STELLAR ENVIRONMENTAL SOLUTIONS
2198 SIXTH STREET, BERKELEY, CA 94710
TEL: 510.644.3123 ★ FAX: 510.644.3859

TRANSMITTAL MEMORANDUM

TO: ALAMEDA COUNTY HEALTH CARE SERVICES AGENCY
DEPT. OF ENVIRONMENTAL HEALTH
HAZARDOUS MATERIALS DIVISION
1131 HARBOR BAY PKWY, SUITE 250
ALAMEDA, CA 94502

DATE: 1/28/03

ATTENTION: **MR. SCOTT SEERY**

FILE: SES-2003-02

SUBJECT: REDWOOD REGIONAL PARK FUEL LEAK SITE

WE ARE SENDING:
- ☒ HEREWITH
- ☐ UNDER SEPARATE COVER
- ☒ VIA MAIL
- ☐ VIA

THE FOLLOWING: 2002 ANNUAL SUMMARY REPORT FOR REDWOOD REGIONAL PARK SERVICE YARD SITE – OAKLAND, CALIFORNIA (JANUARY 2003)

- ☐ AS REQUESTED
- ☐ FOR YOUR APPROVAL
- ☐ FOR REVIEW
- ☐ FOR YOUR USE
- ☐ FOR SIGNATURE
- ☒ FOR YOUR FILES

COPIES TO: K. BURGER (EBRPD)
M. RUGG (FISH & GAME)
R.BREWER (REGIONAL BOARD)

BY: Bruce Rucker BMR

★ **Stellar Environmental Solutions**

2198 Sixth Street, Suite 201, Berkeley, CA 94710
Tel: (510) 644-3123 • Fax: (510) 644-3859
Geoscience & Engineering Consulting

January 24, 2003

Mr. Scott O. Seery
Hazardous Materials Specialist
Alameda County Health Care Services Agency
Department of Environmental Health, Hazardous Materials Division
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502

Subject: Year 2002 Annual Summary Report
Redwood Regional Park Service Yard Site – Oakland, California

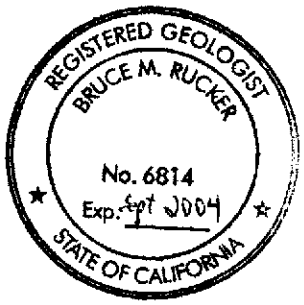
Dear Mr. Seery:

Attached is the Stellar Environmental Solutions (SES) Year 2002 Annual Summary Report for the underground fuel storage tank (UFST) site at the Redwood Regional Park Service Yard, located at 7867 Redwood Road, Oakland, California. This project is being conducted for the East Bay Regional Park District, and follows previous site investigation and remediation activities associated with former leaking underground fuel storage tanks, conducted since 1993. The key regulatory agencies for this investigation are the Alameda County Health Care Services Agency, the California Regional Water Quality Control Board, and the California Department of Fish and Game.

This report summarizes activities conducted from October through December 2002, including groundwater monitoring and sampling of site wells and surface water sampling. Hydrochemical trends and an assessment of the ORC™ injection corrective action program are also discussed. If you have any questions regarding this report, please contact Mr. Ken Burger of the East Bay Regional Park District, or contact us directly at (510) 644-3123.

Sincerely,

Bruce M. Rucker, R.G., R.E.A.
Project Manager



Richard S. Makdisi, R.G., R.E.A.
Principal

cc: Michael Rugg, California Department of Fish and Game
Roger Brewer, California Regional Water Quality Control Board
Ken Burger, East Bay Regional Park District

YEAR 2002 ANNUAL SUMMARY REPORT

REDWOOD REGIONAL PARK
SERVICE YARD
OAKLAND, CALIFORNIA

Prepared for:

EAST BAY REGIONAL PARK DISTRICT
OAKLAND, CALIFORNIA

Prepared by:

STELLAR ENVIRONMENTAL SOLUTIONS, INC.
2198 SIXTH STREET
BERKELEY, CALIFORNIA 94710

January 27, 2003

Project No. 2003-02

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1.0 INTRODUCTION

PROJECT BACKGROUND AND PREVIOUS ACTIVITIES

The subject property is the East Bay Regional Park District (EBRPD) Redwood Regional Park Service Yard located at 7867 Redwood Road in Oakland, Alameda County, California. The site has undergone site investigations and remediation since 1993 to address subsurface contamination caused by leakage from one or more of two former underground fuel storage tanks (UFSTs) that contained gasoline and diesel fuel. The Alameda County Health Care Services Agency (ACHCSA) has provided regulatory oversight of the investigation since its inception. Other regulatory agencies with historical involvement in site review include the California Regional Water Quality Control Board (RWQCB) and the California Department of Fish and Game (CDFG).

The following phases of site investigation and corrective action have been completed:

- May and June 1993: Site USTs were removed.
- September and October 1993: Initial site characterization (17 exploratory boreholes).
- October 1994: Installation of six groundwater monitoring wells.
- November 1994 to April 1999: Quarterly groundwater and surface water monitoring (14 events).
- April 1999: Additional site characterization (10 exploratory boreholes) and initial instream bioassessment event.
- December 1999 to September 2000: Quarterly groundwater and surface water monitoring (two events).
- December 2000: Installation of two additional groundwater monitoring wells.
- January 2001, April 2001, and August 2001: Quarterly groundwater and surface water monitoring (three events) and second instream bioassessment event.
- September 2001: Installation of three additional groundwater monitoring wells followed by injection of ORC™ (3,000 lbs) via 44 exploratory injection boreholes (first of two injection phases).
- December 2001: Quarterly groundwater and surface water monitoring (one event).
- March and June 2002: Quarterly groundwater and surface monitoring (two events).

- July 2002: Injection of ORC™ (1,000 pounds) via 30 exploratory injection boreholes (second injection phase).
- September 2002: Quarterly groundwater and surface water monitoring (one event).
- December 2002: Quarterly groundwater and surface water monitoring (one event).

OBJECTIVES AND SCOPE OF WORK

This report discusses activities conducted from October through December 2002, including:

- Collecting water levels in site wells to determine shallow groundwater flow direction;
- Sampling site wells for contaminant concentrations and natural attenuation indicators;
- Collecting surface water samples for contaminant analysis; and
- Evaluating hydrochemical trends and assessing the effectiveness of the ORC™ injection program in the central area of contamination.

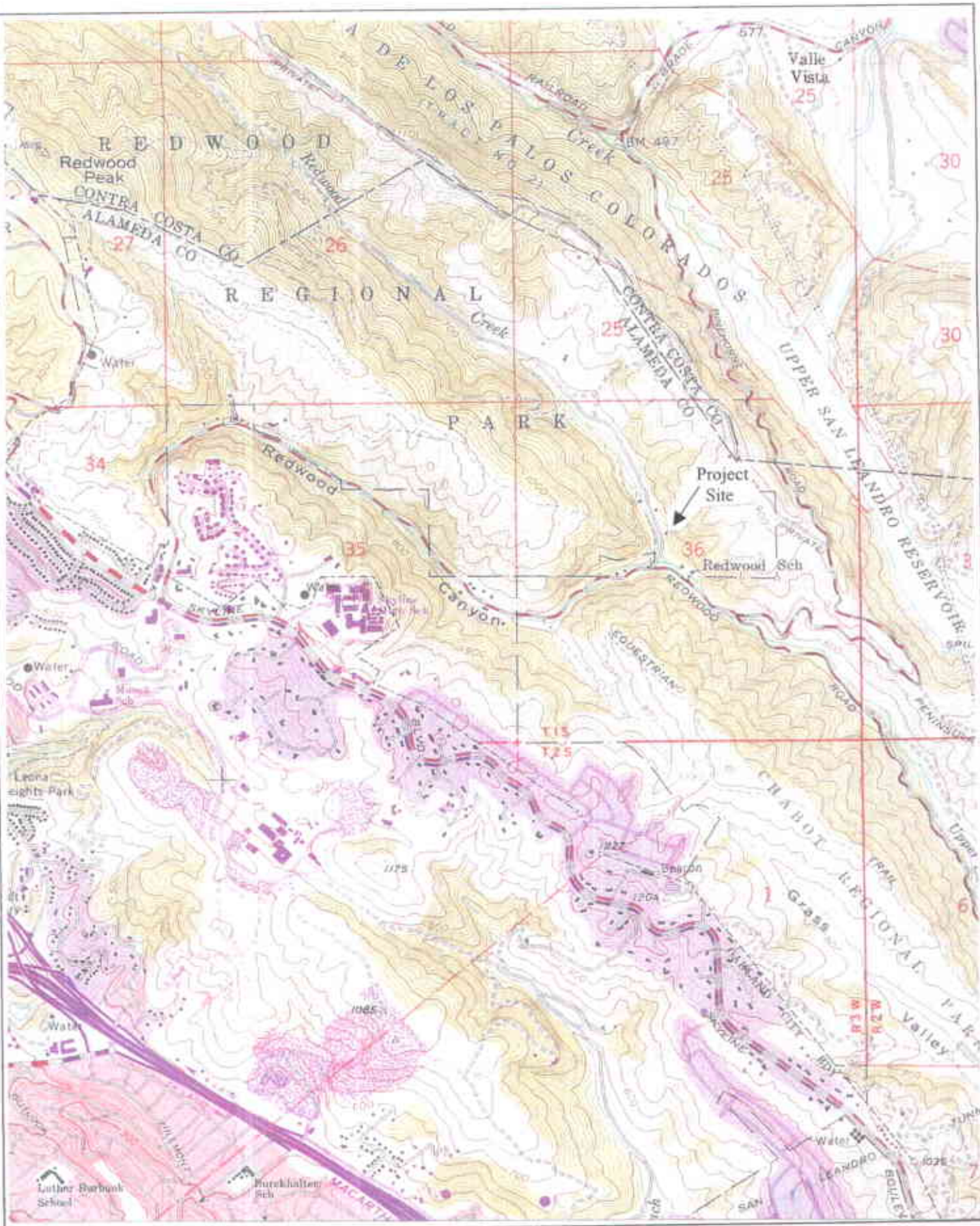
Previous SES reports submitted in June 1999 and April 2000 provided a full discussion of previous site remediation and investigations; site geology and hydrogeology; residual site contamination; conceptual model for contaminant fate and transport; and evaluation of hydrochemical trends and plume stability. An October 2000 Feasibility Study report for the site, submitted to ACHCSA, provided detailed analyses of the regulatory implications of the site contamination and an assessment of viable corrective actions (SES, 2000d). The two phases of ORC™ injection are summarized in previous SES reports (SES, 2001c; SES, 2002c).

SITE DESCRIPTION

The project site is located at 7867 Redwood Road in Oakland, Alameda County, California. Figure 1 shows the location of the project site. The site slopes to the west, from an elevation of approximately 564 feet above mean sea level (amsl) at the eastern edge of the service yard to approximately 545 feet amsl at Redwood Creek, which approximately defines the western edge of the project site with regard to this investigation. Figure 2 shows the site plan.

REGULATORY OVERSIGHT

The lead regulatory agency for the site investigation and remediation is the ACHCSA, with oversight provided by the RWQCB. The CDFG is also involved due to concerns over water quality impacts to Redwood Creek. All workplans and reports are submitted to these agencies. The most recent ACHCSA directive regarding the site (letter dated January 8, 2001) approved the ORC™ injection corrective action and requested continued quarterly groundwater monitoring and sampling.



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U.S.G.S. TOPOGRAPHIC MAP SHOWING SITE LOCATION

Redwood Regional Park Service Yard
Oakland, Alameda County, California

By: MJC | NOVEMBER 1997

Figure 1

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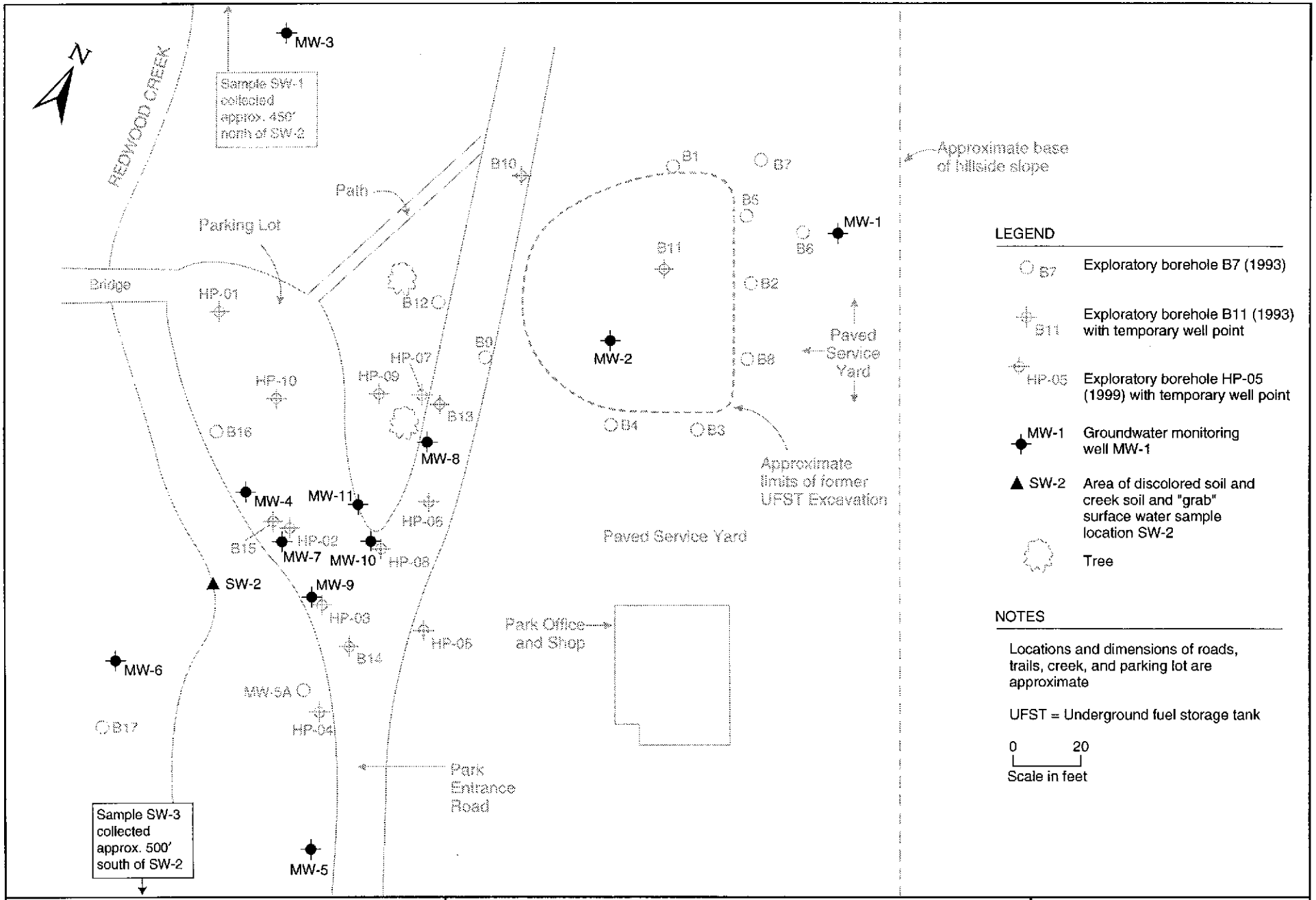

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SITE PLAN AND HISTORICAL SAMPLING LOCATIONS
Redwood Regional Park Service Yard, Oakland, CA

Figure 2

by: MJC | JANUARY 2003

2001-53-01

Historical ACHCSA-approved revisions to the groundwater sampling program have included: 1) discontinuing hydrochemical sampling and analysis in wells MW-1, MW-3, MW-5, and MW-6; 2) discontinuing creek surface water sampling at upstream location SW-1; and 3) reducing the frequency of creek surface water sampling from quarterly to semi-annually (ACHCSA, 1996). The latter recommendation has not yet been implemented due to continued concern over potential impacts to Redwood Creek.

2.0 PHYSICAL SETTING

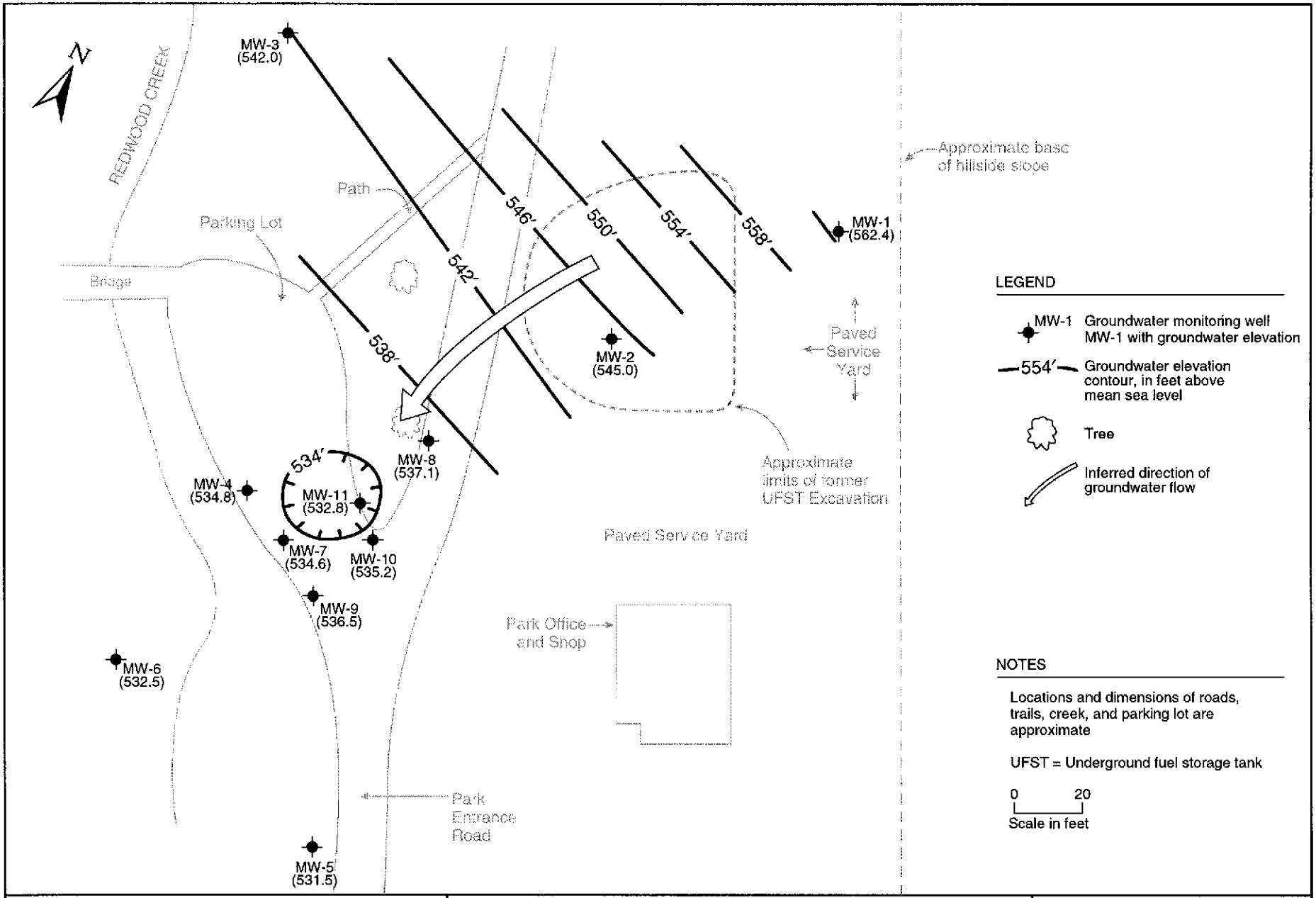
Following is a brief summary of the site hydrogeologic conditions based on geologic logging and water level measurements collected at the site since September 1993. A full discussion is presented in the SES June 1999 report.

Shallow soil stratigraphy consists of a surficial 3- to 10-foot-thick clayey silt unit underlain by a 5- to 15-foot-thick silty clay unit. In the majority of boreholes, a 5- to 10-foot-thick clayey coarse-grained sand and clayey gravel unit was encountered that laterally grades to a clay or silty clay. This unit overlies a weathered siltstone at the base of the observed soil profile. Soils in the vicinity of MW-1 are inferred to be landslide debris.

Groundwater at the site occurs under unconfined and semi-confined conditions, generally within the clayey, silty sand-gravel zone. The top of this zone varies between approximately 12 and 19 feet below ground surface (bgs), and the bottom of the water-bearing zone (approximately 25 to 28 feet bgs) corresponds to the top of the siltstone bedrock unit. Seasonal fluctuations in groundwater depth create a capillary fringe of several feet which is saturated in the rainy period (late fall through early spring) and unsaturated the remainder of the year. The thickness of the saturated zone plus the capillary fringe varies between approximately 10 and 15 feet in the area of contamination. Local perched water zones have been observed well above the top of the capillary fringe. Local groundwater flow direction has been consistently measured as northeast to southwest.

Figure 3 is a groundwater elevation map constructed from the current event monitoring well static water levels, and Table 1 (in Section 4.0) summarizes current event groundwater elevation data. The groundwater gradient is relatively steep—approximately 2 feet per foot—between well MW-1 and the former UFST source area, resulting from the topography and the highly disturbed nature of sediments in the landslide debris. Downgradient from (west of) the UFST source area (between MW-2 and Redwood Creek), the groundwater gradient is approximately 0.1 feet per foot. The direction of shallow groundwater flow during the current event was west-southwest (toward Redwood Creek), which is consistent with site historical groundwater flow direction.

From site-specific empirical data (using the estimated time for UFST-sourced contamination to reach Redwood Creek), a conservative estimate of groundwater velocity within the aquifer material is at 7 to 10 feet per year, with the rate of movement within the clay rich zones being substantially less.



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GROUNDWATER ELEVATION MAP–December 18, 2002
Redwood Regional Park Service Yard, Oakland, CA

Figure 3

by: MJC | JANUARY 2003

2003-02-03

Redwood Creek borders the site to the west, and is a seasonal creek known for the occurrence of rainbow trout. Creek flow in the vicinity of the site shows significant seasonal variation, with little to no flow during the summer and fall dry season, and vigorous flow with depths to 1 foot during the winter and spring wet season. The creek is a gaining stream (i.e., it is recharged by groundwater) in the vicinity of the site that discharges into Upper San Leandro Reservoir, located approximately 1 mile southeast of the site.

3.0 DECEMBER 2002 CREEK AND GROUNDWATER SAMPLING

This section presents the creek surface water and groundwater sampling and analytical methods for the current event. Groundwater and surface water analytical results are summarized in Section 4.0. Monitoring and sampling protocols were in accordance with the ACHCSA-approved SES technical workplan (SES 1998a). Activities included:

- Measuring static water levels and field analyzing pre-purge groundwater samples for indicators of natural attenuation (dissolved oxygen, ferrous iron, and redox potential) in all site wells (MW-1 through MW-11);
- Collecting pre-purge groundwater samples for laboratory analysis of the natural attenuation indicators nitrate and sulfate from monitoring wells MW-3, MW-4, and MW-7 through MW-11;
- Collecting post-purge groundwater samples for laboratory analysis of site contaminants from wells located within the groundwater plume (MW-2, MW-4, and MW-7 through MW-11); and
- Collecting Redwood Creek surface water samples for laboratory analysis from locations SW-2 and SW-3.

Creek sampling and groundwater monitoring/sampling was conducted on December 18, 2002. The locations of all site monitoring wells and creek water sampling locations are shown on Figure 2. Well construction information and water level data are summarized in Table 1. Appendix A contains the groundwater monitoring field record.

GROUNDWATER LEVEL MONITORING AND SAMPLING

Groundwater monitoring well water level measurements, purging, sampling, and field analyses were conducted by Blaine Tech Services under the direct supervision of SES personnel. Groundwater sampling was conducted in accordance with State of California guidelines for sampling dissolved analytes in groundwater associated with leaking UFSTs (RWQCB, 1989), and followed the methods and protocols approved by the ACHCSA in the SES 1998 workplan (SES, 1998a).

Table 1
Groundwater Monitoring Well Construction and Groundwater Elevation Data
Redwood Regional Park Corporation Yard, Oakland, California

Well	Well Depth	Screened Interval	TOC Elevation	Groundwater Elevation (12/18/02)
MW-1	18	7 to17	565.9	562.4
MW-2	36	20 to 35	566.5	545.0
MW-3	42	7 to 41	560.9	542.0
MW-4	26	10 to 25	548.1	534.8
MW-5	26	10 to 25	547.5	531.5
MW-6	26	10 to 25	545.6	532.5
MW-7	24	9 to24	547.7	534.6
MW-8	23	8 to 23	549.2	537.1
MW-9	26	11 to 26	549.4	536.5
MW-10	26	11 to 26	547.3	535.2
MW-11	26	11 to 26	547.9	532.8

Notes:

TOC = Top of casing.

Wells MW-1 through MW-6 are 4-inch diameter; all other wells are 2-inch diameter.

All elevations are feet above USGS mean sea level. Elevations of Wells MW-1 through MW-6 were surveyed by EBRPD relative to USGS Benchmark No. JHF-49. Wells MW-7 through MW-11 were surveyed by a licensed land surveyor using existing site wells as datum.

As the first task of the monitoring event, static water levels were measured using an electric water level indicator. Pre-purge groundwater samples were then collected for field and laboratory analysis of natural attenuation indicators. The wells to be sampled for contaminant analyses were then purged (by bailing and/or pumping) of a minimum of three wetted casing volumes. Aquifer stability parameters (temperature, pH, and electrical conductivity) were measured after each purged casing volume to ensure that representative formation water would be sampled.

Approximately 114 gallons of well purge water and decontamination rinseate from the current event was containerized in the onsite plastic tank. Purge water from future events will continue to be accumulated in the onsite tank until it is full, at which time the water will be transported offsite for proper disposal.

CREEK SURFACE WATER SAMPLING

Surface water sampling was conducted by SES on December 18, 2001. Surface water samples were collected from Redwood Creek location SW-2 (immediately downgradient of the former UFST source area and within the area of documented creek bank soil contamination) and location SW-3 (approximately 500 feet downstream from SW-2) (see Figure 2 for locations). In accordance with a previous ACHCSA-approved SES recommendation, upstream sample location SW-1 was not sampled.

At the time of sampling, water in the creek was relatively high and flowing briskly between locations SW-2 and SW-3. Creek water depth was approximately 1 to 2 feet. Because of the high water flow, the historically-observed (during low water conditions) petroleum sheen at SW-2 was not evident.

4.0 CURRENT MONITORING EVENT ANALYTICAL RESULTS AND REGULATORY CONSIDERATIONS

This section presents the field and laboratory analytical results of the most recent monitoring event, preceded by a brief summary of regulatory considerations regarding surface water and groundwater contamination. Table 2 and Figure 4 summarize the contaminant analytical results of the current monitoring event; Table 3 summarizes natural attenuation indicator results from the current event. Appendix B contains the certified analytical laboratory report and chain-of-custody record. Section 5.0 contains a detailed discussion of hydrochemical and surface water trends and a preliminary evaluation of the effectiveness of the ORC™ injection corrective action. Appendix C contains a tabular summary of historical groundwater and surface water analytical results and hydrochemical trend plots.

REGULATORY CONSIDERATIONS

Groundwater Contamination

As specified in the RWQCB's *San Francisco Bay Region Water Quality Control Plan*, all groundwaters are considered potential sources of drinking water unless otherwise approved by the RWQCB, and are also assumed to ultimately discharge to a surface water body and potentially impact aquatic organisms. While it is likely that site groundwater would satisfy geology-related criteria for exclusion as a drinking water source (excessive total dissolved solids and/or insufficient sustained yield), RWQCB approval for this exclusion has not been obtained for the site. As summarized in Table 2, site groundwater contaminant levels are compared to two sets of criteria: 1) RWQCB Tier 1 Risk-Based Screening Levels (RBSLs) for sites where groundwater is a current or potential drinking water source; and 2) RBSLs for sites where groundwater is not a current or potential drinking water source.

As stipulated in the RBSL document (August 2000, Interim Final), the RBSLs are not cleanup criteria; rather, they are conservative screening-level criteria designed to be protective of both drinking water resources and aquatic environments in general. The groundwater RBSLs include one or more components, including ceiling value, human toxicity, indoor air impacts, and aquatic life protection. Exceedance of RBSLs suggests that additional investigation and/or remediation is warranted. While drinking water standards (e.g., Maximum Contaminant Levels [MCLs]) are

Table 2
Groundwater and Surface Water Sample
Analytical Results – December 2002
Redwood Regional Park Corporation Yard, Oakland, California

Compound	Concentrations in µg/L						
	TPHg	TPHd	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE
Groundwater Samples							
MW-2	*<50*	*<50*	4.3	*<0.5*	*<0.5*	*<0.5*	*<2.0*
MW-4	*<50*	*<50*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<2.0*
MW-7	9,600	3,700	110	*<0.5*	400	189	*<2.0*
MW-8	3,300	290	67	*<0.5*	190	203	*<2.0*
MW-9	7,000	3,500	380	9.5	730	147	<10
MW-10	<50	<50	<0.5	<0.5	<0.5	<0.5	16
MW-11	18,000	4,500	420	<2.5	1,100	912	<10
Groundwater RBSLs [a]	100 / 500	100 / 640	1.0 / 46	40 / 130	30 / 290	13 / 13	5.0 / 1,800
Redwood Creek Surface Water Samples							
SW-2	<50	<50	<0.5	<0.5	<0.5	<0.5	<2.0
SW-3	<50	<50	<0.5	<0.5	<0.5	<0.5	<2.0
Surface Water Screening Levels [b]	500	640	46	130	290	13	8,000

Notes:

[a] RWQCB Risk-Based Screening Levels (drinking water resource threatened/not threatened) (RWQCB, 2000).

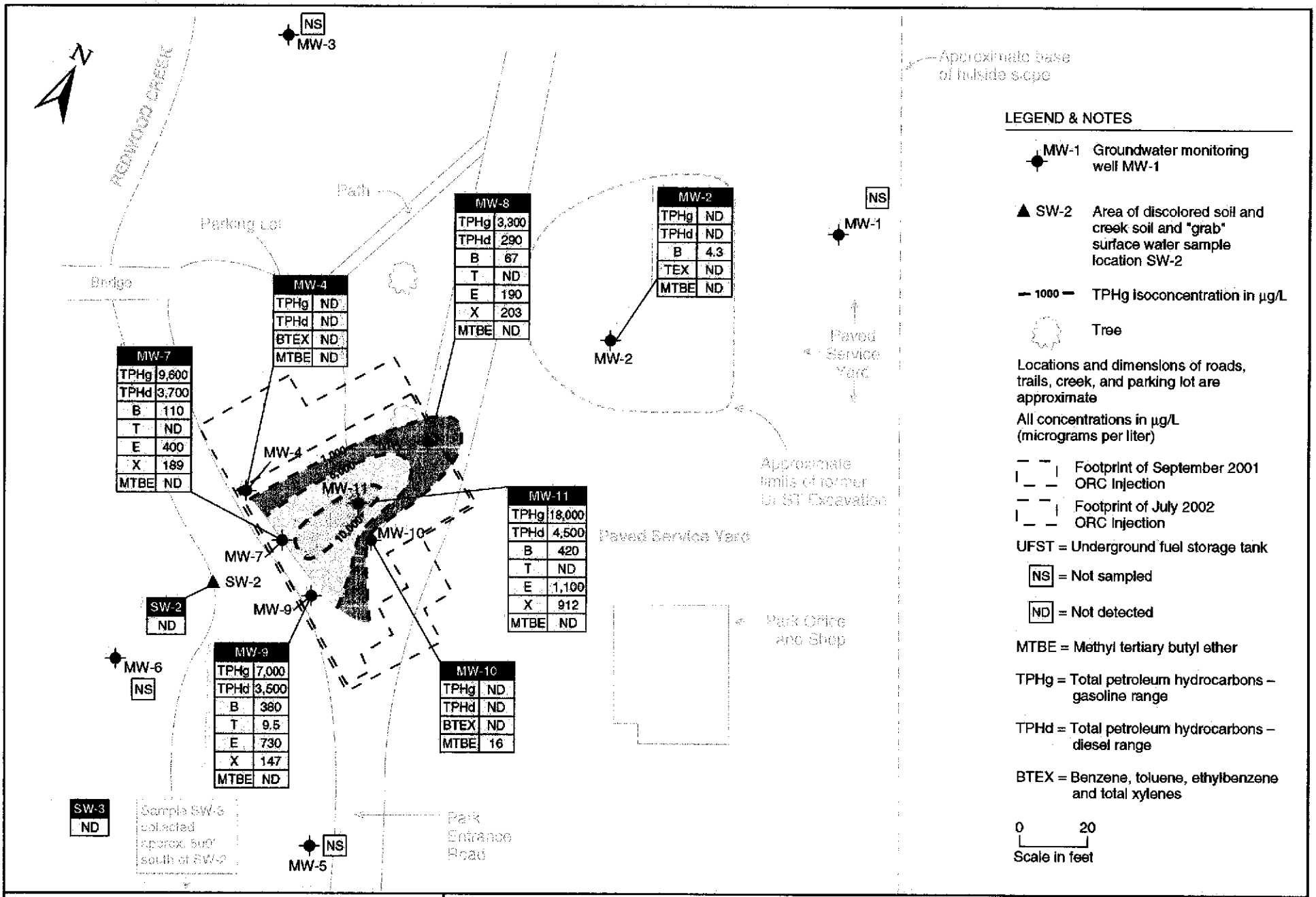
[b] Lowest of chronic and acute surface water criteria published by the State of California, U.S. Environmental Protection Agency, or U.S. Department of Energy.

MTBE = Methyl *tertiary*-butyl ether.

TPHg = Total petroleum hydrocarbons - gasoline range (equivalent to total volatile hydrocarbons - gasoline range).

TPHd = Total petroleum hydrocarbons - diesel range (equivalent to total extractable hydrocarbons - diesel range).

µg/L = Micrograms per liter, equivalent to parts per billion (ppb).



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ANALYTICAL RESULTS AND TPH-GAS PLUME—DECEMBER 2002
Redwood Regional Park Service Yard, Oakland, CA

Figure 4

by: MJC | JANUARY 2003

2003-02-05

Table 3
Groundwater Sample Analytical Results
Natural Attenuation Indicators – December 18, 2002
Redwood Regional Park Corporation Yard, Oakland, California

Sample I.D.	Nitrogen (as Nitrate) (mg/L)	Sulfate (mg/L)	Dissolved Oxygen (mg/L)	Ferrous Iron (mg/L)	Redox Potential (milliVolts)
MW-1	NA	NA	1.3	0.2	174
MW-2	NA	NA	0.7	0.6	216
MW-3	<0.05	36	1.2	0.4	170
MW-4	0.42	59	12.1	0.4	264
MW-5	NA	NA	0.9	0.2	210
MW-6	NA	NA	1.0	0.4	166
MW-7	0.05	3.4	0.8	2.6	-67
MW-8	0.05	88	0.5	0.4	215
MW-9	0.06	67	0.9	0.4	124
MW-10	<0.05	61	6.7	0.4	180
MW-11	<0.05	1.9	0.4	2.0	-78

Notes:

mg/L = Milligrams per liter, equivalent to parts per million (ppm).

NA = Not analyzed.

published for the site contaminants of concern, the ACHCSA has indicated that impacts to nearby Redwood Creek are of primary importance, and that site target cleanup standards should be evaluated primarily within the context of surface water quality criteria.

Surface Water Contamination

As summarized in Table 2, site surface water contaminant levels are compared to the most stringent screening level criteria published by the State of California, U.S. Environmental Protection Agency, and U.S. Department of Energy. These screening criteria address chronic and acute exposures to aquatic life. As discussed in the RWQCB August 2000 RBSL document, benthic communities at the groundwater/surface water interface (e.g., at site groundwater discharge location SW-2) are assumed to be exposed to the full concentration of groundwater contamination prior to dilution/mixing with the surface water). This was also a fundamental assumption in the instream benthic macro-invertebrate bioassessment events, which documented no measurable impacts.

Historical surface water sampling in the immediate vicinity of contaminated groundwater discharge (SW-2) has sporadically documented petroleum contamination, usually in periods of low stream flow, and generally at concentrations several orders of magnitude less than adjacent (within 20 feet) groundwater monitoring well concentrations. It is likely that mixing/dilution between groundwater and surface water precludes obtaining an "instantaneous discharge" surface water sample that is wholly representative of groundwater contamination at the discharge location. Therefore, the most conservative assumption is that surface water contamination at the groundwater/surface water interface is equivalent to the upgradient groundwater contamination (e.g., site downgradient wells MW-4, MW-7, and MW-9).

While site target cleanup standards for groundwater have not been determined, it is likely that no further action will be required by regulatory agencies when groundwater (and surface water) contaminant concentrations are all below their respective screening level criteria. Residual contaminant concentrations in excess of screening level criteria might be acceptable to regulatory agencies, if a more detailed risk assessment (e.g., Tier 2 and/or Tier 3) can demonstrate that no significant impacts are likely.

GROUNDWATER AND SURFACE WATER CONTAMINANT FINDINGS

Current event groundwater and surface water data indicate the following:

- Current site groundwater contaminant concentrations exceed their respective groundwater RBSLs (for both cases, where drinking water resource is or is not threatened), with the exception of toluene, which does not exceed either set of criteria. MTBE exceeds only the "drinking water resource threatened" criterion, and only in one well. Site groundwater contaminant concentrations also exceed all surface water screening levels, with the exception of toluene and MTBE.
- Maximum groundwater contaminant concentrations for TPHg, TPHd, benzene, ethyl-benzene, and xylenes were detected in well MW-11 (approximately 50 upgradient of Redwood Creek). Wells MW-7 and MW-9 (both located at the extreme downgradient edge of the site, immediately upgradient of Redwood Creek), showed the next highest groundwater contaminant concentrations for most site contaminants. Trace to non-detectable groundwater contaminant concentrations were present in former source area well MW-2 (approximately 130 feet upgradient of Redwood Creek), well MW-4 (northern boundary of the plume), and MW-10 (southern boundary of the plume).
- The existing well layout fully constrains the lateral extent of groundwater contamination, and the vertical limit is very likely the top of the near-surface (25 to 28 feet) siltstone bedrock. The saturated interval extends approximately 12 to 15 feet from top of bedrock through the capillary fringe.

- Groundwater contamination above screening levels appears to be approximately 100 feet long and approximately 70 feet wide. The zone of greatest contamination (greater than 10,000 μg/L TPH) is an approximately 20- to 30-foot-wide by 50-foot-long area extending from just upgradient of MW-11 to the most downgradient well MW-7.
- The groundwater contaminant plume has become disconnected from the former source, and has migrated well beyond the former source area (represented by well MW-2) toward Redwood Creek.
- No site-sourced contaminants were detected in either of two surface water samples, nor was there visual evidence of petroleum discharge to the Creek.

NATURAL ATTENUATION INDICATORS

Pre-purge groundwater samples from selected wells were collected and analyzed for indicators of the natural biodegradation of the hydrocarbon contamination or "natural attenuation." Petroleum hydrocarbons require molecular oxygen to break down the ring structure of specific constituents. Accordingly, although biodegradation of hydrocarbons can occur under anaerobic conditions, hydrocarbon biodegradation is greatest under aerobic conditions. As a result of the demonstrated degradability of petroleum hydrocarbons, remediation by natural attenuation has been found to be a viable option for addressing many hydrocarbon plumes, replacing the need for more aggressive remediation. However, such natural attenuation only occurs if the concentration of hydrocarbons is low enough to facilitate the infiltration of natural oxygen through the interstitial space around the contamination, supporting the microorganisms for which the contamination is a food source, thus "attenuating" it.

The concentration in soil or groundwater above which natural attenuation is unlikely to take place is still the subject of various research studies. In general, biodegradation of petroleum hydrocarbons in groundwater has a significant role in creating a stable plume and minimizing groundwater plume configuration and concentrations over time. Evidence of the historical occurrence and potential for future occurrence of biodegradation can be obtained from analysis of groundwater for specific biodegradation-indicator parameters, including dissolved oxygen, oxidation-reduction potential (ORP), and general mineral analyses (ferrous iron, nitrate, and sulfate).

Dissolved Oxygen

Dissolved oxygen (DO) is the most thermodynamically-favored electron acceptor used in aerobic biodegradation of hydrocarbons. Active aerobic biodegradation of petroleum hydrocarbon compounds requires at least 1 to 2 mg/L of DO in groundwater. During aerobic biodegradation, DO levels are reduced in the hydrocarbon plume as respiration occurs. Therefore, DO levels that vary inversely to hydrocarbon concentrations are consistent with the occurrence of aerobic

biodegradation. Current monitoring event DO concentrations ranged from 0.7 mg/L to 12.1 mg/L. DO concentrations in the six site wells with recent groundwater contamination were all at or below 1.2 mg/L, following the model expected. However, two of the five remaining wells (inferred or known to have no recent groundwater contamination) also have comparable low DO concentrations, suggesting that site background DO concentrations are low. Elevated DO concentrations (above approximately 1 mg/L) were present only in two site wells, and both are outside the contaminant plume. These data suggest no direct correlation between DO and TPH concentrations. As discussed in detail in Section 5.0, dissolved oxygen levels generally increased following the September 2001 ORC™ injection program.

Oxidation-Reduction Potential

The oxidation-reduction potential (ORP) of groundwater is a measure of electron activity, and is an indicator of the relative tendency of a solute species to gain or lose electrons. The ORP of groundwater generally ranges from -400 millivolts (mV) to +800 mV. In oxidizing conditions, the ORP of groundwater is positive; while in reducing conditions, the ORP is typically negative (or less positive). Reducing conditions (less positive ORP) are consistent with occurrence of anaerobic biodegradation. Therefore, ORP values of groundwater inside a hydrocarbon plume are typically less than those measured outside the plume.

Current monitoring event ORP concentrations ranged from -78 mV to 264 mV. Of the four wells with pronounced hydrocarbon contamination (MW-7, MW-8, MW-9, and MW-11), the ORP values ranged from -78 mV to 215 mV, with a strong inverse correlation between TPH and ORP. ORP values in the remaining wells (with no pronounced TPH contamination) all showed ORP values greater than 166 mV. The results generally show the expected inverse correlation indicative of biodegradation.

General Mineral Analyses

An inverse relationship between general minerals—including ferrous iron (Fe_2^+), nitrate (NO_3^-), and sulfate (SO_4^{2-})—and hydrocarbon concentrations is also indicative of the occurrence of biodegradation. Specifically, anaerobic degradation and oxidation of compounds is implied where general mineral concentrations are low and TPH concentrations are high.

Ferrous iron values in the current event ranged from 0.2 mg/L to 2.4 mg/L, with all but two of the wells having values at or below 0.6 mg/L, and did not show the expected inverse correlation with TPH concentrations. Neither nitrate nor sulfate showed a viable correlation with TPH concentrations.

In summary, the natural attenuation indicator data provide mixed correlation with expected values inside as opposed to outside the plume. It is reasonable to assume that natural attenuation is likely

occurring in a more pronounced manner on the fringes of the plume, where there is less contamination and more oxygen, while oxygen levels in the area of maximum groundwater contamination are likely to be insufficient to support significant natural attenuation. This has been modified somewhat with the ORC™ injection events (discussed in the following section). Future monitoring for bio-indicator analyses will allow for a more complete evaluation of the occurrence of enhanced biodegradation at the site as a result of the ORC™ injection. SES will further evaluate the occurrence of biodegradation, the influence of natural attenuation, and the ultimate extent of the hydrocarbon plume underlying the site.

QUALITY CONTROL SAMPLE ANALYTICAL RESULTS

Laboratory QC samples (e.g., method blanks, matrix spikes, surrogate spikes, etc.) were analyzed by the laboratory in accordance with requirements of each analytical method. All laboratory QC sample results and sample holding times were within the acceptance limits of the methods (see Appendix B).

5.0 HYDROCHEMICAL TRENDS AND EVALUATION OF CORRECTIVE ACTION EFFECTIVENESS

This section evaluates the observed hydrochemical trends with regard to plume stability and migration of the center of contaminant mass toward Redwood Creek. An evaluation of the effectiveness of the ORC™ injection corrective action is also made.

Groundwater monitoring has been conducted in contaminant-impacted site wells for a minimum of eight quarterly groundwater monitoring events. Two ORC™ injection events have been conducted: 1) September 2001 (3,000 pounds ORC™ in 44 boreholes), followed by three quarterly groundwater monitoring events; and 2) July 2002 (1,000 pounds ORC™ in 30 boreholes), followed by two quarterly groundwater monitoring events. Both injections focused on the area of elevated petroleum contamination in groundwater. More ORC™ product was loaded into and around the centerline of the plume (as represented by wells MW-8 and MW-7) than along the plume margins.

GENERAL HYDROCHEMICAL TRENDS

Appendix C contains a summary of historical groundwater analytical results, as well as figures showing historical contaminant plume extent relative to the ORC injection footprints.

In general, the lateral extent of groundwater contamination has decreased over time, specifically the northern and southern limits of the plume have contracted, such that wells MW-4 (constraining the northern edge of the plume) and MW-10 (constraining the southern edge of the plume) have shown trace or no detectable contamination since before August 2001 (the first event following the first ORC injection phase). This suggests that the ORC injection was wholly effective in eliminating contamination on the fringes of the plume. A good example of localized reduction in contaminant concentrations is shown in the March 2002 sampling event (see plume extent map in Appendix C). In that event (2nd event following 2nd ORC injection phase), gasoline concentrations in mid-plume well MW-11 were reduced from 5,800 µg/L to 100 µg/L.

All petroleum-impacted wells showed a decrease in contaminant concentrations relative to the previous quarter (the first monitoring event following the ORC™ injection program), with some

exceptions: TPHd increased in well MW-9; ethylbenzene increased slightly in well MW-2; and benzene, ethylbenzene, and xylenes increased slightly in well MW-7. However, quarter to quarter comparisons can be unduly influenced by seasonal effects that mask longer trends. A general decrease of contaminant concentrations is expected in the December event due to seasonal impacts of dilution from rainwater recharge.

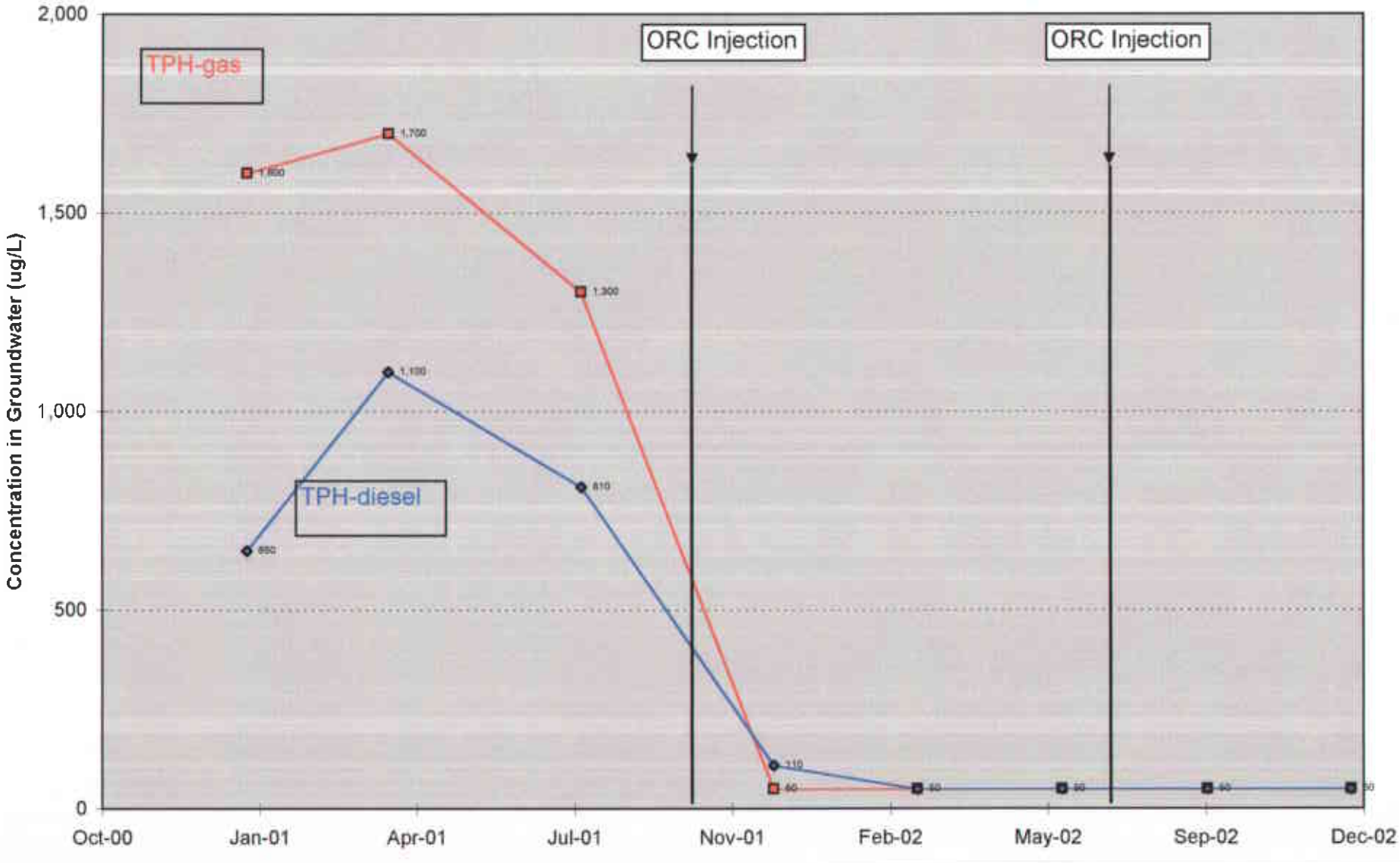
Three wells within the contaminant plume (MW-4, MW-7, and MW-8) have been analyzed for the primary site contaminants (TPHg, TPHd, benzene, and MTBE) for at least eight quarters. Well MW-4 has shown an overall decrease in all contaminant concentrations over the previous year of monitoring, including a decrease between the pre- and post-ORC™ injection events. Contaminant concentrations in the most recent event (indicative of wet weather conditions) are well below the concentrations of the previous wet weather event (January 2001). Well MW-8 has shown similar downward trends for all contaminants except TPHd (the concentration of which is equivalent to that measured a year ago). Well MW-7 has shown a downward trend for TPHg and MTBE. Benzene in this well is at approximately the same concentration as a year ago, while TPHd has increased slightly. Figures 5, 6, and 7 show the plots of TPHg and TPHd concentrations over time for MW-4, MW-8, and MW-7, respectively.

The hydrochemical trends for the chemical of concern do not show a simple linear reduction trend line. This is expected because the system is dynamic, with many variables such as seasonal effects and the short interval between groundwater sampling events and the two ORC™ injection events. Generally, the February 2002 and May 2002 data appear at odds with the principal trends. In addition, the wells on the margins sometimes show significantly fluctuating levels, or may, as with MW-4, deceptively appear to reflect the best-case scenario in which all samples following the initial injection of September 2001 drop to an asymptote for both gas and diesel (Figure 5). We concluded that the most effective way to filter out seasonal and other "noise" of the data set was to compare the three quarterly samples collected before the first injection event with the last three quarterly samples collected in 2002, and average the results into two datasets. Furthermore, as our principal concern involves the centerline of the plume with the highest concentrations and greatest potential to impact Redwood Creek, we examined the contaminant concentrations in the most upgradient well with significant concentrations (MW-8) and the most downgradient well in the centerline (MW-7).

UPGRADIENT PLUME TRENDS

Well MW-8 was installed to monitor the residual high concentration portion of the plume (approximately 80 feet upgradient of Redwood Creek) that showed significant TPHg and BTEX. Figure 6 shows the pre- and post-ORC™ injection hydrochemical data for MW-8. The location of

Figure 5: TPH-gasoline and TPH-diesel Hydrochemical Trends: Well MW-4
Redwood Regional Park Service Yard, Oakland, California



Stellar Environmental Solutions, Inc.

Figure 6: TPH-gasoline and TPH-diesel Hydrochemical Trends: Well MW-8
Redwood Regional Park Service Yard, Oakland, California

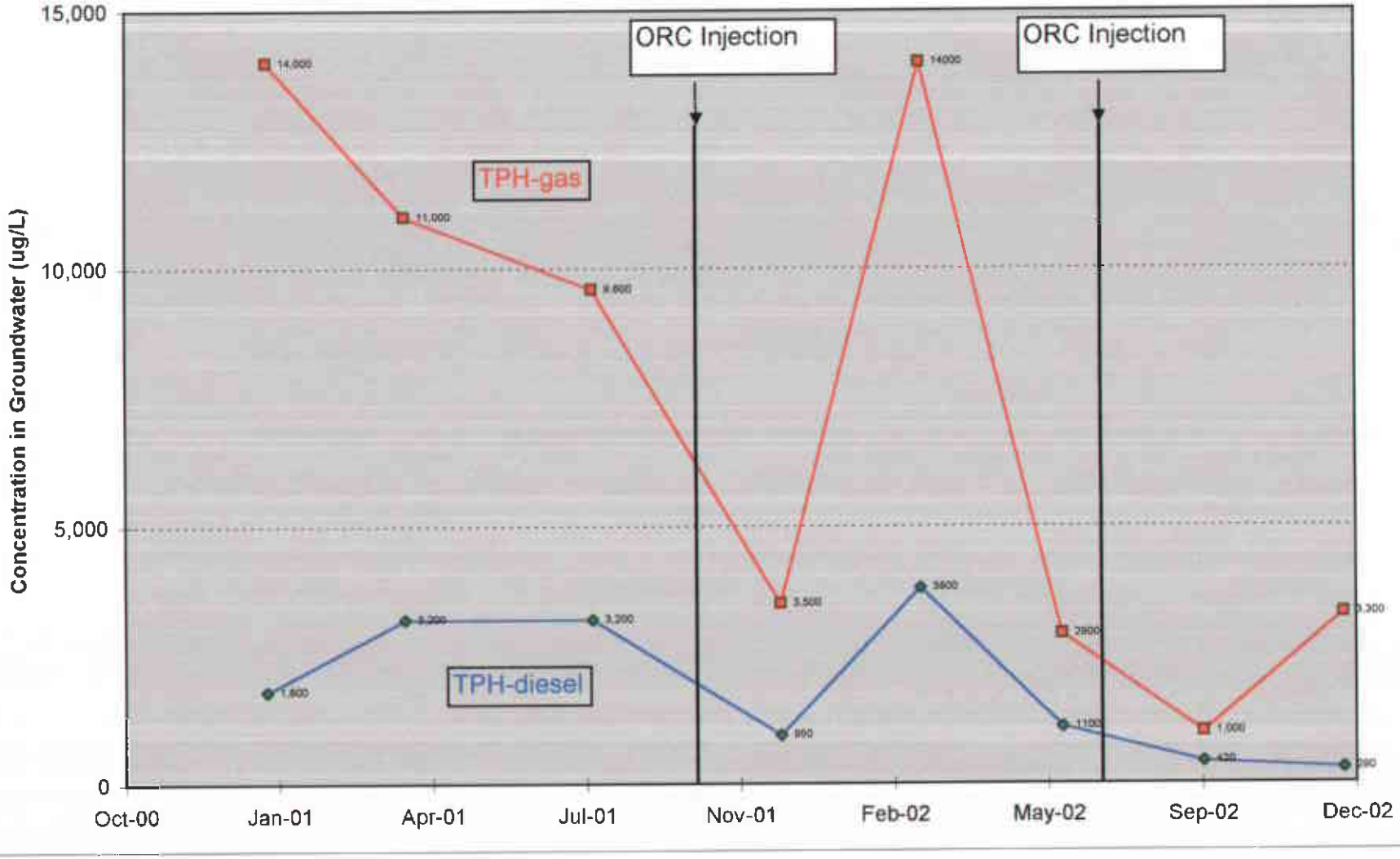
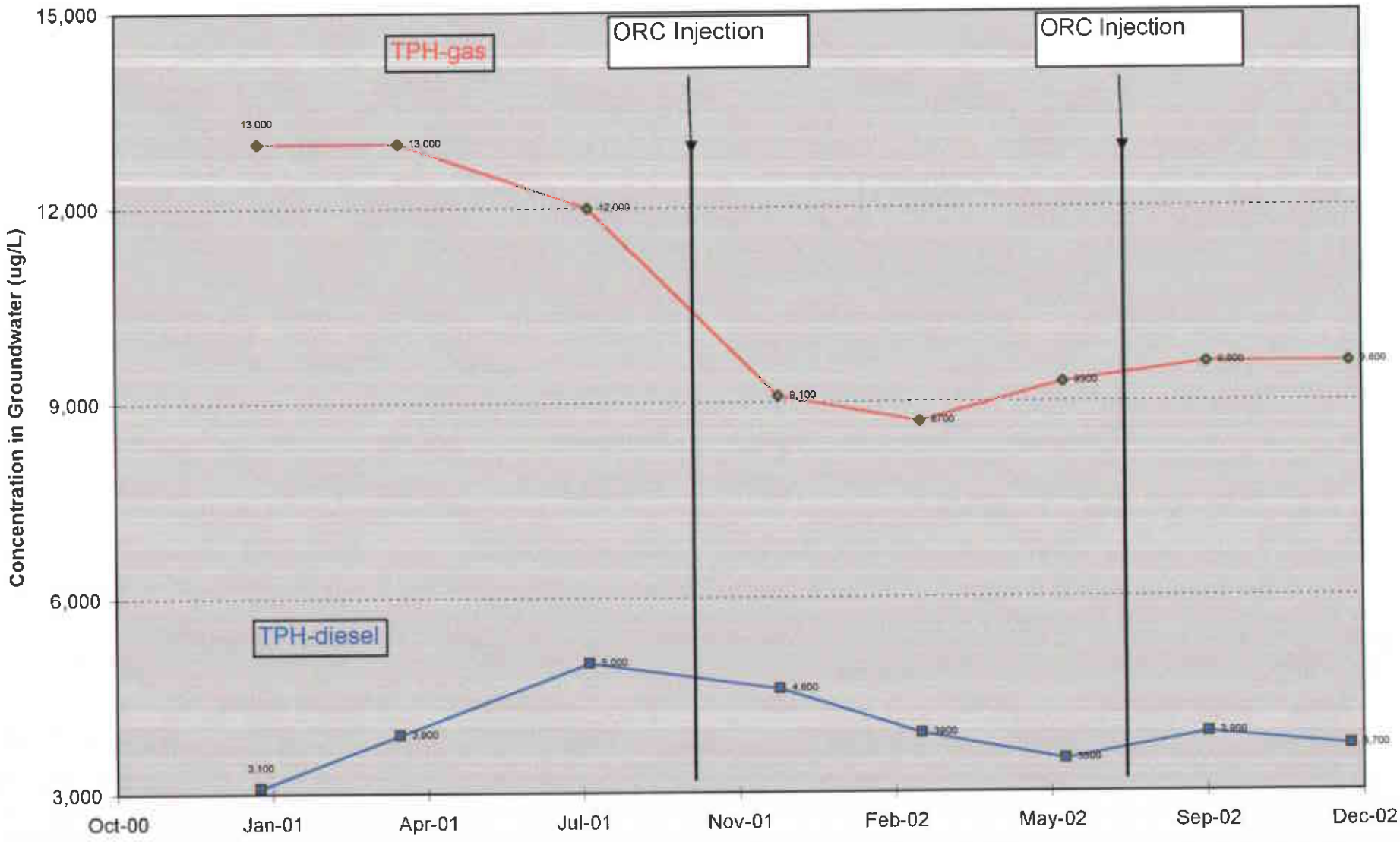


Figure 7: TPH-gasoline and TPH-diesel Hydrochemical Trends: Well MW-7
Redwood Regional Park Service Yard, Oakland, California



Stellar Environmental Solutions, Inc.

MW-8 is considered to be in the centerline of the plume, and therefore ORC™ injection loading in that area was a maximum. While the plot of all eight data points for MW-8 shows significant fluctuation, when three pre-ORC™ injection quarterly sample results for gasoline and BTEX are compared to the last three quarterly samples, the results show a significant decrease. Average gasoline concentrations of the three pre-ORC™ injection sample sets is 11,533 μg/L, compared to an average of 2,400 μg/L for the last three quarterly samples. This translates into a reduction of more than 80 percent. Likewise, the diesel concentrations showed a reduction from 2,733 μg/L to 603 μg/L (an approximately 88% reduction).

DOWNGRADIENT PLUME TRENDS

Well MW-7 represents the high concentration centerline of the plume at the downgradient area approximately 20 feet from Redwood Creek. Figure 7 shows the pre- and post-ORC™ injection data. Using the aforementioned data set averaging, pre-injection average gasoline concentration in MW-7 was 12,667 μg/L vs. 9,500 μg/L from the last three events. This represents an approximately 25 percent reduction. Likewise, the diesel concentration showed a reduction from an average of 4,000 μg/L to 3,500 μg/L (an approximately 13% reduction).

Dissolved Oxygen Trends

Dissolved oxygen (DO) concentrations in petroleum-impacted wells are expected to go up following the ORC™ injection, then decrease within 6 to 9 months (the expected active life in the product following injection). A substantial increase in DO was observed following the September 2001 ORC™ injection (first phase) in all impacted wells with the exception of MW-9 and MW-11. DO concentrations then showed the expected decrease with the exception of MW-4 and MW-10 which remained elevated. Following the July 2002 injection event (second phase), DO concentrations have either increased or stayed at pre-injection concentrations in all impacted wells except in MW-8. The data suggest that the injection program has measurably increased DO concentrations within the contaminant plume, or at least has maintained DO concentrations at pre-ORC injection levels.

As of the most recent groundwater monitoring event, approximately 5 months (two monitoring events) has passed since the second phase of ORC™ injection. The useful life of injected ORC™ is generally 6 to 9 months. The effectiveness of the ORC™ injection program will be better evaluated following the results of the next monitoring event, to see if any further reduction is evident, particularly in wells MW-8 and MW-7. At that time, an evaluation will be made as to whether additional corrective action is needed, and if so, would additional ORC™ injection be the most appropriate action.

6.0 SUMMARY, CONCLUSIONS AND PROPOSED ACTIONS

SUMMARY AND CONCLUSIONS

- Groundwater sampling has been conducted on an approximately quarterly basis since November 1994 (24 events). A total of 11 site wells are available for monitoring; 7 of the available wells are currently monitored for contamination.
- A two-phase ORC™ injection corrective action program has been implemented at the site. In September 2001, approximately 3,000 pounds of ORC™ was injected into 44 boreholes over a 4,400-square foot area of the maximum groundwater contamination. In June 2002, approximately 1,000 pounds of ORC™ was injected in 30 boreholes over a smaller area that showed residual high contaminant concentrations following the initial injection phase. The ORC™ was injected over the full saturated interval (including capillary fringe). The corrective action is designed to facilitate biodegradation within the central area of the plume, with the ultimate objective of reducing or eliminating continued discharge of contaminated groundwater to Redwood Creek.
- Current site groundwater contaminant concentrations exceed their respective groundwater RBSLs (for both cases, where drinking water resource is and is not threatened), with the exception of toluene, which does not exceed either set of criteria. MTBE exceeds only the "drinking water resource threatened" criterion, and only in one well. Site groundwater contaminant concentrations also exceed all surface water screening levels, with the exception of toluene and MTBE.
- Maximum concentrations for the majority of site contaminants in the most recent groundwater samples were detected in well MW-11 (approximately 50 upgradient of Redwood Creek). Wells MW-7 and MW-9 (both located at the extreme downgradient edge of the site, immediately upgradient of Redwood Creek), showed the next highest groundwater contaminant concentrations for most site contaminants. Trace to non-detectable groundwater contaminant concentrations were present in former source area well MW-2 (approximately 130 feet upgradient of Redwood Creek), well MW-4 (northern boundary of the plume), and MW-10 (southern boundary of the plume).
- Groundwater contamination above screening levels appears to be approximately 100 feet long and approximately 70 feet wide. The zone of greatest contamination (greater than

10,000 µg/L TPH) is an approximately 20- to 30-foot-wide by 50-foot-long area extending from just upgradient of MW-11 to the most downgradient well MW-7.

- The groundwater contaminant plume has become disconnected from the former source, and has migrated well beyond the former source area (represented by well MW-2) toward Redwood Creek.
- The existing well layout fully constrains the lateral extent of groundwater contamination, and the vertical limit is very likely the top of the near-surface (25 to 28 feet) siltstone bedrock. The saturated interval extends approximately 12 to 15 feet from top of bedrock through the capillary fringe.
- No site-sourced contaminants were detected in the two surface water samples in the current event. Historically, creek contamination is evident only in low-flow periods. Creek contamination has been detected only once above surface water screening level criteria (gasoline and xylenes in December 1999).
- In general, the petroleum-impacted wells showed a decrease in contaminant concentrations relative to the previous quarter, the first monitoring event following the ORC™ injection program.
- The lateral limits of contamination (isocontours) have decreased relative to the previous event, with the center of contaminant mass moving downgradient, toward Redwood Creek. Significant reductions in contaminant concentrations in plume-boundary wells MW-4 and MW-10 were observed immediately following and in all events since the first ORC™ injection phase, suggesting that the ORC injection has been wholly effective in shrinking the lateral limits of the contaminant plume.
- Gasoline and diesel concentrations in the centerline of the plume in both upgradient (MW-8) and downgradient (MW-7) wells show significant reductions when the averaged concentration of the last three quarterly events (after the last ORC™ injection) are compared with the average concentration in the first three (pre-ORC™ injection) monitoring events.
- The BTEX and MTBE, at far lower concentrations than the dominant TPHd and TPHg contaminants, show a similar (although not as pronounced) pattern of reduction in wells MW-4, MW-7, and MW-8, with the exception of benzene in well MW-7 which increases slightly when the three quarterly averages are compared.
- In general, the ORC injection phase has increased dissolved oxygen concentrations in groundwater, or at least has maintained pre-injection DO concentrations.
- Natural attenuation is suggested to be occurring at the site, mainly at the plume margins and former source area. Prior to ORC™ injection, natural attenuation was likely minimal to non-existent in the higher concentration portion along the centerline of the plume due to limited

oxygen content, suggesting that natural attenuation has not historically been sufficient to mitigate impacts to the Creek. The natural attenuation pattern has been accelerated through the use of ORC™.

PROPOSED ACTIONS

The EBRPD proposes to implement the following actions to address regulatory concerns:

- Continue the quarterly program of Creek and groundwater sampling and reporting.
- Evaluate the results of the next quarterly event in the context of the efficacy of the corrective action, and implement additional corrective action if warranted.

7.0 LIMITATIONS

This report has been prepared for the exclusive use of the East Bay Regional Park District, its authorized representatives, and the regulatory agencies. No reliance on this report shall be made by anyone other than those for whom it was prepared.

The findings and conclusions presented in this report are based on the review of previous investigators' findings at the site, as well as onsite activities conducted by SES since September 1998. This report provides neither a certification nor guarantee that the property is free of hazardous substance contamination. This report has been prepared in accordance with generally accepted methodologies and standards of practice. The SES personnel who performed these activities are qualified to perform such investigations and have accurately reported the information available, but cannot attest to the validity of that information. No warranty, expressed or implied, is made as to the findings, conclusions, and recommendations included in the report.

The findings of this report are valid as of the present. Site conditions may change with the passage of time, natural processes, or human intervention, which can invalidate the findings and conclusions presented in this report. As such, this report should be considered a reflection of the current site conditions as based on the investigation and remediation completed.

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WELL GAUGING DATA

Project # 021218-SS1 Date 12/18/02 Client STELLAR

Site REDWOOD REGIONAL PARK SERVICE YARD. OAKLAND.

Well ID	Well Size (in.)	Sheen / Odor	Depth to Immiscible Liquid (ft.)	Thickness of Immiscible Liquid (ft.)	Volume of Immiscibles Removed (ml)	Depth to water (ft.)	Depth to well bottom (ft.)	Survey Point: TOB or TOC	
MW-1	4					3.50	18.85		1.3/174/0.2 G ~~0.9/210/0.2~~
MW-2	4					21.55	38.82		0.8/216/0.6 S
MW-3	4					18.95	44.10		1.2/170/0.4 G
MW-4	4					13.33	26.51		12.1/264/0.4 S
MW-5	4					16.02	26.92		0.9/210/0.2 G
MW-6	4					13.12	27.93		1.0/166/0.4 G
MW-7	2					13.10	25.33		0.8/-67/2.6 S
MW-8	2					12.10	22.21		0.5/215/0.4 S
MW-9	2					12.90	26.00		0.9/124/0.4 S
MW-10	2					12.10	28.75		6.7/180/0.4 S
MW-11	2					15.10	26.00		0.4/-78/2.0 S

* REPLACED GATE LOCK PER BRUCE. DID HAVE 2357 LOCK, ONLY 2244, SO REPLACED W/ 2244.

WELL MONITORING DATA SHEET

Project #: 021218-SS1	Client: STELLAR ENVIRON.
Sampler: SCOTT	Start Date: 12/18/02
Well I.D.: MW-1	Well Diameter: 2 3 (4) 6 8 ___
Total Well Depth: 18.85	Depth to Water: 3.50
Before: After:	Before: After:
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	D.O. Meter (if req'd): (YSI) HACH

Purge Method:

Bailer / Disposable Bailer / Middleburg / Electric Submersible / Waterra / Peristaltic / Extraction Pump / Other_____

Sampling Method: Bailer / Disposable Bailer / Extraction Port / Dedicated Tubing / Other: _____

_____(Gals.) X _____ = _____
Gals.

Well Diameter	Multiplier	Well Diameter	Multiplier
1"	0.04	4"	0.65
2"	0.16	6"	1.47
3"	0.37	Other	radius² * 0.163

Time	Temp. (°F or °C)	pH	Conductivity (mS or µS)	Turbidity (NTU)	Gals. Removed	Observations

Did well dewater? Yes No		Gallons actually evacuated:	
Sampling Time:		Sampling Date: 12/	
Sample I.D.: MW-1		Laboratory: CURTIS & TOMPKINS	
Analyzed for: TPH-G BTEX MTBE TPH-D		Other:	
Equipment Blank I.D.: @ Time		Duplicate I.D.:	
Analyzed for: TPH-G BTEX MTBE TPH-D		Other:	
D.O. (if req'd): $Fe^{+2} = 0.2$ Pre-purge:	1.3 mg/L	Post-purge:	mg/L
ORP (if req'd): Pre-purge:	174 mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: 021218-SS1	Client: STELLAR ENVIRON.
Sampler: SOOCH	Start Date: 12/18/02
Well I.D.: MW-2	Well Diameter: 2 3 (4) 6 8 ____
Total Well Depth: 38.82	Depth to Water: 21.55
Before: After:	Before: After:
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	D.O. Meter (if req'd): (YSI) HACH

Purge Method:

- Bailer
- Disposable Bailer
- Middleburg
- (Electric Submersible)
- Waterra
- Peristaltic
- Extraction Pump
- Other____

Sampling Method: Bailer

- (Disposable Bailer)
- Extraction Port
- Dedicated Tubing
- Other: ____

11. (Gals.) X 3 = 33 Gals.

Well Diameter	Multiplier	Well Diameter	Multiplier
1"	0.04	4"	0.65
2"	0.16	6"	1.47
3"	0.37	Other	radius² * 0.163

Time	Temp. (°F or °C)	pH	Conductivity (mS or µS)	Turbidity (NTU)	Gals. Removed	Observations
1044	59.6	7.0	853	55	11	CLEAR
1046	59.5	6.9	869	80	22	"
1048	59.4	6.9	854	>200	33	TURBID

Did well dewater? Yes (No)	Gallons actually evacuated: 33
Sampling Time: 1052	Sampling Date: 12/18/02
Sample I.D.: MW-2	Laboratory: CURTIS & TOMPKINS
Analyzed for: (TPH-G BTEX MTBE TPH-D)	Other:
Equipment Blank I.D.: @ Time	Duplicate I.D.:
Analyzed for: TPH-G BTEX MTBE TPH-D	Other:

D.O. (if req'd): Fe+2 = 0.6 (Pre-purge:)	0.7 mg/L	Post-purge:		mg/L
ORP (if req'd): (Pre-purge:)	216 mV	Post-purge:		mV

WELL MONITORING DATA SHEET

Project #: 021218-SS1	Client: STELLAR ENVIRON.
Sampler: SOOCH	Start Date: 12/18/02
Well I.D.: MW-3	Well Diameter: 2 3 (4) 6 8 ___
Total Well Depth: 44.10	Depth to Water: 18.95
Before: After:	Before: After:
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	D.O. Meter (if req'd): (YSI) HACH

Purge Method:

- Bailer
- Disposable Bailer
- Middleburg
- Electric Submersible
- ~~Waterra~~
- Peristaltic
- Extraction Pump
- Other_____

Sampling Method: Bailer

- (Disposable Bailer)
- Extraction Port
- Dedicated Tubing
- Other: _____

_____(Gals.) X _____ = _____ Gals.

Well Diameter	Multiplier	Well Diameter	Multiplier
1"	0.04	4"	0.65
2"	0.16	6"	1.47
3"	0.37	Other	radius² * 0.163

Time	Temp. (°F or °C)	pH	Conductivity (mS or µS)	Turbidity (NTU)	Gals. Removed	Observations
GRAB SAMPLE PRE-PURGE FOR NITRATE/SULFATE.						

Did well dewater? ~~Yes~~ ___ ~~No~~ → Gallons actually evacuated: →

Sampling Time: Sampling Date: 12/18/02

Sample I.D.: MW-3 Laboratory: CURTIS & TOMPKINS

Analyzed for: TPH-G BTEX MTBE TPH-D Other: NITRATE/SULFATE PRE-PURGE @ 1220

Equipment Blank I.D.: @ Time Duplicate I.D.:

Analyzed for: TPH-G BTEX MTBE TPH-D Other:

D.O. (if req'd): Fe+2 = 0.4	(Pre-purge):	1.2 mg/L	Post-purge:	.	mg/L
ORP (if req'd):	(Pre-purge):	176 mV	Post-purge:		mV

WELL MONITORING DATA SHEET

Project #: 021218-SS1	Client: STELLAR ENVIRON.
Sampler: SCOTT	Start Date: 12/18/02
Well I.D.: MW-4	Well Diameter: 2 3 (4) 6 8 ____
Total Well Depth: 26.51	Depth to Water: 13.33
Before: After:	Before: After:
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	D.O. Meter (if req'd): (YSI) HACH

Purge Method:

- Bailer
- Disposable Bailer
- Middleburg
- (Electric Submersible)
- Waterra
- Peristaltic
- Extraction Pump
- Other____

Sampling Method: Bailer

- (Disposable Bailer)
- Extraction Port
- Dedicated Tubing
- Other: ____

8.5 (Gals.) X 3 = 25.5 Gals.

Well Diameter	Multiplier	Well Diameter	Multiplier
1"	0.04	4"	0.65
2"	0.16	6"	1.47
3"	0.37	Other	radius^2 * 0.163

Time	Temp. (°F or °C)	pH	Conductivity (mS or µS)	Turbidity (NTU)	Gals. Removed	Observations
1114	58.5	7.3	655	17	8.5	CLEAR
1115	WELL DEWATERED @ .13 gal.					DTW = 24.20
1345	55.0	7.0	833	35	———	DTW = 22.00

Did well dewater? (Yes) No — Gallons actually evacuated: 13

Sampling Time: 1350 @ SITE DEPARTURE — Sampling Date: 12/18/02

Sample I.D.: MW-4 — Laboratory: CURTIS & TOMPKINS

Analyzed for: (TPH-G BTEX MTBE TPH-D) — Other: NITRATE/SULFATE @ 1100 PRE-PURGE

Equipment Blank I.D.: @ Time — Duplicate I.D.:

Analyzed for: TPH-G BTEX MTBE TPH-D — Other:

D.O. (if req'd): Fe+2 = 0.4	(Pre-purge):	12.1 mg/L	Post-purge:		mg/L
ORP (if req'd):	(Pre-purge):	264 mV	Post-purge:		mV

WELL MONITORING DATA SHEET

Project #: 021218-SS1	Client: STELLAR ENVIRON.
Sampler: SOOCH	Start Date: 12/18/02
Well I.D.: MW-5	Well Diameter: 2 3 (4) 6 8 ____
Total Well Depth: 26.92	Depth to Water: 16.02
Before: After:	Before: After:
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	D.O. Meter (if req'd): (YSI) HACH

Purge Method:

Bailer / Disposable Bailer / Middleburg / Electric Submersible / Waterra / Peristaltic / Extraction Pump / Other ____

Sampling Method: Bailer / Disposable Bailer / Extraction Port / Dedicated Tubing / Other: ____

____ (Gals.) X ____ = ____ Gals.

Well Diameter	Multiplier	Well Diameter	Multiplier
1"	0.04	4"	0.65
2"	0.16	6"	1.47
3"	0.37	Other	radius^2 * 0.163

Time	Temp. (°F or °C)	pH	Conductivity (mS or µS)	Turbidity (NTU)	Gals. Removed	Observations

Did well dewater? Yes No		Gallons actually evacuated:	
Sampling Time:		Sampling Date: 12/	
Sample I.D.: MW-5		Laboratory: CURTIS & TOMPKINS	
Analyzed for: TPH-G BTEX MTBE TPH-D		Other:	
Equipment Blank I.D.: @ Time		Duplicate I.D.:	
Analyzed for: TPH-G BTEX MTBE TPH-D		Other:	
D.O. (if req'd): Fe^{+2}: 0.2 Pre-purge:	0.9 mg/L	Post-purge:	mg/L
ORP (if req'd): Pre-purge:	210 mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: 021218-SS1	Client: STELLAR ENVIRON.
Sampler: SCOTT	Start Date: 12/18/02
Well I.D.: MW-6	Well Diameter: 2 3 (4) 6 8 ___
Total Well Depth: 27.93	Depth to Water: 13.12
Before: After:	Before: After:
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	D.O. Meter (if req'd): (YSI) HACH

Purge Method:

- Bailer
- Disposable Bailer
- Middleburg
- Electric Submersible
- Waterra
- Peristaltic
- Extraction Pump
- Other_____

Sampling Method: Bailer

- Disposable Bailer
- Extraction Port
- Dedicated Tubing
- Other: _____

_____(Gals.) X _____ = _____ Gals.

Well Diameter	Multiplier	Well Diameter	Multiplier
1"	0.04	4"	0.65
2"	0.16	6"	1.47
3"	0.37	Other	radius^2 * 0.163

Time	Temp. (°F or °C)	pH	Conductivity (mS or µS)	Turbidity (NTU)	Gals. Removed	Observations

Did well dewater? Yes No		Gallons actually evacuated:	
Sampling Time:		Sampling Date: 12/	
Sample I.D.: MW-6		Laboratory: CURTIS & TOMPKINS	
Analyzed for: TPH-G BTEX MTBE TPH-D		Other:	
Equipment Blank I.D.: @ Time		Duplicate I.D.:	
Analyzed for: TPH-G BTEX MTBE TPH-D		Other:	
D.O. (if req'd): Fe^{+2} = 0.4 Pre-purge:	1.0 mg/L	Post-purge:	mg/L
ORP (if req'd): Pre-purge:	166 mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: 021218-SS1	Client: STELLAR ENVIRON.
Sampler: SCOTT	Start Date: 12/18/02
Well I.D.: MW-7	Well Diameter: (2) 3 4 6 8 ____
Total Well Depth: 25.33	Depth to Water: 13.10
Before: After:	Before: After:
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	D.O. Meter (if req'd): (YSI) HACH

Purge Method:

- Bailer
- (Disposable Bailer)
- Middleburg
- Electric Submersible
- Waterra
- Peristaltic
- Extraction Pump
- Other_____

Sampling Method: Bailer

- (Disposable Bailer)
- Extraction Port
- Dedicated Tubing
- Other: _____

2 (Gals.) X 3 = 6 Gals.

Well Diameter	Multiplier	Well Diameter	Multiplier
1"	0.04	4"	0.65
2"	0.16	6"	1.47
3"	0.37	Other	radius² * 0.163

Time	Temp. (°F) or °C)	pH	Conductivity (mS or (µS))	Turbidity (NTU)	Gals. Removed	Observations
1305 +/- 5	56.5	4.5	672	>200	2	BROWN / GAS ODOR
1307	56.5	4.5	687	>200	4	" "
1309	56.6	4.6	697	>200	6	" "
* LOW	pH readings. recalibrated. still low.					

Did well dewater? Yes (No)		Gallons actually evacuated: 6	
Sampling Time: 1313		Sampling Date: 12/18/02	
Sample I.D.: MW-7		Laboratory: CURTIS & TOMPKINS	
Analyzed for: (TPH-G) BTEX MTBE (TPH-D) @ Time		Other: NITRATE/SULFATE PRE-PURGE @ 1300	
Equipment Blank I.D.:		Duplicate I.D.:	
Analyzed for: TPH-G BTEX MTBE TPH-D		Other:	
D.O. (if req'd): $Fe^{+2} = 2.6$ (Pre-purge)	0.8 mg/L	Post-purge:	mg/L
ORP (if req'd): (Pre-purge)	-67 mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: 021218-SS1	Client: STELLAR ENVIRON.
Sampler: SCOTT	Start Date: 12/18/02
Well I.D.: MW-8	Well Diameter: (2) 3 4 6 8 ____
Total Well Depth: 22.21	Depth to Water: 12.10
Before: After:	Before: After:
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	D.O. Meter (if req'd): (YSI) HACH

Purge Method:

- Bailer
- (Disposable Bailer)
- Middleburg
- Electric Submersible
- Waterra
- Peristaltic
- Extraction Pump
- Other_____

Sampling Method:

- Bailer
- (Disposable Bailer)
- Extraction Port
- Dedicated Tubing
- Other: _____

1.6 (Gals.) X 3 = 4.8 Gals.

Well Diameter	Multiplier	Well Diameter	Multiplier
1"	0.04	4"	0.65
2"	0.16	6"	1.47
3"	0.37	Other	radius^2 * 0.163

Time	Temp. (°F or °C)	pH	Conductivity (mS or µS)	Turbidity (NTU)	Gals. Removed	Observations
1205	58.1	6.8	791	>200	1.6	BROWN
1207	57.9	6.8	799	>200	3.2	"
1209	57.6	6.8	795	>200	5.0	"

Did well dewater? Yes (No) Gallons actually evacuated: 5

Sampling Time: 1212 Sampling Date: 12/18/02

Sample I.D.: MW-8 Laboratory: CURTIS & TOMPKINS

Analyzed for: (TPH-G BTEX MTBE TPH-D) Other: NITRATE/SULFATE PRE-PURGE @ 1155

Equipment Blank I.D.: @ Time Duplicate I.D.:

Analyzed for: TPH-G BTEX MTBE TPH-D Other:

D.O. (if req'd): Fe+2 = 0.4	(Pre-purge):	0.5 mg/L	Post-purge:		mg/L
ORP (if req'd):	(Pre-purge):	215 mV	Post-purge:		mV

WELL MONITORING DATA SHEET

Project #: 021218-551	Client: STELLAR ENVIRON.
Sampler: SCOTT	Start Date: 12/18/02
Well I.D.: MW-11	Well Diameter: (2) 3 4 6 8 ____
Total Well Depth: 26.00	Depth to Water: 15.10
Before: After:	Before: After:
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	D.O. Meter (if req'd): (YSI) HACH

Purge Method:
- Bailer
- (Disposable Bailer)
- Middleburg
- Electric Submersible
- Waterra
- Peristaltic
- Extraction Pump
- Other_____

Sampling Method: Bailer
- (Disposable Bailer)
- Extraction Port
- Dedicated Tubing
- Other: _____

Well Diameter	Multiplier	Well Diameter	Multiplier
1"	0.04	4"	0.65
2"	0.16	6"	1.47
3"	0.37	Other	radius² * 0.163

2 (Gals.) X 3 = 6 Gals.

Time	Temp. (°F or °C)	pH	Conductivity (mS or µS)	Turbidity (NTU)	Gals. Removed	Observations
1332	56.9	4.4	978	>200	2	TURBID/GAS ODOR
1334	57.0	4.7	967	>200	4	" "
1336	57.1	4.7	947	>200	6	" "
* LOW	pH readings. CHECKED & RECALIBRATED ULTRAMETER. STILL LOW.					

Did well dewater? Yes (No) Gallons actually evacuated: 6

Sampling Time: 1340 Sampling Date: 12/18/02

Sample I.D.: MW-11 Laboratory: CURTIS & TOMPKINS

Analyzed for: (TPH-G) BTEX MTBE (TPH-D) Other: NITRATE/SULFATE PRE-PURGE @ 1325

Equipment Blank I.D.: @ Time Duplicate I.D.:

Analyzed for: TPH-G BTEX MTBE TPH-D Other:

D.O. (if req'd): $Fe^{+2} = 2.0$	(Pre-purge):	0.4 mg/L	Post-purge:	.	mg/L
ORP (if req'd):	(Pre-purge):	-78 mV	Post-purge:		mV

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

ANALYTICAL REPORT

Prepared for:

Stellar Environmental Solutions
2198 6th Street
Suite 201
Berkeley, CA 94710

Date: 07-JAN-03
Lab Job Number: 162711
Project ID: 021218-551
Location: Redwood Regional Park

This data package has been reviewed for technical correctness and completeness. Release of this data has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signatures. The results contained in this report meet all requirements of NELAC and pertain only to those samples which were submitted for analysis.

Reviewed by: _____
Project Manager

Reviewed by: _____
Operations Manager

Curtis & Tompkins, Ltd.

Laboratory Numbers: **162711**
Client: **Stellar Environmental Solutions**
Location: **Redwood Regional Park**
Project#: **021218-551**

Sampled Date: **12/18/02**
Received Date: **12/18/02**

CASE NARRATIVE

This hardcopy data package contains samples and QC results for seven water samples, which were received from the site referenced above on December 18, 2002. The samples were received cold and intact.

TVH/BTXE: High Trifluorotoluene surrogate recoveries were observed for samples MW-2 (CT# 162711-001), MW-7 (CT# 162711-004) and MW-8 (CT#162711-005) due to coelution of the hydrocarbons with the surrogate. No other analytical problems were encountered.

TEH by (EPA 8015B(M)): No analytical problems were encountered.

General Chemistry: No analytical problems were encountered.

Chain of Custody Record

162711

Lab job no. ______
Date 12/18/02
Page 1 of 1

Laboratory: CURTIS & TOMPKINS
Address: 2323 FIFTH ST, BERKELEY, CA
CLIENT ~~Project Owner~~: STELLAR ENV. SOLUTIONS
~~Site~~ Address: ~~OAKLAND, CA~~ BERKELEY, CA
Project Name: REDWOOD REGIONAL PARK
Project Number: 021218-SS1

Method of Shipment: ______
Shipment No.: ______
Airbill No.: ______
Cooler No.: ______
Project Manager: BRUCE RUCKER
Telephone No.: (510) 644-3123
Fax No.: (510) 644-3859
Samplers: (Signature) [signature]

Analysis Required

Field Sample Number	Location/Depth	Date	Time	Sample Type	Type/Size of Container	Preservation: Cooler	Preservation: Chemical	Filtered	No. of Containers	TPH-G/BTEX/MTBE	TPH-D	*NITRATE/SULFATE	Remarks	TIME
MW-2		12/18/02	1052	W	40ml VOA/1L AMBER	X	HCL/NP		5	X	X			
MW-3		↓	1220	↓	1X1L POLY	↓	NP		1			X		
MW-4			1350		1X1L POLY 40ml VOA/1X1L AMBER		HCL/NP		6	X	X	X	NITRATE/SULFATE @	1100
MW-7			1313		" "		↓		6	X	X	X	↓ @	1300
MW-8			1212		" "				6	X	X	X	@	1155
MW-9			1245		" "				6	X	X	X	@	1230
MW-10			1150		" "				6	X	X	X	@	1125
MW-11		↓	1340	↓	" "	↓	↓		6	X	X	X	↓ @	1325

Preservation Correct? ☐ Yes ☐ No ☐ N/A

Received ☑ On Ice ☑ Cold ☐ Ambient ☐ Intact

Relinquished by:	Date	Received by:	Date	Relinquished by:	Date	Received by:	Date
Signature [signature]	12/18/02	Signature Anna Pejanello	12/18/02	Signature		Signature	
Printed SUCHEN SUNG	Time	Printed Anna Pejanello	Time	Printed	Time	Printed	Time
Company BLAINE TECH	1520	Company Curtis & Tompkins	1520	Company		Company	

Turnaround Time:
Comments: * NITRATE: 48 hr HOLD TIME

Relinquished by:	Date	Received by:	Date
Signature		Signature	
Printed	Time	Printed	Time
Company		Company	

2000-00-01

★ Stellar Environmental Solutions

2198 Sixth Street #201, Berkeley, CA 94710

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	162711	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	021218-551		
Matrix:	Water	Sampled:	12/18/02
Units:	ug/L	Received:	12/18/02

Field ID:	MW-2	Diln Fac:	1.000
Type:	SAMPLE	Batch#:	77822
Lab ID:	162711-001	Analyzed:	12/20/02

Analyte	Result	RL	Analysis
Gasoline C7-C12	ND	50	8015B(M)
MTBE	ND	2.0	EPA 8021B
Benzene	4.3	0.50	EPA 8021B
Toluene	ND	0.50	EPA 8021B
Ethylbenzene	ND	0.50	EPA 8021B
m,p-Xylenes	ND	0.50	EPA 8021B
o-Xylene	ND	0.50	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	156 *	68-145	8015B(M)
Bromofluorobenzene (FID)	110	66-143	8015B(M)
Trifluorotoluene (PID)	117	53-143	EPA 8021B
Bromofluorobenzene (PID)	114	52-142	EPA 8021B

Field ID:	MW-4	Diln Fac:	1.000
Type:	SAMPLE	Batch#:	77822
Lab ID:	162711-003	Analyzed:	12/20/02

Analyte	Result	RL	Analysis
Gasoline C7-C12	ND	50	8015B(M)
MTBE	ND	2.0	EPA 8021B
Benzene	ND	0.50	EPA 8021B
Toluene	ND	0.50	EPA 8021B
Ethylbenzene	ND	0.50	EPA 8021B
m,p-Xylenes	ND	0.50	EPA 8021B
o-Xylene	ND	0.50	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	98	68-145	8015B(M)
Bromofluorobenzene (FID)	109	66-143	8015B(M)
Trifluorotoluene (PID)	114	53-143	EPA 8021B
Bromofluorobenzene (PID)	113	52-142	EPA 8021B

*= Value outside of QC limits; see narrative
b= See narrative
ND= Not Detected
RL= Reporting Limit
>LR= Response exceeds instrument's linear range

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	162711	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	021218-551		
Matrix:	Water	Sampled:	12/18/02
Units:	ug/L	Received:	12/18/02

Field ID: MW-7 Lab ID: 162711-004
Type: SAMPLE

Analyte	Result	RL	Diln Fac	Batch#	Analyzed	Analysis
Gasoline C7-C12	9,600	50	1.000	77822	12/20/02	8015B(M)
MTBE	ND	2.0	1.000	77822	12/20/02	EPA 8021B
Benzene,	110	0.50	1.000	77822	12/20/02	EPA 8021B
Toluene	ND	0.50	1.000	77822	12/20/02	EPA 8021B
Ethylbenzene	400	1.0	2.000	77838	12/22/02	EPA 8021B
m,p-Xylenes	180	0.50	1.000	77822	12/20/02	EPA 8021B
o-Xylene	8.9	0.50	1.000	77822	12/20/02	EPA 8021B

Surrogate	%REC	Limits	Diln Fac	Batch#	Analyzed	Analysis
Trifluorotoluene (FID)	307 *	>LR b 68-145	1.000	77822	12/20/02	8015B(M)
Bromofluorobenzene (FID)	126	66-143	1.000	77822	12/20/02	8015B(M)
Trifluorotoluene (PID)	169 *	53-143	1.000	77822	12/20/02	EPA 8021B
Bromofluorobenzene (PID)	129	52-142	1.000	77822	12/20/02	EPA 8021B

Field ID: MW-8 Lab ID: 162711-005
Type: SAMPLE

Analyte	Result	RL	Diln Fac	Batch#	Analyzed	Analysis
Gasoline C7-C12	3,300	50	1.000	77822	12/20/02	8015B(M)
MTBE	ND	2.0	1.000	77822	12/20/02	EPA 8021B
Benzene	67	0.50	1.000	77822	12/20/02	EPA 8021B
Toluene	ND	0.50	1.000	77822	12/20/02	EPA 8021B
Ethylbenzene	190	1.0	2.000	77838	12/22/02	EPA 8021B
m,p-Xylenes	190	1.0	2.000	77838	12/22/02	EPA 8021B
o-Xylene	13	0.50	1.000	77822	12/20/02	EPA 8021B

Surrogate	%REC	Limits	Diln Fac	Batch#	Analyzed	Analysis
Trifluorotoluene (FID)	116	68-145	1.000	77822	12/20/02	8015B(M)
Bromofluorobenzene (FID)	119	66-143	1.000	77822	12/20/02	8015B(M)
Trifluorotoluene (PID)	161 *	53-143	1.000	77822	12/20/02	EPA 8021B
Bromofluorobenzene (PID)	128	52-142	1.000	77822	12/20/02	EPA 8021B

*= Value outside of QC limits; see narrative
b= See narrative
ND= Not Detected
RL= Reporting Limit
>LR= Response exceeds instrument's linear range

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	162711	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	021218-551		
Matrix:	Water	Sampled:	12/18/02
Units:	ug/L	Received:	12/18/02

Field ID: MW-9 Lab ID: 162711-006
Type: SAMPLE

Analyte	Result	RL	Diln Fac	Batch#	Analyzed	Analysis
Gasoline C7-C12	7,000	50	1.000	77822	12/20/02	8015B(M)
MTBE	ND	10	5.000	77838	12/22/02	EPA 8021B
Benzene	380	2.5	5.000	77838	12/22/02	EPA 8021B
Toluene	9.5	2.5	5.000	77838	12/22/02	EPA 8021B
Ethylbenzene	730	2.5	5.000	77838	12/22/02	EPA 8021B
m,p-Xylenes	140	2.5	5.000	77838	12/22/02	EPA 8021B
o-Xylene	6.6	2.5	5.000	77838	12/22/02	EPA 8021B

Surrogate	%REC	Limits	Diln Fac	Batch#	Analyzed	Analysis
Trifluorotoluene (FID)	123	68-145	1.000	77822	12/20/02	8015B(M)
Bromofluorobenzene (FID)	124	66-143	1.000	77822	12/20/02	8015B(M)
Trifluorotoluene (PID)	125	53-143	5.000	77838	12/22/02	EPA 8021B
Bromofluorobenzene (PID)	121	52-142	5.000	77838	12/22/02	EPA 8021B

Field ID: MW-10 Diln Fac: 1.000
Type: SAMPLE Batch#: 77822
Lab ID: 162711-007 Analyzed: 12/20/02

Analyte	Result	RL	Analysis
Gasoline C7-C12	ND	50	8015B(M)
MTBE	16	2.0	EPA 8021B
Benzene	ND	0.50	EPA 8021B
Toluene	ND	0.50	EPA 8021B
Ethylbenzene	ND	0.50	EPA 8021B
m,p-Xylenes	ND	0.50	EPA 8021B
o-Xylene	ND	0.50	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	92	68-145	8015B(M)
Bromofluorobenzene (FID)	126	66-143	8015B(M)
Trifluorotoluene (PID)	113	53-143	EPA 8021B
Bromofluorobenzene (PID)	120	52-142	EPA 8021B

*= Value outside of QC limits; see narrative
b= See narrative
ND= Not Detected
RL= Reporting Limit
>LR= Response exceeds instrument's linear range

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	162711	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	021218-551		
Matrix:	Water	Sampled:	12/18/02
Units:	ug/L	Received:	12/18/02

Field ID: MW-11 Lab ID: 162711-008
Type: SAMPLE

Analyte	Result	RL	Diln Fac	Batch#	Analyzed	Analysis
Gasoline C7-C12	18,000	250	5.000	77838	12/22/02	8015B(M)
MTBE	ND	10	5.000	77838	12/22/02	EPA 8021B
Benzene	420	2.5	5.000	77838	12/22/02	EPA 8021B
Toluene	ND	2.5	5.000	77838	12/22/02	EPA 8021B
Ethylbenzene	1,100	5.0	10.00	77866	12/23/02	EPA 8021B
m,p-Xylenes	890	2.5	5.000	77838	12/22/02	EPA 8021B
o-Xylene	22	2.5	5.000	77838	12/22/02	EPA 8021B

Surrogate	%REC	Limits	Diln Fac	Batch#	Analyzed	Analysis
Trifluorotoluene (FID)	147 *	68-145	5.000	77838	12/22/02	8015B(M)
Bromofluorobenzene (FID)	120	66-143	5.000	77838	12/22/02	8015B(M)
Trifluorotoluene (PID)	173 *	53-143	5.000	77838	12/22/02	EPA 8021B
Bromofluorobenzene (PID)	122	52-142	5.000	77838	12/22/02	EPA 8021B

Type: BLANK Batch#: 77822
Lab ID: QC199601 Analyzed: 12/20/02
Diln Fac: 1.000

Analyte	Result	RL	Analysis
Gasoline C7-C12	ND	50	8015B(M)
MTBE	ND	2.0	EPA 8021B
Benzene	ND	0.50	EPA 8021B
Toluene	ND	0.50	EPA 8021B
Ethylbenzene	ND	0.50	EPA 8021B
m,p-Xylenes	ND	0.50	EPA 8021B
o-Xylene	ND	0.50	EPA 8021B

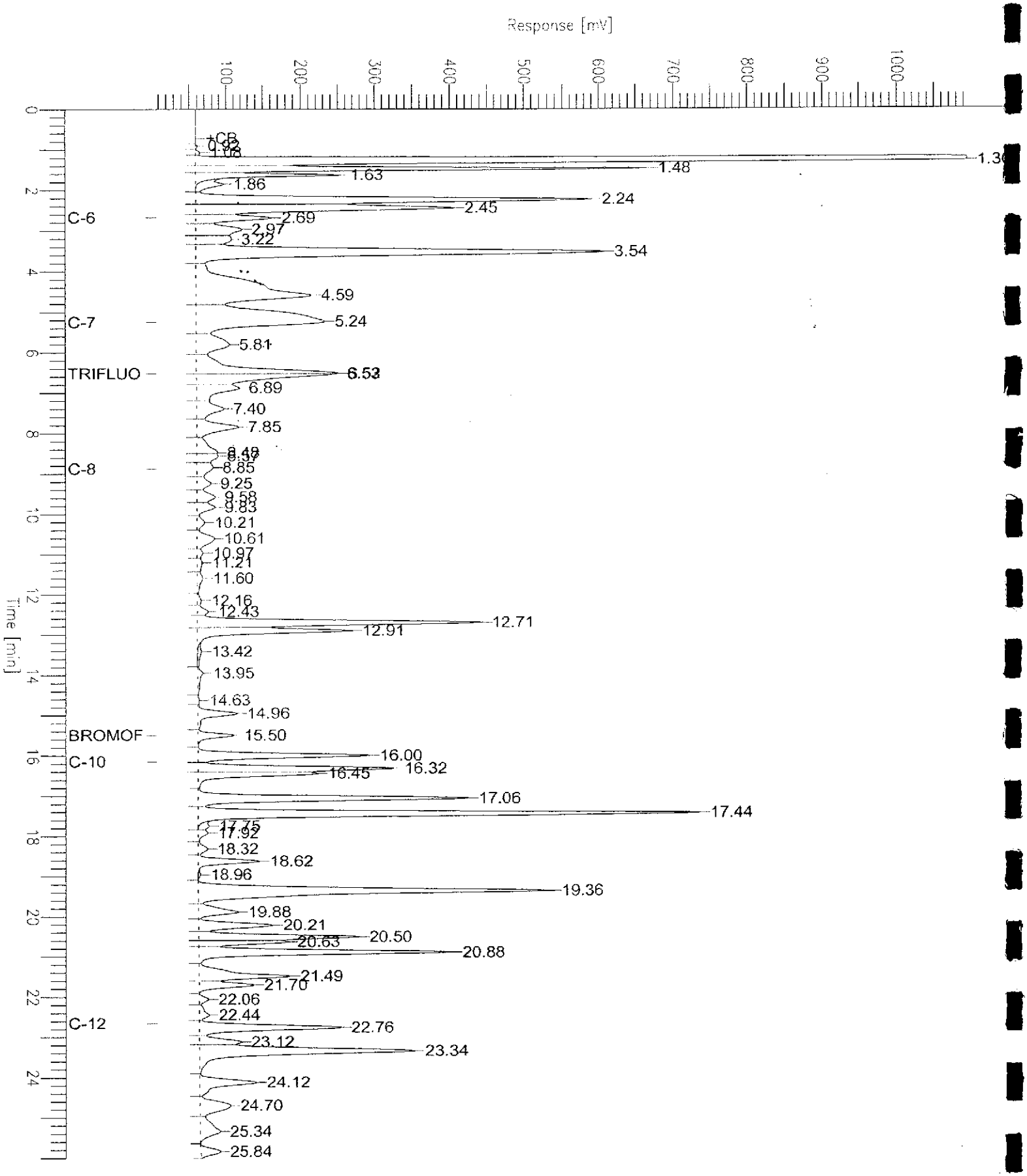
Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	95	68-145	8015B(M)
Bromofluorobenzene (FID)	106	66-143	8015B(M)
Trifluorotoluene (PID)	117	53-143	EPA 8021B
Bromofluorobenzene (PID)	114	52-142	EPA 8021B

*= Value outside of QC limits; see narrative
b= See narrative
ND= Not Detected
RL= Reporting Limit
>LR= Response exceeds instrument's linear range

GC04 TVH 'J' Data File FID

Sample Name : 162711-004,77822
FileName : G:\GC04\DATA\354J008.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 26.00 min
Scale Factor: 1.0 Plot Offset: 7 mV

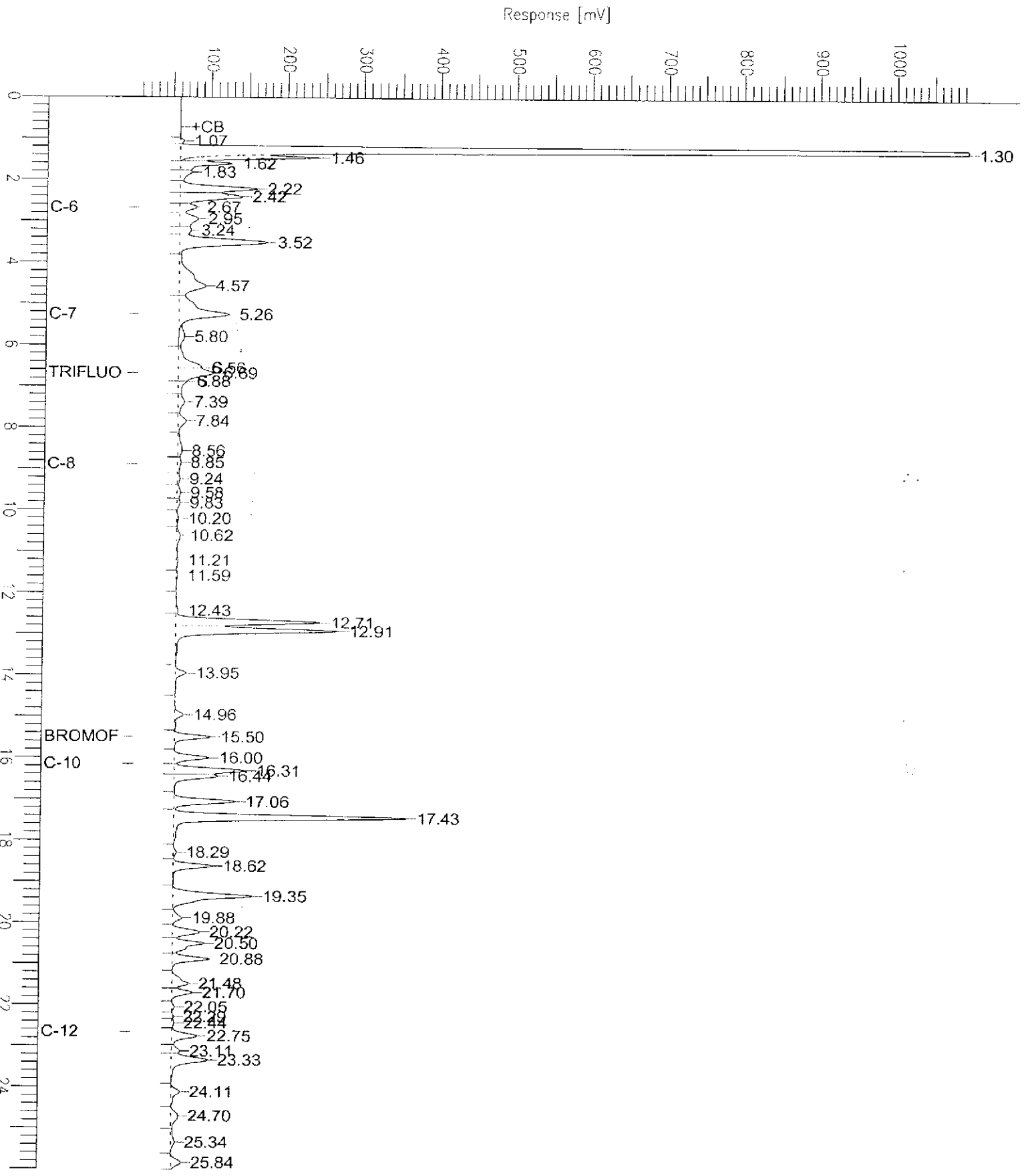
Sample #: a1 Page 1 of 1
Date : 12/21/02 10:15 AM
Time of Injection: 12/20/02 09:18 PM
Low Point : 6.50 mV High Point : 1094.41 mV
Plot Scale: 1087.9 mV



GC04 TVH 'J' Data File FID

Sample Name : 162711-005,77822
FileName : G:\GC04\DATA\354J009.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 26.00 min
Scale Factor: 1.0 Plot Offset: 6 mV

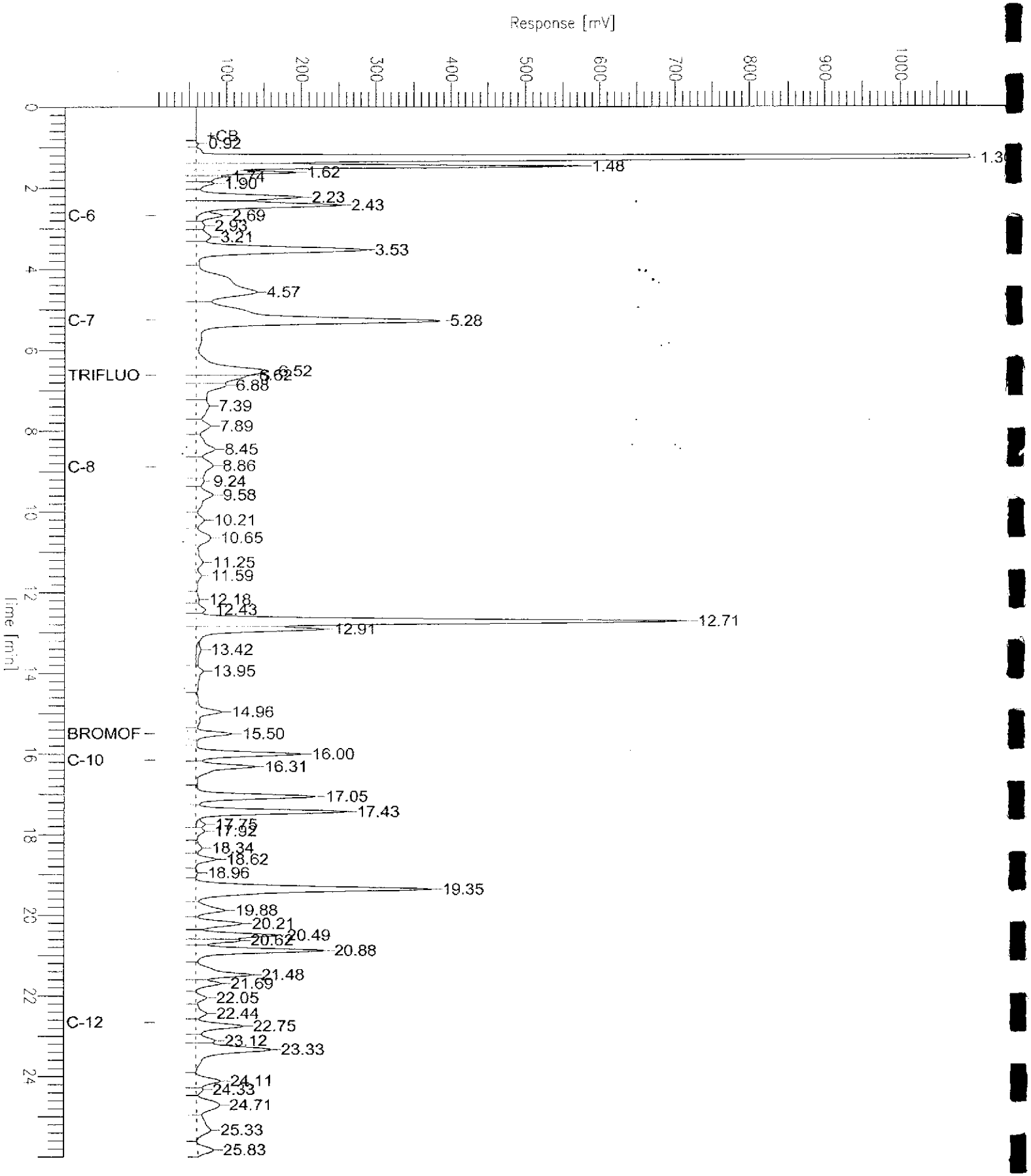
Sample #: a1 Page 1 of 1
Date : 12/21/02 10:15 AM
Time of Injection: 12/20/02 09:54 PM
Low Point : 6.46 mV High Point : 1094.40 mV
Plot Scale: 1087.9 mV



GC04 TVH 'J' Data File FID

Sample Name : 162711-006,77822
FileName : G:\GC04\DATA\354J010.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 26.00 min
Scale Factor: 1.0 Plot Offset: 7 mV

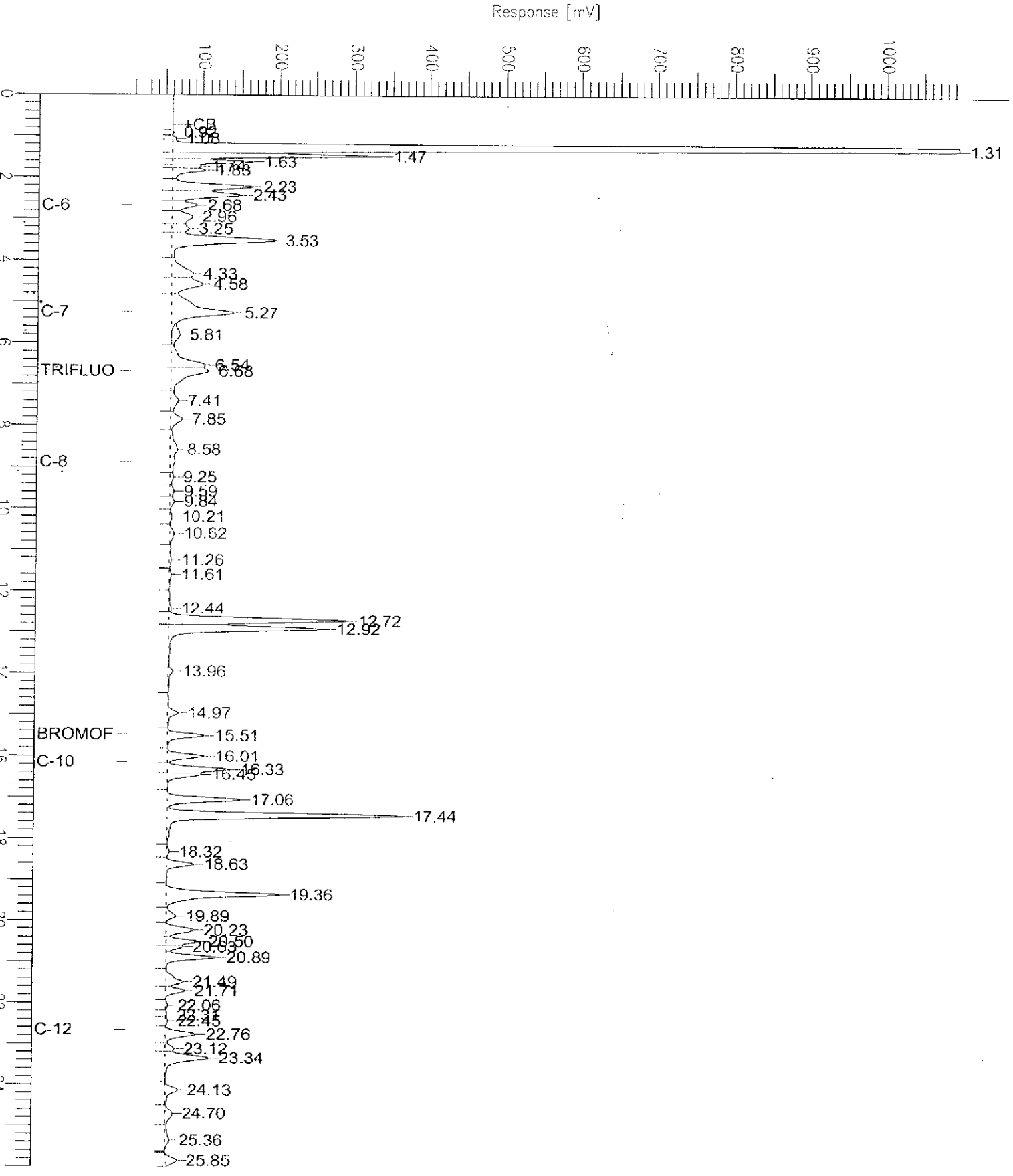
Sample #: a1 Page 1 of 1
Date : 12/21/02 10:15 AM
Time of Injection: 12/20/02 10:30 PM
Low Point : 6.54 mV High Point : 1094.41 mV
Plot Scale: 1087.9 mV



GC04 TVH 'J' Data File FID

Sample Name : 162711-008,77838
FileName : G:\GC04\DATA\355J020.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 26.00 min
Scale Factor: 1.0 Plot Offset: 7 mV

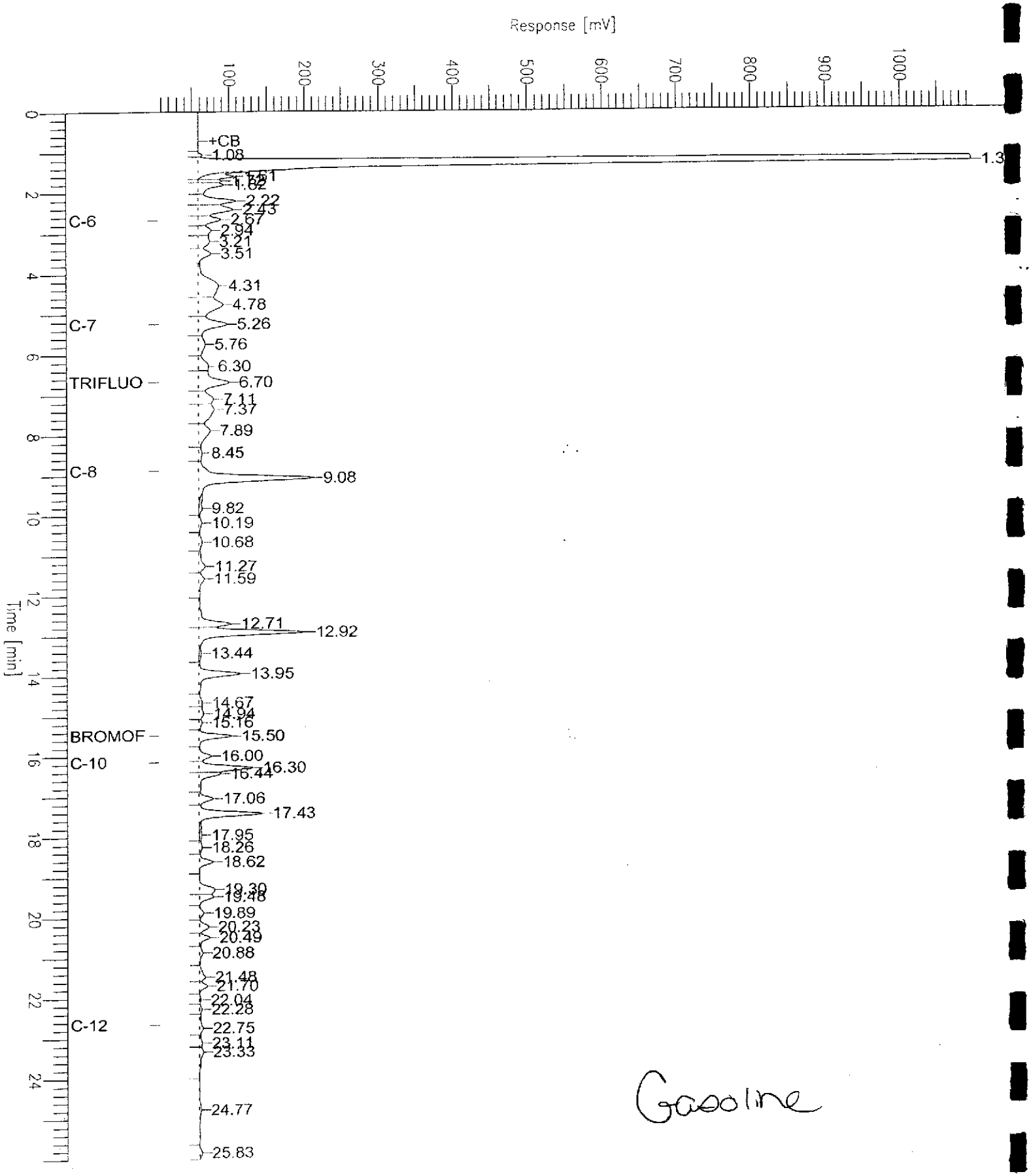
Sample #: bl Page 1 of 1
Date : 12/22/02 03:07 AM
Time of Injection: 12/22/02 02:41 AM
Low Point : 6.76 mV High Point : 1094.41 mV
Plot Scale: 1087.7 mV



GC04 TVH 'J' Data File FID

Sample Name : ccv/lcs,qc199602,77822,02ws1992,5/5000
FileName : G:\GC04\DATA\354J004.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 26.00 min
Scale Factor: 1.0 Plot Offset: 6 mV

Sample #: Page 1 of 1
Date : 12/20/02 07:20 PM
Time of Injection: 12/20/02 06:54 PM
Low Point : 6.29 mV High Point : 1094.42 mV
Plot Scale: 1088.1 mV



Gasoline

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	162711	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	021218-551		
Matrix:	Water	Sampled:	12/18/02
Units:	ug/L	Received:	12/18/02

Type:	BLANK	Batch#:	77838
Lab ID:	QC199659	Analyzed:	12/21/02
Diln Fac:	1.000		

Analyte	Result	RL	Analysis
Gasoline C7-C12	ND	50	8015B(M)
MTBE	ND	2.0	EPA 8021B
Benzene	ND	0.50	EPA 8021B
Toluene	ND	0.50	EPA 8021B
Ethylbenzene	ND	0.50	EPA 8021B
m,p-Xylenes	ND	0.50	EPA 8021B
o-Xylene	ND	0.50	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	93	68-145	8015B(M)
Bromofluorobenzene (FID)	103	66-143	8015B(M)
Trifluorotoluene (PID)	113	53-143	EPA 8021B
Bromofluorobenzene (PID)	108	52-142	EPA 8021B

Type:	BLANK	Batch#:	77866
Lab ID:	QC199773	Analyzed:	12/23/02
Diln Fac:	1.000		

Analyte	Result	RL	Analysis
Ethylbenzene	ND	0.50	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	92	68-145	8015B(M)
Bromofluorobenzene (FID)	101	66-143	8015B(M)
Trifluorotoluene (PID)	115	53-143	EPA 8021B
Bromofluorobenzene (PID)	108	52-142	EPA 8021B

*= Value outside of QC limits; see narrative
b= See narrative
ND= Not Detected
RL= Reporting Limit
>LR= Response exceeds instrument's linear range

Curtis & Tompkins, Ltd.

Total Volatile Hydrocarbons

Lab #:	162711	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	021218-551	Analysis:	8015B(M)
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC199602	Batch#:	77822
Matrix:	Water	Analyzed:	12/20/02
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	2,000	2,122	106	79-120

Surrogate	%REC	Limits
Trifluorotoluene (FID)	122	68-145
Bromofluorobenzene (FID)	113	66-143

Curtis & Tompkins, Ltd.

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	162711	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	021218-551	Analysis:	EPA 8021B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC199603	Batch#:	77822
Matrix:	Water	Analyzed:	12/20/02
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
MTBE	20.00	20.00	100	51-125
Benzene	20.00	20.44	102	65-122
Toluene	20.00	19.43	97	67-121
Ethylbenzene	20.00	20.15	101	70-121
m,p-Xylenes	40.00	39.24	98	72-125
o-Xylene	20.00	21.01	105	73-122

Surrogate	%REC	Limits
Trifluorotoluene (PID)	112	53-143
Bromofluorobenzene (PID)	111	52-142

Curtis & Tompkins, Ltd.

Total Volatile Hydrocarbons

Lab #:	162711	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	021218-551	Analysis:	8015B(M)
Type:	BS	Diln Fac:	1.000
Lab ID:	QC199660	Batch#:	77838
Matrix:	Water	Analyzed:	12/21/02
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	1,000	1,083	108	79-120

Surrogate	%REC	Limits
Trifluorotoluene (FID)	104	68-145
Bromofluorobenzene (FID)	114	66-143

Curtis & Tompkins, Ltd.

Total Volatile Hydrocarbons

Lab #:	162711	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	021218-551	Analysis:	8015B(M)
Type:	BSD	Diln Fac:	1.000
Lab ID:	QC199669	Batch#:	77838
Matrix:	Water	Analyzed:	12/22/02
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	2,000	2,165	108	79-120	0	20

Surrogate	%REC	Limits
Trifluorotoluene (FID)	129	68-145
Bromofluorobenzene (FID)	117	66-143

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	162711	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	021218-551	Analysis:	EPA 8021B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC199661	Batch#:	77838
Matrix:	Water	Analyzed:	12/21/02
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
MTBE	10.00	9.120	91	51-125
Benzene	10.00	9.172	92	65-122
Toluene	10.00	8.720	87	67-121
Ethylbenzene	10.00	8.803	88	70-121
m,p-Xylenes	20.00	17.00	85	72-125
o-Xylene	10.00	9.226	92	73-122

Surrogate	%REC	Limits
Trifluorotoluene (PID)	127	53-143
Bromofluorobenzene (PID)	120	52-142

Curtis & Tompkins, Ltd.

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	162711	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	021218-551	Analysis:	EPA 8021B
Matrix:	Water	Batch#:	77866
Units:	ug/L	Analyzed:	12/23/02
Diln Fac:	1.000		

Type: BS Lab ID: QC199774

Analyte	Spiked	Result	%REC	Limits
Ethylbenzene	20.00	17.59	88	70-121

Surrogate	%REC	Limits
Trifluorotoluene (PID)	98	53-143
Bromofluorobenzene (PID)	101	52-142

Type: BSD Lab ID: QC199775

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Ethylbenzene	20.00	18.34	92	70-121	4	20

Surrogate	%REC	Limits
Trifluorotoluene (PID)	109	53-143
Bromofluorobenzene (PID)	110	52-142

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	162711	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	021218-551	Analysis:	EPA 8021B
Field ID:	ZZZZZZZZZZ	Batch#:	77822
MSS Lab ID:	162751-002	Sampled:	12/18/02
Matrix:	Water	Received:	12/19/02
Units:	ug/L	Analyzed:	12/21/02
Diln Fac:	1.000		

Type: MS Lab ID: QC199604

Analyte	MSS Result	Spiked	Result	%REC	Limits
MTBE	0.9926	20.00	30.01	145 *	33-131
Benzene	<0.2000	20.00	20.33	102	52-149
Toluene	<0.2500	20.00	19.13	96	69-130
Ethylbenzene	<0.1500	20.00	20.05	100	70-131
m,p-Xylenes	<0.1500	40.00	39.77	99	68-137
o-Xylene	<0.1600	20.00	20.78	104	73-133

Surrogate	%REC	Limits
Trifluorotoluene (PID)	118	53-143
Bromofluorobenzene (PID)	119	52-142

Type: MSD Lab ID: QC199605

Analyte	Spiked	Result	%REC	Limits	RPD	Li
MTBE	20.00	29.19	141 *	33-131	3	20
Benzene	20.00	20.24	101	52-149	0	30
Toluene	20.00	19.60	98	69-130	2	30
Ethylbenzene	20.00	20.38	102	70-131	2	30
m,p-Xylenes	40.00	39.62	99	68-137	0	30
o-Xylene	20.00	21.50	108	73-133	3	30

Surrogate	%REC	Limits
Trifluorotoluene (PID)	120	53-143
Bromofluorobenzene (PID)	121	52-142

*= Value outside of QC limits; see narrative
RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	162711	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	021218-551	Analysis:	EPA 8021B
Field ID:	ZZZZZZZZZZ	Batch#:	77838
MSS Lab ID:	162744-001	Sampled:	12/19/02
Matrix:	Water	Received:	12/19/02
Units:	ug/L	Analyzed:	12/21/02
Diln Fac:	1.000		

Type: MS Lab ID: QC199662

Analyte	MSS Result	Spiked	Result	%REC	Limits
MTBE	1.484	20.00	22.26	104	33-131
Benzene	<0.2000	20.00	19.91	100	52-149
Toluene	<0.2500	20.00	19.54	98	69-130
Ethylbenzene	<0.1500	20.00	20.89	104	70-131
m,p-Xylenes	<0.1500	40.00	40.75	102	68-137
o-Xylene	<0.1600	20.00	22.09	110	73-133

Surrogate	%REC	Limits
Trifluorotoluene (PID)	119	53-143
Bromofluorobenzene (PID)	119	52-142

Type: MSD Lab ID: QC199663

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	20.00	23.01	108	33-131	3	20
Benzene	20.00	19.65	98	52-149	1	30
Toluene	20.00	20.04	100	69-130	3	30
Ethylbenzene	20.00	20.99	105	70-131	1	30
m,p-Xylenes	40.00	41.17	103	68-137	1	30
o-Xylene	20.00	21.77	109	73-133	1	30

Surrogate	%REC	Limits
Trifluorotoluene (PID)	117	53-143
Bromofluorobenzene (PID)	119	52-142

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	162711	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 3520C
Project#:	021218-551	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	12/18/02
Units:	ug/L	Received:	12/18/02
Batch#:	77887	Prepared:	12/23/02

Field ID: MW-2
Type: SAMPLE
Lab ID: 162711-001
Diln Fac: 1.000
Analyzed: 12/26/02

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	102	39-137

Field ID: MW-4
Type: SAMPLE
Lab ID: 162711-003
Diln Fac: 1.000
Analyzed: 12/26/02

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	110	39-137

Field ID: MW-7
Type: SAMPLE
Lab ID: 162711-004
Diln Fac: 2.000
Analyzed: 12/26/02

Analyte	Result	RL
Diesel C10-C24	3,700 L Y	100

Surrogate	%REC	Limits
Hexacosane	90	39-137

Field ID: MW-8
Type: SAMPLE
Lab ID: 162711-005
Diln Fac: 1.000
Analyzed: 12/28/02

Analyte	Result	RL
Diesel C10-C24	290 L Y	50

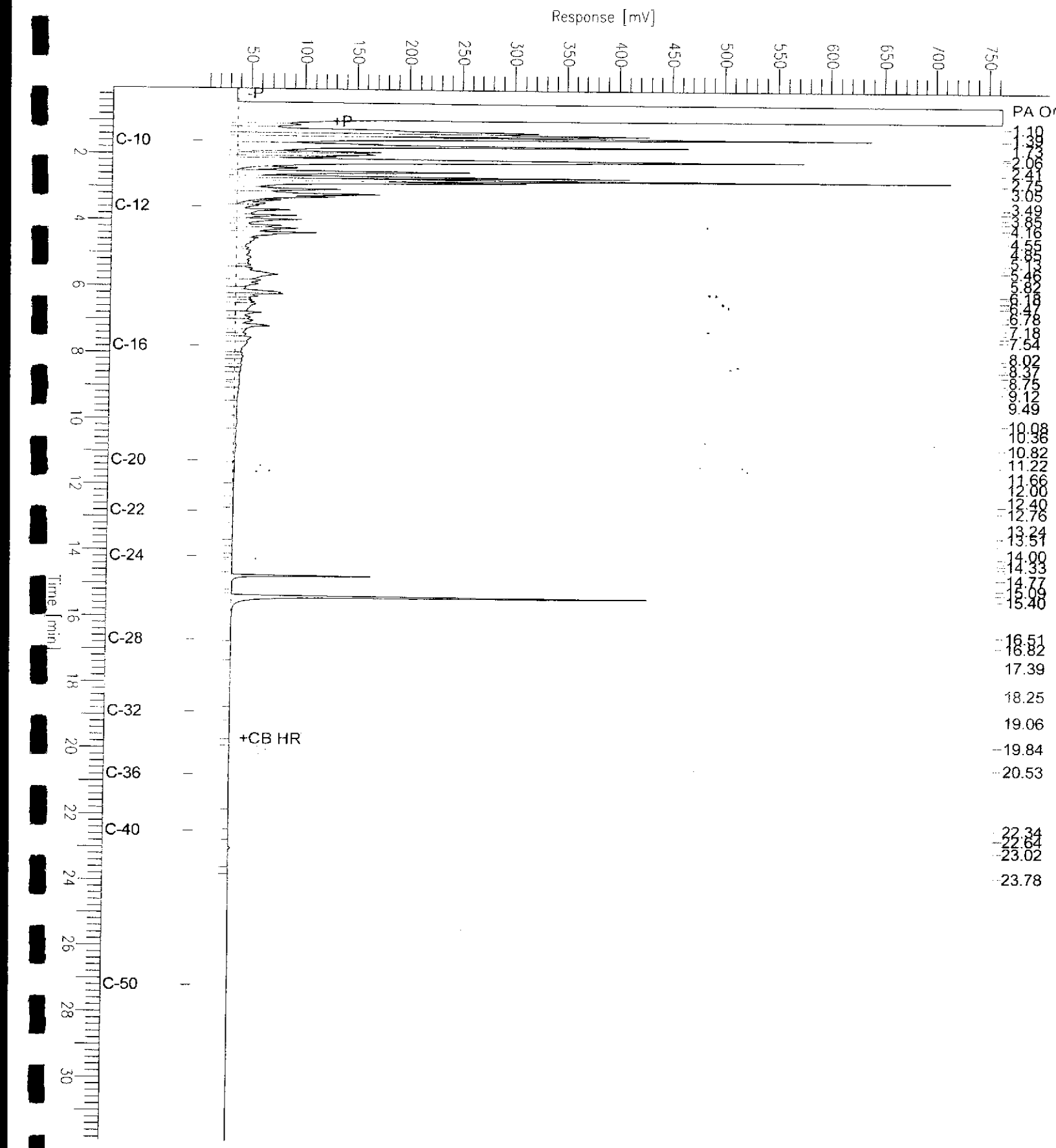
Surrogate	%REC	Limits
Hexacosane	87	39-137

L= Lighter hydrocarbons contributed to the quantitation
Y= Sample exhibits fuel pattern which does not resemble standard
ND= Not Detected
RL= Reporting Limit

Chromatogram

Sample Name : 162711-004,77887
FileName : G:\GC13\CHB\358B063.RAW
Method : BTEH358.MTH
Start Time : 0.01 min End Time : 31.91 min
Scale Factor: 0.0 Plot Offset: 3 mV

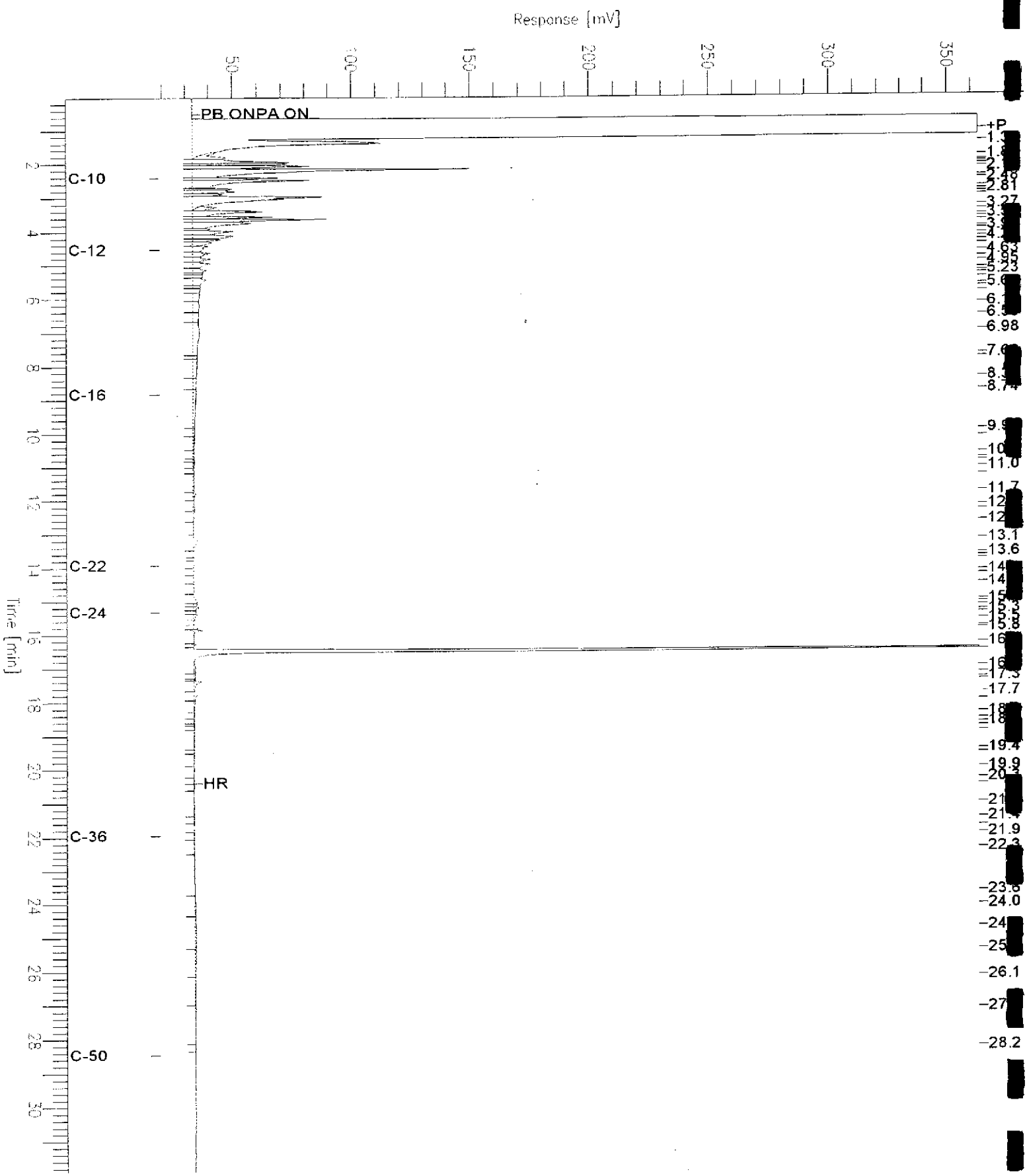
Sample #: 77887
Date : 12/26/02 09:57 AM
Time of Injection: 12/26/02 03:24 AM
Low Point : 2.91 mV High Point : 762.16 mV
Plot Scale: 759.2 mV



Chromatogram

Sample Name : 162711-005,77887
FileName : G:\GC15\CHB\360B056.RAW
Method : BTEH309.MTH
Start Time : 0.01 min End Time : 31.91 min
Scale Factor: 0.0 Plot Offset: 19 mV

Sample #: 77887 Page 1 of 1
Date : 12/29/2002 04:16 PM
Time of Injection: 12/28/2002 05:39 AM
Low Point : 19.05 mV High Point : 363.01 mV
Plot Scale: 344.0 mV



Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	162711	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 3520C
Project#:	021218-551	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	12/18/02
Units:	ug/L	Received:	12/18/02
Batch#:	77887	Prepared:	12/23/02

Field ID: MW-9 | Diln Fac: 1.000
Type: SAMPLE | Analyzed: 12/28/02
Lab ID: 162711-006

Analyte	Result	RL
Diesel C10-C24	3,500 L Y	50

Surrogate	%REC	Limits
Hexacosane	94	39-137

Field ID: MW-10 | Diln Fac: 1.000
Type: SAMPLE | Analyzed: 12/26/02
Lab ID: 162711-007

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	84	39-137

Field ID: MW-11 | Diln Fac: 1.000
Type: SAMPLE | Analyzed: 12/26/02
Lab ID: 162711-008

Analyte	Result	RL
Diesel C10-C24	4,500 L Y	50

Surrogate	%REC	Limits
Hexacosane	95	39-137

Type: BLANK | Diln Fac: 1.000
Lab ID: QC199858 | Analyzed: 12/26/02

Analyte	Result	RL
Diesel C10-C24	ND	50

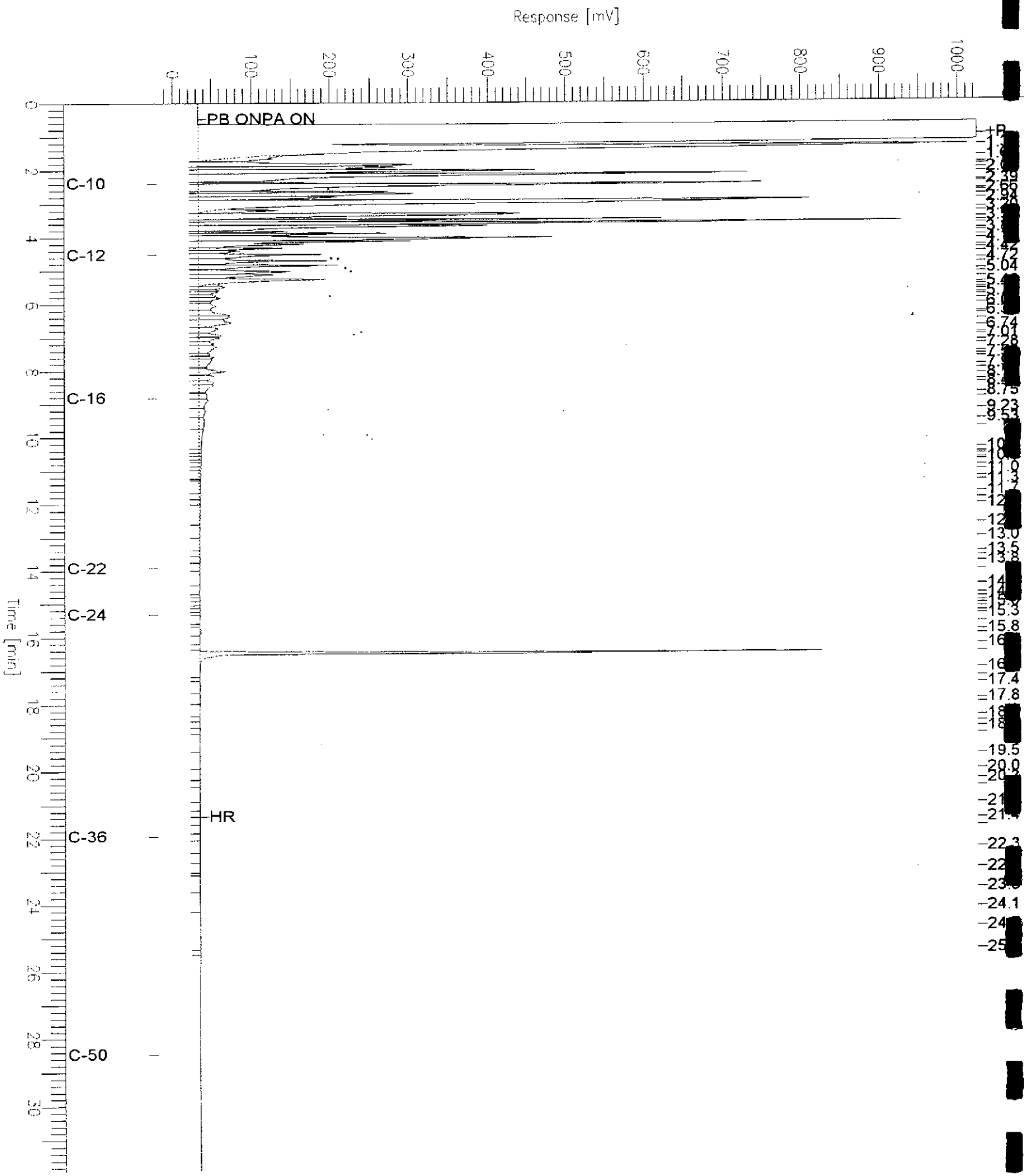
Surrogate	%REC	Limits
Hexacosane	104	39-137

L= Lighter hydrocarbons contributed to the quantitation
Y= Sample exhibits fuel pattern which does not resemble standard
ND= Not Detected
RL= Reporting Limit

Chromatogram

Sample Name : 162711-006,77887
FileName : G:\GC15\CHB\360B057.RAW
Method : BTEH309.MTH
Start Time : 0.00 min End Time : 31.90 min
Scale Factor: 0.0 Plot Offset: -20 mV

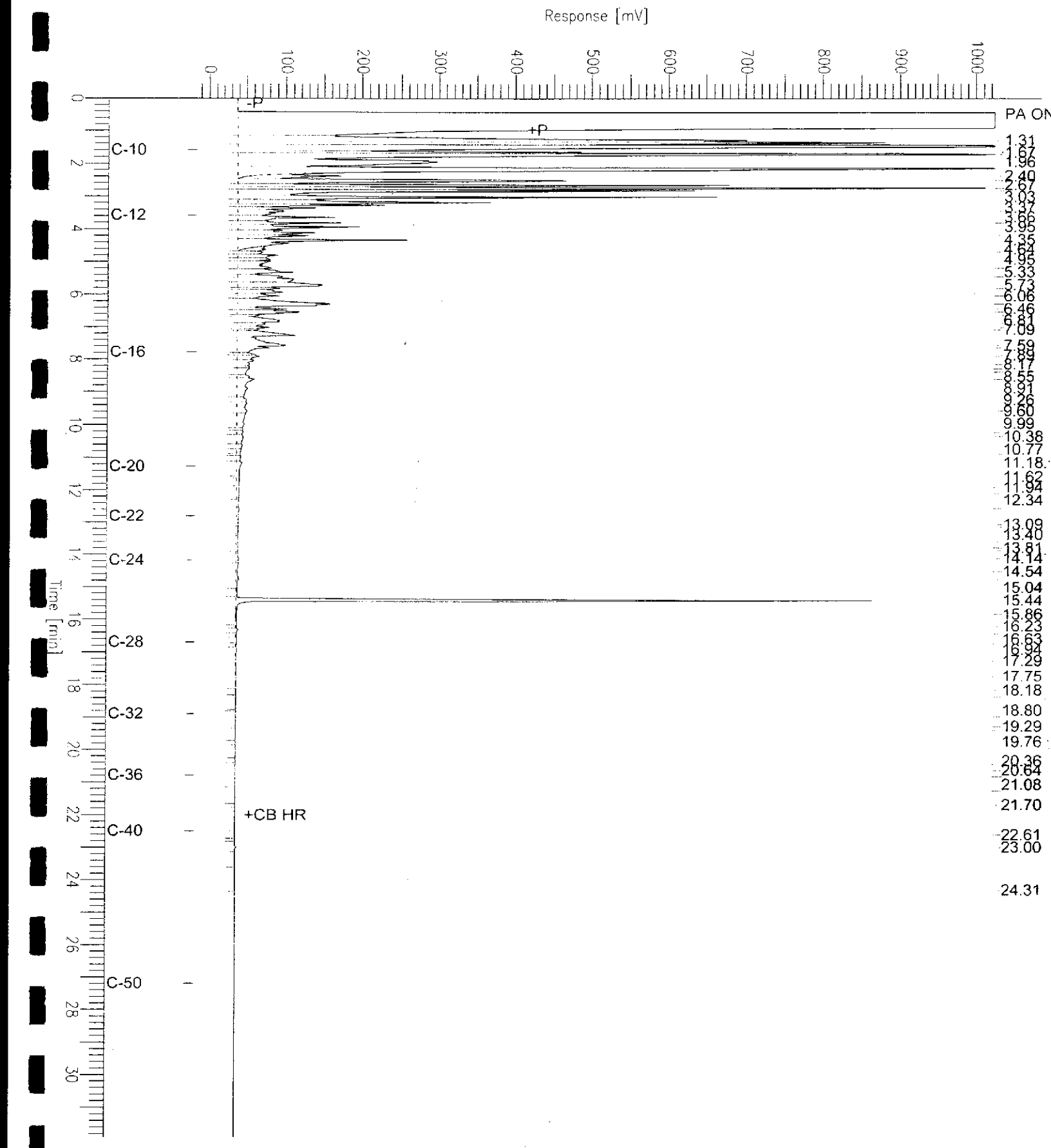
Sample #: 77887 Page 1 of 1
Date : 12/29/2002 04:17 PM
Time of Injection: 12/28/2002 06:20 AM
Low Point : -19.80 mV High Point : 1024.00 mV
Plot Scale: 1043.8 mV



Chromatogram

Sample Name : 162711-008,77887
FileName : G:\GC13\CHB\358B068.RAW
Method : BTEH358.MTH
Start Time : 0.00 min End Time : 31.90 min
Scale Factor: 0.0 Plot Offset: -16 mV

Sample #: 77887 Page 1 of 1
Date : 12/26/02 09:58 AM
Time of Injection: 12/26/02 09:14 AM
Low Point : -15.52 mV High Point : 1024.00 mV
Plot Scale: 1039.5 mV



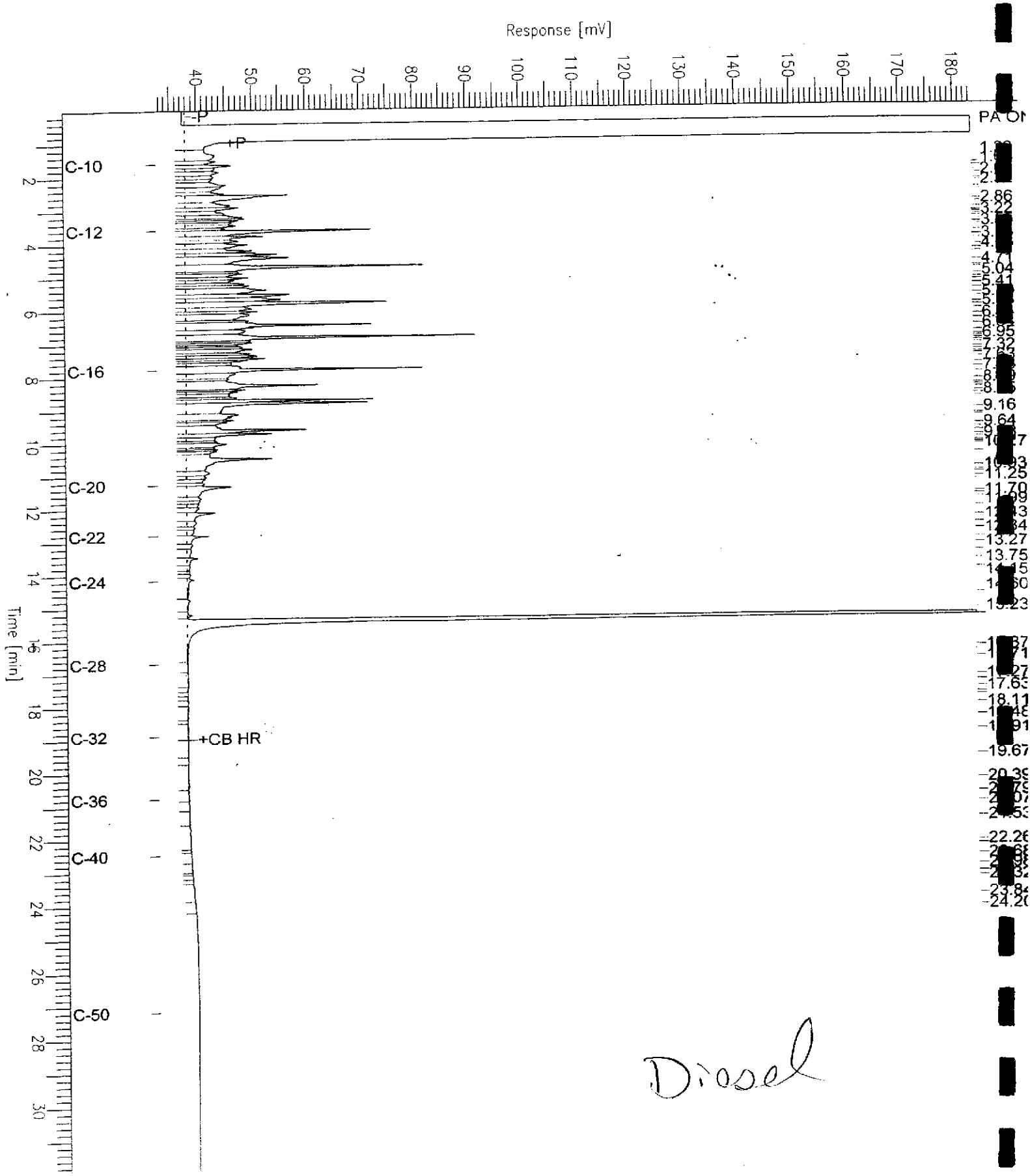
Chromatogram

Sample Name : ccv,02ws1752,dsl
FileName : G:\GC13\CHB\358B002.RAW
Method : BTEH358.MTH
Start Time : 0.01 min
Scale Factor: 0.0

End Time : 31.91 min
Plot Offset: 33 mV

Sample #: 100mg/L
Date : 12/24/02 03:49 PM
Time of Injection: 12/24/02 02:09 PM
Low Point : 32.55 mV
Plot Scale: 150.9 mV

High Point : 183.44 mV



Diesel

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	162711	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 3520C
Project#:	021218-551	Analysis:	EPA 8015B
Matrix:	Water	Batch#:	77887
Units:	ug/L	Prepared:	12/23/02
Diln Fac:	1.000	Analyzed:	12/26/02

Type: BS Lab ID: QC199859

Analyte	Spiked	Result	%REC	Limits
Diesel C10-C24	2,500	2,342	94	37-120

Surrogate	%REC	Limits
Hexacosane	88	39-137

Type: BSD Lab ID: QC199860

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Diesel C10-C24	2,500	2,742	110	37-120	16	26

Surrogate	%REC	Limits
Hexacosane	105	39-137

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Nitrate Nitrogen

Lab #:	162711	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Analysis:	EPA 300.0
Project#:	021218-551		
Analyte:	Nitrogen, Nitrate	Batch#:	77752
Matrix:	Water	Sampled:	12/18/02
Units:	mg/L	Received:	12/18/02
Diln Fac:	1.000	Analyzed:	12/19/02

Field ID	Type	Lab ID	Result	RL
MW-3	SAMPLE	162711-002	ND	0.05
MW-4	SAMPLE	162711-003	0.42	0.05
MW-7	SAMPLE	162711-004	ND	0.05
MW-8	SAMPLE	162711-005	0.05	0.05
MW-9	SAMPLE	162711-006	0.05	0.05
MW-10	SAMPLE	162711-007	0.06	0.05
MW-11	SAMPLE	162711-008	ND	0.05
	BLANK	QC199355	ND	0.05

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Nitrate Nitrogen

Lab #:	162711	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Analysis:	EPA 300.0
Project#:	021218-551		
Analyte:	Nitrogen, Nitrate	Batch#:	77752
Field ID:	ZZZZZZZZZZ	Sampled:	12/09/02
MSS Lab ID:	162486-001	Received:	12/09/02
Matrix:	Water	Analyzed:	12/19/02
Units:	mg/L		

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim	Diln Fac
BS	QC199356		1.000	1.075	108	90-110			1.000
BSD	QC199357		1.000	1.032	103	90-110	4	20	1.000
MS	QC199358	7.223	5.000	12.49	105	80-120			10.00
MSD	QC199359		5.000	12.33	102	80-120	1	20	10.00

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Sulfate

Lab #:	162711	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Analysis:	EPA 300.0
Project#:	021218-551		
Analyte:	Sulfate	Sampled:	12/18/02
Matrix:	Water	Received:	12/18/02
Units:	mg/L		

Field ID	Type	Lab ID	Result	RL	Dil'n Fac	Batch#	Analyzed
MW-3	SAMPLE	162711-002	36	0.50	1.000	77752	12/19/02
MW-4	SAMPLE	162711-003	59	1.0	2.000	77738	12/19/02
MW-7	SAMPLE	162711-004	3.4	0.50	1.000	77752	12/19/02
MW-8	SAMPLE	162711-005	88	1.0	2.000	77738	12/19/02
MW-9	SAMPLE	162711-006	67	1.0	2.000	77738	12/19/02
MW-10	SAMPLE	162711-007	61	1.0	2.000	77738	12/19/02
MW-11	SAMPLE	162711-008	1.9	0.50	1.000	77752	12/19/02
	BLANK	QC199303	ND	0.50	1.000	77738	12/18/02
	BLANK	QC199355	ND	0.50	1.000	77752	12/19/02

ND= Not Detected
RL= Reporting Limit

3.0

Curtis & Tompkins, Ltd.

Sulfate

Lab #:	162711	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Analysis:	EPA 300.0
Project#:	021218-551		
Analyte:	Sulfate	Units:	mg/L
Field ID:	ZZZZZZZZZZ	Sampled:	12/09/02
MSS Lab ID:	162486-001	Received:	12/09/02
Matrix:	Water		

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim	Diln Fac	Batch#	Analyzed
BS	QC199304		10.00	10.20	102	90-110			1.000	77738	12/18/02
BSD	QC199305		10.00	10.25	103	90-110	1	20	1.000	77738	12/18/02
BS	QC199356		10.00	10.26	103	90-110			1.000	77752	12/19/02
BSD	QC199357		10.00	9.846	98	90-110	4	20	1.000	77752	12/19/02
MS	QC199358	32.42	50.00	83.94	103	72-125			10.00	77752	12/19/02
MSD	QC199359		50.00	85.36	106	72-125	2	20	10.00	77752	12/19/02

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710. Phone (510) 486-0900

ANALYTICAL REPORT

Prepared for:

Stellar Environmental Solutions
2198 6th Street
Suite 201
Berkeley, CA 94710

Date: 06-JAN-03
Lab Job Number: 162689
Project ID: 2001-53
Location: Redwood Park Service Yard

This data package has been reviewed for technical correctness and completeness. Release of this data has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signatures. The results contained in this report meet all requirements of NELAC and pertain only to those samples which were submitted for analysis.

Reviewed by: _____
Project Manager

Reviewed by: _____
Operations Manager

Chain of Custody Record

162689

Lab job no. —
Date —
Page 1 of 1

Laboratory: Curtis + Tompkins, Ltd.
Address: 2323 Fifth Street, Berkeley CA, 510/486-0900
Project Owner: East Bay Regional Park District
Site Address: 7867 Redwood Rd., Oakland CA
Project Name: Redwood Park Service Yard
Project Number: 2001-53

Method of Shipment: hand delivery
Shipment No. —
Airbill No. —
Cooler No. —
Project Manager: Bruce Ruckes
Telephone No.: (510) 644-3123
Fax No.: (510) 644-3859
Samplers: (Signature) B.M. Ruckes

Field Sample Number	Location/ Depth	Date	Time	Sample Type	Type/Size of Container	Preservation: Cooler	Preservation: Chemical	Filtered	No. of Containers	Analysis Required: TVH + BTEX + MTBE	Analysis Required: TEH- Diesel	Remarks
SW-2	—	12/18/02	810	H2O	40 ml VOAs	✓	HCl		2	X		
	—				1-L amber glass	✓	none		1		X	
SW-3	—		820		40 ml VOAs	✓	HCl		2	X		
	—				1-L amber glass	✓	none		1		X	

Preservation Correct? ☒ Yes ☐ No ☐ N/A

Received ☒ On Ice ☒ Intact ☒ Cold ☐ Ambient

Relinquished by:	Date	Received by:	Date
Signature: B.M. Ruckes	12/18/02	Signature: [signature]	12/18/02
Printed: Bruce Ruckes	Time	Printed: C. Alvarez	Time
Company: Stellar Env. Solutions	1725	Company: Curtis + Tompkins, Ltd.	1725

Relinquished by:	Date	Received by:	Date
Signature		Signature	
Printed	Time	Printed	Time
Company		Company	

Relinquished by:	Date	Received by:	Date
Signature		Signature	
Printed	Time	Printed	Time
Company		Company	

Turnaround Time: 5 Day

Comments:

2000-00-01

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	162689	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2001-53		
Matrix:	Water	Sampled:	12/18/02
Units:	ug/L	Received:	12/18/02
Diln Fac:	1.000	Analyzed:	12/20/02
Batch#:	77812		

Field ID: SW-2 Lab ID: 162689-001
Type: SAMPLE

Analyte	Result	RL	Analysis
Gasoline C7-C12	ND	50	8015B(M)
MTBE	ND	2.0	EPA 8021B
Benzene	ND	0.50	EPA 8021B
Toluene	ND	0.50	EPA 8021B
Ethylbenzene	ND	0.50	EPA 8021B
m,p-Xylenes	ND	0.50	EPA 8021B
o-Xylene	ND	0.50	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	97	68-145	8015B(M)
Bromofluorobenzene (FID)	100	66-143	8015B(M)
Trifluorotoluene (PID)	100	53-143	EPA 8021B
Bromofluorobenzene (PID)	101	52-142	EPA 8021B

Field ID: SW-3 Lab ID: 162689-002
Type: SAMPLE

Analyte	Result	RL	Analysis
Gasoline C7-C12	ND	50	8015B(M)
MTBE	ND	2.0	EPA 8021B
Benzene	ND	0.50	EPA 8021B
Toluene	ND	0.50	EPA 8021B
Ethylbenzene	ND	0.50	EPA 8021B
m,p-Xylenes	ND	0.50	EPA 8021B
o-Xylene	ND	0.50	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	99	68-145	8015B(M)
Bromofluorobenzene (FID)	103	66-143	8015B(M)
Trifluorotoluene (PID)	100	53-143	EPA 8021B
Bromofluorobenzene (PID)	104	52-142	EPA 8021B

ND= Not Detected
RL= Reporting Limit

1.0

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	162689	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2001-53		
Matrix:	Water	Sampled:	12/18/02
Units:	ug/L	Received:	12/18/02
Diln Fac:	1.000	Analyzed:	12/20/02
Batch#:	77812		

Type: BLANK Lab ID: QC199564

Analyte	Result	RL	Analysis
Gasoline C7-C12	ND	50	8015B(M)
MTBE	ND	2.0	EPA 8021B
Benzene	ND	0.50	EPA 8021B
Toluene	ND	0.50	EPA 8021B
Ethylbenzene	ND	0.50	EPA 8021B
m,p-Xylenes	ND	0.50	EPA 8021B
o-Xylene	ND	0.50	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	95	68-145	8015B(M)
Bromofluorobenzene (FID)	97	66-143	8015B(M)
Trifluorotoluene (PID)	98	53-143	EPA 8021B
Bromofluorobenzene (PID)	97	52-142	EPA 8021B

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Total Volatile Hydrocarbons

Lab #:	162689	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2001-53	Analysis:	8015B(M)
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC199565	Batch#:	77812
Matrix:	Water	Analyzed:	12/20/02
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	1,000	1,017	102	79-120

Surrogate	%REC	Limits
Trifluorotoluene (FID)	102	68-145
Bromofluorobenzene (FID)	94	66-143

Curtis & Tompkins, Ltd.

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	162689	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2001-53	Analysis:	EPA 8021B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC199566	Batch#:	77812
Matrix:	Water	Analyzed:	12/20/02
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
MTBE	10.00	9.930	99	51-125
Benzene	10.00	9.703	97	65-122
Toluene	10.00	9.615	96	67-121
Ethylbenzene	10.00	9.153	92	70-121
m,p-Xylenes	20.00	17.17	86	72-125
o-Xylene	10.00	9.852	99	73-122

Surrogate	%REC	Limits
Trifluorotoluene (PID)	96	53-143
Bromofluorobenzene (PID)	98	52-142

3.0

Curtis & Tompkins, Ltd.

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	162689	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2001-53	Analysis:	EPA 8021B
Field ID:	SW-2	Batch#:	77812
MSS Lab ID:	162689-001	Sampled:	12/18/02
Matrix:	Water	Received:	12/18/02
Units:	ug/L	Analyzed:	12/20/02
Diln Fac:	1.000		

Type: MS Lab ID: QC199567

Analyte	MSS Result	Spiked	Result	%REC	Limits
MTBE	<0.3700	20.00	19.75	99	33-131
Benzene	<0.06500	20.00	19.93	100	52-149
Toluene	<0.06000	20.00	20.55	103	69-130
Ethylbenzene	<0.03800	20.00	20.02	100	70-131
m,p-Xylenes	<0.03400	40.00	37.45	94	68-137
o-Xylene	<0.03600	20.00	20.86	104	73-133

Surrogate	%REC	Limits
Trifluorotoluene (PID)	102	53-143
Bromofluorobenzene (PID)	103	52-142

Type: MSD Lab ID: QC199568

Analyte	Spiked	Result	%REC	Limits	RPD	Li
MTBE	20.00	18.62	93	33-131	6	20
Benzene	20.00	19.22	96	52-149	4	30
Toluene	20.00	21.97	110	69-130	7	30
Ethylbenzene	20.00	19.32	97	70-131	4	30
m,p-Xylenes	40.00	37.15	93	68-137	1	30
o-Xylene	20.00	20.53	103	73-133	2	30

Surrogate	%REC	Limits
Trifluorotoluene (PID)	98	53-143
Bromofluorobenzene (PID)	100	52-142

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	162689	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 3520C
Project#:	2001-53	Analysis:	EPA 8015B(M)
Matrix:	Water	Sampled:	12/18/02
Units:	ug/L	Received:	12/18/02
Diln Fac:	1.000	Prepared:	12/23/02
Batch#:	77893	Analyzed:	12/24/02

Field ID: SW-2 Lab ID: 162689-001
Type: SAMPLE

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	97	39-137

Field ID: SW-3 Lab ID: 162689-002
Type: SAMPLE

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	88	39-137

Type: BLANK Lab ID: QC199873

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	97	39-137

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	162689	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 3520C
Project#:	2001-53	Analysis:	EPA 8015B(M)
Matrix:	Water	Batch#:	77893
Units:	ug/L	Prepared:	12/23/02
Diln Fac:	1.000	Analyzed:	12/24/02

Type: BS Lab ID: QC199874

Analyte	Spiked	Result	%REC	Limits
Diesel C10-C24	2,500	2,529	101	37-120

Surrogate	%REC	Limits
Hexacosane	106	39-137

Type: BSD Lab ID: QC199875

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Diesel C10-C24	2,500	2,768	111	37-120	9	2

Surrogate	%REC	Limits
Hexacosane	117	39-137

RPD= Relative Percent Difference

HISTORICAL GROUNDWATER MONITORING WELLS ANALYTICAL RESULTS

REDWOOD REGIONAL PARK SERVICE YARD, OAKLAND, CALIFORNIA

(all concentrations in ug/L, equivalent to parts per billion [ppb])

Well MW-2									
Event	Date	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	MTBE
1	Nov-94	66	< 50	3.4	< 0.5	< 0.5	0.9	4.3	NA
2	Feb-95	89	< 50	18	2.4	1.7	7.5	29.6	NA
3	May-95	< 50	< 50	3.9	< 0.5	1.6	2.5	8	NA
4	Aug-95	< 50	< 50	5.7	< 0.5	< 0.5	< 0.5	5.7	NA
5	May-96	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
6	Aug-96	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
7	Dec-96	< 50	< 50	6.3	< 0.5	1.6	< 0.5	7.9	NA
8	Feb-97	< 50	< 50	0.69	< 0.5	0.55	< 0.5	1.2	NA
9	May-97	67	< 50	8.9	< 0.5	5.1	< 1.0	14	NA
10	Aug-97	< 50	< 50	4.5	< 0.5	1.1	< 0.5	5.6	NA
11	Dec-97	61	< 50	21	< 0.5	6.5	3.9	31.4	NA
12	Feb-98	2,000	200	270	92	150	600	1,112	NA
13	Sep-98	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	7
14	Apr-99	82	710	4.2	< 0.5	3.4	4	12	7.5
15	Dec-99	57	< 50	20	0.6	5.9	<0.5	27	4.5
16	Sep-00	< 50	< 50	0.72	< 0.5	< 0.5	< 0.5	0.7	7.9
17	Jan-01	51	< 50	8.3	< 0.5	1.5	< 0.5	9.8	8.0
18	Apr-01	110	< 50	10	< 0.5	11	6.4	27	10
19	Aug-01	260	120	30	6.7	1.6	6.4	45	27
20	Dec-01	74	69	14	0.8	3.7	3.5	22	6.6

NA = Not Analyzed for this constituent

Well MW-2 (continued)									
Event	Date	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	MTBE
21	Mar-02	< 50	< 50	2.3	0.51	1.9	1.3	8.3	8.2
22	Jun-02	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	7.7
23	Sep-02	98	< 50	5.0	< 0.5	< 0.5	< 0.5	—	13.0
24	Dec-02	< 50	< 50	4.3	< 0.5	< 0.5	< 0.5	—	< 2.0

Well MW-4									
Event	Date	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	MTBE
1	Nov-94	2,600	230	120	4.8	150	88	363	NA
2	Feb-95	11,000	330	420	17	440	460	1,337	NA
3	May-95	7,200	440	300	13	390	330	1,033	NA
4	Aug-95	1,800	240	65	6.8	89	67	227	NA
5	May-96	1,100	140	51	< 0.5	< 0.5	47	98	NA
6	Aug-96	3,700	120	63	2	200	144	409	NA
7	Dec-96	2,700	240	19	< 0.5	130	93	242	NA
8	Feb-97	3,300	< 50	120	1.0	150	103	374	NA
9	May-97	490	< 50	2.6	6.7	6.4	6.7	22	NA
10	Aug-97	1,900	150	8.6	3.5	78	53	143	NA
11	Dec-97	1,000	84	4.6	2.7	61	54	123	NA
12	Feb-98	5,300	340	110	24	320	402	856	NA
13	Sep-98	1,800	< 50	8.9	< 0.5	68	27	104	23
14	Apr-99	2,900	710	61	1.2	120	80	263	32
15	Dec-99	1,000	430	4	2	26	14	45.9	< 2.0
16	Sep-00	570	380	< 0.5	< 0.5	16	4.1	20.1	2.4
17	Jan-01	1,600	650	4.2	0.89	46	13.8	65	8.4
18	Apr-01	1,700	1,100	4.5	2.8	48	10.7	66.0	5.0

NA = Not Analyzed for this constituent

Well MW-4 (continued)									
Event	Date	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	MTBE
19	Aug-01	**1,300**	**810**	**3.2**	**4.0**	**29**	**9.7**	**46**	*< 2.0*
20	Dec-01	*< 50*	**110**	*< 0.5*	*< 0.5*	*< 0.5*	**1.2**	**1.2**	*< 2.0*
21	Mar-02	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 2.0*
22	Jun-02	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 2.0*
23	Sep-02	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 2.0*
24	Dec-02	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 2.0*

Well MW-5									
Event	Date	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	MTBE
1	Nov-94	**50**	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	—	*NA*
2	Feb-95	**70**	*< 50*	**0.6**	*< 0.5*	*< 0.5*	*< 0.5*	**0.6**	*NA*
3	May-95	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	—	*NA*
4	Aug-95	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	—	*NA*
5	May-96	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	—	*NA*
6	Aug-96	**80**	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	—	*NA*
7	Dec-96	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	—	*NA*
8	Feb-97	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	—	*NA*
9	May-97	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	—	*NA*
10	Aug-97	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	—	*NA*
11	Dec-97	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	—	*NA*
12	Feb-98	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	—	*NA*
13	Sep-98	*< 50*	*<50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	—	*< 2*
Groundwater monitoring in this well discontinued with Alameda County Health Care Services Agency approval									

NA = Not Analyzed for this constituent

Well MW-7									
Event	Date	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	MTBE
1	Jan-01	13,000	3,100	95	4	500	289	888	95
2	Apr-01	13,000	3,900	140	*< 0.5*	530	278	948	52
3	Aug-01	12,000	5,000	55	25	440	198	718	19
4	Dec-01	9,100	4,600	89	*< 2.5*	460	228	777	*< 10*
5	Mar-02	8,700	3,900	220	6.2	450	191	867	200
6	Jun-02	9,300	3,500	210	6.3	380	155	751	18
7	Sep-02	9,600	3,900	180	*< 0.5*	380	160	720	*< 2.0*
8	Dec-02	9,600	3,700	110	*< 0.5*	400	188.9	699	*< 2.0*

Well MW-8									
Event	Date	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	MTBE
1	Jan-01	14,000	1,800	430	17	360	1230	2,037	96
2	Apr-01	11,000	3,200	320	13	560	1,163	2,056	42
3	Aug-01	9,600	3,200	130	14	470	463	1,077	14
4	Dec-01	3,500	950	69	2.4	310	431	812	*< 4.0*
5	Mar-02	14,000	3,800	650	17	1,200	1,510	3,377	240
6	Jun-02	2,900	1,100	70	2.0	170	148	390	19
7	Sep-02	1,000	420	22	*< 0.5*	64	50	136	*< 2.0*
8	Dec-02	3,300	290	67	*< 0.5*	190	203	460	*< 2.0*

NA = Not Analyzed for this constituent

Well MW-9									
Event	Date	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	MTBE
1	Aug-01	11,000	170	340	13	720	616	1,689	48
2	Dec-01	9,400	2,700	250	5.1	520	317	1,092	*< 10*
3	Mar-02	1,700	300	53	4.2	120	67	244	20
4	Jun-02	11,000	2,500	200	16	600	509	1,325	85
5	Sep-02	3,600	2,800	440	11	260	39	750	*< 4.0*
6	Dec-02	7,000	3,500	380	9.5	730	147	1,266	*< 10*

Well MW-10									
Event	Date	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	MTBE
1	Aug-01	550	2,100	17	*< 0.5*	31	44	92	40
2	Dec-01	*< 50*	81	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	—	25
3	Mar-02	*< 50*	*< 50*	0.61	*< 0.5*	*< 0.5*	*< 0.5*	0.61	6.0
4	Jun-02	*< 50*	*< 50*	0.59	*< 0.5*	0.58	*< 0.5*	1.2	9.0
5	Sep-02	160	120	10	*< 0.5*	6.7	3.6	20	26
6	Dec-02	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	—	16

Well MW-11									
Event	Date	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	MTBE
1	Aug-01	17,000	7,800	390	17	820	344	1,571	*< 10*
2	Dec-01	5,800	2,800	280	7.8	500	213	1,001	*< 10*
3	Mar-02	100	94	*< 0.5*	*< 0.5*	0.64	*< 0.5*	0.64	2.4
4	Jun-02	8,200	2,600	570	13	560	170	1,313	*< 4*
5	Sep-02	12,000	4,400	330	13	880	654	1,877	*< 10*
6	Dec-02	18,000	4,500	420	*< 2.5*	1100	912	2,432	*< 10*

NA = Not Analyzed for this constituent

HISTORICAL SURFACE WATER ANALYTICAL RESULTS
REDWOOD REGIONAL PARK SERVICE YARD, OAKLAND, CALIFORNIA

(all concentrations in ug/L, equivalent to parts per billion [ppb])

Sampling Location SW-1 (Upstream of Contaminated Groundwater Discharge Location SW-2)									
Event	**Date**	**TPHg**	**TPHd**	**Benzene**	**Toluene**	**Ethylbenzene**	**Total Xylenes**	**Total BTEX**	**MTBE**
1	Feb-94	**50**	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	—	*NA*
2	May-95	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	—	*NA*
3	May-96	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	—	*NA*
4	Aug-96	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	—	*NA*
5	Dec-96	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	—	*NA*
6	Feb-97	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	—	*NA*
7	Aug-97	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	—	*NA*
8	Dec-97	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	—	*NA*
9	Feb-98	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	—	*NA*
10	Sep-98	*< 50*	*<50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	—	*< 2.0*
11	Apr-99	*< 50*	*<50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	—	*< 2.0*
Sampling at this location discontinued after April 1999 with Alameda County Health Services Agency approval.									

NA = Not Analyzed for this constituent

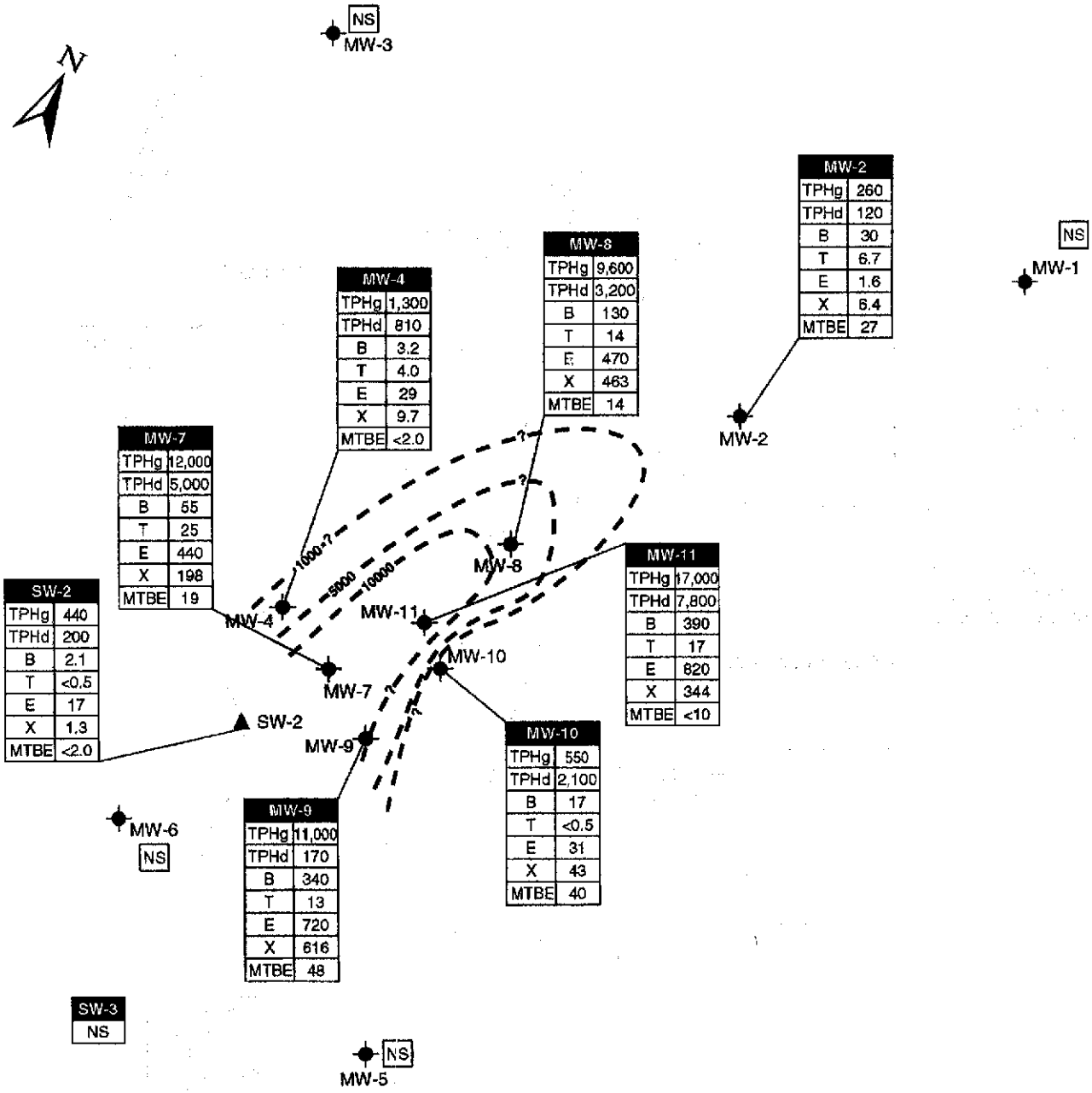
Sampling Location SW-2 (Area of Contaminated Groundwater Discharge)									
Event	Date	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	MTBE
1	Feb-94	130	< 50	1.9	< 0.5	4.4	3.2	9.5	NA
2	May-95	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
3	Aug-95	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
4	May-96	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
5	Aug-96	200	< 50	7.5	< 0.5	5.4	< 0.5	13	NA
6	Dec-96	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
7	Feb-97	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
8	Aug-97	350	130	13	0.89	19	11	44	NA
9	Dec-97	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
10	Feb-98	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
11	Sep-98	< 50	<50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2.0
12	Apr-99	81	<50	2.0	< 0.5	2.5	1.3	5.8	2.3
13	Dec-99	1,300	250	10	1.0	47	27	85	2.2
14	Sep-00	160	100	2.1	< 0.5	5.2	1.9	9.2	3.4
15	Jan-01	< 50	< 50	< 0.5	< 0.5	0.53	< 0.5	0.5	< 2.0
16	Apr-01	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2.0
17	Sep-01	440	200	2.1	< 0.5	17	1.3	20	10
18	Dec-01	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	-	< 2.0
19	Mar-02	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	-	< 2.0
20	Jun-02	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	-	< 2.0
21	Sep-02	220	590	10	< 0.5	13	< 0.5	23	< 2.0
22	Dec-02	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	-	< 2.0

NA = Not Analyzed for this constituent

Sampling Location SW-3 (Downstream of Contaminated Groundwater Discharge Location SW-2)									
Event	Date	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	MTBE
1	May-95	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
2	Aug-95	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
3	May-96	< 50	**74**	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
4	Aug-96	**69**	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
5	Dec-96	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
6	Feb-97	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
7	Aug-97	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
8	Dec-97	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
9	Feb-98	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
10	Sep-98	< 50	<50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2.0
11	Apr-99	< 50	<50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2.0
12	Dec-99	< 50	<50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2.0
13	Sep-00	NS	NS	NS	NS	NS	NS	—	NS
14	Jan-01	< 50	<50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2.0
15	Apr-01	< 50	<50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2.0
16	Sep-01	NS	NS	NS	NS	NS	NS	—	NS
17	Dec-01	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2.0
18	Mar-02	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2.0
19	Jun-02	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	**2.4**
20	Sep-02	NS	NS	NS	NS	NS	NS	—	NS
21	Dec-02	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	-	< 2.0

NS = Not Sampled (no surface water present during sampling event)

NA = Not Analyzed for this constituent



LEGEND

- MW-1 Groundwater monitoring well MW-1
- ▲ SW-2 Area of discolored soil and creek soil and "grab" surface water sample location SW-2
- 1000 TPHg isoconcentration in µg/L
- Tree

NOTES

Locations and dimensions of roads, trails, creek, and parking lot are approximate

All concentrations in µg/L (micrograms per liter)

UFST = Underground fuel storage tank

NS = Not sampled

ND = Not detected

MTBE = Methyl tertiary butyl ether

TPHg = Total petroleum hydrocarbons – gasoline range

TPHd = Total petroleum hydrocarbons – diesel range

BTEX = Benzene, toluene, ethylbenzene and total xylenes

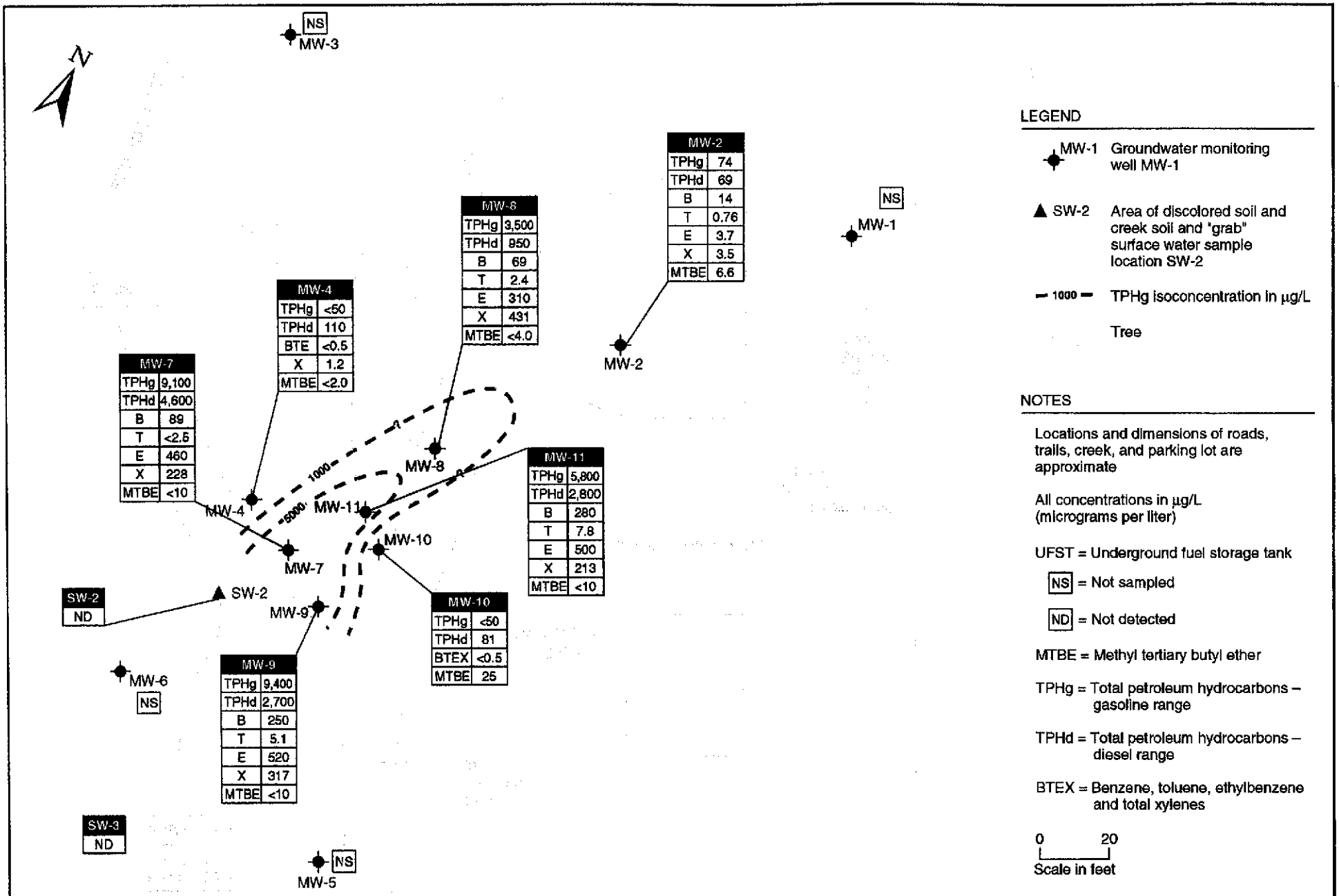
0 20
Scale in feet

Stellar Environmental Solutions
Geoscience & Engineering Consulting

GROUNDWATER MONITORING WELL AND SURFACE WATER ANALYTICAL RESULTS–SEPTEMBER, 2001
Redwood Regional Park Service Yard, Oakland, CA

Figure 4

by: MJC | OCTOBER 2001



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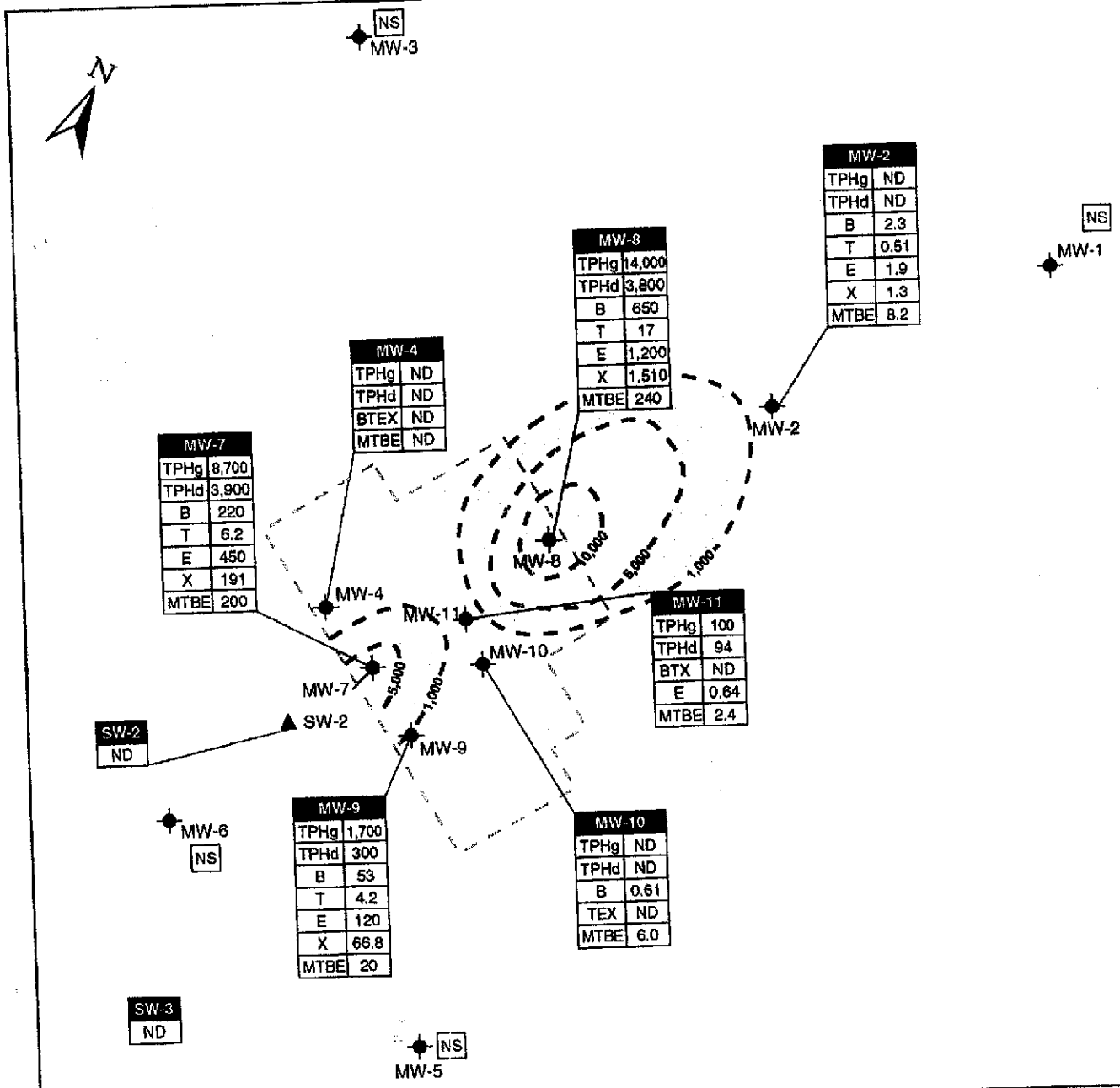
GROUNDWATER MONITORING WELL AND SURFACE WATER ANALYTICAL RESULTS–DECEMBER, 2001
Redwood Regional Park Service Yard, Oakland, CA

Figure 4

by: MJC | JANUARY 2002

2001-53-17



LEGEND

- MW-1 Groundwater monitoring well MW-1
- SW-2 Area of discolored soil and creek soil and "grab" surface water sample location SW-2
- 1000 TPHg isoconcentration in µg/L
- Tree

NOTES

Locations and dimensions of roads, trails, creek, and parking lot are approximate

All concentrations in µg/L (micrograms per liter)

Footprint of September 2001 ORC Injection

UFST = Underground fuel storage tank

NS = Not sampled

ND = Not detected

MTBE = Methyl tertiary butyl ether

TPHg = Total petroleum hydrocarbons – gasoline range

TPHd = Total petroleum hydrocarbons – diesel range

BTEX = Benzene, toluene, ethylbenzene and total xylenes

0 20

Scale in feet

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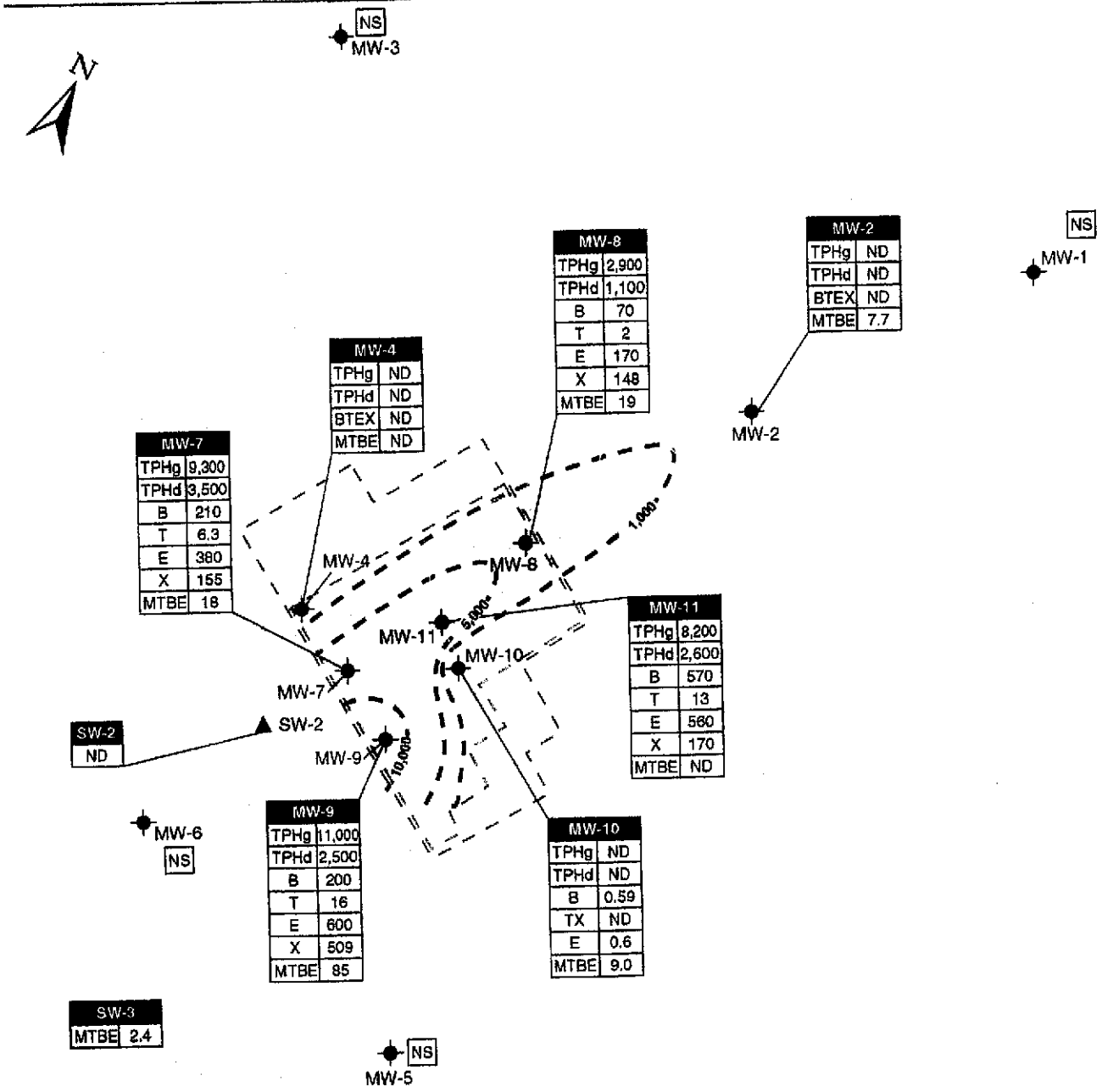
GROUNDWATER MONITORING WELL AND SURFACE WATER ANALYTICAL RESULTS—MARCH 2002
Redwood Regional Park Service Yard, Oakland, CA

Figure 5

by: MJC | APRIL 2002

01-53-18



LEGEND & NOTES

MW-1 Groundwater monitoring well MW-1

▲ SW-2 Area of discolored soil and creek soil and "grab" surface water sample location SW-2

1000 TPHg isoconcentration in µg/L

Tree

Locations and dimensions of roads, trails, creek, and parking lot are approximate

All concentrations in µg/L (micrograms per liter)

Footprint of September 2001 ORC Injection

Footprint of July 2002 ORC Injection

UFST = Underground fuel storage tank

NS = Not sampled

ND = Not detected

MTBE = Methyl tertiary butyl ether

TPHg = Total petroleum hydrocarbons – gasoline range

TPHd = Total petroleum hydrocarbons – diesel range

BTEX = Benzene, toluene, ethylbenzene and total xylenes

0 20
Scale in feet

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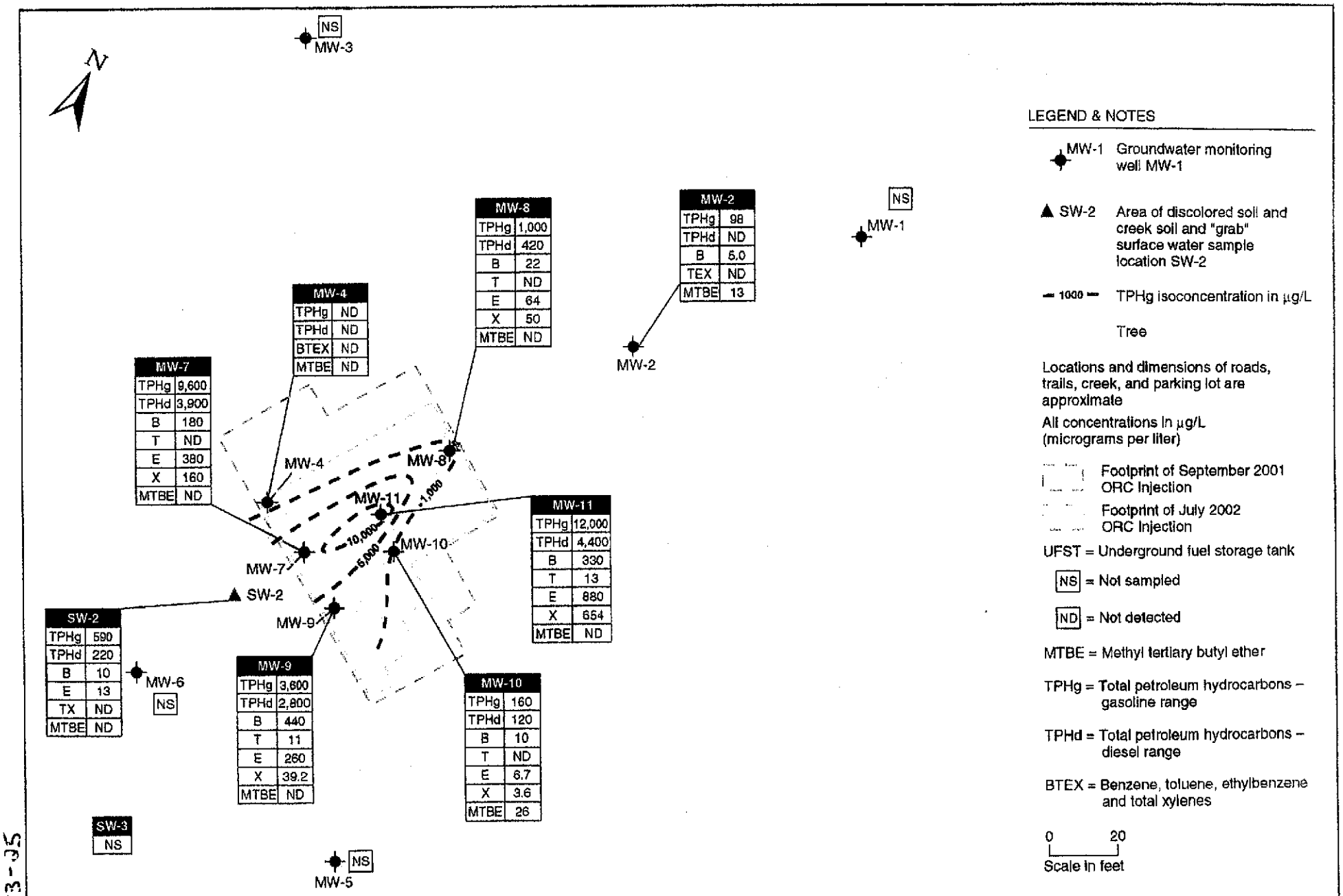
GROUNDWATER MONITORING WELL AND SURFACE WATER ANALYTICAL RESULTS—JULY 2002
Redwood Regional Park Service Yard, Oakland, CA

Figure 4

by: MJC | JULY 2002



2001-53-35

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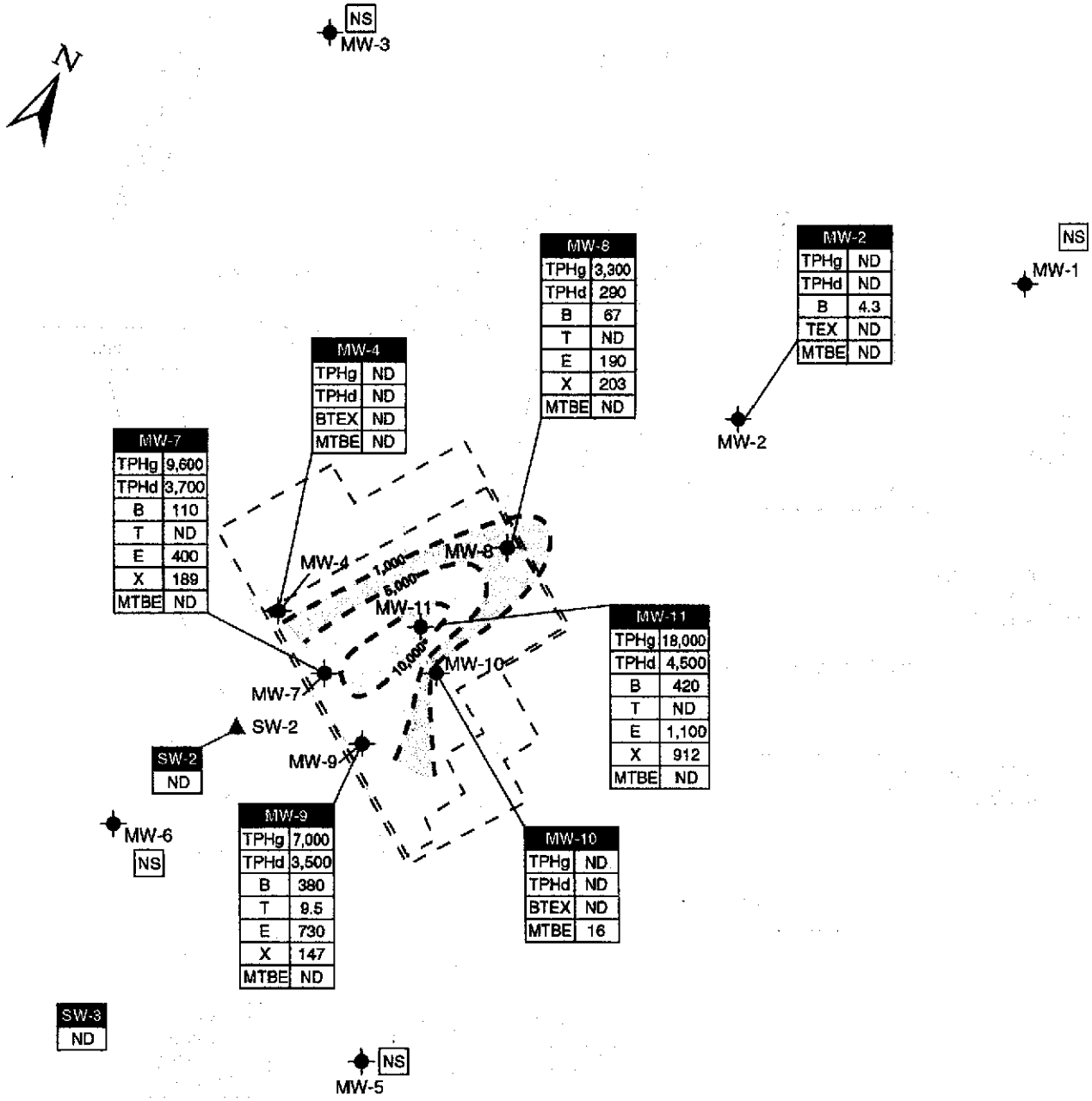
ANALYTICAL RESULTS AND TPH-GAS PLUME—SEPTEMBER 2002
Redwood Regional Park Service Yard, Oakland, CA

Figure 4

by: MJC | OCTOBER 2002



LEGEND & NOTES

MW-1 Groundwater monitoring well MW-1

▲ SW-2 Area of discolored soil and creek soil and "grab" surface water sample location SW-2

1000 TPHg isoconcentration in µg/L

Tree

Locations and dimensions of roads, trails, creek, and parking lot are approximate

All concentrations in µg/L (micrograms per liter)

Footprint of September 2001 ORC Injection

Footprint of July 2002 ORC Injection

UFST = Underground fuel storage tank

NS = Not sampled

ND = Not detected

MTBE = Methyl tertiary butyl ether

TPHg = Total petroleum hydrocarbons – gasoline range

TPHd = Total petroleum hydrocarbons – diesel range

BTEX = Benzene, toluene, ethylbenzene and total xylenes

0 20

Scale in feet

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ANALYTICAL RESULTS AND TPH-GAS PLUME—DECEMBER 2002
Redwood Regional Park Service Yard, Oakland, CA

Figure 4

by: MJC | JANUARY 2003