____ H2SO4____ NaOH____ HCL____

FOR LAB USE ONLY

COMMENTS: * 1 VOA void w/ 1 cm bubble 4/8/02

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

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

R____ PR____ M____ F____

REV. 2/99

WHITE - LABORATORY COPY YELLOW - CLIENT COPY TO ACCOMPANY FINAL REPORT PINK - CLIENT COPY AS RECEIPT

T-558 P.001/001 F-854

7072261001

APR-05-2002 03:05PM FROM-CALTEST ANALYTICAL

Caltest
ANALYTICAL LABORATORY

1885 N. KELLY ROAD • NAPA, CA 94558 • (707) 258-4000 • Fax (707) 226-1001 • www.caltestlab.com

SAMPLE CHAIN OF CUSTODY

LAB ORDER #: C040219

P.O. #

PROJECT #/ PROJECT NAME: OAKLAND MUNI SERVICE CENTER

CLIENT: CITY OF OAKLAND

REPORT TO:

ADDRESS: 250 FRANK OGAWA PLAZA SUITE 5301 CITY: STATE: CA ZIP: 94612

BILLING ADDRESS: SAME

PHONE #: 510 238-7154 FAX PHONE: 510 238-0140 SAMPLER (PRINT & SIGN NAME): J. SPEIR

ANALYSES REQUESTED: TPH-EXTRACT EL55B; TPH-G, BETX, MTBE

TURN-AROUND TIME: ☐ STANDARD ☐ RUSH

DUE DATE:

CALTEST #	DATE SAMPLED	TIME SAMPLED	MATRIX	CONTAINER AMOUNT/TYPE	PRESERVATIVE	SAMPLE IDENTIFICATION SITE	CLIENT LAB #	COMP. or GRAB	TPH-EXTRACT EL55B	TPH-G, BETX, MTBE						REMARKS
3	4/5/02	1201	H2O	AMBER LITER/5	NONE	MW-15		GRAB	X							5 ONE LITER AMBER
↓	4/5/02	1201	H2O	VOA/3	HCL	MW-15		GRAB		X						3 VOA'S W/HCL
4	4/5/02	1315	H2O	AMBER LITER/2	NONE	MW-2		GRAB	X							2 ONE LITER
↓	4/5/02	1315	H2O	VOA/3	HCL	MW-2		GRAB		X						3 VOA'S W/HCL
5				VOA/3	HCL	TRIP BLANK 2										TRIP BLANK

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
J. SPEIR	4/5/02 1528	[signature]	[signature]	4/5/02 1715	[signature]

Samples: WC__ MICRO__ BIO__ AA__ SV__ VOA__ pH7 Y/N TEMP: 4.3 SEALED: Y/N INTACT: Y/N

BD: BIO__ WC__ AA__

CC: AA__ SV__ VOA__

SIL: HP__ PT__ QT__ VOA__

W/HNO_3__ H_2SO_4__ NaOH__

PIL: HNO_3__ H_2SO_4__ NaOH__ HCL__

FOR LAB USE ONLY

COMMENTS: 3 of 3 voa's rec'd w/ over 1 cm bubble. 4-8-02

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

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

R__ PR__ M__ F__

REV. 2/99 PINK - CLIENT COPY AS RECEIPT YELLOW - CLIENT COPY TO ACCOMPANY FINAL REPORT WHITE - LABORATORY

May 22, 2002

CASE NARRATIVE for Lab order # C040331

On April 10, 2002 Caltest received 9 samples for analyses.

Samples were analyzed for benzene, ethylbenzene, toluene, xylenes, MTBE and both purgeable and extractable hydrocarbons. Samples contained hydrocarbon patterns; these could not be identified as a specific hydrocarbon pattern or source, but only as the range they appear in. The diesel range (Carbon chain length 12-24) was quantified as diesel #2. The motor oil range (C24-C36) was quantified as motor oil. The instrument was calibrated for diesel and motor oil; the instrument was not calibrated for kerosene. The gasoline range (purgeable) was quantified as gasoline.

All samples were extracted and analyzed within holdtime.

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

NELAP Certification 01103CA

ELAP Certification 1664

Caltest
ANALYTICAL LABORATORY
ENVIRONMENTAL ANALYSES

LAB ORDER No.: C040331

REPORT of ANALYTICAL RESULTS

Report Date: 30 MAY 2002
Received Date: 10 APR 2002

Client:
City Of Oakland
250 Frank Ogawa Plaza Suite 5301
Oakland, CA 94612

Project: MUNI SERVICE CENTER

Sampled by: J SPEIR

Lab Number	Sample Identification	Matrix	Sampled Date/Time
C040331-1	MW-7	AQUEOUS	08 APR 02 10:15
C040331-2	MW-8	AQUEOUS	08 APR 02 12:37
C040331-3	MW-10	AQUEOUS	08 APR 02 11:05
C040331-4	MW-12	AQUEOUS	08 APR 02 13:15
C040331-5	MW-13	AQUEOUS	08 APR 02 16:10
C040331-6	MW-14	AQUEOUS	09 APR 02 11:10
C040331-7	MW-1	AQUEOUS	09 APR 02 14:15
C040331-8	MW-5	AQUEOUS	09 APR 02 14:55
C040331-9	MW-17	AQUEOUS	09 APR 02 10:30

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.).
'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.

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(707) 258-4000 • Fax: (707) 226-1001 • e-mail: caltest@caltestlab.com

ORGANIC ANALYTICAL RESULTS

LAB ORDER No.: C040331

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: C040331-1							
SAMPLE ID: MW-7							
SAMPLED: 08 APR 02 10:15							
METHOD: EPA 8015M							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1	04.16.02	T020101TPH	1,2
Diesel Fuel	ND	50.	ug/L				
TPH-Extractable, quantitated as diesel	80.	50.	ug/L				
Motor Oil	ND	200.	ug/L				
TPH-Extractable, quantitated as Motor Oil	ND	200.	ug/L				
Surrogate o-Terphenyl	96.		%				
LAB NUMBER: C040331-1 (continued)							
SAMPLE ID: MW-7							
SAMPLED: 08 APR 02 10:15							
METHOD: EPA 8015/8020A							
AROMATIC HYDROCARBONS AND TOTAL PURGEABLE PETROLEUM HYDROCARBONS				1	04.18.02	V020029G9A	3
Total Petroleum Hydrocarbons - Gasoline	ND	50.	ug/L				
TPH-Purgeable, quantitated as gasoline	ND	50.	ug/L				
Benzene	ND	0.5	ug/L				
Toluene	0.5	0.5	ug/L				
Ethylbenzene	0.6	0.5	ug/L				
Xylenes (Total)	ND	0.5	ug/L				
Methyl tert-Butyl Ether (MTBE)	ND	5.	ug/L				
Surrogate 4-Bromofluorobenzene [FID]	83.		%				
Surrogate 4-Bromofluorobenzene [PID]	86.		%				

1) Sample Preparation on 04-12-02 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) Sample Preparation on 04-18-02 using EPA 5030

ORGANIC ANALYTICAL RESULTS

LAB ORDER No.: C040331

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: C040331-2							
SAMPLE ID: MW-8							
SAMPLED: 08 APR 02 12:37							
METHOD: EPA 8015M							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1	04.16.02	T020101TPH	1,2,3
Diesel Fuel	ND	50.	ug/L				
TPH-Extractable, quantitated as diesel	440.	50.	ug/L				
Motor Oil	ND	200.	ug/L				
TPH-Extractable, quantitated as Motor Oil	800.	200.	ug/L				
Surrogate o-Terphenyl	102.		%				
LAB NUMBER: C040331-2 (continued)							
SAMPLE ID: MW-8							
SAMPLED: 08 APR 02 12:37							
METHOD: EPA 8015/8020A							
AROMATIC HYDROCARBONS AND TOTAL PURGEABLE PETROLEUM HYDROCARBONS				1	04.18.02	V020029G9A	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]	88.		%				
Surrogate 4-Bromofluorobenzene [PID]	88.		%				

1) Sample Preparation on 04-12-02 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 04-18-02 using EPA 5030

ORGANIC ANALYTICAL RESULTS

LAB ORDER No.: C040331

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: C040331-3 SAMPLE ID: MW-10 SAMPLED: 08 APR 02 11:05 METHOD: EPA 8015M							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1	04.16.02	T020101TPH	1,2,3
Diesel Fuel	ND	50.	ug/L				
TPH-Extractable, quantitated as diesel	220.	50.	ug/L				
Motor Oil	ND	200.	ug/L				
TPH-Extractable, quantitated as Motor Oil	300.	200.	ug/L				
Surrogate o-Terphenyl	101.		%				
LAB NUMBER: C040331-3 (continued) SAMPLE ID: MW-10 SAMPLED: 08 APR 02 11:05 METHOD: EPA 8015/8020A							
AROMATIC HYDROCARBONS AND TOTAL PURGEABLE PETROLEUM HYDROCARBONS				1	04.18.02	V020029G9A	4
Total Petroleum Hydrocarbons - Gasoline	ND	50.	ug/L				
TPH-Purgeable, quantitated as gasoline	ND	50.	ug/L				
Benzene	1.1	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]	91.		%				
Surrogate 4-Bromofluorobenzene [PID]	89.		%				

1) Sample Preparation on 04-12-02 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 04-18-02 using EPA 5030

ORGANIC ANALYTICAL RESULTS

LAB ORDER No.: C040331

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: C040331-4							
SAMPLE ID: MW-12							
SAMPLED: 08 APR 02 13:15							
METHOD: EPA 8015M							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1	04.16.02	T020101TPH	1,2,3
Diesel Fuel	ND	50.	ug/L				
TPH-Extractable, quantitated as diesel	500.	50.	ug/L				
Motor Oil	ND	200.	ug/L				
TPH-Extractable, quantitated as Motor Oil	500.	200.	ug/L				
Surrogate o-Terphenyl	91.		%				
LAB NUMBER: C040331-4 (continued)							
SAMPLE ID: MW-12							
SAMPLED: 08 APR 02 13:15							
METHOD: EPA 8015/8020A							
AROMATIC HYDROCARBONS AND TOTAL PURGEABLE PETROLEUM HYDROCARBONS				1	04.18.02	V020029G9A	4,5
Total Petroleum Hydrocarbons - Gasoline	ND	50.	ug/L				
TPH-Purgeable, quantitated as gasoline	180.	50.	ug/L				
Benzene	ND	0.5	ug/L				
Toluene	ND	0.5	ug/L				
Ethylbenzene	0.7	0.5	ug/L				
Xylenes (Total)	ND	1.5	ug/L				
Methyl tert-Butyl Ether (MTBE)	ND	5.	ug/L				
Surrogate 4-Bromofluorobenzene [FID]	100.		%				
Surrogate 4-Bromofluorobenzene [PID]	91.		%				

1) Sample Preparation on 04-12-02 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 04-18-02 using EPA 5030
5) 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.: C040331

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: C040331-5 **SAMPLE ID: MW-13** **SAMPLED: 08 APR 02 16:10** **METHOD: EPA 8015M**							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1	04.16.02	T020101TPH	1,2,3
Diesel Fuel	ND	50.	ug/L				
TPH-Extractable, quantitated as diesel	440.	50.	ug/L				
Motor Oil	ND	200.	ug/L				
TPH-Extractable, quantitated as Motor Oil	900.	200.	ug/L				
Surrogate o-Terphenyl	91.		%				
LAB NUMBER: C040331-5 (continued) **SAMPLE ID: MW-13** **SAMPLED: 08 APR 02 16:10** **METHOD: EPA 8015/8020A**							
AROMATIC HYDROCARBONS AND TOTAL PURGEABLE PETROLEUM HYDROCARBONS				1	04.18.02	V020029G9A	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]	89.		%				
Surrogate 4-Bromofluorobenzene [PID]	89.		%				

1) Sample Preparation on 04-12-02 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 04-18-02 using EPA 5030

ORGANIC ANALYTICAL RESULTS

LAB ORDER No.: C040331

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: C040331-6							
SAMPLE ID: MW-14							
SAMPLED: 09 APR 02 11:10							
METHOD: EPA 8015M							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1	04.17.02	T020101TPH	1,2,3
Diesel Fuel	ND	50.	ug/L				
TPH-Extractable, quantitated as diesel	870.	50.	ug/L				
Motor Oil	ND	200.	ug/L				
TPH-Extractable, quantitated as Motor Oil	1100.	200.	ug/L				
Surrogate o-Terphenyl	92.		%				
LAB NUMBER: C040331-6 (continued)							
SAMPLE ID: MW-14							
SAMPLED: 09 APR 02 11:10							
METHOD: EPA 8015/8020A							
AROMATIC HYDROCARBONS AND TOTAL PURGEABLE PETROLEUM HYDROCARBONS				1	04.18.02	V020029G9A	4,5
Total Petroleum Hydrocarbons - Gasoline	ND	50.	ug/L				
TPH-Purgeable, quantitated as gasoline	250.	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]	99.		%				
Surrogate 4-Bromofluorobenzene [PID]	97.		%				

1) Sample Preparation on 04-12-02 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 04-18-02 using EPA 5030
5) 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.: C040331

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: C040331-7							
SAMPLE ID: MW-1							
SAMPLED: 09 APR 02 14:15							
METHOD: EPA 8015M							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1	04.17.02	T020101TPH	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	1000.	200.	ug/L				
Surrogate o-Terphenyl	99.		%				
LAB NUMBER: C040331-7 (continued)							
SAMPLE ID: MW-1							
SAMPLED: 09 APR 02 14:15							
METHOD: EPA 8015/8020A							
AROMATIC HYDROCARBONS AND TOTAL PURGEABLE PETROLEUM HYDROCARBONS							4,5,6
Total Petroleum Hydrocarbons - Gasoline	ND	50.	ug/L	10	04.19.02	V020030G9A	
TPH-Purgeable, quantitated as gasoline	2000.	500.	ug/L	10	04.19.02	V020030G9A	
Benzene	320.	5.	ug/L	10	04.19.02	V020030G9A	
Toluene	5.38	0.5	ug/L	1	04.18.02	V020029G9A	
Ethylbenzene	3.08	0.5	ug/L	1	04.18.02	V020029G9A	
Xylenes (Total)	6.24	0.5	ug/L	1	04.18.02	V020029G9A	
Methyl tert-Butyl Ether (MTBE)	ND	5.	ug/L	1	04.18.02	V020029G9A	
Surrogate 4-Bromofluorobenzene [FID]	99.		%	10	04.19.02	V020030G9A	
Surrogate 4-Bromofluorobenzene [PID]	98.		%	10	04.19.02	V020030G9A	

1) Sample Preparation on 04-12-02 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 04-18-02 using EPA 5030
5) An unidentified petroleum hydrocarbon was present in the sample. An approximate concentration has been calculated based on gasoline standards.
6) Sample diluted to bring concentration of target analyte(s) within the working range of the instrument, resulting in increased reporting limits.

ORGANIC ANALYTICAL RESULTS

LAB ORDER No.: C040331

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: C040331-8							
SAMPLE ID: MW-5							
SAMPLED: 09 APR 02 14:55							
METHOD: EPA 8015M							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1	04.17.02	T020101TPH	1,2,3
Diesel Fuel	ND	50.	ug/L				
TPH-Extractable, quantitated as diesel	480.	50.	ug/L				
Motor Oil	ND	200.	ug/L				
TPH-Extractable, quantitated as Motor Oil	260.	200.	ug/L				
Surrogate o-Terphenyl	93.		%				
LAB NUMBER: C040331-8 (continued)							
SAMPLE ID: MW-5							
SAMPLED: 09 APR 02 14:55							
METHOD: EPA 8015/8020A							
AROMATIC HYDROCARBONS AND TOTAL PURGEABLE PETROLEUM HYDROCARBONS							4,5,6
Total Petroleum Hydrocarbons - Gasoline	ND	50.	ug/L	20	04.19.02	V020030G9A	
TPH-Purgeable, quantitated as gasoline	8000.	1000.	ug/L	20	04.19.02	V020030G9A	
Benzene	110.	10.	ug/L	20	04.19.02	V020030G9A	
Toluene	5.95	0.5	ug/L	1	04.18.02	V020029G9A	
Ethylbenzene	650.	10.	ug/L	20	04.19.02	V020030G9A	
Xylenes (Total)	53.9	0.5	ug/L	1	04.18.02	V020029G9A	
Methyl tert-Butyl Ether (MTBE)	166.	5.	ug/L	1	04.18.02	V020029G9A	
Surrogate 4-Bromofluorobenzene [FID]	99.		%	20	04.19.02	V020030G9A	
Surrogate 4-Bromofluorobenzene [PID]	101.		%	20	04.19.02	V020030G9A	

1) Sample Preparation on 04-12-02 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 04-18-02 using EPA 5030
5) An unidentified petroleum hydrocarbon was present in the sample. An approximate concentration has been calculated based on gasoline standards.
6) Sample diluted to bring concentration of target analyte(s) within the working range of the instrument, resulting in increased reporting limits.

ORGANIC ANALYTICAL RESULTS

LAB ORDER No.: C040331

ANALYTE	RESULT	R.L.	UNITS	D.F.	ANALYZED	QC BATCH	NOTES
LAB NUMBER: C040331-9							
SAMPLE ID: MW-17							
SAMPLED: 09 APR 02 10:30							
METHOD: EPA 8015M							
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				1	04.17.02	T020101TPH	1,2,3
Diesel Fuel	ND	50.	ug/L				
TPH-Extractable, quantitated as diesel	590.	50.	ug/L				
Motor Oil	ND	200.	ug/L				
TPH-Extractable, quantitated as Motor Oil	800.	200.	ug/L				
Surrogate o-Terphenyl	96.		%				
LAB NUMBER: C040331-9 (continued)							
SAMPLE ID: MW-17							
SAMPLED: 09 APR 02 10:30							
METHOD: EPA 8015/8020A							
AROMATIC HYDROCARBONS AND TOTAL PURGEABLE PETROLEUM HYDROCARBONS				1	04.18.02	V020029G9A	4,5
Total Petroleum Hydrocarbons - Gasoline	ND	50.	ug/L				
TPH-Purgeable, quantitated as gasoline	60.	50.	ug/L				
Benzene	ND	0.5	ug/L				
Toluene	ND	0.5	ug/L				
Ethylbenzene	1.6	0.5	ug/L				
Xylenes (Total)	ND	0.5	ug/L				
Methyl tert-Butyl Ether (MTBE)	ND	5.	ug/L				
Surrogate 4-Bromofluorobenzene [FID]	94.		%				
Surrogate 4-Bromofluorobenzene [PID]	91.		%				

1) Sample Preparation on 04-12-02 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 04-18-02 using EPA 5030
5) An unidentified petroleum hydrocarbon was present in the sample. An approximate concentration has been calculated based on gasoline standards.

NELAP Certification 01103CA

ELAP Certification 1664

Caltest
ANALYTICAL LABORATORY
ENVIRONMENTAL ANALYSES

LAB ORDER No.: C040331

SUPPLEMENTAL QUALITY CONTROL (QC) DATA REPORT

Report Date: 23 MAY 2002
Received Date: 10 APR 2002

Client:
City Of Oakland
250 Frank Ogawa Plaza Suite 5301
Oakland, CA 94612

Project: MUNI SERVICE CENTER

QC Batch ID	Method	Matrix
T020101TPH	8015M	AQUEOUS
V020029G9A	8015/8020A	AQUEOUS
V020030G9A	8015/8020A	AQUEOUS

William Svoboda
Project Manager

CAHorn
Christine Horn
Laboratory Director

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

LAB ORDER No.: C040331

METHOD BLANK ANALYTICAL RESULTS

ANALYTE	RESULT	R.L.	UNITS	ANALYZED	NOTES
QC BATCH: T020101TPH					
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS				04.16.02	
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	94.		%		
QC BATCH: V020029G9A					
AROMATIC HYDROCARBONS AND TOTAL PURGEABLE PETROLEUM HYDROCARBONS				04.18.02	
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]	84.		%		
Surrogate 4-Bromofluorobenzene [PID]	85.		%		
QC BATCH: V020030G9A					
AROMATIC HYDROCARBONS AND TOTAL PURGEABLE PETROLEUM HYDROCARBONS				04.19.02	
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]	87.		%		
Surrogate 4-Bromofluorobenzene [PID]	89.		%		

LAB ORDER No.: C040331

LABORATORY CONTROL SAMPLE ANALYTICAL RESULTS

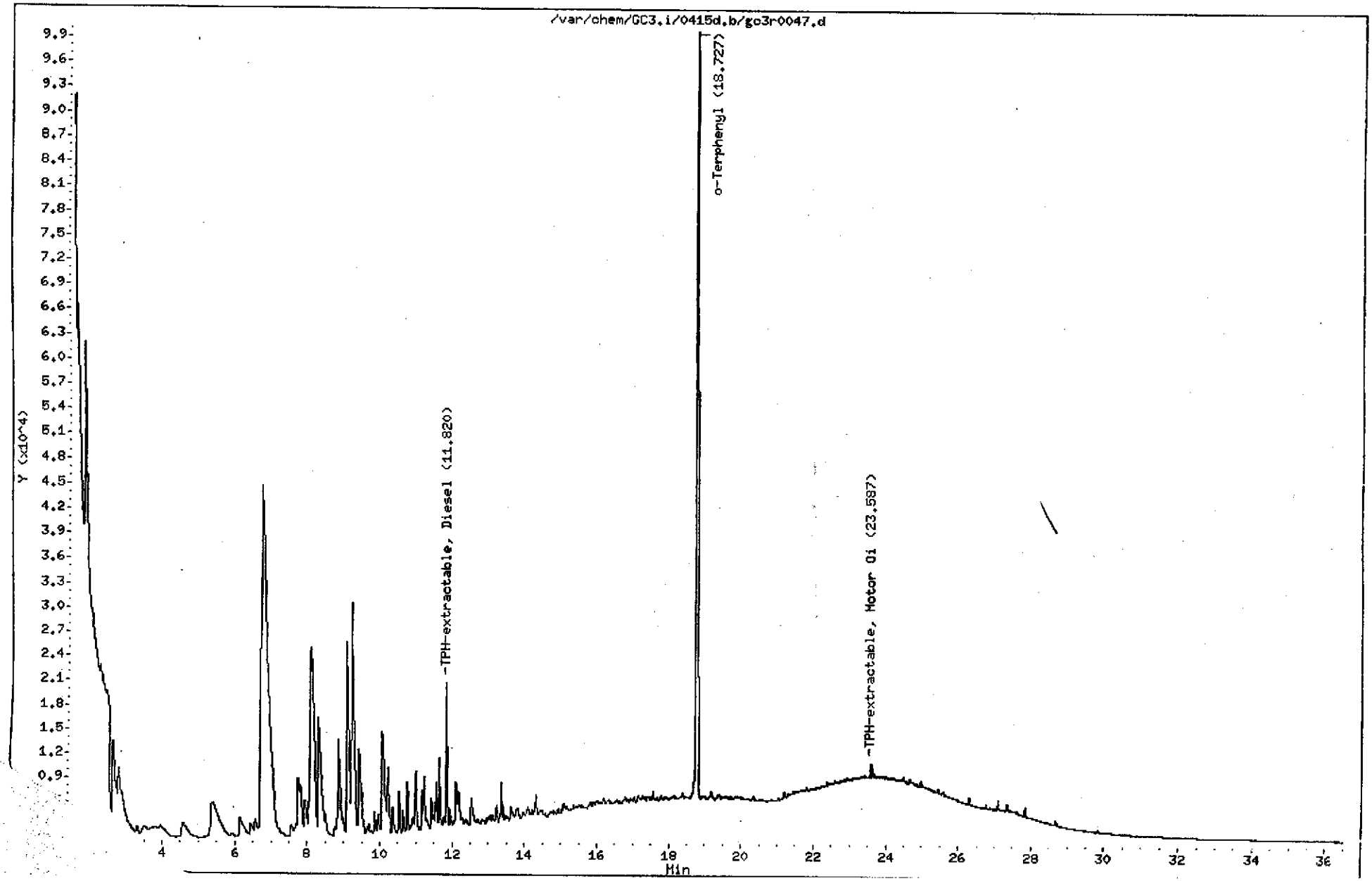
ANALYTE	SPIKE AMOUNT	SPIKE\DUP RESULT	SPK\DUP %REC	ACCEPTANCE %REC \RPD	REL% DIFF	ANALYZED	NOTES
QC BATCH: T020101TPH							
						04.16.02	
TOTAL SEMI-VOLATILE PETROLEUM HYDROCARBONS							
Diesel Fuel	1000	750.\	75\	36-102\32			
Surrogate o-Terphenyl	100	92.1\	92\	50-150\			
QC BATCH: V020029G9A							
						04.18.02	
AROMATIC HYDROCARBONS AND TOTAL PURGEABLE PETROLEUM HYDROCARBONS							
Total Petroleum Hydrocarbons - Gasoline	550.	539.\560.	98\102	50-130\	3.8		
Benzene	6.4	6.45\6.91	101\108	50-130\	6.9		
Toluene	38.6	38.4\40.4	99\105	50-130\	5.1		
Ethylbenzene	9.2	10.5\10.6	114\115	50-130\	1		
Xylenes (Total)	46.2	47.8\48.9	103\106	49-129\	2.3		
Surrogate 4-Bromofluorobenzene [FID]	10.0	10.1\11.1	101\111	50-130\			
Surrogate 4-Bromofluorobenzene [PID]	10.0	9.83\9.96	98\100	50-130\			
QC BATCH: V020030G9A							
						04.19.02	
AROMATIC HYDROCARBONS AND TOTAL PURGEABLE PETROLEUM HYDROCARBONS							
Total Petroleum Hydrocarbons - Gasoline	550.	536.\580.	97\105	50-130\	7.9		
Benzene	6.4	6.52\7.17	102\112	50-130\	9.5		
Toluene	38.6	38.8\41.8	101\108	50-130\	7.4		
Ethylbenzene	9.2	10.4\11.0	113\120	50-130\	5.6		
Xylenes (Total)	46.2	47.5\50.7	103\110	49-129\	6.5		
Surrogate 4-Bromofluorobenzene [FID]	10.0	8.19\8.99	82\90	50-130\			
Surrogate 4-Bromofluorobenzene [PID]	10.0	9.80\10.4	98\104	50-130\			

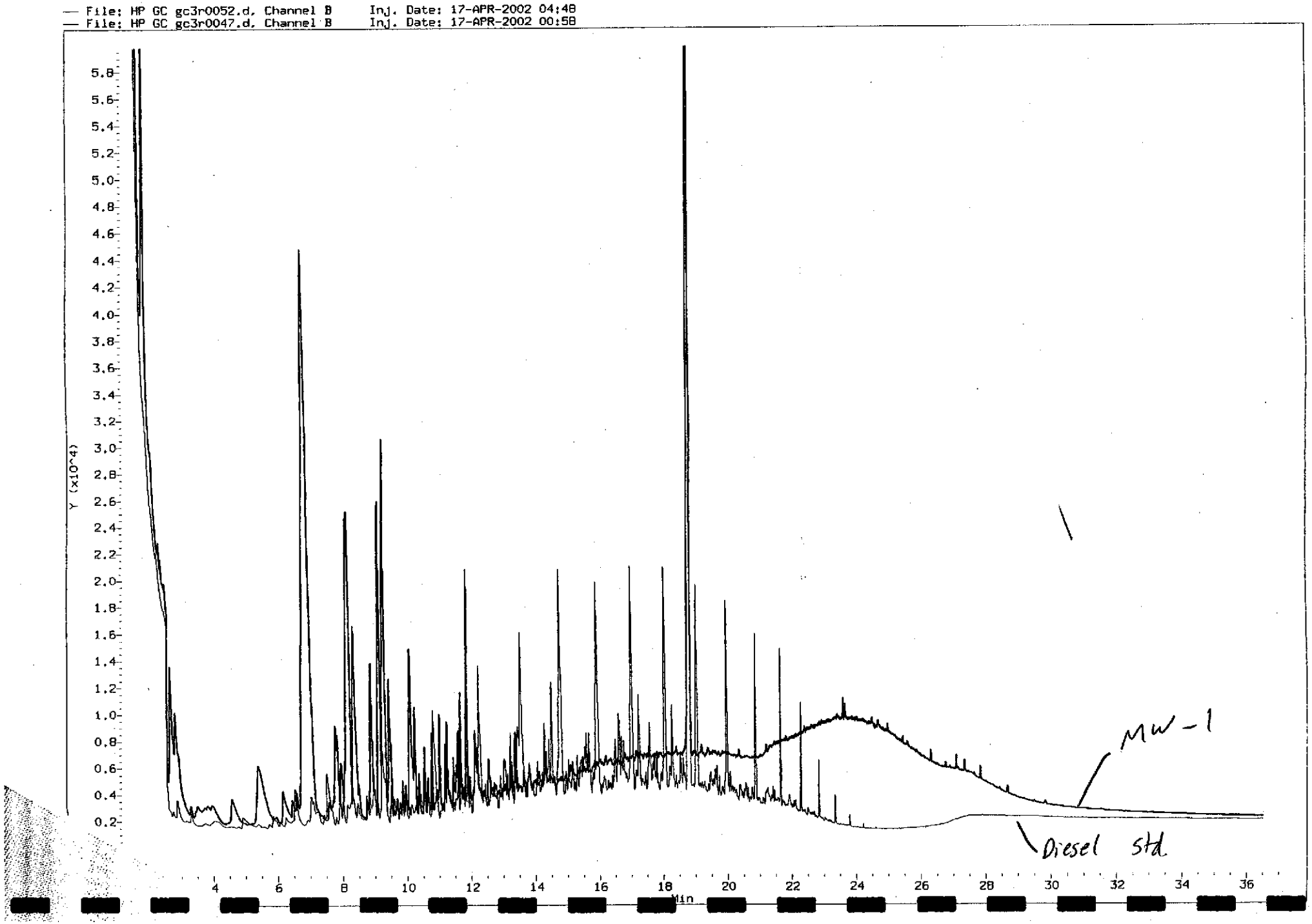
MW-1

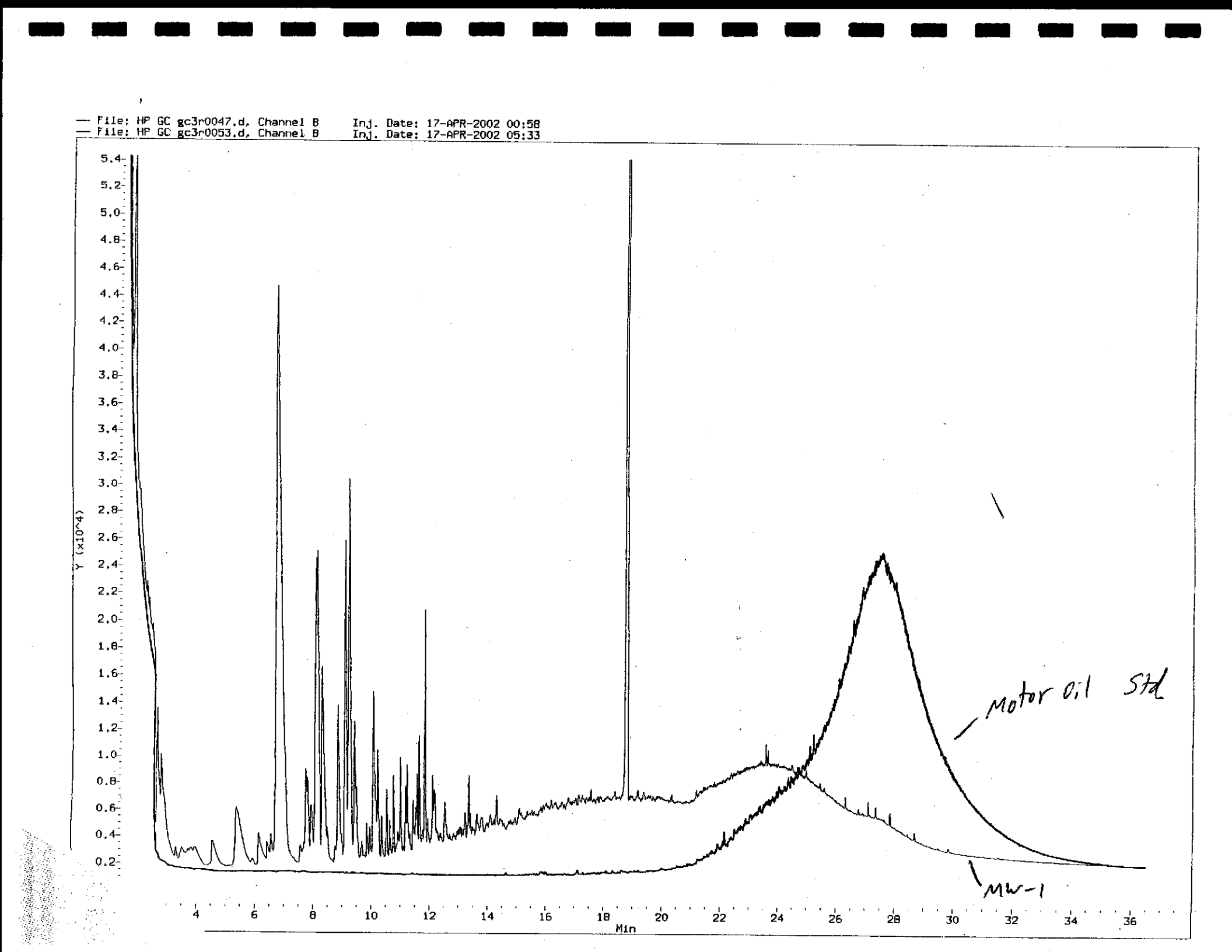
Data File: /var/chem/GC3.i/0415d.b/gc3r0047.d
Date : 17-APR-2002 00:58
Client ID:
Sample Info: C040331-7;;1X
Volume Injected (uL): 1000.0
Column phase: MXT-1

Instrument: GC3.i

Operator: MDT
Column diameter: 0.53



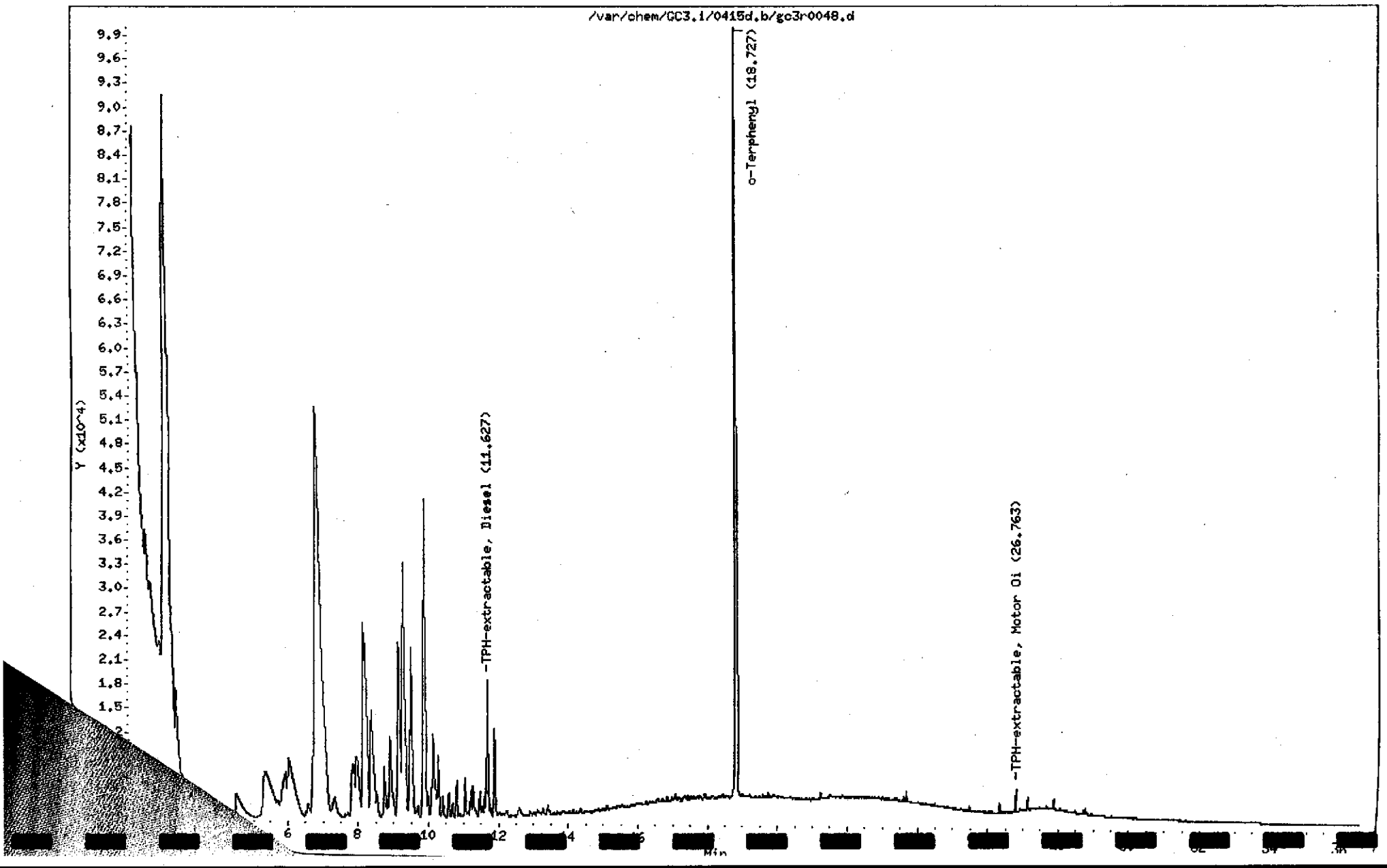

File: HP GC gc3r0052.d, Channel B Inj. Date: 17-APR-2002 04:48
File: HP GC gc3r0047.d, Channel B Inj. Date: 17-APR-2002 00:58
Y (x10^4)
5.8
5.6
5.4
5.2
5.0
4.8
4.6
4.4
4.2
4.0
3.8
3.6
3.4
3.2
3.0
2.8
2.6
2.4
2.2
2.0
1.8
1.6
1.4
1.2
1.0
0.8
0.6
0.4
0.2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
Min
MW-1
Diesel Std.

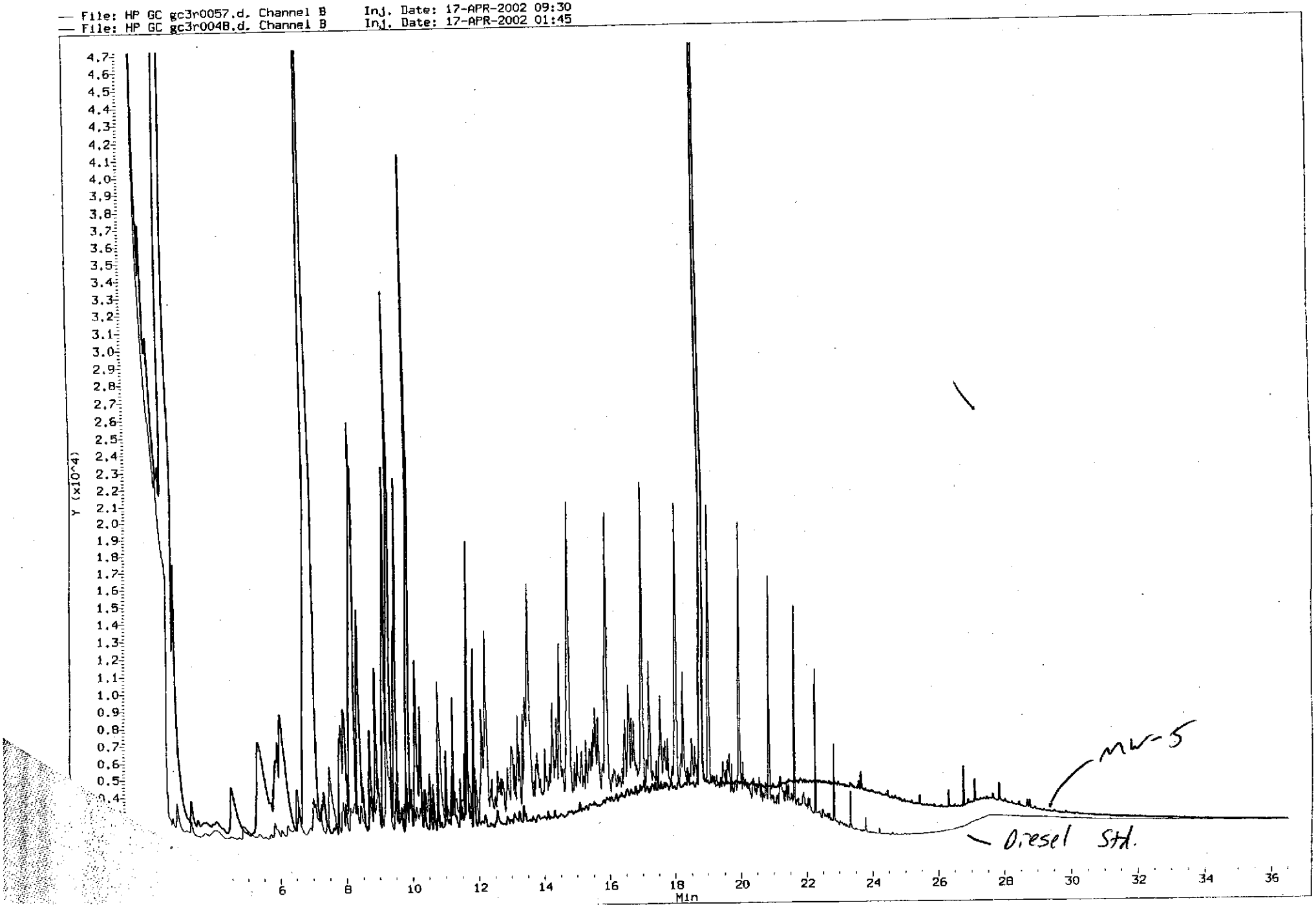

File: HP GC gc3r0047.d, Channel B Inj. Date: 17-APR-2002 00:58
File: HP GC gc3r0053.d, Channel B Inj. Date: 17-APR-2002 05:33
Y (x10^4)
Min
motor oil Std
MW-1

MW-5

Data File: /var/chem/GC3.i/0415d.b/gc3r0048.d
Date : 17-APR-2002 01:45
Client ID:
Sample Info: C040331-8;;1X
Volume Injected (uL): 1000.0
Column phase: MXT-1

Instrument: GC3.i
Operator: MDT
Column diameter: 0.53



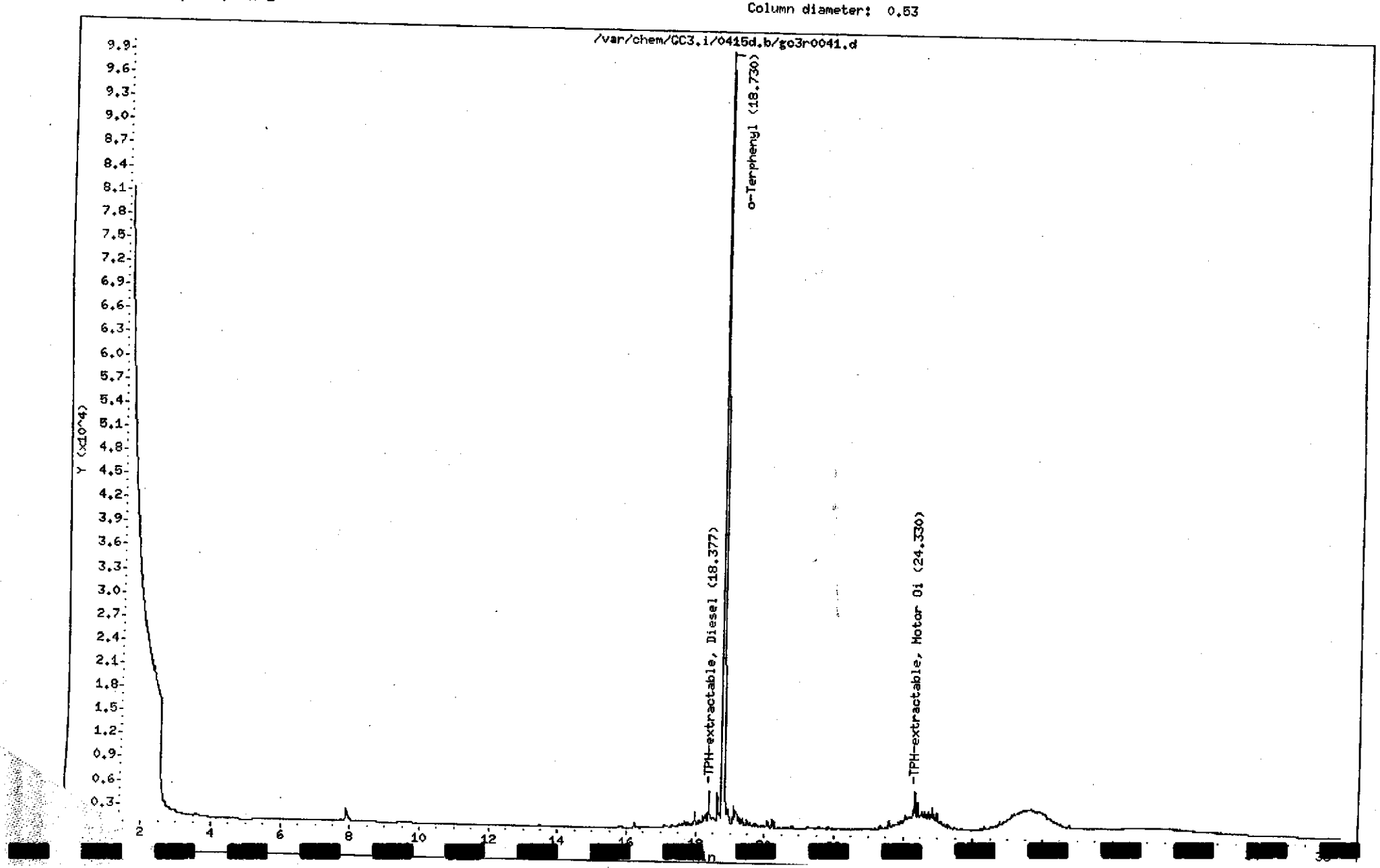

File: HP GC gc3r0057.d, Channel B
Inj. Date: 17-APR-2002 09:30
File: HP GC gc3r004B.d, Channel B
Inj. Date: 17-APR-2002 01:45
Y (x10^4)
Min
MW-5
Diesel Std.

MW-7

Data File: /var/chem/GC3.i/0415d.b/gc3r0041.d
Date : 16-APR-2002 20:23
Client ID:
Sample Info: C040331-1;;1X
Volume Injected (uL): 1000.0
Column phase: MXT-1

Instrument: GC3.i

Operator: MDT
Column diameter: 0.53



MW-8

Data File: /var/chem/GC3.i/0415d.b/gc3r0042.d

Page 3

Date : 16-APR-2002 21:08

Client ID:

Instrument: GC3.i

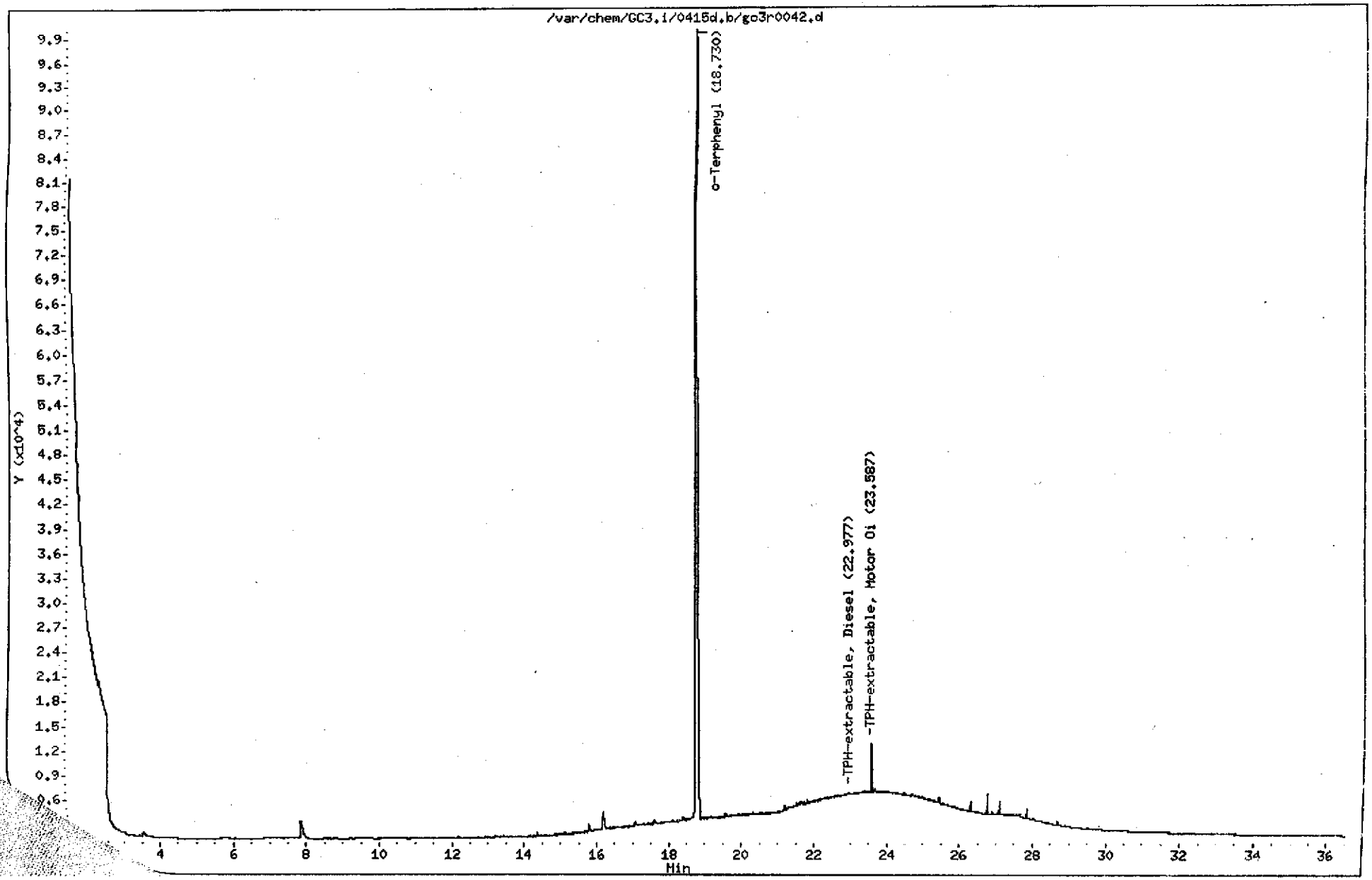
Sample Info: C040331-2;;1X

Volume Injected (uL): 1000.0

Operator: MDT

Column phase: HXT-1

Column diameter: 0.53



MW-10

Data File: /var/chem/GC3.i/0415d.b/gc3r0043.d

Date : 16-APR-2002 21:54

Client ID:

Instrument: GC3.i

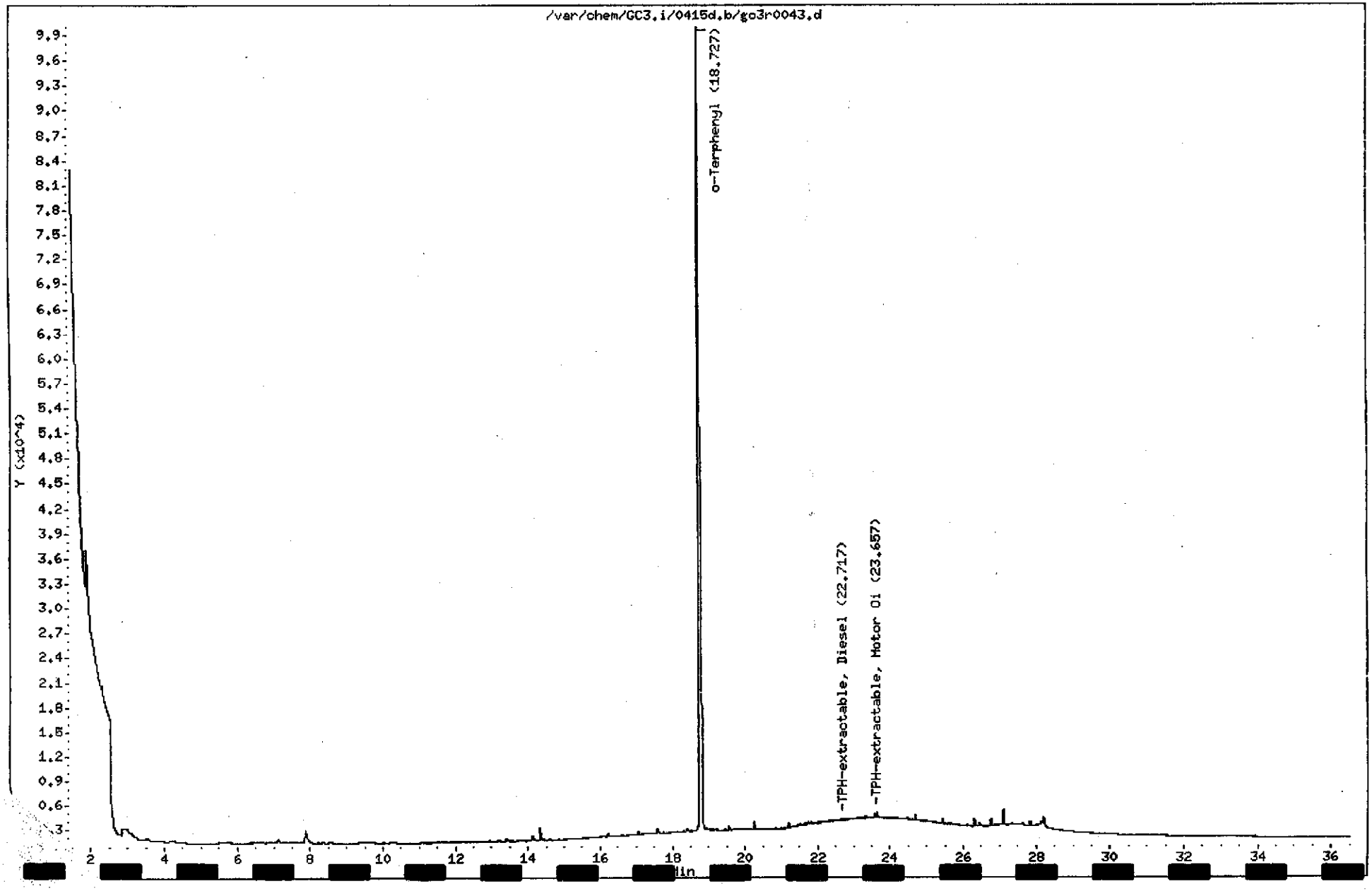
Sample Info: C040331-3;;1X

Volume Injected (uL): 1000.0

Operator: MDT

Column phase: MXT-1

Column diameter: 0.53

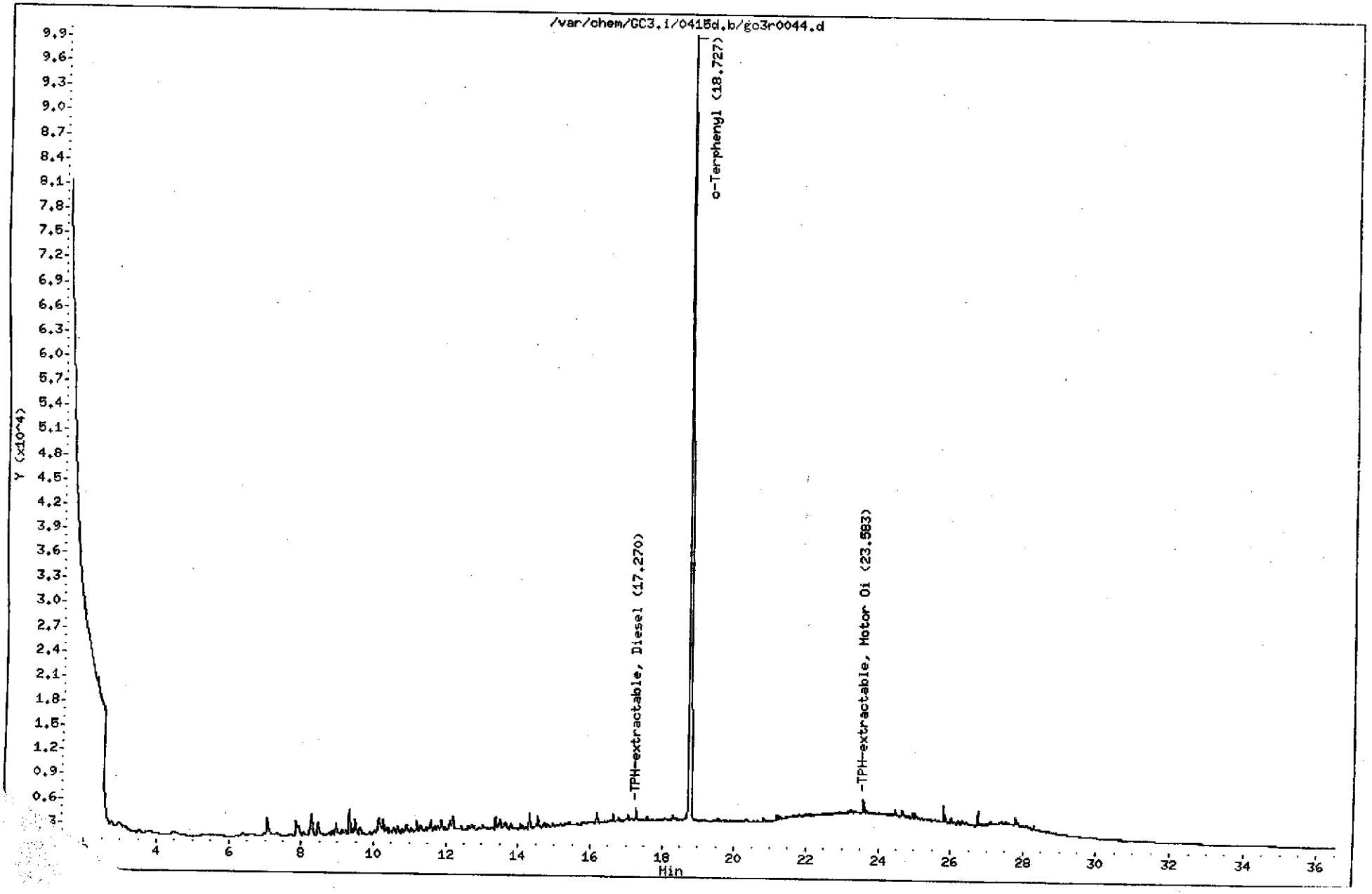


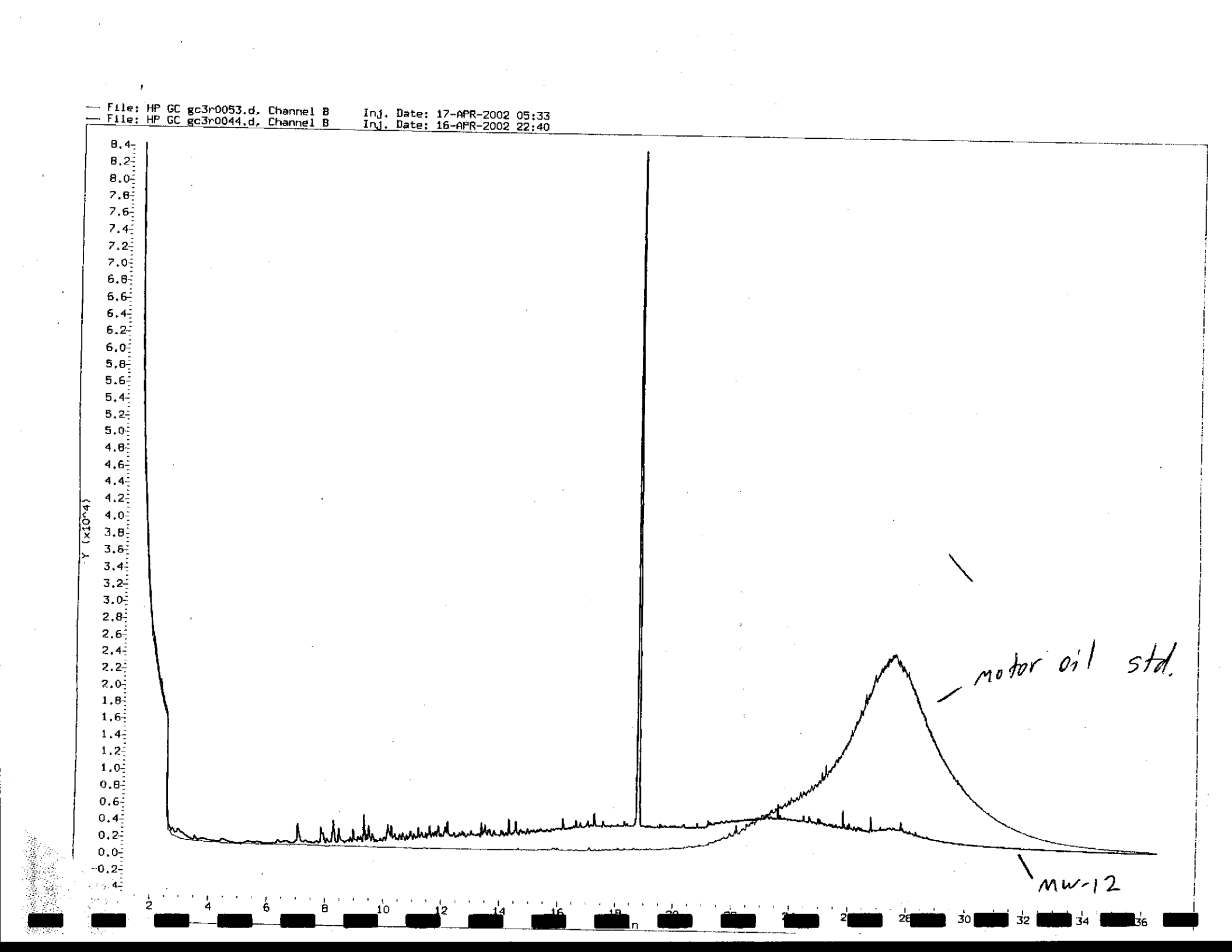
MW-12

Data File: /var/chem/GC3.i/0415d.b/gc3r0044.d
Date : 16-APR-2002 22:40
Client ID:
Sample Info: C040331-4;;1X
Volume Injected (uL): 1000.0
Column phase: MXT-1

Instrument: GC3.i

Operator: MDT
Column diameter: 0.53



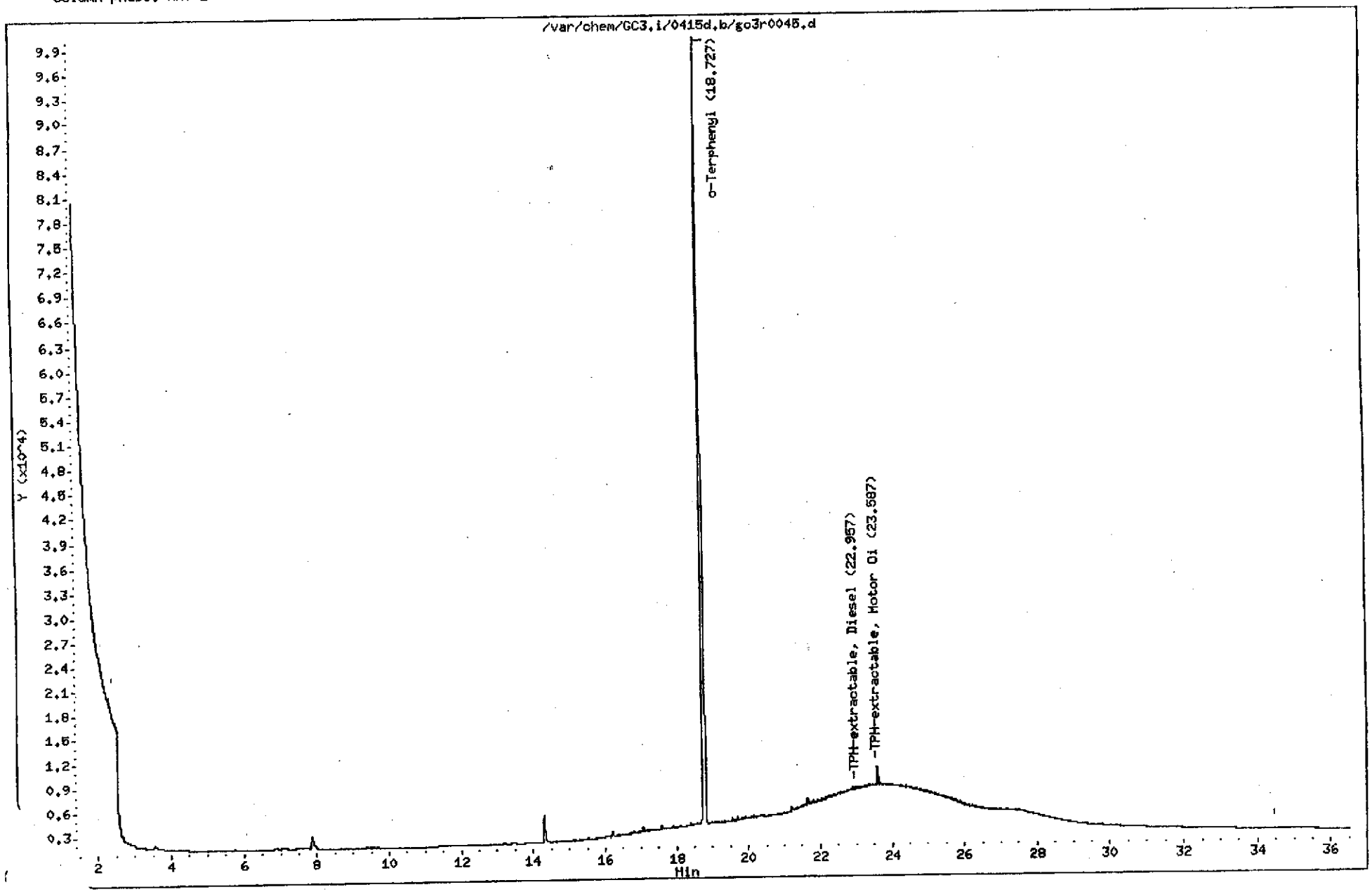

File: HP GC gc3r0053.d, Channel B
Inj. Date: 17-APR-2002 05:33
File: HP GC gc3r0044.d, Channel B
Inj. Date: 16-APR-2002 22:40
Y (x10^4)
motor oil std.
MW-12
n

MW-13

Data File: /var/chem/GC3.i/0415d.b/go3r0045.d
Date : 16-APR-2002 23:26
Client ID:
Sample Info: C040331-5;;1X
Volume Injected (uL): 1000.0
Column phase: HXT-1

Instrument: GC3.i

Operator: HDT
Column diameter: 0.53

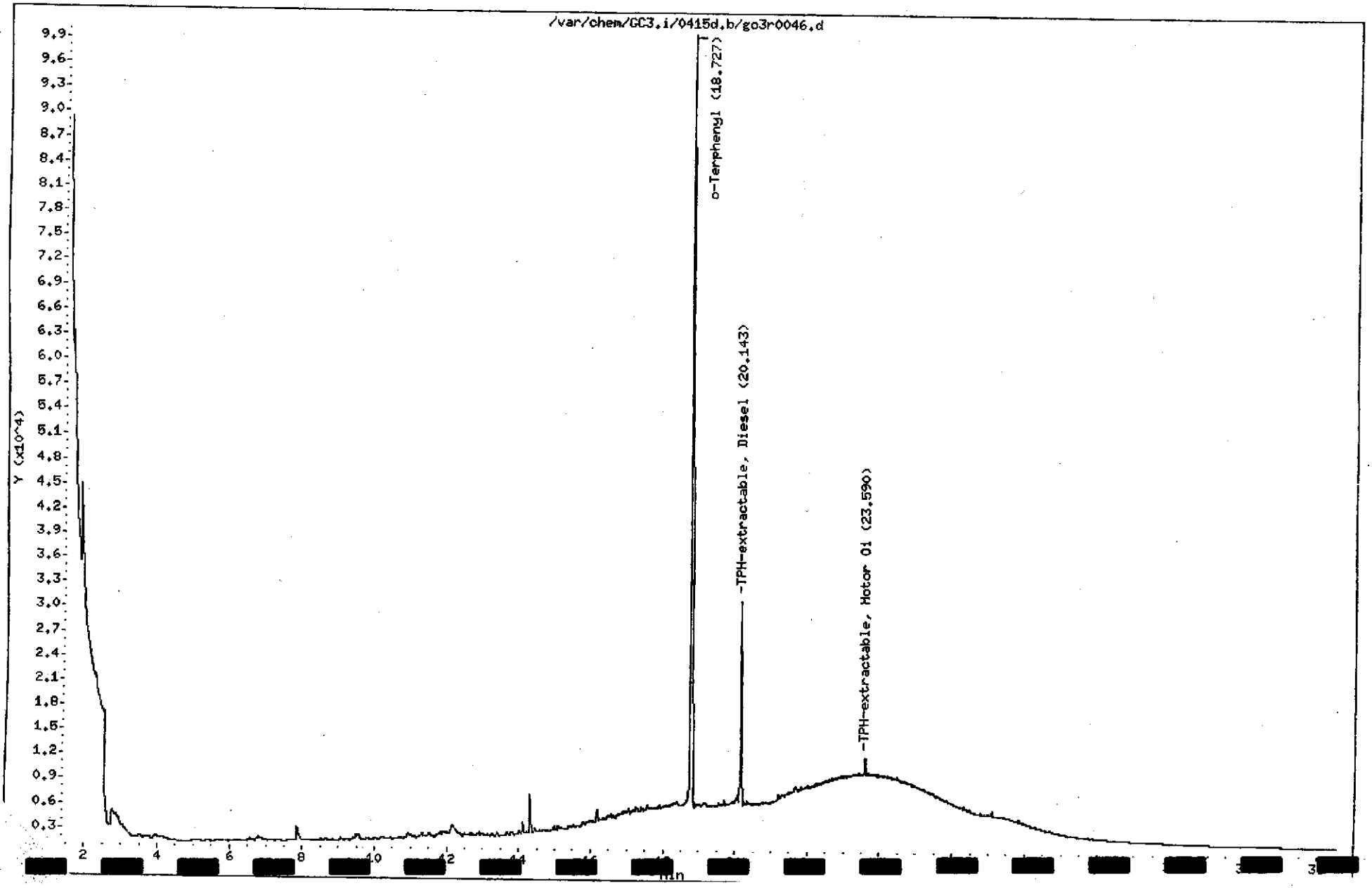


MW-14

Data File: /var/chem/GC3.i/0415d.b/gc3r0046.d
Date : 17-APR-2002 00:12
Client ID:
Sample Info: C040331-6;;1X
Volume Injected (uL): 1000.0
Column phase: MXT-1

Instrument: GC3.i

Operator: MDT
Column diameter: 0.53

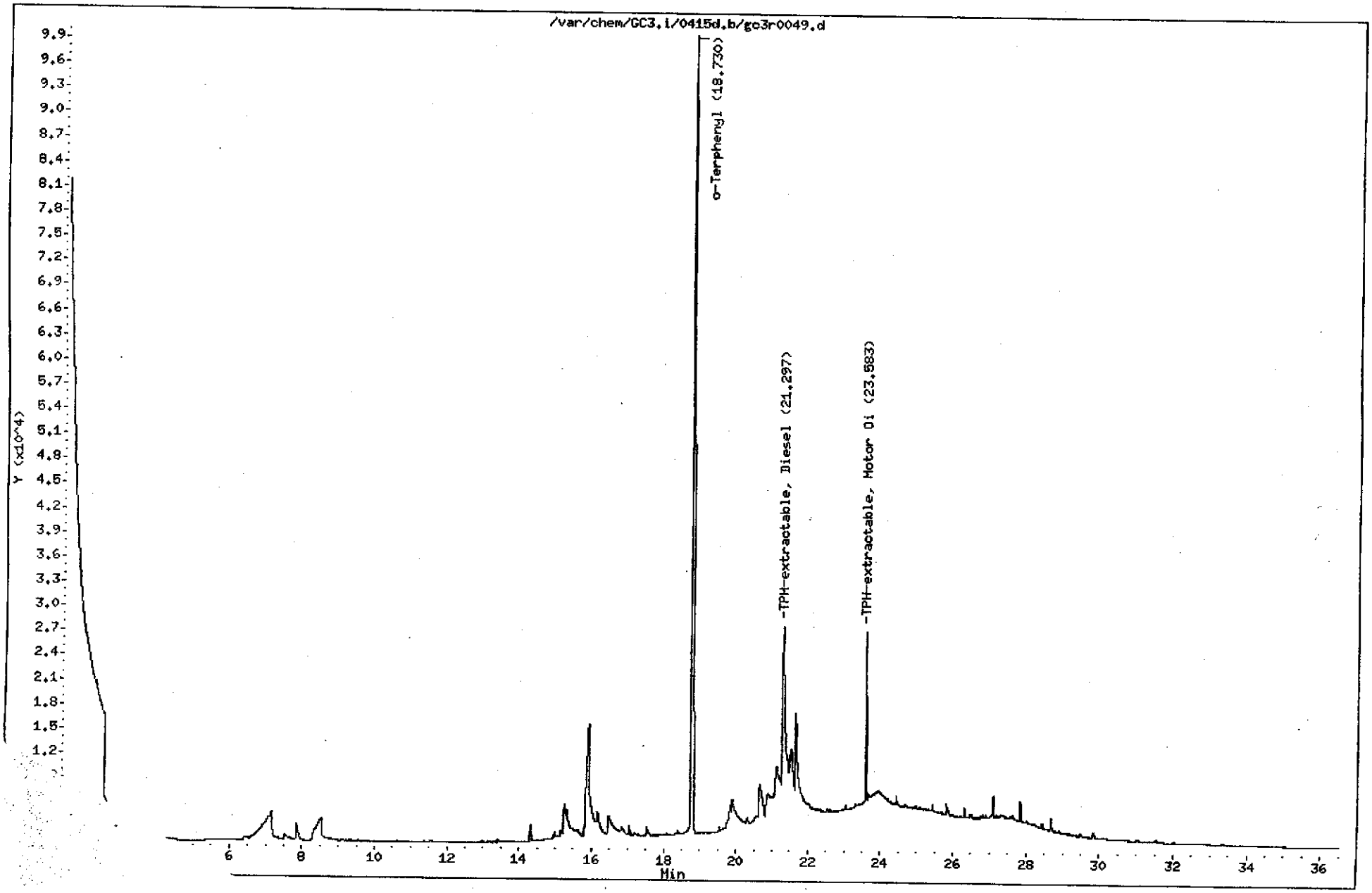


MW-17

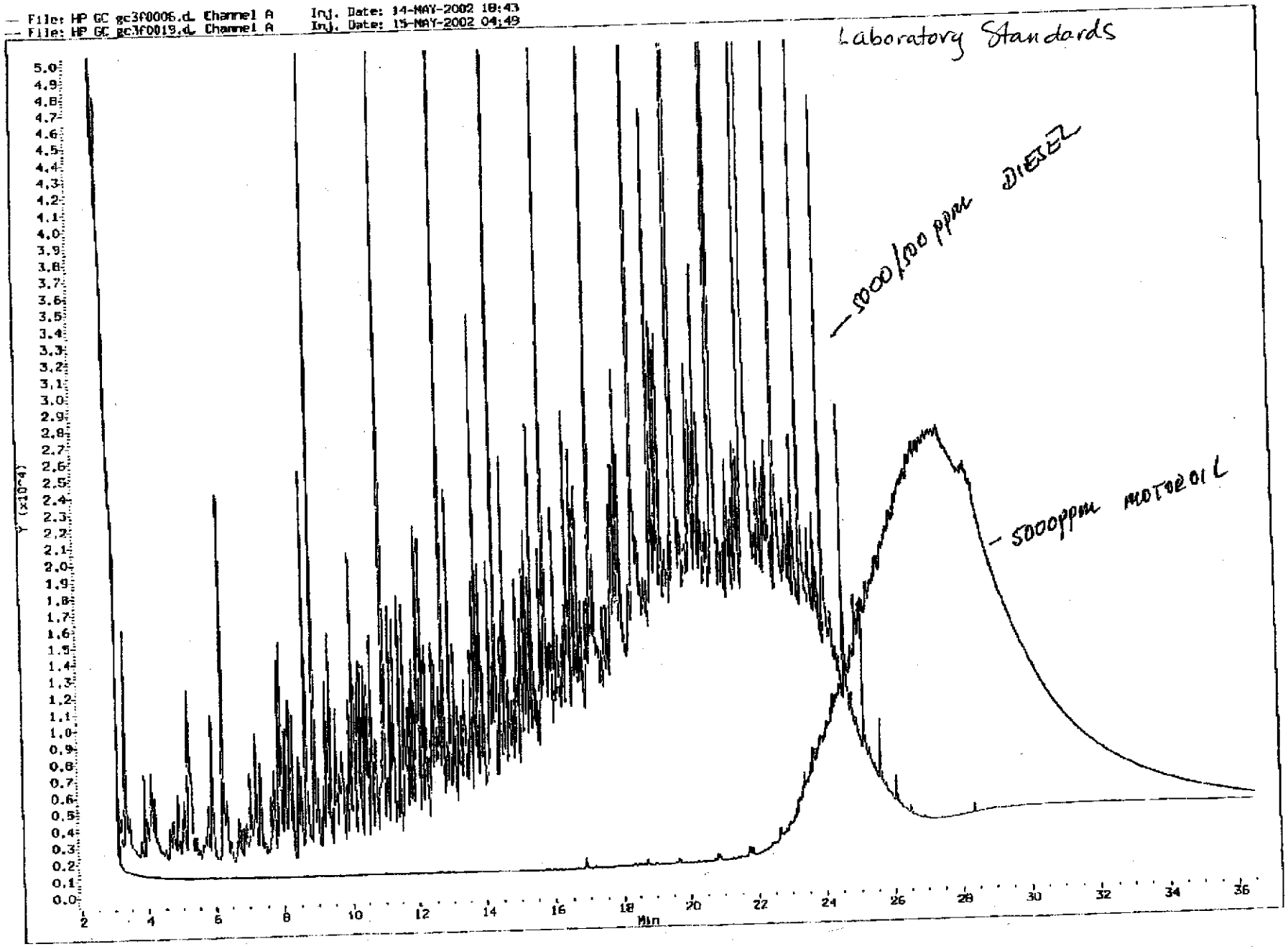
Data File: /var/chem/GC3.i/0415d.b/go3r0049.d
Date : 17-APR-2002 02:30
Client ID:
Sample Info: C040331-9;;1X
Volume Injected (uL): 1000.0
Column phase: MXT-1

Instrument: GC3.i

Operator: MDT
Column diameter: 0.53



Standards


File: HP GC gc3f0006.d Channel A Inj. Date: 14-MAY-2002 18:43
File: HP GC gc3f0019.d Channel A Inj. Date: 15-MAY-2002 04:49
Laboratory Standards
5000/100 ppm DIESEL
5000ppm MOTOR OIL
Y (x10^-4)
Min

C 040331

Caltest ANALYTICAL LABORATORY

1885 N. KELLY ROAD • NAPA, CA 94558 • (707) 258-4000 • Fax (707) 226-1001 • www.caltestlab.com

SAMPLE CHAIN OF CUSTODY

PAGE 1 OF 3

LAB ORDER #:

PROJECT # / PROJECT NAME: MUNI SERVICE CENTER

P.O. #:

REPORT TO:

CLIENT: CITY OF OAKLAND

ADDRESS: 250 FRANK OGAWA PLAZA SUITE 5301 CITY: OAKLAND STATE: CA ZIP: 94612

BILLING ADDRESS: SAME

PHONE #: 510-267-0851 FAX PHONE: SAMPLER (PRINT & SIGN NAME): J. SPEIR

ANALYSES REQUESTED

TURN-AROUND TIME
☐ STANDARD
☐ RUSH

DUE DATE:

CALTEST #	DATE SAMPLED	TIME SAMPLED	MATRIX	CONTAINER AMOUNT/TYPE	PRESERVATIVE	SAMPLE IDENTIFICATION SITE	CLIENT LAB #	COMP. or GRAB	TPH-G / BTEX / MTBE	TPH-D EXTRACT	REMARKS
	4/8/02	10:15	H2O	LITER AMBER	NONE	MW-7	1	GRAB	X		2 EACH
	4/8/02	10:15	H2O	VOA	HCL	MW-7	↓	GRAB		X	3 EACH
	4/8/02	10:57	H2O	AMBER LITER	NONE	MW-8	2	GRAB	X		2 EACH
	4/8/02	12:57	H2O	VOA	HCL	MW-8	↓	GRAB		X	3 EACH
	4/8/02	11:05	H2O	AMBER LITER	NONE	MW-10	3	GRAB	X		2 EACH
	4/8/02	11:05	H2O	VOA	HCL	MW-10	↓	GRAB		X	3 EACH

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
	4-10-02 14:25			4/10/02 1715	

Samples: WC____ MICRO____ BIO____ AA____ SV____ VOA____ pH? Y/N TEMP: 4.0 SEALED: Y/N INTACT: Y/N

BD: BIO____ WC____ AA____

CC: AA____ SV____ VOA____

SIL: HP____ PT____ QT____ VOA____

W/HNO_3____ H_2SO_4____ NaOH____

PH: HNO_3____ H_2SO_4____ NaOH____ HCL____

FOR LAB USE ONLY

COMMENTS

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

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

R____ PR____ M____ F____

WHITE - LABORATORY YELLOW - CLIENT COPY TO ACCOMPANY FINAL REPORT PINK - CLIENT COPY AS RECEIPT REV. 2/99

APR-05-2002 03:05PM FROM-CALTEST ANALYTICAL 7072261001 T-558 P.001/001 F-954

C040331

Caltest ANALYTICAL LABORATORY

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SAMPLE CHAIN OF CUSTODY

PAGE 2 OF 3

LAB ORDER #:

PROJECT #/ PROJECT NAME: MUNI SERVICE CENTER

P.O. #:

REPORT TO:

CLIENT: CITY OF OAKLAND

ADDRESS: 250 FRANK OGAWA PLAZA SUITE 5301, CITY: OAKLAND STATE: CA ZIP: 94612

BILLING ADDRESS: SAME

PHONE #: 510-267-0134

FAX PHONE:

SAMPLER (PRINT & SIGN NAME): J. SHETH

ANALYSES REQUESTED

TURN-AROUND TIME
☐ STANDARD
☐ RUSH

DUE DATE:

CALTEST #	DATE SAMPLED	TIME SAMPLED	MATRIX	CONTAINER AMOUNT/TYPE	PRESERVATIVE	SAMPLE IDENTIFICATION SITE	CLIENT LAB #	COMP. or GRAB	TPH-G/BTEX/MTBE	TPH EXTRACT	REMARKS
	4/3/02	1315	H2O	AMBER LITER	NONE	MW-12	4	GRAB	X		2 EACH
	4/3/02	1315	H2O	VOA	HCL	MW-12	↓	GRAB	X		3 EACH
	4/6/02	1610	H2O	AMBER LITER	NONE	MW-13	5	GRAB	X		2 EACH
	4/6/02	1610	H2O	VOA	HCL	MW-13	↓	GRAB	X		3 EACH
	4/9/02	1110	H2O	AMBER LITER	NONE	MW-14	6	GRAB	X		2 EACH
	4/9/02	1110	H2O	VOA	HCL	MW-14	↓	GRAB	X		3 EACH

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RELINQUISHED BY	DATE/TIME	RECEIVED BY	RELINQUISHED BY	DATE/TIME	RECEIVED BY
	4-10-02 1425	Fco. Portillo	Fco. Portillo	4/10/02 1415	

Samples: WC____ MICRO____ BIO____ AA____ SV____ VOA____ pH? Y/N TEMP: 4.0 SEALED: Y/N INTACT: Y/N

BD: BIO____ WC____ AA____

CC: AA____ SV____ VOA____

SIL: HP____ PT____ QT____ VOA____

W/HNO$_3$____ H$_2$SO$_4$____ NaOH____

SL: HN[redacted] H[redacted]

COMMENTS

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

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

B[redacted] PR[redacted] M[redacted] F[redacted]

LAB USE ONLY

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APR-05-2002 03:05PM FROM-CALTEST ANALYTICAL 7072261001 T-558 P.001/001 F-954

6040391

Caltest ANALYTICAL LABORATORY

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PAGE 3 OF 3

LAB ORDER #:

SAMPLE CHAIN OF CUSTODY

PROJECT # / PROJECT NAME: MINI SERVICE CENTER

P.O. #:

REPORT TO:

CLIENT: CITY OF OAKLAND

ADDRESS: 250 FRANK OGAWA PLAZA SUITE 5301, CITY: OAKLAND STATE: CA, ZIP: 94612

BILLING ADDRESS: SAME

PHONE #: 510-867-0434

FAX PHONE:

SAMPLER (PRINT & SIGN NAME): J. SHEIK

ANALYSES REQUESTED

TURN-AROUND TIME: ☐ STANDARD ☐ RUSH

DUE DATE:

CALTEST #	DATE SAMPLED	TIME SAMPLED	MATRIX	CONTAINER AMOUNT/TYPE	PRESERVATIVE	SAMPLE IDENTIFICATION SITE	CLIENT LAB #	COMP. or GRAB	TPH-G/BTEX/MTBE	TPH EXTRACT	REMARKS
	4/9/02	1415	H2O	AMBER LITER	NONE	MW-1	1	GRAB	X		2 EACH
	4/9/02	1415	H2O	VOA	HCL	MW-1	↓	GRAB	X		3 EACH
	4/9/02	1455	H2O	AMBER LITER	NONE	MW-5	2	GRAB	X		2 EACH
	4/9/02	1455	H2O	VOA	HCL	MW-5	↓	GRAB	X		3 EACH
	4/9/02	1080	H2O	AMBER LITER	NONE	MW-17	9	GRAB	X		2 EACH
	4/9/02	1030	H2O	VOA	HCL	MW-17	↓	GRAB	X		3 EACH

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RELINQUISHED BY	DATE/TIME	RECEIVED BY	RELINQUISHED BY	DATE/TIME	RECEIVED BY
	4-10-02 1425	Fed Ex	Fed Ex	4/10/02 1715	

Samples: WC____ MICRO____ BIO____ AA____ SV____ VOA____ pH? Y/N TEMP: 4.0 SEALED: Y/N INTACT: Y/N

BD: BIO____ WC____ AA____

CC: AA____ SV____ VOA____

SIL: NP____ PT____ QT____ VOA____

W/HNO3____ H2SO4____ NaOH____ HCL____

COMMENTS

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

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

B____ PR____ M____ F____

REV. 2/99

WHITE - LABORATORY YELLOW - CLIENT COPY TO ACCOMPANY FINAL REPORT PINK - CLIENT COPY AS RECEIPT

Appendix D

Well Sampling Protocol for Second Quarter 2002

Appendix D– Well Sampling Protocol Second Quarter 2002
City of Oakland Municipal Services Center

Well	Quarter				Gauge Every Qtr.	DO (field meter)	TPH-g 8260B/ MTBE* (8015B/ 8021)	TPH diesel (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	X				
MW-10	X	X			X	X	X	X				
MW-11	X	X			X	X	X	X				
MW-12	X	X			X	X	X	X				
MW-13	X	X			X	X	X	X				
MW-14	X	X			X	X	X	X				
MW-15	X	X			X	X	X	X				
MW-16					X	X	X	X				SPH present
MW-17	X	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 reanalysis using EPA Method 8260, except for [illegible]
** 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 [illegible] 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