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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: 7/25/02 JUL 30 2002

ATTENTION: MR. SCOTT SEERY

FILE: SES-2001-53

SUBJECT: REDWOOD REGIONAL PARK FUEL LEAK SITE

WE ARE SENDING:

- ☒ HEREWITH
- ☐ UNDER SEPARATE COVER
- ☒ VIA MAIL
- ☐ VIA

THE FOLLOWING: SECOND QUARTER 2002 SITE MONITORING AND CORRECTIVE ACTION REPORT FOR REDWOOD REGIONAL PARK SERVICE YARD SITE – OAKLAND, CALIFORNIA (JULY 2002)

- ☐ 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 7/25/02

★ **Stellar Environmental Solutions**

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

July 23, 2002

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

JUL 3 0 2002

Subject: Second Quarter 2002 Groundwater Monitoring Report
Redwood Regional Park Service Yard Site – Oakland, California

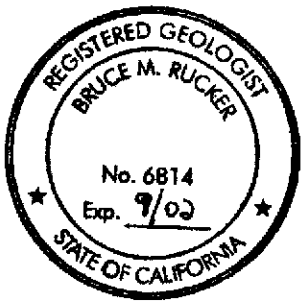
Dear Mr. Seery:

Attached is the Stellar Environmental Solutions "Second Quarter 2002 Groundwater Monitoring and Corrective Action Report" for the underground fuel storage tank 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 groundwater and surface monitoring and sampling activities conducted in June 2002 (Second Quarter 2002) and the second phase of the ORC™ injection corrective action program (July 2002). 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

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SECOND QUARTER 2002 GROUNDWATER MONITORING AND CORRECTIVE ACTION REPORT

REDWOOD REGIONAL PARK SERVICE YARD OAKLAND, CALIFORNIA

Prepared for:

EAST BAY REGIONAL PARK DISTRICT
P.O. BOX 5381
OAKLAND, CALIFORNIA 94605

Prepared By:

STELLAR ENVIRONMENTAL SOLUTIONS
2198 SIXTH STREET
BERKELEY, CALIFORNIA 94710

July 23, 2002

Project No. 2001-53

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1.0 INTRODUCTION

PROJECT BACKGROUND

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 both 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).

OBJECTIVES AND SCOPE OF WORK

This report discusses the following activities conducted/coordinated by Stellar Environmental Solutions (SES) in June and July, 2002:

- Collecting water levels in site wells to determine shallow groundwater flow direction;
- Sampling site wells for contaminant analysis and natural attenuation indicators;
- Collecting surface water samples for contaminant analysis; and
- Conducting the second phase of the ORC™ injection corrective action program.

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). Additional monitoring well installations and corrective action by ORC™ injection proposed by SES were approved by the ACHCSA in its January 8, 2001 letter to the EBRPD, and were implemented in September 2001. A total of 22 groundwater monitoring events have been conducted on a quarterly basis since inception (November 1994) and a total of 11 groundwater monitoring wells are currently available for monitoring.

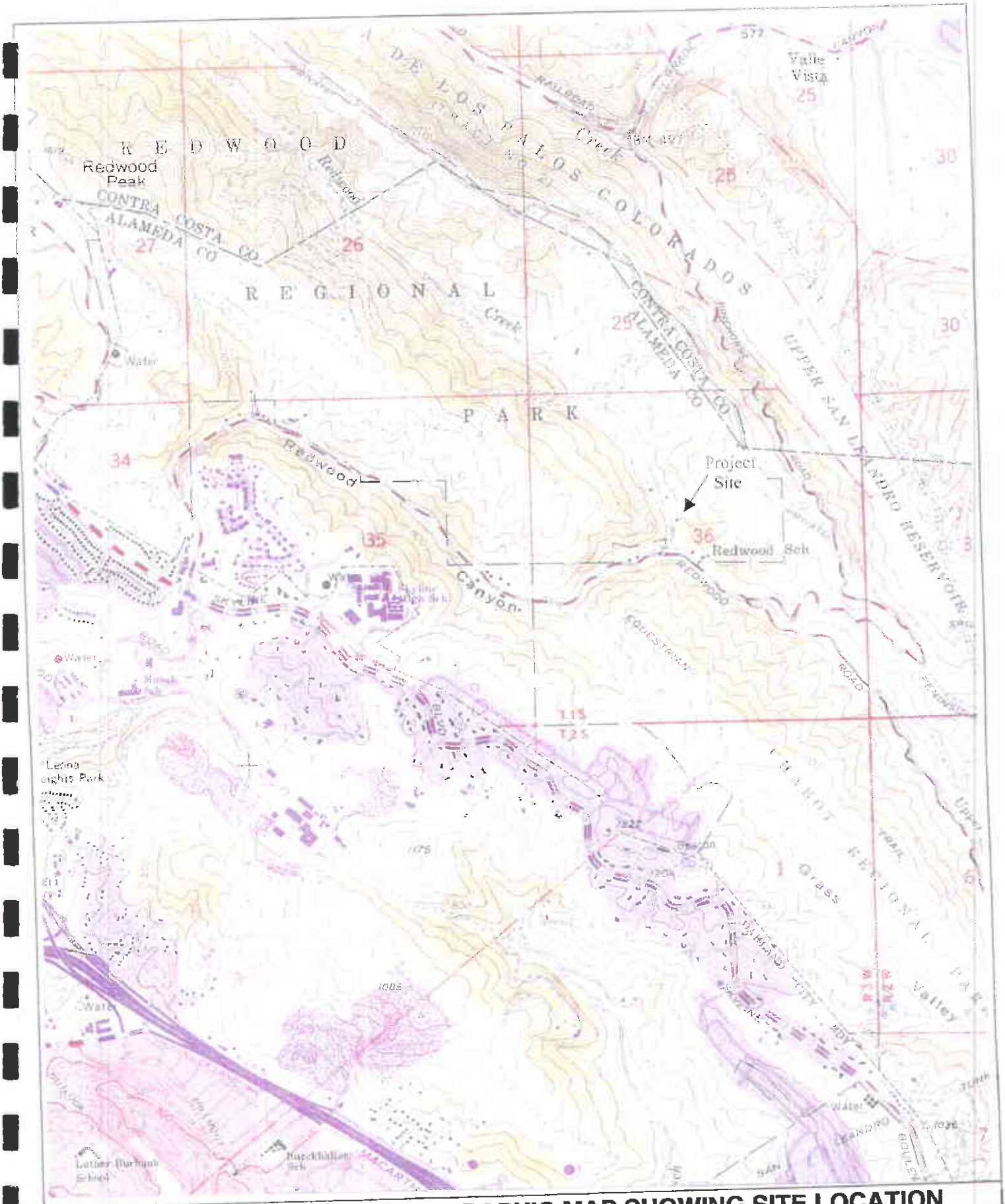
SITE DESCRIPTION

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 defines the approximate 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 ACHCSA, with oversight provided by the RWQCB. The CDFG is also involved with regard to 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. 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.

Electronic Data Format (EDF) groundwater analytical results from the groundwater monitoring events beginning in the third quarter have been successfully uploaded to the State of California Water Resources Control Board's GeoTracker database, in accordance with that agency's requirements for EDF submittals.



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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

Stellar Environmental Solutions

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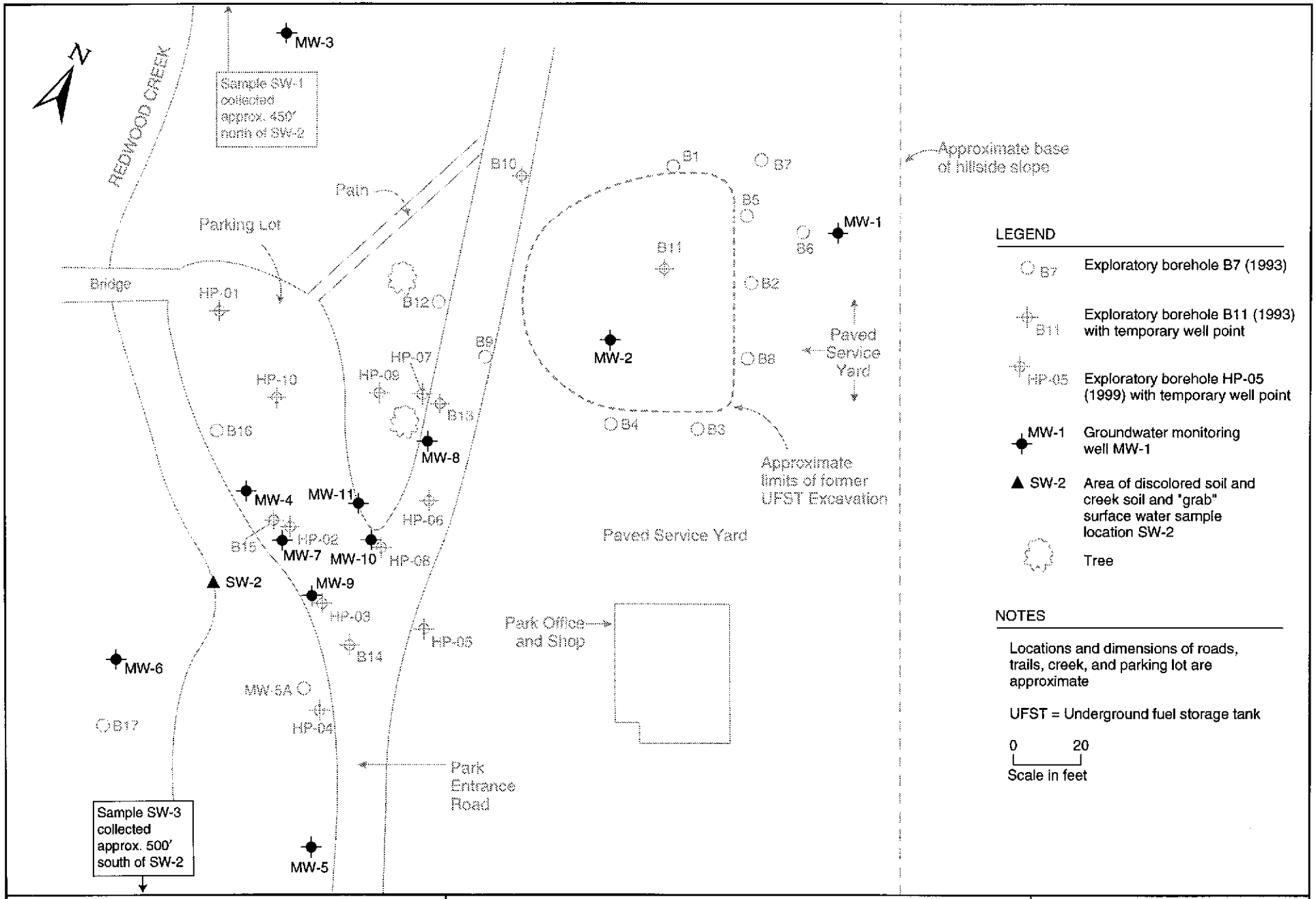

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SITE PLAN AND HISTORICAL SAMPLING LOCATIONS

Redwood Regional Park Service Yard, Oakland, CA

Figure 2

by: MJC

APRIL 2002

2001-53-01

2.0 PHYSICAL SETTING

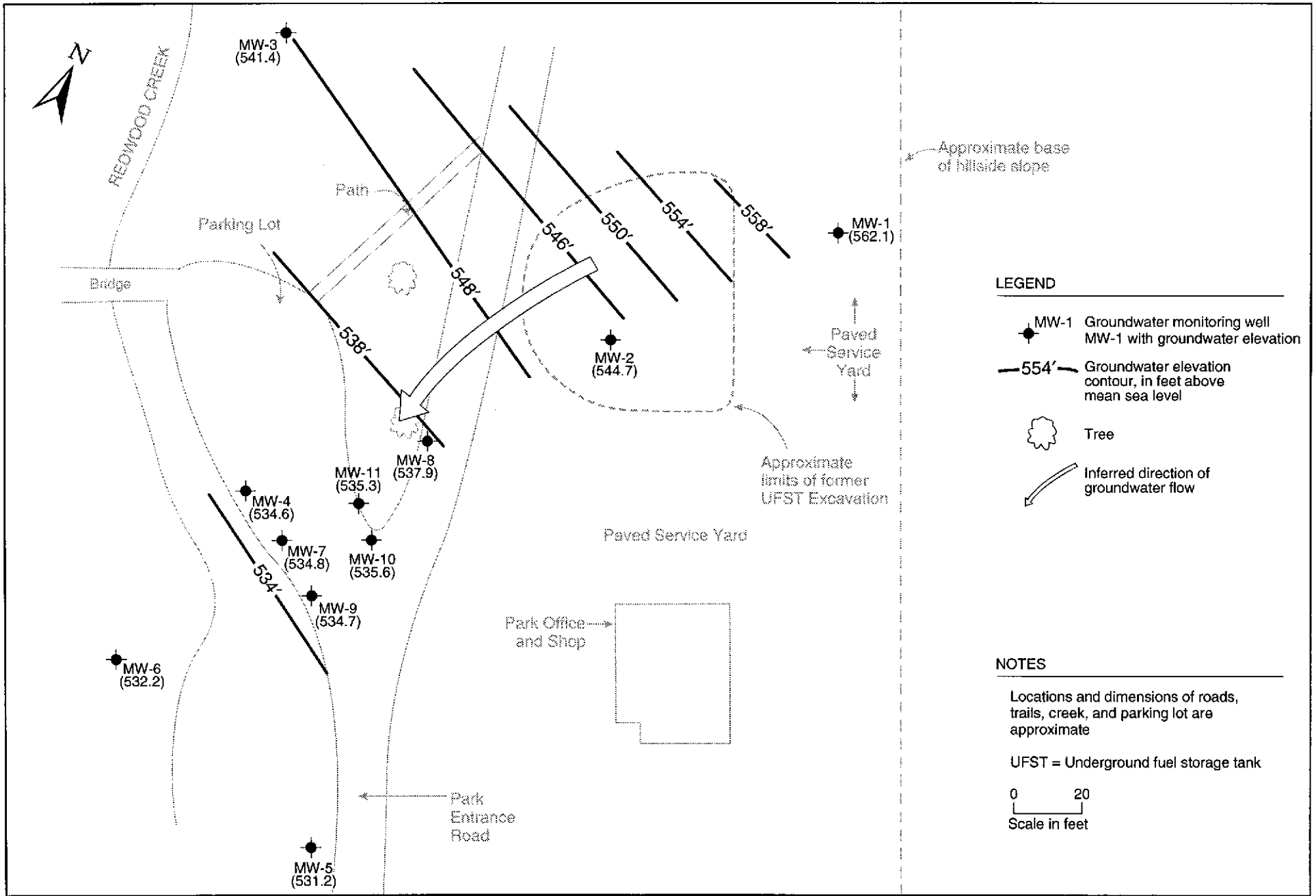
Following is a brief summary of the site hydrogeologic conditions based on geologic logging and water level measurements collected at the site since September 1993. A full discussion is presented in the SES June 1999 report.

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 that laterally grades to a clay or silty clay was encountered. 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 during 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 to the west-southwest (toward Redwood Creek), which is consistent with historical site 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 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–JUNE 18, 2002
Redwood Regional Park Service Yard, Oakland, CA

Figure 3

by: MJC | JUNE 2002

2001-53-21

Redwood Creek, which borders the site to the west, 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 exceeding 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, and discharges into Upper San Leandro Reservoir located approximately 1 mile southeast of the site.

3.0 CURRENT GROUNDWATER AND SURFACE WATER MONITORING EVENT ACTIVITIES

This section presents the creek surface water and groundwater sampling and analytical methods for the most recent event. Groundwater and surface water analytical results are summarized in Section 6.0. Monitoring and sampling protocols were in accordance with the ACHCSA-approved SES technical workplan (SES 1998a). Current event 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 11 site wells;
- Collecting pre-purge groundwater samples for laboratory analysis of the natural attenuation indicators nitrate and sulfate from monitoring wells MW-3, MW-4, MW-7, and MW-8;
- Collecting post-purge groundwater samples for laboratory analysis of site contaminants from wells located within the groundwater plume (MW-2, MW-4, MW-7, MW-8, MW-9, MW-10, and MW-11); and
- Collecting Redwood Creek surface water samples for laboratory analysis from locations SW-2 and SW-3.

Creek sampling and monitoring/sampling was conducted on June 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 records.

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 (6/18/02)
MW-1	18	7 to17	565.9	562.1
MW-2	36	20 to 35	566.5	544.7
MW-3	42	7 to 41	560.9	541.4
MW-4	26	10 to 25	548.1	534.6
MW-5	26	10 to 25	547.5	531.2
MW-6	26	10 to 25	545.6	532.2
MW-7	24	9 to24	547.7	534.8
MW-8	23	8 to 23	549.2	537.9
MW-9	26	11 to 26	549.4	534.7
MW-10	26	11 to 26	547.3	535.6
MW-11	26	11 to 26	547.9	535.3

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 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.

The well development, purge water, and decontamination rinseate (approximately 90 gallons) from the current event was containerized in the onsite plastic tank and then transported offsite the same day. Purge water from future events will continue to be accumulated in the onsite tank until it is full, at which time it will be transported offsite for proper disposal.

CREEK SURFACE WATER SAMPLING

Surface water sampling was conducted by SES on June 18, 2002. 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, the creek was flowing slightly with water depths between approximately 0.5 and 1 feet. Portions of the creek bed in the vicinity of SW-2 and SW-3 were dry, consistent with historical conditions in the dry season. At the SW-2 location, where contaminated groundwater discharge to the creek has historically been observed, a petroleum odor was noted, as was an orange algae growing on the saturated portion of the creek bank. It is likely that this algae is utilizing the petroleum as a carbon source, and is therefore a good indicator of the presence of petroleum contamination.

4.0 REGULATORY CONSIDERATIONS

The following is a summary of regulatory considerations regarding surface water and groundwater contamination.

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 (Section 6.0), 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 are composed of multiple 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 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 primarily be evaluated in the context of surface water quality criteria.

SURFACE WATER CONTAMINATION

As summarized in Table 2 (Section 6.0), 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's 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 macroinvertebrate 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) demonstrates that no significant impacts are likely.

5.0 MONITORING EVENT ANALYTICAL RESULTS

This section presents the field and laboratory analytical results of the most recent monitoring event. Table 2 summarizes the contaminant analytical results of the current monitoring event, and Table 3 summarizes natural attenuation indicator results from the current event. Appendix B contains the certified analytical laboratory report and chain-of-custody records for the current event.

CURRENT EVENT GROUNDWATER RESULTS

Current site groundwater contaminant concentrations exceed their respective groundwater RBSLs (both for cases in which the drinking water resource is and is not threatened)—with the exception of toluene, which does not exceed either set of criteria. Site groundwater contaminant concentrations also exceed all surface water screening levels, with the exception of toluene and MTBE.

Maximum groundwater contaminant concentrations for all site contaminants except benzene and toluene were detected in downgradient wells MW-7 and MW-9 (approximately 100 feet downgradient of the former USTs and approximately 30 feet upgradient of Redwood Creek). The maximum concentrations of benzene and toluene were detected in well MW-11 (approximately 30 feet upgradient of wells MW-7 and MW-9). The only contaminant detected in former source area well MW-2 (approximately 130 feet upgradient of Redwood Creek) was MTBE (7.7 µg/L), and non-detectable to trace concentrations were detected in cross-gradient wells MW-4 and MW-10.

The only site-sourced contaminant detected in the surface water samples was MTBE, at 2.4 µg/L (just above the reporting limit) in downstream sample SW-3.

CURRENT EVENT NATURAL ATTENUATION PARAMETERS RESULTS

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 active remediation.

Table 2
Groundwater and Surface Water Sample
Analytical Results – June 18, 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*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	**7.7**
MW-4	*<50*	*<50*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<2.0*
MW-7	**9,300**	**3,500**	**210**	**6.3**	**380**	**154.7**	**18**
MW-8	**2,900**	**1,100**	**70**	**2.0**	**170**	**148.2**	**19**
MW-9	**11,000**	**2,500**	**200**	**16**	**600**	**509.3**	**85**
MW-10	*<50*	*<50*	**0.59**	*<0.5*	**0.58**	*<0.5*	**9.0**
MW-11	**8,200**	**2,600**	**570**	**13**	**560**	**170**	*<4.0*
Groundwater RBSLs [a]	100/500	100/640	1.0/46	40/130	30/290	13/13	5/1,800
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*	**2.4**
Surface Water Screening Levels [a, 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).

Table 3
Groundwater Sample Analytical Results
Natural Attenuation Indicators – June 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	0.8	0.0	110
MW-2	NA	NA	0.7	0.0	159
MW-3	<0.05	36	0.6	0.0	34
MW-4	0.16	44	>15.0	0.1	-101
MW-5	NA	NA	0.8	0.0	-23
MW-6	NA	NA	1.4	0.4	30
MW-7	<0.05	3.4	0.2	3.2	-101
MW-8	<0.05	84	0.3	0.8	-37
MW-9	<0.05	28	0.4	2.5	-70
MW-10	1.2	80	>15.0	0.0	-70
MW-11	<0.05	70	0.4	0.0	17

Notes:

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

NA = Not analyzed.

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, and general mineral analyses.

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. The DO readings in the current quarterly monitoring data are potentially impacted by the injection of the ORC™ compound last year.

Current monitoring event DO concentrations ranged from 0.3 mg/L to >15 mg/L. The highest concentrations of total hydrocarbons in the current quarter were in wells MW-7, MW-8, MW-9, and MW-11. Dissolved oxygen in these wells ranged from 0.2 to 0.4 mg/L. In wells with little or no hydrocarbon contamination (e.g., MW-1, MW-2, MW-3, MW-5, and MW-6), similar DO concentrations were observed. Only wells MW-4 and MW-10 showed elevated DO concentrations (above 15.0 mg/L). The following Section 6.0 discusses historical and current DO concentrations in groundwater in the context of the ongoing ORC™ injection corrective action program.

Oxidation-Reduction Potential

The oxidation-reduction potential (ORP, aka redox potential) 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 –101 mV to +159 mV. Of the four wells with pronounced hydrocarbon contamination (MW-7, MW-8, MW-9 and MW-11) the ORP values ranged from –101 mV to +17 mV. Other wells with little or no contamination showed similarly low ORP values. Thus, the ORP readings in this field event did not show a consistent inverse correlation with hydrocarbon concentrations.

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 hydrocarbon concentrations are high. In the current site

monitoring event, neither the Fe_2^+ nor the SO_4^{2-} results did not show the expected inverse correlation with hydrocarbon concentrations. Nitrate concentrations showed a viable correlation.

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).

6.0 DATA EVALUATION

This chapter includes an evaluation of the most recent and historical analytical results in the context of hydrochemical trends and the efficacy of the ORC™ injection corrective action, preceded by a summary of historical investigation and remediation activities.

HISTORICAL INVESTIGATION AND REMEDIATION ACTIVITIES

The following is a brief summary of the phases of the site investigation to provide a context for evaluation of hydrochemical trends.

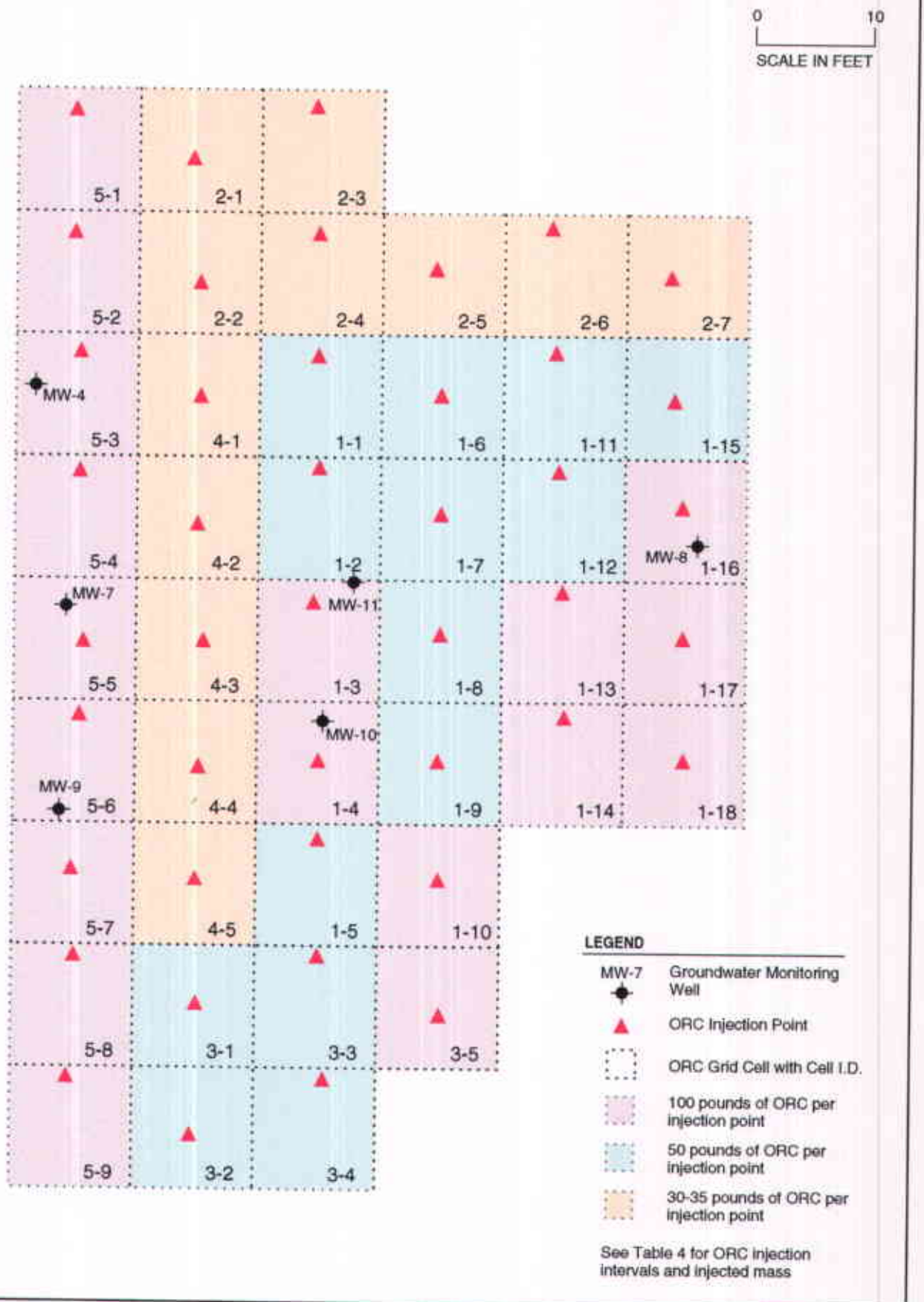
- May and June 1993: Site USTs were removed.
- September and October 1993: Initial site characterization (17 exploratory boreholes).
- October 1994: Installation of six groundwater monitoring wells.
- November 1994 to April 1999: Quarterly groundwater and surface water monitoring (14 events).
- April 1999: Additional site characterization (10 exploratory boreholes) and initial instream bioassessment event.
- December 1999 to September 2000: Quarterly groundwater and surface water monitoring (2 events).
- December 2000: Installation of two additional groundwater monitoring wells.
- January 2001 to August 2001: Quarterly groundwater and surface water monitoring (3 events) and second instream bioassessment event.
- September 2001: Installation of three additional groundwater monitoring wells followed by injection of 3,000 pounds of ORC™ via 44 injection boreholes.
- December 2001: Quarterly groundwater and surface water monitoring (first post-ORC™ injection event).
- March 2002: Quarterly groundwater and surface water monitoring (second post-ORC™ injection event).

- June 2002: Quarterly groundwater and surface water monitoring (third post-ORC™ injection event).
- July 2002: Second ORC™ injection phase (approximately 1,000 pounds via 30 boreholes).

HYDROCHEMICAL TREND ANALYSIS

Figure 4 shows the analytical results of the most recent groundwater and surface water event. Figures C.1 through C.5 (Appendix C) show hydrochemical trends (TPHg and TPHd) for wells within the contaminant plume (MW-7 through MW-11). Appendix C contains a tabular summary of historical groundwater and surface water analytical results. The available data indicate the following:

- The groundwater contaminant plume has become disconnected from the former source, and has migrated downgradient from the former source area (represented by well MW-2) to Redwood Creek.
- The zone of greatest groundwater contamination (TPHg greater than 8,000 µg/L) is centered around wells MW-7, MW-9, and MW-11. The area of groundwater contamination in excess of screening level criteria appears to be no greater than 100 feet long by 50 feet wide, which is significantly reduced relative to pre-ORC injection conditions.
- Concentrations of TPHg and TPHd in groundwater showed a downward trend in all wells between the September 2001 ORC™ injection program and the March 2002 groundwater monitoring event (two quarterly events), suggesting that the ORC™ injection program was effective over that approximately 6-month period. Between March and June 2002, TPHg and TPHd showed a rebound (increasing concentrations) in well MW-9 and MW-11, suggesting that the active life of the injected ORC™ may have been exceeded.
- Dissolved oxygen (DO) levels increased in contaminated wells MW-4, MW-7, MW-8, and MW-10 following the September 2001 ORC™ injection. In wells MW-4 and MW-10, DO levels increased by several fold and have remained so over the three post-injection events, and contaminant concentrations in those wells have decreased to trace or non-detectable levels. In wells MW-7 and MW-8, DO levels remained above the pre-injection levels for 6 months, then dropped below pre-injection levels after 9 months. Contaminant concentrations in MW-7 and MW-8 in the June 2002 monitoring event have remained below pre-injection concentrations. In wells MW-9 and MW-11, DO concentrations have shown a downward trend since the ORC™ injection, and in the most recent event were below the 1 to 2 mg/L concentration sufficient to support biodegradation. Contaminant concentrations in well



SEPT 2001 (Phase I) ORC INJECTION LAYOUT—REDWOOD REGIONAL PARK SERVICE YARD

7867 Redwood Rd.
Oakland, CA

By: MJC | JULY 2002

Figure 5

Stellar Environmental Solutions
Geoscience & Engineering Consulting

2001-53-23

MW-9 have rebounded to or above pre-injection concentrations, while in MW-11 contaminant concentrations have remained below pre-injection concentrations. In summary, the first phase of the ORC™ injection was generally successful in increasing DO levels and reducing groundwater contaminant concentrations, although the active life of the ORC™ appears to have been exceeded between the second and third post-injection events in some of the wells.

- Maximum groundwater concentrations for the majority of the contaminants have reached the most downgradient wells (just upgradient of the creek). Continued discharge of elevated concentrations could continue for at least several years if unabated.
- It can be reasonably assumed that natural attenuation is occurring 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 assumption was one of the main criteria for implementing the ORC™ injection corrective action program.

7.0 ORC™ INJECTION CORRECTIVE ACTION PROGRAM

The following discusses the ongoing ORC™ injection corrective action program at the site. The SES October 2000 Feasibility Study report provided detailed analyses of the regulatory implications of the site contamination and an assessment of viable corrective actions (SES, 2000d). Injection of ORC™ was determined to be the most viable corrective action, and the approach was approved by the ACHCSA in its January 8, 2001 letter to the EBRPD.

OBJECTIVES OF CORRECTIVE ACTION

Various assessment and monitoring studies since 1993 have concluded that the site-specific conditions (predominantly available oxygen) for the natural attenuation of the hydrocarbon plume are not sufficient to reduce the hydrocarbon plume concentrations before the plume interfaces with Redwood Creek. This fact was the basis for the more aggressive corrective action program involving the injection of the ORC™ compound to provide a catalyst for enhanced biodegradation to occur.

Current conditions likely include groundwater contamination in the approximately 50-foot-wide by 20-foot-long area between the downgradient edge of the parking area and Redwood Creek, a steep vegetated hillside slope with no vehicle access. There is no reasonably cost-effective method for remediating contamination within this zone. A substantial mass of groundwater and capillary fringe soil contamination is located upgradient of that zone, primarily west of the roadway. Based on the current plume configuration and hydraulic regime, groundwater contamination equaling or exceeding current site maxima could persist at the downgradient plume limits (adjacent to Redwood Creek) for at least several years, in the absence of corrective action.

The overall objective of the corrective action is to arrest the migration of the hydrocarbon plume from daylighting downgradient in Redwood Creek. While the discharge has been occurring since at least 1993 when it was noted for the first time, the site data suggests that a higher concentration portion of the plume is moving closer to the Creek, and that this part of the plume may be effectively mitigated through the injection of ORC™.

The first phase of the ORC™ injection corrective action program was implemented in September 2001. The following subsections discuss the injection method.

As discussed in previous Section 6.0, three groundwater monitoring events have been conducted since the first injection phase (December 2001, March 2002, and June 2002). The ORC™ manufacturer indicates that the usable life of the product is 6 to 12 months, depending on site conditions. It has been 9 months since the first injection phase. As discussed in Section 6.0, hydro-chemical (contaminant and dissolved oxygen) data suggest that the initial ORC injection was generally effective in reducing contaminant concentrations over this period; however, the most recent data indicate that its effectiveness has been reduced as of the third (most recent) groundwater monitoring event.

METHOD DESCRIPTION

The ORC™ product is a patented formulation of magnesium peroxide that produces a slow and sustained (generally 6- to 12-month duration) release of molecular oxygen when in contact with soil moisture or groundwater. The oxygen release function stimulates the growth of naturally-occurring microbes that will aerobically degrade petroleum hydrocarbons, using the carbon as a food source. This process is especially useful in areas where elevated levels of petroleum hydrocarbons have inhibited naturally-occurring oxygen to levels below those required for microbial degradation. A smaller percentage of hydrocarbon degradation is anticipated via direct oxidation, especially in close proximity to the injection boreholes. For the subject site, the ORC™ was delivered as a slurry across the saturated interval via injection by a direct-push Geoprobe™ rig.

Phase 1 Injection (September 2001)

A 4,400-square foot grid system consisting of 44 square cells (each 100 square feet) was overlain over the area of maximum groundwater contamination, as determined by available soil and groundwater analytical data. Figure 4 shows the grid layout, and Figure 5 is a detail of the grid layout and location of injection points—one in each cell—with color-coded sub-grid cells showing amounts of ORC™ injected. Cells were grouped into five sub-grids according to similarity in groundwater contamination and/or saturated intervals. Cells were identified by sub-grid name and cell number (e.g., "Cell 3-4" is the fourth cell in Sub-Grid 3). Using methods prescribed by the ORC™ vendor, the mass of ORC™ to be injected in each cell was calculated based on inferred average contaminant concentrations. The saturated interval was determined based on existing borehole data, and included the interval between the top of the siltstone bedrock and the top of the capillary fringe (15 feet in the majority of the cells).

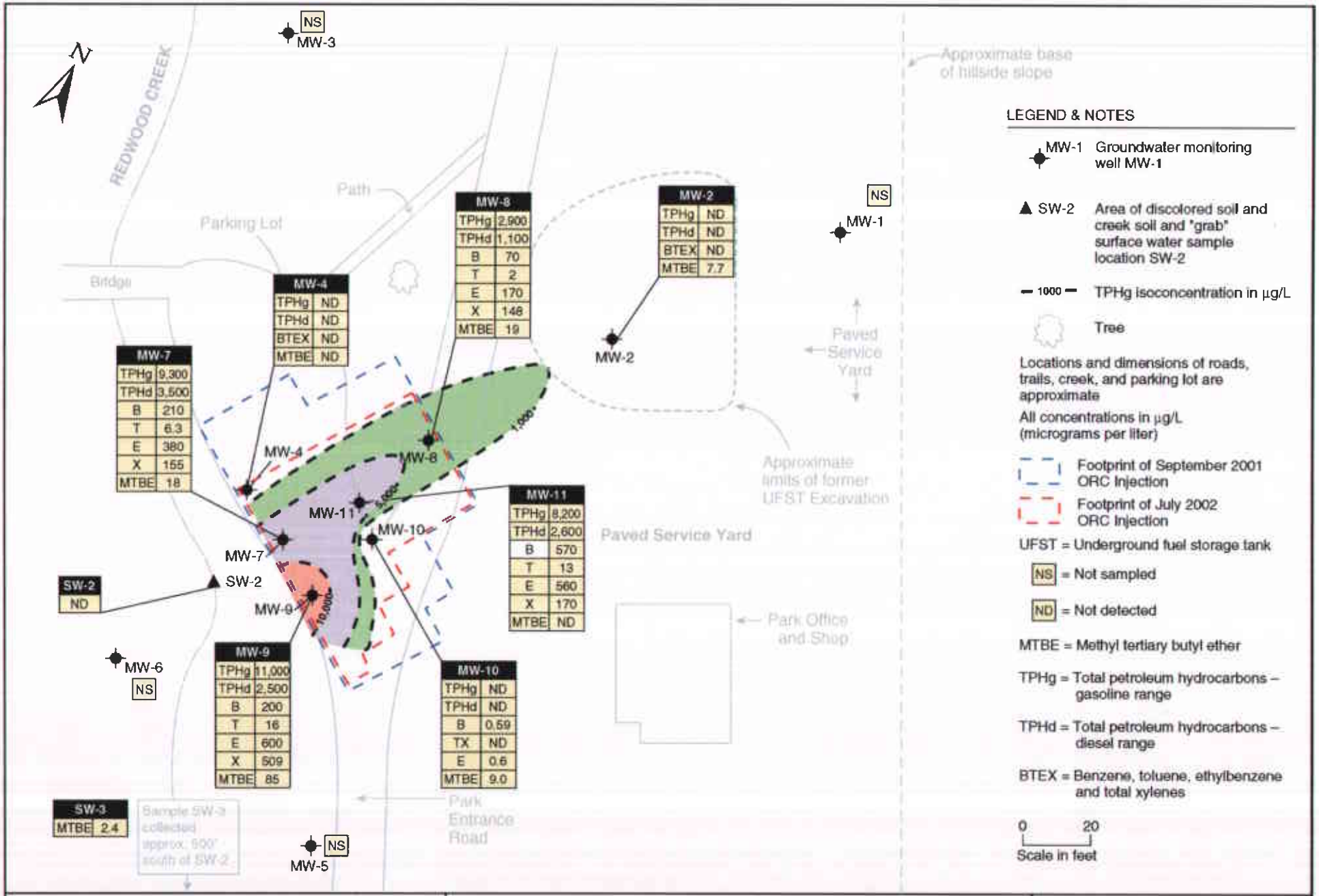
Table 4 summarizes data regarding the first phase of the ORC™ injection program, including: size of sub-grids; ORC™ injection intervals; inferred average contaminant concentrations; and mass of ORC™ injected at each cell. Between 30 and 100 pounds of ORC™ was injected at each cell,

TABLE 4
ORC INJECTION GRID CRITERIA - PHASE 1 (SEPTEMBER 2001)
REDWOOD REGIONAL PARK SERVICE YARD, OAKLAND, CA

Sub-grid I.D.	Sub-grid Area (sq ft)	Thickness of Saturated Interval (ft)	Representative Boreholes	BTEX Conc. (mg/L)	TPH Conc. (mg/L)	# Injection Points	Injection Interval (ft bgs)	ORC (lbs/inj. point)
1	2,000	**15**					**25-10**	
		14	MW-8	1.1	12.8	9		50
		16	HP-8	1.8	14.9	(cells 1, 2, 3, 6, 7, 8, 9, 11, 12 & 15)		
		16	HP-6	14.8	70	9		100
		Average Concentrations		*5.9*	*32.6*	(cells 4, 5, 10, 13, 14, 16, 17 & 18)		
			Total Number of Injection Points in Sub-grid			**18**		
						Mass (lbs) ORC in sub-grid		**1,350**
2	700	**12**				7	**23-12**	35
		10	HP-9	11	46.7			
		13	HP-10	1.6	31.4			
		Average Concentrations		*4.2*	*26.0*			
			Total Number of Injection Points in Sub-grid			7		
						Mass (lbs) ORC in sub-grid		**245**
3	700	**15**					**26-11**	
		16	HP-6	14.8	70	4		50
		15	HP-3	0.23	5.1	(cells 3-1 through 3-4)		
		Average Concentrations		*5.01*	*25.0*	1	(cell 3-5)	100
			Total Number of Injection Points in Sub-grid			**5**		
						Mass (lbs) ORC in sub-grid		**300**
4	500	**15**				5	**27-12**	30
		15	HP-3	0.23	5.1			
		11	MW-4	0.05	2.1			
		13	MW-7	0.8	17			
		15	MW-9	NA	NA			
		Average Concentrations		*0.36*	*8.1*			
			Total Number of Injection Points in Sub-grid			**5**		
						Mass (lbs) ORC in sub-grid		**150**
5	900	**15**				9	**27-12**	100
		11	MW-4	0.05	2.1			
		13	MW-7	0.8	17			
		15	MW-9	NA	NA			
		15	HP-3	0.23	5.1			
		Average Concentrations		*0.36*	*8.1*			
			Total Number of Injection Points in Sub-grid			9		
						Mass (lbs) ORC in sub-grid		**900**

Total Number of Injection Points at Site:	**44**

Total Mass (lbs) ORC Injected:	**2,945**



Stellar Environmental Solutions

Geoscience & Engineering Consulting

GROUNDWATER MONITORING WELL AND SURFACE WATER ANALYTICAL RESULTS—JULY 2002

Redwood Regional Park Service Yard, Oakland, CA

Figure 4

by: MJC | JULY 2002

2001-53-22

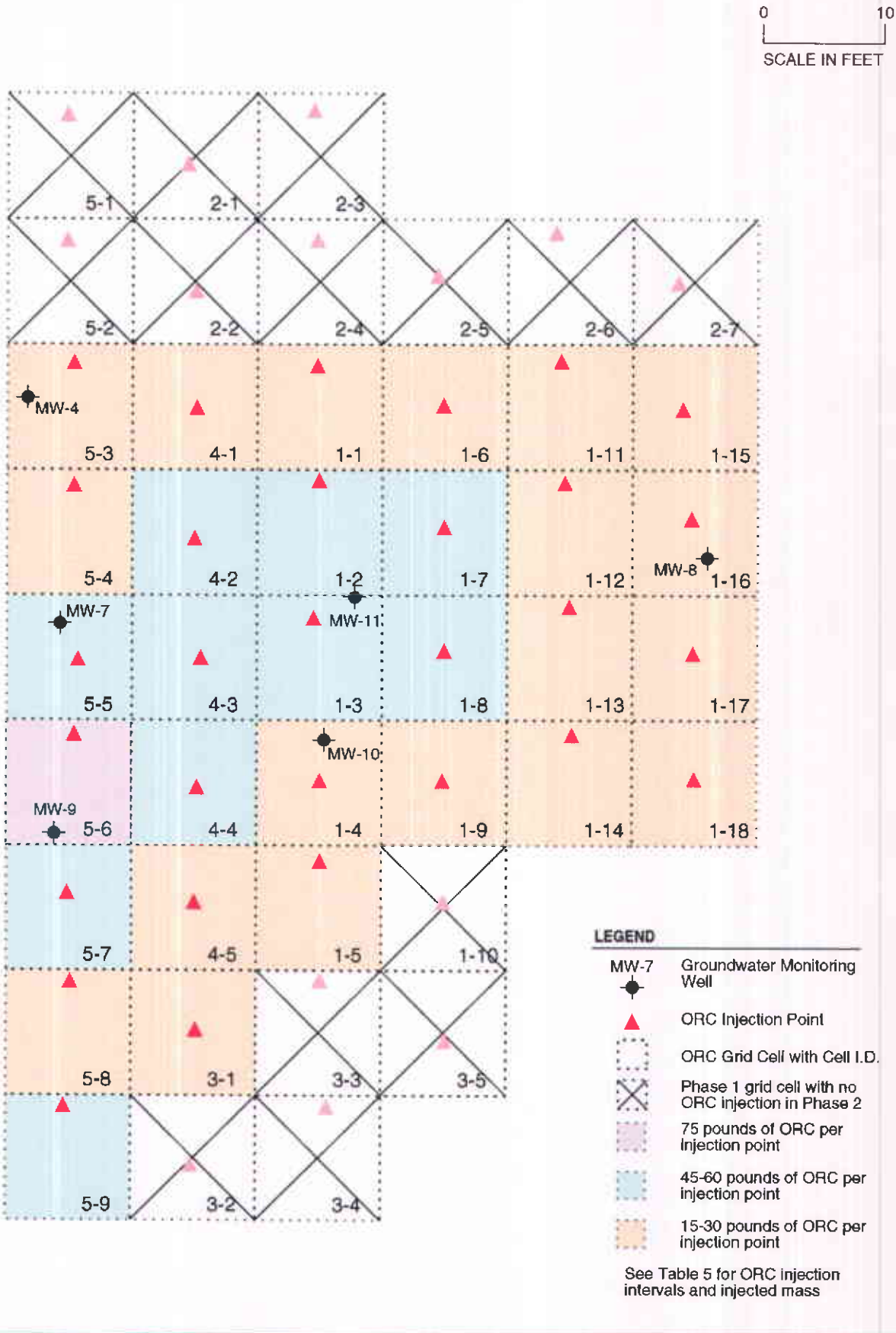
depending on the inferred contaminant concentrations at each cell and the height of the saturated interval. Further sub-division of the grid was not supported by the density of available geologic and contaminant data from the site. A total of 3,000 pounds of ORC™ was injected in all 44 cells.

As shown on Figure 5, injection points along the roughly north-south lines perpendicular to the plume's longitudinal axis were staggered to maximize the distribution of oxygen release and minimize the potential for "channels" where contaminated groundwater would not intercept oxygenated areas. To ensure maximum efficacy of the ORC™ in the downgradient area of the plume, adjacent to the creek, cells in sub-grid #5 received the site maximum of 100 pounds ORC™ per injection point. To ensure that the effectiveness of site wells in monitoring representative formation water would not be compromised (i.e., ORC™ slurry was not injected into the wells' annular sand pack), no injection points were placed within approximately 5 feet of any well.

Phase 2 Injection (July 2002)

The second phase of the ORC™ injection program was implemented between July 9 and July 15, 2002. Similar to Phase 1, a grid of 100-square foot cells (30 total) was overlain on the area of groundwater contamination as evidenced by recent (June 2002) hydrochemical data. While the number of cells was less than Phase 1 (30 rather than 44) and the cell designations (sub-grids based on contaminant concentrations and injection intervals) are no longer applicable, Phase 1 cell numbers were retained in Phase 2 for continuity.

Figure 4 shows the grid layout, and Figure 6 is a detail of the injection grid layout for Phase 2 with the previous larger Phase 1 injection grid also shown. Table 5 summarizes data regarding the second phase of the ORC™ injection program, including: cell designations; estimated groundwater contaminant concentrations; ORC™ injection depth intervals; and mass of ORC™ injected at each cell. Between 15 and 75 pounds of ORC™ was injected at each cell, depending on the inferred contaminant concentrations at each cell and the height of the saturated interval. Further sub-division of the grid was not supported by the density of available geologic and contaminant data from the site. A total of 1,000 pounds of ORC™ was injected throughout the 30 cells. As in Phase 1, the amount of ORC injected was determined based on the manufacturer's algorithm (based predominantly on contaminant concentrations and site hydrogeologic data). As discussed in Section 6.0, wells MW-4 and MW-10 in the recent (June 2002) groundwater monitoring event showed low to no contaminant concentrations and elevated dissolved oxygen concentrations. As a conservative measure, ORC™ was injected in cells around these wells (based on pre-Phase 1 ORC™ injection contaminant concentrations) to ensure that "fresh" ORC™ is in place in the event that contaminant concentrations rebound in these areas over time.



JULY 2002 (Phase 2) ORC INJECTION LAYOUT—REDWOOD REGIONAL PARK SERVICE YARD

7867 Redwood Rd. Oakland, CA	By: MJC	JULY 2002	Stellar Environmental Solutions Geoscience & Engineering Consulting
	Figure 6		

2001-03-24

TABLE 5
ORC INJECTION GRID CRITERIA - PHASE 2 (JULY 2002)

Cell # (a)	June 2002 Groundwater Concentrations (µg/L) (b)				Injection Interval (ft below grade)	Mass ORC (lbs)
	TVHg	TEHd	BTEX	MTBE		
1-1	2.0	1.0	0.20	0.00	25 to 10	15
1-2	8.2	2.6	0.51	0.00	25 to 10	60
1-3	8.2	2.6	1.61	0.00	25 to 10	60
1-4	0.55	2.1	0.09	0.09	25 to 10	15
1-5	0.27	1.1	0.04	0.05	25 to 10	30
1-6	1.0	1.0	0.20	0.00	25 to 10	15
1-7	7.0	2.0	0.58	0.01	25 to 10	45
1-8	7.0	2.0	0.68	0.01	25 to 10	45
1-9	5.0	1.0	0.30	0.01	25 to 10	15
1-11	0.0	1.0	0.20	0.01	25 to 10	15
1-12	5.0	1.5	0.46	0.01	25 to 10	30
1-13	5.0	1.5	0.48	0.01	25 to 10	15
1-14	3.0	1.0	0.20	0.01	25 to 10	15
1-15	1.0	1.0	0.20	0.01	25 to 10	15
1-16	2.9	1.1	0.39	0.02	25 to 10	15
1-17	1.0	1.0	0.30	0.01	25 to 10	15
1-18	0.0	1.0	0.00	0.00	25 to 10	15
3-1	1.0	1.5	0.10	0.00	26 to 11	30
4-1	2.0	1.0	0.20	0.00	27 to 12	15
4-2	6.0	3.0	0.71	0.01	27 to 12	45
4-3	9.0	3.0	1.71	0.01	27 to 12	60
4-4	5.0	2.5	0.70	0.05	27 to 12	45
4-5	3.0	2.0	0.70	0.04	27 to 12	30
5-3	2.5	0.8	0.05	0.05	27 to 12	15
5-4	4.0	1.0	0.30	0.01	27 to 12	30
5-5	9.3	3.5	0.75	0.02	27 to 12	60
5-6	11	2.5	1.33	0.09	27 to 12	75
5-7	10	2.5	1.10	0.07	27 to 12	60
5-8	9.0	2.5	0.80	0.05	20 to 12 (c.)	30
5-9	8.0	2.0	0.60	0.03	27 to 12	60
					TOTAL ORC INJECTED	990

(a) Cell designations same as Phase I injection grid.
(b) Concentrations in shaded cells are for groundwater monitoring wells within that cell.
(c.) Drilling refusal encountered at 20' bgs and injection interval was therefore shortened.
Other cell concentrations are interpolated based on June 2002 hydrochemical results, except for cells in the vicinity of wells MW-4 and MW-10 that utilize contaminant concentrations from pre-ORC injection (Aug 2001)

INJECTION PROCEDURE

The Geoprobe rig advanced an approximately 1.5-inch-diameter, hollow, steel drive casing to the bottom of the pre-determined saturated interval. The casing was then lifted approximately 4 feet to drop the sacrificial drive point and expose the inner screened casing through which the ORC™ slurry was pumped. A slurry of approximately 1 gallon of water to 3 pounds of ORC™ powder was mixed in buckets. The slurry was transferred to an in-line hopper and pumped down the casing, through the screen and into the formation at a pressure of approximately 2,000 pounds per square inch. Care was taken to deliver an approximately uniform mass of ORC™ over each saturated interval. At several of the boreholes, "short-circuiting" of the ORC™ slurry around the drive casing and to ground surface was observed; however, this was generally near the top of the injection interval and represented a small percentage of the total ORC™ slurry for each borehole. No communication between boreholes or groundwater monitoring wells was observed (i.e., slurry observed exiting a well or adjacent borehole during injection). Following full injection over the interval, the drive casing was fully withdrawn and the open portion of the borehole was filled with bentonite chips and hydrated.

FUTURE ACTIVITIES

The effectiveness of the ORC™ injection corrective action program in reducing groundwater contaminant concentrations will continue to be evaluated. This evaluation will occur though the comparison of the pre-injection baseline data with post-injection groundwater monitoring well analytical results over subsequent quarterly events. The post-injection groundwater data will be evaluated in the context of effectiveness of the corrective action, including both indicators of natural attenuation and hydrochemical trends. It is possible that an additional injection phase(s) will be required in "hot spot" areas where groundwater contamination persists beyond the active life of the ORC™ (estimated to be approximately 9 months). The quarterly hydrochemcial and natural attenuation indicator trends will be examined in the light of the Phase 1 and Phase 2 ORC™ injection events to evaluate its effectiveness in remediating the residual hydrocarbon plume.

8.0 SUMMARY, CONCLUSIONS, AND PROPOSED ACTIONS

The following conclusions and proposed actions are focused on the findings of the current event activities, as well as salient historical findings.

SUMMARY AND CONCLUSIONS

- Groundwater sampling has been conducted approximately on a quarterly basis since November 1994 (22 events in the original wells).
- Current site groundwater contaminant concentrations exceed their respective groundwater RBSLs (for both cases in which the drinking water resource is and is not threatened)—with the exception of toluene, which does not exceed either set of criteria. Site groundwater contaminant concentrations also exceed all surface water screening levels, with the exception of toluene and MTBE.
- 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 zone of greatest groundwater contamination (TPHg greater than 8,000 µg/L) is centered around wells MW-7, MW-9, and MW-11. The area of groundwater contamination in excess of screening level criteria appears to be no greater than 100 feet long by 50 feet wide, which is significantly reduced relative to pre-ORC injection conditions. Maximum groundwater concentrations for the majority of the contaminants have reached the most downgradient wells (just upgradient of the creek). Continued discharge of elevated concentrations could continue for at least several years if unabated.
- Hydrochemical (contaminant and dissolved oxygen) trends indicate that the first phase of the ORC™ injection (Septemer 2001) was generally successful in increasing DO levels and reducing groundwater contaminant concentrations, although the active life of the ORC™ appears to have been exceeded between the second and third post-injection events in some of the wells. A second phase of ORC™ injection was conducted in July 2002.
- 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 siltstone bedrock. The saturated interval extends approximately 12 to 15 feet from top of bedrock through the capillary fringe.

- 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 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 only contaminant detected in site surface water (creek samples) was MTBE, detected in one sample at a concentration below any screening-level criteria.

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, including evaluating future groundwater and surface water analytical results in the context of the need for additional corrective action.

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9.0 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 this limited remedial investigation 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.

WELL GAUGING DATA

Project # 020615-MW1 Date 6/18/02 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	DO/ORP/Ferrous Iron
MW-1	4					3.84	19.85		.8/100/0
MW-2	4					21.81	38.82		.7/157/0
MW-3	4					19.53	44.10		.6/34/0
MW-4	4					13.46	26.51		.715/-101/.1
MW-5	4					16.30	26.92		.8/-23/0
MW-6	4					15.45	27.93		1.4/30/.4
MW-7	2					12.92	25.33		.2/-10/3.2
MW-8	2					11.32	22.21		.3/-37/.8
MW-9	2					14.73	26.00		.4/-70/2.5
MW-10	2					11.74	28.75		.715/.70/0
MW-11	2					12.61	26.00		.4/17/0

WELL MONITORING DATA SHEET

Project #: 02088-MW1	Client: Stellar
Sampler: Mike N	Start Date: 6/18/02
Well I.D.: MW-1	Well Diameter: 2 3 (4) 6 8 ___
Total Well Depth: 1885	Depth to Water: 3.84
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

- X Disposable Bailer
- Extraction Port
- Dedicated Tubing
- Other: ____

____ (Gals.) X 3 = ____ Gals.
1 Case Volume | Specified Volumes | Calculated Volume

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)	pH	Cond.	Turbidity	Gals. Removed	Observations
					Ferrous Iron = 0	

Did well dewater? Yes No		Gallons actually evacuated:	
Sampling Time:		Sampling Date: 6/18/02	
Sample I.D.: MW-1		Laboratory: C&T	
Analyzed for: (TPH-G) (BTEX) (MTBE) (TPH-D)		Other: Nitrate & Sulfate	
Equipment Blank I.D.:	@ Time	Duplicate I.D.:	
Analyzed for: TPH-G BTEX MTBE TPH-D		Other:	
D.O. (if req'd):	Pre-purge: .8 mg/L	Post-purge:	mg/L
ORP (if req'd):	Pre-purge: 110 mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: 020618-MW1	Client: Stellar
Sampler: Mike N	Start Date: 6/18/02
Well I.D.: MW-2	Well Diameter: 2 3 (4) 6 8 ___
Total Well Depth: 30.82	Depth to Water: 21.81
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
- X Electric Submersible
- Waterra
- Peristaltic
- Extraction Pump
- Other ____

Sampling Method: Bailer

- X Disposable Bailer
- Extraction Port
- Dedicated Tubing
- Other: ____

11.0 (Gals.) X 3 = 33.0 Gals.
1 Case Volume | Specified Volumes | Calculated Volume

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)	pH	Cond.	Turbidity	Gals. Removed	Observations
1159	61.4	7.2	780	7200	11.0	Light Brwn, Cloudy
1201	60.8	7.1	790	>200	22.0	" "
1203	61.8	7.1	794	>200	33.0	" "
					Ferrous Iron = 0	

Did well dewater? Yes (No)		Gallons actually evacuated: 33.0	
Sampling Time: 1208		Sampling Date: 6/18/02	
Sample I.D.: MW-2		Laboratory: C&T	
Analyzed for: (TPH-G) (BTEX) (MTBE) (TPH-D)		Other: ~~Nitrate & Sulfate~~	
Equipment Blank I.D.: @ Time		Duplicate I.D.:	
Analyzed for: TPH-G BTEX MTBE TPH-D		Other:	
D.O. (if req'd): (Pre-purge)	.7 mg/L	Post-purge:	mg/L
ORP (if req'd): (Pre-purge)	159 mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: 020618-MW1	Client: Stellar
Sampler: MikeN	Start Date: 6/18/02
Well I.D.: MW-3	Well Diameter: 2 3 (4) 6 8 ___
Total Well Depth: 44.10	Depth to Water: 19.53
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

- X Disposable Bailer
- Extraction Port
- Dedicated Tubing
- Other: ___

No purge

___ (Gals.) X 3 = ___ Gals.

1 Case Volume | Specified Volumes | Calculated Volume

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)	pH	Cond.	Turbidity	Gals. Removed	Observations
920	58.1	7.5	572	62	0	clear
					Ferrous Iron = 0	

Did well dewater? Yes (No) Gallons actually evacuated: 0

Sampling Time: 920 Sampling Date: 6/18/02

Sample I.D.: MW-3 Laboratory: C&T

Analyzed for: ~~TPH-G~~ ~~BTEX~~ ~~MTBE~~ ~~TPH-D~~ Other: Nitrate & Sulfate

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

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

D.O. (if req'd):	(Pre-purge):	.6 mg/L	Post-purge:		mg/L
ORP (if req'd):	(Pre-purge):	34 mV	Post-purge:		mV

WELL MONITORING DATA SHEET

Project #: 022GB-MW1	Client: Stellar
Sampler: Mike N	Start Date: 6/18/02
Well I.D.: MW-4	Well Diameter: 2 3 (4) 6 8 ___
Total Well Depth: 26.51	Depth to Water: 13.46
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
- X Electric Submersible
- Waterra
- Peristaltic
- Extraction Pump
- Other ____

Sampling Method: Bailer

- X Disposable Bailer
- Extraction Port
- Dedicated Tubing
- Other: ____

8.5 (Gals.) X 3 = 25.5 Gals.
1 Case Volume | Specified Volumes | Calculated Volume

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)	pH	Cond.	Turbidity	Gals. Removed	Observations
1055	56.1	8.2	649	17	0	clear
1225	59.6	8.4	653	37	8.5	"
1226	61.9	8.7	641	42	17.0	"
1228	61.7	8.5	654	97	25.5	increased cloudiness
					Ferrous Iron = 0.1	

Did well dewater? Yes (No) Gallons actually evacuated: 25.5

Sampling Time: 1233 Sampling Date: 6/18/02

Sample I.D.: MW-4 Laboratory: C&T

Analyzed for: (TPH-G) (BTEX) (MTBE) (TPH-D) Other: Nitrate & Sulfate @ 1055

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

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

D.O. (if req'd):	(Pre-purge):	>15.0 mg/L	Post-purge:	mg/L
ORP (if req'd):	(Pre-purge):	-101 mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: 020618-MW1	Client: Stellar
Sampler: Mike N	Start Date: 6/18/02
Well I.D.: MW-5	Well Diameter: 2 3 (4) 6 8 ___
Total Well Depth: 26.92	Depth to Water: 16.30
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~~

- X Disposable Bailer
- Extraction Port
- Dedicated Tubing

Other: ___

___ (Gals.) X	3	=	___ Gals.
1 Case Volume	Specified Volumes		Calculated Volume

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)	pH	Cond.	Turbidity	Gals. Removed	Observations
					Ferrous Iron = 0	

Did well dewater? Yes No		Gallons actually evacuated: 0	
Sampling Time:		Sampling Date: 6/18/02	
Sample I.D.: MW-5		Laboratory: C&T	
Analyzed for: (TPH-G) (BTEX) (MTBE) (TPH-D)		Other: Nitrate & Sulfate	
Equipment Blank I.D.: @ Time		Duplicate I.D.:	
Analyzed for: TPH-G BTEX MTBE TPH-D		Other:	
D.O. (if req'd): (Pre-purge):	.8 mg/L	Post-purge:	mg/L
ORP (if req'd): (Pre-purge):	-23 mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: C2008-MW1	Client: Stellar
Sampler: Mike N	Start Date: 6/18/02
Well I.D.: MW-6	Well Diameter: 2 3 (4) 6 8 ___
Total Well Depth: 27.93	Depth to Water: 13.45
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

X Disposable Bailer
Extraction Port
Dedicated Tubing
Other: ___

___ (Gals.) X 3 = ___ Gals.
1 Case Volume | Specified Volumes | Calculated Volume

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)	pH	Cond.	Turbidity	Gals. Removed	Observations
	-	Roots	in well -			
						Ferrous Iron = .4

Did well dewater? Yes No		Gallons actually evacuated: 0	
Sampling Time:		Sampling Date: 6/18/02	
Sample I.D.: MW-6		Laboratory: C&T	
Analyzed for: (TPH-G) (BTEX) (MTBE) (TPH-D)		Other: Nitrate & Sulfate	
Equipment Blank I.D.:	@ Time	Duplicate I.D.:	
Analyzed for: TPH-G BTEX MTBE TPH-D		Other:	
D.O. (if req'd): (Pre-purge):	1.4 mg/L	Post-purge:	mg/L
ORP (if req'd): (Pre-purge):	30 mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: 02208-MW1	Client: Stellar
Sampler: MikeN	Start Date: 6/18/02
Well I.D.: MW-7	Well Diameter: (2) 3 4 6 8 ___
Total Well Depth: 25.33	Depth to Water: 12.92
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	Waterra	
X Disposable Bailer	Peristaltic	
Middleburg	Extraction Pump	
Electric Submersible	Other_____	

Sampling Method: Bailer

X 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	radius^2 * 0.163

2.0 (Gals.) X 3 = 6.0 Gals.

1 Case Volume | Specified Volumes | Calculated Volume

Time	Temp (°F)	pH	Cond.	Turbidity	Gals. Removed	Observations
1040	56.6	7.2	561	>200	0	Light Brown/Grey, odor
1406	58.3	7.0	745	>200	2.0	" "
1408	57.8	6.9	712	>200	4.0	Grey, odor
1410	57.7	6.9	701	>200	6.0	" "
					Ferrous Iron = 3.2	

Did well dewater? Yes (No) Gallons actually evacuated: 6.0

Sampling Time: 1415 Sampling Date: 6/18/02

Sample I.D.: MW-7 Laboratory: C&T

Analyzed for: (TPH-G) (BTEX) (MTBE) (TPH-D) Other: Nitrate & Sulfate @ 1040

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

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

D.O. (if req'd):	(Pre-purge):	.2 mg/L	Post-purge:	mg/L
ORP (if req'd):	(Pre-purge):	-101 mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: 020618-MW1	Client: Stellar
Sampler: Mike N	Start Date: 6/18/02
Well I.D.: MW-8	Well Diameter: (2) 3 4 6 8 ___
Total Well Depth: 22.21	Depth to Water: 11.32
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
- [x] Disposable Bailer
- Middleburg
- Electric Submersible
- Waterra
- Peristaltic
- Extraction Pump
- Other ___

Sampling Method: Bailer

- [x] Disposable Bailer
- Extraction Port
- Dedicated Tubing
- Other: ___

1.8 (Gals.) X 3 = 5.4 Gals.
1 Case Volume | Specified Volumes | Calculated Volume

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)	pH	Cond.	Turbidity	Gals. Removed	Observations
1025	57.4	7.7	755	7200	0	Brown, cloudy, odor
1430	58.7	7.3	764	7200	1.8	" "
1432	57.7	7.2	776	>200	3.6	Brown/Grey, odor
1434	57.5	7.2	756	>200	5.4	" "
					Ferrous Iron = .8	

Did well dewater? Yes (No)		Gallons actually evacuated: 5.4	
Sampling Time: 1439		Sampling Date: 6/18/02	
Sample I.D.: MW-8		Laboratory: C&T	
Analyzed for: (TPH-G) (BTEX) (MTBE) (TPH-D)		Other: Nitrate & Sulfate @ 1025	
Equipment Blank I.D.: @ Time		Duplicate I.D.:	
Analyzed for: TPH-G BTEX MTBE TPH-D		Other:	
D.O. (if req'd): (Pre-purge):	.3 mg/L	Post-purge:	mg/L
ORP (if req'd): (Pre-purge):	-37 mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: 020618-MW1	Client: Stellar
Sampler: Mike N	Start Date: 6/18/02
Well I.D.: MW-9	Well Diameter: (2) 3 4 6 8 ___
Total Well Depth: 26.00	Depth to Water: 14.73
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
- X Disposable Bailer
- Middleburg
- Electric Submersible
- Waterra
- Peristaltic
- Extraction Pump
- Other_____

Sampling Method: Bailer

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

1.8 (Gals.) X 3 = 5.4 Gals.
1 Case Volume | Specified Volumes | Calculated Volume

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)	pH	Cond.	Turbidity	Gals. Removed	Observations
952	57.3	7.2	796	>200	0	Brown, cloudy, odor
1345	57.4	7.1	934	>200	1.8	Brown, cloudy, odor
1347	57.4	6.9	968	>200	3.6	" " "
1349	57.8	6.9	958	>200	5.4	" " "
					Ferrous Iron = 20.5	

Did well dewater? Yes (No) Gallons actually evacuated: 5.4

Sampling Time: 1354 Sampling Date: 6/18/02

Sample I.D.: MW-9 Laboratory: C&T

Analyzed for: (TPH-G) (BTEX) (MTBE) (TPH-D) Other: Nitrate & Sulfate @ 952

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

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

D.O. (if req'd):	(Pre-purge):	.4 mg/L	Post-purge:	mg/L
ORP (if req'd):	(Pre-purge):	-70 mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: C2008-MW1	Client: Stellar
Sampler: Mike N	Start Date: 6/18/02
Well I.D.: MW-10	Well Diameter: (2) 3 4 6 8 ___
Total Well Depth: 28.75	Depth to Water: 11.74
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
- (X) Disposable Bailer
- ~~Middleburg~~
- Electric Submersible
- Waterra
- Peristaltic
- Extraction Pump
- Other_____

Sampling Method: Bailer

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

2.7 (Gals.) X 3 = 8.1 Gals.
1 Case Volume | Specified Volumes | Calculated Volume

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)	pH	Cond.	Turbidity	Gals. Removed	Observations
1010	57.9	7.6	552	19	0	clear
1300	61.4	9.1	603	>200	2.7	Brown, cloudy
1304	58.9	8.9	616	>200	5.4	" "
1308	58.3	8.8	655	>200	8.1	" "
					Ferrous Iron = 0	

Did well dewater? Yes (No)	Gallons actually evacuated: 8.1
Sampling Time: 1313	Sampling Date: 6/18/02
Sample I.D.: MW-10	Laboratory: C&T
Analyzed for: (TPH-G) (BTEX) (MTBE) (TPH-D)	Other: Nitrate & Sulfate @ 1010
Equipment Blank I.D.: @ Time	Duplicate I.D.:
Analyzed for: TPH-G BTEX MTBE TPH-D	Other:

D.O. (if req'd): (Pre-purge):	>15.0 mg/L	Post-purge:	mg/L
ORP (if req'd): (Pre-purge):	-70 mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: 020618-M11	Client: Stellar
Sampler: Mike N	Start Date: 6/18/02
Well I.D.: MW-11	Well Diameter: (2) 3 4 6 8 ___
Total Well Depth: 26.00	Depth to Water: 12.61
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
- [X] Disposable Bailer
- Middleburg
- Electric Submersible
- Waterra
- Peristaltic
- Extraction Pump
- Other_____

Sampling Method: Bailer

- [X] Disposable Bailer
- Extraction Port
- Dedicated Tubing
- Other: _____

2.1 (Gals.) X 3 = 6.3 Gals.
1 Case Volume | Specified Volumes | Calculated Volume

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)	pH	Cond.	Turbidity	Gals. Removed	Observations
1115	57.3	8.2	648	>200	0	Light Brown, cloudy
1325	57.8	8.1	692	>200	2.1	Brown, Cloudy
1327	57.1	7.4	774	>200	4.2	" " odor
1329	56.9	7.2	813	>200	6.3	" " "
					Ferrous Iron = 0	

Did well dewater? Yes (No) Gallons actually evacuated: 6.3

Sampling Time: 1334 Sampling Date: 6/18/02

Sample I.D.: MW-11 Laboratory: C&T

Analyzed for: (TPH-G) (BTEX) (MTBE) (TPH-D) Other: Nitrate & Sulfate @ 1115

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

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

D.O. (if req'd):	(Pre-purge):	.4 mg/L	Post-purge:	mg/L
ORP (if req'd):	(Pre-purge):	17 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: 25-JUN-02
Lab Job Number: 159216
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

154216

Chain of Custody Record

Lab job no. _____
Date 6/18/00
Page 1 of 1

Laboratory Curtis & Tompkins Ltd
Address 2323 Fifth Street
Berkeley CA 94710

Method of Shipment hand delivery
Shipment No. —
Airbill No. —
Cooler No. —

Project Owner East Bay Regional Parks District
Site Address 7867 Redwood Rd.
Oakland CA

Project Manager Bruce Rucker
Telephone No. (510) 644-3123
Fax No. (510) 644-3859

Project Name Redwood Park Service Yard
Project Number 3001-53

Samplers: *(Signature)* B.M. Rucker

Field Sample Number	Location/ Depth	Date	Time	Sample Type	Type/Size of Container	Preservation: Cooler	Preservation: Chemical	Filtered	No. of Containers	TVH + BTEX + MTBE	TEH - diesel	Remarks
SW-3	—	6/18/00	750	H20	40 ml VOAs	✓	HCl		3	X		
"		↓			1-L amber	✓	none		1		X	
SW-2	—	↓	800	H20	Same as above	✓	HCl		3	X		
"						✓	none		1		X	

Preservation Correct? ☒ Yes ☐ No ☐ N/A

Received ☒ On Ice ☒ Cold ☐ Ambient ☒ Intact

Relinquished by:	Date	Received by:	Date
Signature B.M. Rucker	6/18/00	Signature	6/18/00
Printed Bruce Rucker	Time 845	Printed A. Alvarez	Time 845
Company Stellar Env. Solns		Company Cat	

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.

Total Extractable Hydrocarbons

Lab #:	159216	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 3520C
Project#:	2001-53	Analysis:	EPA 8015B(M)
Matrix:	Water	Sampled:	06/18/02
Units:	ug/L	Received:	06/18/02
Diln Fac:	1.000	Prepared:	06/21/02
Batch#:	73221		

Field ID:	SW-3	Lab ID:	159216-001
Type:	SAMPLE	Analyzed:	06/24/02

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	99	39-137

Field ID:	SW-2	Lab ID:	159216-002
Type:	SAMPLE	Analyzed:	06/24/02

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	100	39-137

Type:	BLANK	Analyzed:	06/23/02
Lab ID:	QC181982	Cleanup Method:	EPA 3630C

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	81	39-137

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	159216	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 3520C
Project#:	2001-53	Analysis:	EPA 8015B(M)
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC181983	Batch#:	73221
Matrix:	Water	Prepared:	06/21/02
Units:	ug/L	Analyzed:	06/23/02

Cleanup Method: EPA 3630C

Analyte	Spiked	Result	%REC	Limits
Diesel C10-C24	2,500	2,103	84	37-120

Surrogate	%REC	Limits
Hexacosane	87	39-137

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	159216	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 3520C
Project#:	2001-53	Analysis:	EPA 8015B(M)
Field ID:	ZZZZZZZZZZ	Batch#:	73221
MSS Lab ID:	159139-003	Sampled:	06/12/02
Matrix:	Water	Received:	06/12/02
Units:	ug/L	Prepared:	06/21/02
Diln Fac:	1.000	Analyzed:	06/23/02

Type: MS Cleanup Method: EPA 3630C
Lab ID: QC181984

Analyte	MSS Result	Spiked	Result	%REC	Limits
Diesel C10-C24	63.43	2,500	2,499	97	44-131

Surrogate	%REC	Limits
Hexacosane	104	39-137

Type: MSD Cleanup Method: EPA 3630C
Lab ID: QC181985

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Diesel C10-C24	2,500	1,978	77	44-131	23	26

Surrogate	%REC	Limits
Hexacosane	82	39-137

RPD= Relative Percent Difference

13.0

Curtis & Tompkins, Ltd.

Total Volatile Hydrocarbons

Lab #:	159216	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2001-53	Analysis:	8015B(M)
Matrix:	Water	Sampled:	06/18/02
Units:	ug/L	Received:	06/18/02
Diln Fac:	1.000	Analyzed:	06/18/02
Batch#:	73090		

Field ID: SW-3 Lab ID: 159216-001
Type: SAMPLE

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Trifluorotoluene (FID)	91	68-145
Bromofluorobenzene (FID)	86	66-143

Field ID: SW-2 Lab ID: 159216-002
Type: SAMPLE

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Trifluorotoluene (FID)	93	68-145
Bromofluorobenzene (FID)	84	66-143

Type: BLANK Lab ID: QC181513

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Trifluorotoluene (FID)	90	68-145
Bromofluorobenzene (FID)	83	66-143

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	159216	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2001-53	Analysis:	EPA 8021B
Matrix:	Water	Sampled:	06/18/02
Units:	ug/L	Received:	06/18/02
Diln Fac:	1.000	Analyzed:	06/18/02
Batch#:	73090		

Field ID: SW-3 Lab ID: 159216-001
Type: SAMPLE

Analyte	Result	RL
MTBE	2.4	2.0
Benzene	ND	0.50
Toluene	ND	0.50
Ethylbenzene	ND	0.50
m,p-Xylenes	ND	0.50
o-Xylene	ND	0.50

Surrogate	%REC	Limits
Trifluorotoluene (PID)	89	53-143
Bromofluorobenzene (PID)	83	52-142

Field ID: SW-2 Lab ID: 159216-002
Type: SAMPLE

Analyte	Result	RL
MTBE	ND	2.0
Benzene	ND	0.50
Toluene	ND	0.50
Ethylbenzene	ND	0.50
m,p-Xylenes	ND	0.50
o-Xylene	ND	0.50

Surrogate	%REC	Limits
Trifluorotoluene (PID)	90	53-143
Bromofluorobenzene (PID)	83	52-142

Type: BLANK Lab ID: QC181513

Analyte	Result	RL
MTBE	ND	2.0
Benzene	ND	0.50
Toluene	ND	0.50
Ethylbenzene	ND	0.50
m,p-Xylenes	ND	0.50
o-Xylene	ND	0.50

Surrogate	%REC	Limits
Trifluorotoluene (PID)	89	53-143
Bromofluorobenzene (PID)	82	52-142

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	159216	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:	QC181514	Batch#:	73090
Matrix:	Water	Analyzed:	06/18/02
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
MTBE	20.00	19.49	97	51-125
Benzene	20.00	17.26	86	65-122
Toluene	20.00	18.36	92	67-121
Ethylbenzene	20.00	17.97	90	70-121
m,p-Xylenes	40.00	38.98	97	72-125
o-Xylene	20.00	18.36	92	73-122

Surrogate	%REC	Limits
Trifluorotoluene (PID)	88	53-143
Bromofluorobenzene (PID)	81	52-142

Curtis & Tompkins, Ltd.

Total Volatile Hydrocarbons

Lab #:	159216	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2001-53	Analysis:	8015B(M)
Matrix:	Water	Diln Fac:	1.000
Units:	ug/L	Batch#:	73090

Type: BS Analyzed: 06/18/02
Lab ID: QC181517

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	1,000	886.6	89	79-120

Surrogate	%REC	Limits
Trifluorotoluene (FID)	103	68-145
Bromofluorobenzene (FID)	85	66-143

Type: BSD Analyzed: 06/19/02
Lab ID: QC181518

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	3,000	2,582	86	79-120	3	20

Surrogate	%REC	Limits
Trifluorotoluene (FID)	127	68-145
Bromofluorobenzene (FID)	85	66-143

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	159216	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2001-53	Analysis:	EPA 8021B
Field ID:	ZZZZZZZZZZ	Batch#:	73090
MSS Lab ID:	159207-001	Sampled:	06/17/02
Matrix:	Water	Received:	06/17/02
Units:	ug/L	Analyzed:	06/18/02
Diln Fac:	1.000		

Type: MS Lab ID: QC181515

Analyte	MSS Result	Spiked	Result	%REC	Limits
MTBE	<0.3300	20.00	26.04	130	33-131
Benzene	<0.05900	20.00	18.30	92	52-149
Toluene	<0.07700	20.00	22.74	114	69-130
Ethylbenzene	0.5827	20.00	19.23	93	70-131
m,p-Xylenes	<0.06300	40.00	39.34	98	68-137
o-Xylene	0.5064	20.00	18.88	92	73-133

Surrogate	%REC	Limits
Trifluorotoluene (PID)	98	53-143
Bromofluorobenzene (PID)	87	52-142

Type: MSD Lab ID: QC181516

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	20.00	25.57	128	33-131	2	20
Benzene	20.00	18.48	92	52-149	1	30
Toluene	20.00	21.38	107	69-130	6	30
Ethylbenzene	20.00	19.22	93	70-131	0	30
m,p-Xylenes	40.00	39.58	99	68-137	1	30
o-Xylene	20.00	19.79	96	73-133	5	30

Surrogate	%REC	Limits
Trifluorotoluene (PID)	98	53-143
Bromofluorobenzene (PID)	85	52-142

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: 26-JUN-02
Lab Job Number: 159241
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

Curtis & Tompkins, Ltd.

Laboratory Numbers: **159241**
Client: **Stellar Environmental Solutions**
Location: **Redwood Park Services Yard**
Project#: **2001-53**

Sampled Date: **06/18/02**
Received Date: **06/18/02**

CASE NARRATIVE

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

TVH/BTXE:
High Trifluorotoluene surrogate recoveries were observed for samples MW-7 (CT# 159241-007) and MW-8 (CT# 159241-008) as a result of hydrocarbons coeluting with the surrogate peaks. For sample MW-7 (CT# 159241-007) the Trifluorotoluene measured concentration was greater than the linear range of the instrument and therefore is flag with a "b". The ethylbenzene matrix spike recoveries for sample MW-8 (CT# 159241-008) are considered not meaningful (NM) because the sample concentration for this compound is four times greater than the spiked level. No other analytical problems were encountered.

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

General Chemistry:
No analytical problems were encountered.

159241

Chain of Custody Record

Lab job no. 159241
Date 6/18/02
Page 1 of 3

Laboratory Curtis & Tompkins Ltd.
Address 2323 Fifth St.
Berkeley CA 94710
510/486-0900
Project Owner East Bay Regional Parks District
Site Address 7867 Redwood Rd.
Oakland CA
Project Name Redwood Park Service Yard
Project Number 2001-53

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

Field Sample Number	Location/ Depth	Date	Time	Sample Type	Type/Size of Container	Preservation: Cooler	Preservation: Chemical	Filtered	No. of Containers	TVH + BTEX + MTBE	TEH - diesel	Nitrate + Sulfate	Remarks
-1 MW-3	MW-3	6/18/02	920	H_2O	1L ~~500~~ ml poly	X	none		1			X	
-2 MW-2	MW-2		1208		40 ml VOAs		HCl		3	X			
"			1208		1-L amber glass		none		2		X		
-3 MW-4	MW-4		1055		1L ~~500~~ ml poly		none		1			X	
"			1233		40 ml VOAs		HCl		3	X			
"			1233		1-L amber glass		none		2		X		
-4 MW-10	MW-10		1010		1L ~~500~~ ml poly		none		1			X	
"			1313		40 ml VOAs		HCl		3	X			
"			1313		1-L amber glass		none		2		X		

Preservation Correct? ☑ Yes ☐ No ☐ N/A

Received ☑ On Ice ☑ Cold ☐ Ambient ☑ Intact

Relinquished by:	Date	Received by:	Date
Signature	6/18/02	Signature	6/18/02
Printed Michael Mercurio	Time 1610	Printed A. Alvarez	Time 4:10
Company Blaine Tech		Company C&T	

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: Provide an EDF report as well as hard copy
Sampling conducted by Blaine Tech Services (San Jose, CA).

2000-00-01

★ Stellar Environmental Solutions

2198 Sixth Street #201, Berkeley, CA 94710

159241

Chain of Custody Record

Lab job no. 159241
Date 6/18/06
Page 2 of 03

Laboratory Curtis + Tompkins Ltd.
Address 2323 Fifth St.
Berkeley CA 94710
510/486-0900

Method of Shipment hand delivered
Shipment No. —
Airbill No. —
Cooler No. —

Project Owner East Bay Regional Parks District
Site Address Re 7867 Redwood Rd.
Oakland CA
Project Name Redwood Park Service Yard
Project Number 2001-53

Project Manager Bruce Rueter
Telephone No. (510) 644-3123
Fax No. (510) 644-3859
Samplers: *(Signature)*

Field Sample Number	Location/ Depth	Date	Time	Sample Type	Type/Size of Container	Preservation: Cooler	Preservation: Chemical	Filtered	No. of Containers	TVH + BTEX + MTBE	TEH-diesel	Nitrate + Sulfate	Remarks
MW-11	MW-11	6/8/06	1115	H_2O	~~500~~ 1L ml poly	X	none		1			X	
"			1334		40 ml VOAs		HCl		3	X			
"			1334		1-L amber glass		none		2		X		
MW-9	MW-9		952		~~500~~ 1L ml poly	X	none		1			X	
"			1354		40 ml VOAs	X	HCl		3	X			
"			1354		1-Lamber	X	none		2		X		

Preservation Correct? ☒ Yes ☐ No ☐ N/A

Received ☒ On Ice ☒ Cold ☐ Ambient ☒ Intact

Relinquished by:	Date	Received by:	Date
Signature	6/16/06	Signature	6/18
Printed Michael Nimokata	Time 1610	Printed A Alvarez	Time 4:10
Company Blaine Tech		Company CST	

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: provide an EDF report as well as hard copy

2000-00-01

T59291

Chain of Custody Record

Lab [redacted] 17[redacted]7

Date 6/18/12

Page 3 of 3

Laboratory Curtis & Tompkins Ltd.
Address 2323 Fifth St.
Berkeley CA 94710
510/486-0900

Method of Shipment hand delivered
Shipment No. —
Airbill No. —
Cooler No. —

Project Owner East Bay Regional Parks District
Site Address Re 7867 Redwood Rd.
Oakland CA

Project Manager Bruce Rueter
Telephone No. (510) 644-3123
Fax No. (510) 644-3859

Project Name Redwood Park Service Yard
Project Number 2001-53

Samplers: (Signature)

Field Sample Number	Location/ Depth	Date	Time	Sample Type	Type/Size of Container	Preservation: Cooler	Preservation: Chemical	Filtered	No. of Containers	TVH + BTEX + MTBE	TEH-diesel	Nitrate + Sulfate	Remarks
MW-7	MW-7	6/18/12	1040	H_2O	1L ~~500~~ ml poly	X	none		1			X	
"			1415		40 ml VOAs		HCl		3	X			
"			1415		1-L amber glass		none		2		X		
MW-8	MW-8		1025		1L ~~500~~ ml poly		none		1			X	
"			1439		40 ml VOAs		HCl		3	X			
"			1439		1-L amber		none		2		X		

Received: Cold ☐ On Ice ☐ Ambient ☒ Intact

Preservation Correct? ☒ Yes ☐ No ☐ N/A

Relinquished by:	Date	Received by:	Date
Signature	6/18/12	Signature	6/18
Printed: Michael Niwskatz	Time: 1610	Printed: A. Alvarez	Time: 4:10
Company: BlaineTech		Company: C.T	

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: provide an EDF report as well as hard copy

2300-60-01

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	159241	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2001-53		
Matrix:	Water	Sampled:	06/18/02
Units:	ug/L	Received:	06/18/02

Field ID:	MW-2	Diln Fac:	1.000
Type:	SAMPLE	Batch#:	73147
Lab ID:	159241-002	Analyzed:	06/19/02

Analyte	Result	RL	Analysis
Gasoline C7-C12	ND	50	8015B(M)
MTBE	7.7	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)	90	68-145	8015B(M)
Bromofluorobenzene (FID)	84	66-143	8015B(M)
Trifluorotoluene (PID)	92	53-143	EPA 8021B
Bromofluorobenzene (PID)	84	52-142	EPA 8021B

Field ID:	MW-4	Diln Fac:	1.000
Type:	SAMPLE	Batch#:	73147
Lab ID:	159241-003	Analyzed:	06/19/02

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)	92	68-145	8015B(M)
Bromofluorobenzene (FID)	85	66-143	8015B(M)
Trifluorotoluene (PID)	91	53-143	EPA 8021B
Bromofluorobenzene (PID)	85	52-142	EPA 8021B

*= Value outside of QC limits; see narrative
C= Presence confirmed, but confirmation concentration differed by more than a factor of two
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 #:	159241	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2001-53		
Matrix:	Water	Sampled:	06/18/02
Units:	uq/L	Received:	06/18/02

Field ID:	MW-10	Diln Fac:	1.000
Type:	SAMPLE	Batch#:	73147
Lab ID:	159241-004	Analyzed:	06/19/02

Analyte	Result	RL	Analysis
Gasoline C7-C12	ND	50	8015B(M)
MTBE	9.0	2.0	EPA 8021B
Benzene	0.59	0.50	EPA 8021B
Toluene	ND	0.50	EPA 8021B
Ethylbenzene	0.58	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)	90	68-145	8015B(M)
Bromofluorobenzene (FID)	82	66-143	8015B(M)
Trifluorotoluene (PID)	91	53-143	EPA 8021B
Bromofluorobenzene (PID)	83	52-142	EPA 8021B

Field ID:	MW-11	Diln Fac:	2.000
Type:	SAMPLE	Batch#:	73147
Lab ID:	159241-005	Analyzed:	06/19/02

Analyte	Result	RL	Analysis
Gasoline C7-C12	8,200	100	8015B(M)
MTBE	ND	4.0	EPA 8021B
Benzene	570	1.0	EPA 8021B
Toluene	13	1.0	EPA 8021B
Ethylbenzene	560	1.0	EPA 8021B
m,p-Xylenes	160	1.0	EPA 8021B
o-Xylene	10	1.0	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	112	68-145	8015B(M)
Bromofluorobenzene (FID)	87	66-143	8015B(M)
Trifluorotoluene (PID)	112	53-143	EPA 8021B
Bromofluorobenzene (PID)	85	52-142	EPA 8021B

*= Value outside of QC limits; see narrative
C= Presence confirmed, but confirmation concentration differed by more than a factor of two
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 #:	159241	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2001-53		
Matrix:	Water	Sampled:	06/18/02
Units:	ug/L	Received:	06/18/02

Field ID:	MW-9	Diln Fac:	2.000
Type:	SAMPLE	Batch#:	73184
Lab ID:	159241-006	Analyzed:	06/20/02

Analyte	Result	RL	Analysis
Gasoline C7-C12	11,000	100	8015B(M)
MTBE	85 C	4.0	EPA 8021B
Benzene	200	1.0	EPA 8021B
Toluene	16	1.0	EPA 8021B
Ethylbenzene	600	1.0	EPA 8021B
m,p-Xylenes	500	1.0	EPA 8021B
o-Xylene	9.3	1.0	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	98	68-145	8015B(M)
Bromofluorobenzene (FID)	88	66-143	8015B(M)
Trifluorotoluene (PID)	117	53-143	EPA 8021B
Bromofluorobenzene (PID)	79	52-142	EPA 8021B

Field ID:	MW-7	Diln Fac:	1.000
Type:	SAMPLE	Batch#:	73147
Lab ID:	159241-007	Analyzed:	06/19/02

Analyte	Result	RL	Analysis
Gasoline C7-C12	9,300	50	8015B(M)
MTBE	18 C	2.0	EPA 8021B
Benzene	210	0.50	EPA 8021B
Toluene	6.3	0.50	EPA 8021B
Ethylbenzene	380	0.50	EPA 8021B
m,p-Xylenes	150	0.50	EPA 8021B
o-Xylene	4.7 C	0.50	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	558 *	>LR b 68-145	8015B(M)
Bromofluorobenzene (FID)	96	66-143	8015B(M)
Trifluorotoluene (PID)	155 *	53-143	EPA 8021B
Bromofluorobenzene (PID)	88	52-142	EPA 8021B

*= Value outside of QC limits; see narrative
C= Presence confirmed, but confirmation concentration differed by more than a factor of two
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 #:	159241	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2001-53		
Matrix:	Water	Sampled:	06/18/02
Units:	ug/L	Received:	06/18/02

Field ID:	MW-8	Lab ID:	159241-008
Type:	SAMPLE	Diln Fac:	1.000

Analyte	Result	RL	Batch#	Analyzed	Analysis
Gasoline C7-C12	2,900	50	73147	06/19/02	8015B(M)
MTBE	19 C	2.0	73184	06/20/02	EPA 8021B
Benzene	70	0.50	73184	06/20/02	EPA 8021B
Toluene	2.0 C	0.50	73184	06/20/02	EPA 8021B
Ethylbenzene	170	0.50	73184	06/20/02	EPA 8021B
m,p-Xylenes	140	0.50	73184	06/20/02	EPA 8021B
o-Xylene	8.2	0.50	73184	06/20/02	EPA 8021B

Surrogate	%REC	Limits	Batch#	Analyzed	Analysis
Trifluorotoluene (FID)	189 *	68-145	73147	06/19/02	8015B(M)
Bromofluorobenzene (FID)	94	66-143	73147	06/19/02	8015B(M)
Trifluorotoluene (PID)	143	53-143	73184	06/20/02	EPA 8021B
Bromofluorobenzene (PID)	79	52-142	73184	06/20/02	EPA 8021B

Type:	BLANK	Batch#:	73147
Lab ID:	QC181736	Analyzed:	06/19/02
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)	90	68-145	8015B(M)
Bromofluorobenzene (FID)	82	66-143	8015B(M)
Trifluorotoluene (PID)	93	53-143	EPA 8021B
Bromofluorobenzene (PID)	83	52-142	EPA 8021B

*= Value outside of QC limits; see narrative
C= Presence confirmed, but confirmation concentration differed by more than a factor of two
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 #:	159241	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2001-53		
Matrix:	Water	Sampled:	06/18/02
Units:	ug/L	Received:	06/18/02

Type:	BLANK	Batch#:	73184
Lab ID:	QC181858	Analyzed:	06/20/02
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

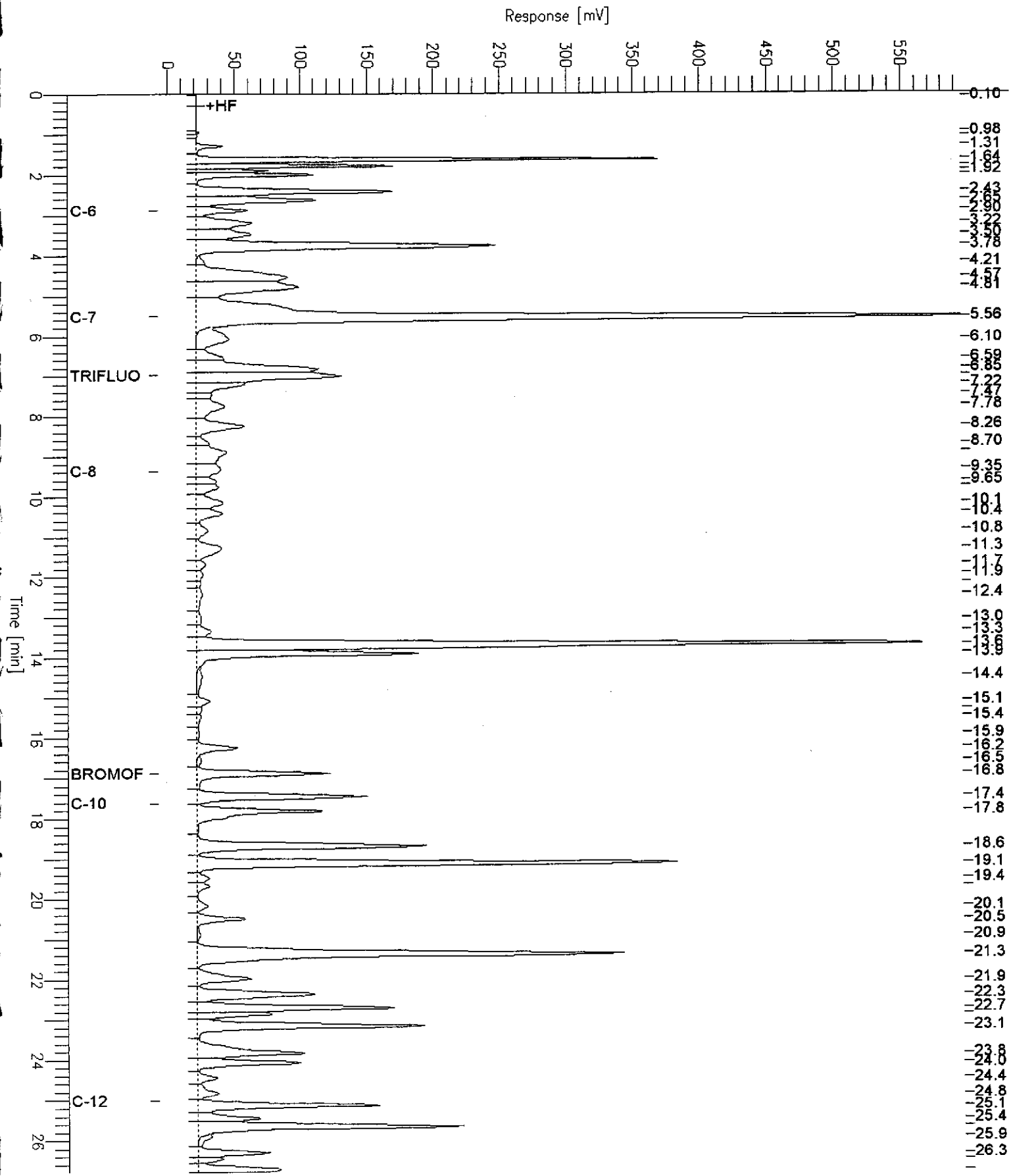
Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	90	68-145	8015B(M)
Bromofluorobenzene (FID)	83	66-143	8015B(M)
Trifluorotoluene (PID)	88	53-143	EPA 8021B
Bromofluorobenzene (PID)	80	52-142	EPA 8021B

*= Value outside of QC limits; see narrative
C= Presence confirmed, but confirmation concentration differed by more than a factor of two
b= See narrative
ND= Not Detected
RL= Reporting Limit
>LR= Response exceeds instrument's linear range

GC19 TVH 'X' Data File (FID)

Sample Name : 159241-005,73147
FileName : G:\GC19\DATA\170X012.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 26.80 min
Scale Factor: 1.0 Plot Offset: -7 mV

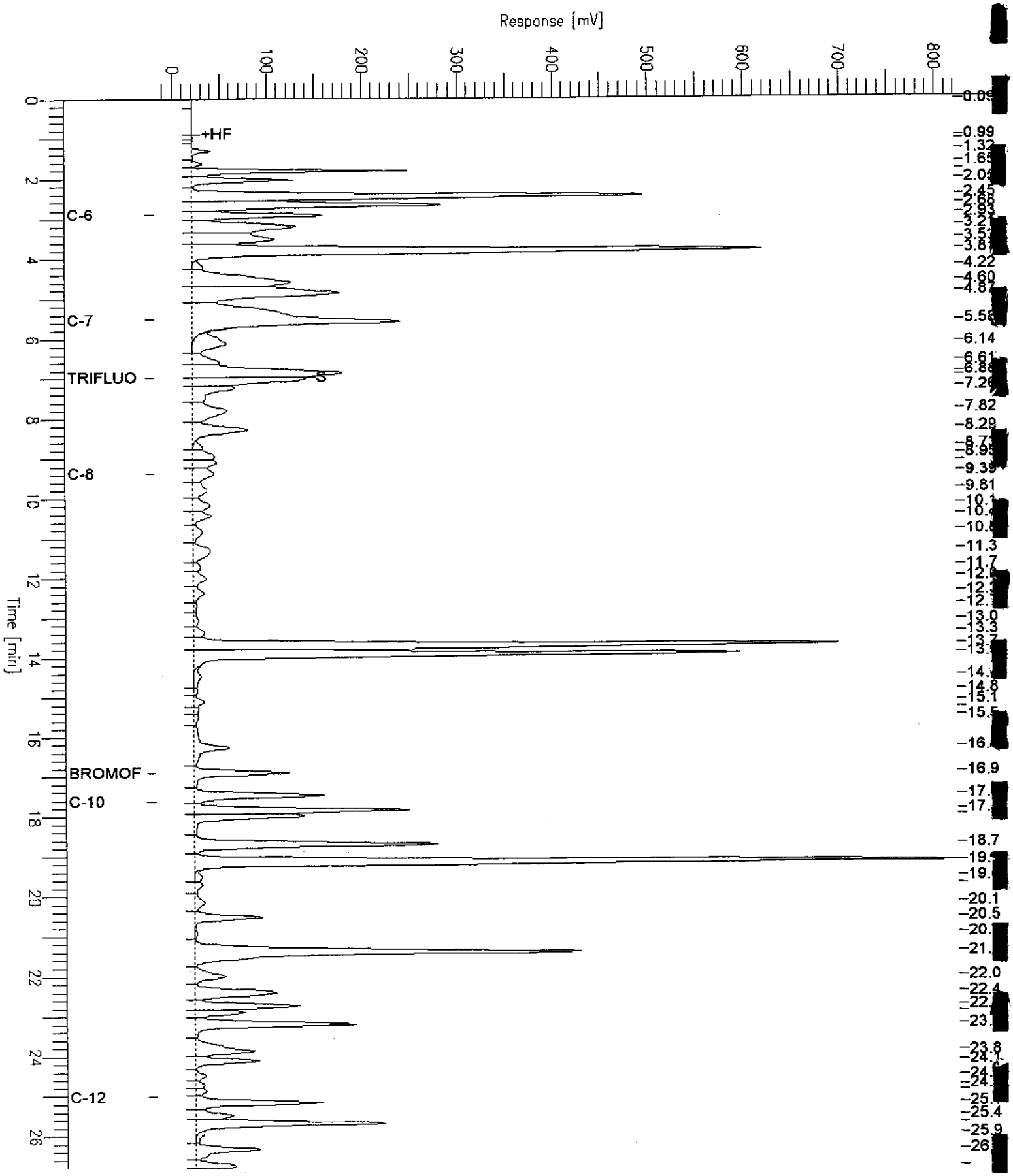
Sample #: A1 Page 1 of 1
Date : 6/20/02 01:26 PM
Time of Injection: 6/19/02 09:53 PM
Low Point : -6.99 mV High Point : 595.27 mV
Plot Scale: 602.3 mV



GC19 TVH 'X' Data File (FID)

Sample Name : 159241-006,73184
FileName : G:\GC19\DATA\171X011.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 26.80 min
Scale Factor: 1.0 Plot Offset: -19 mV

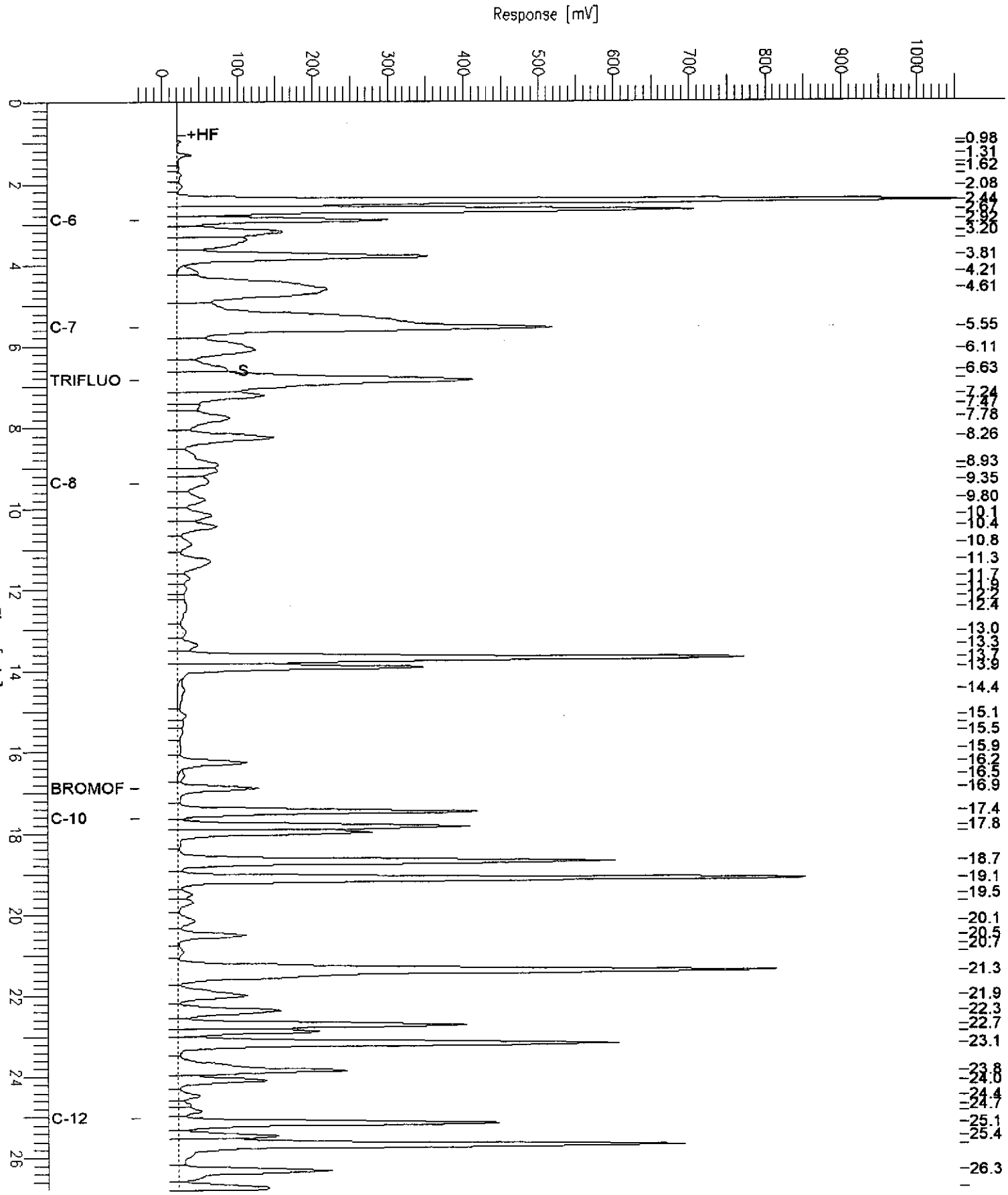
Sample #: bl
Date : 6/21/02 08:42 AM
Time of Injection: 6/20/02 10:19 PM
Low Point : -18.90 mV High Point : 821.32 mV
Plot Scale: 840.2 mV



GC19 TVH 'X' Data File (FID)

Sample Name : 159241-007,73147
FileName : G:\GC19\DATA\170X010.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 26.80 min
Scale Factor: 1.0 Plot Offset: -30 mV

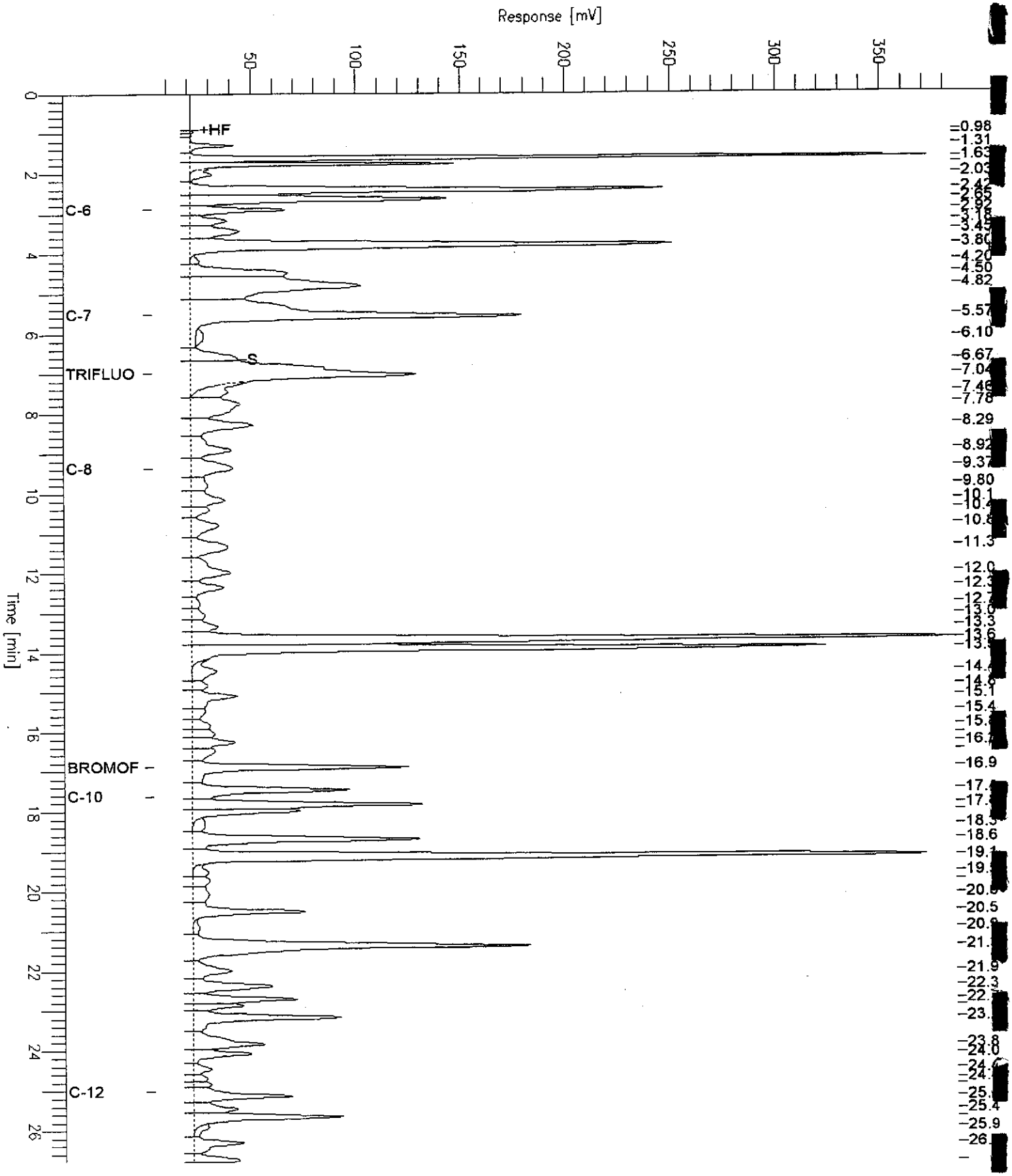
Sample #: A1 Page 1 of 1
Date : 6/20/02 01:26 PM
Time of Injection: 6/19/02 08:31 PM
Low Point : -30.31 mV High Point : 1052.05 mV
Plot Scale: 1082.4 mV



GC19 TVH 'X' Data File (FID)

Sample Name : 159241-008,73147
FileName : G:\GC19\DATA\170X011.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 26.80 min
Scale Factor: 1.0 Plot Offset: 3 mV

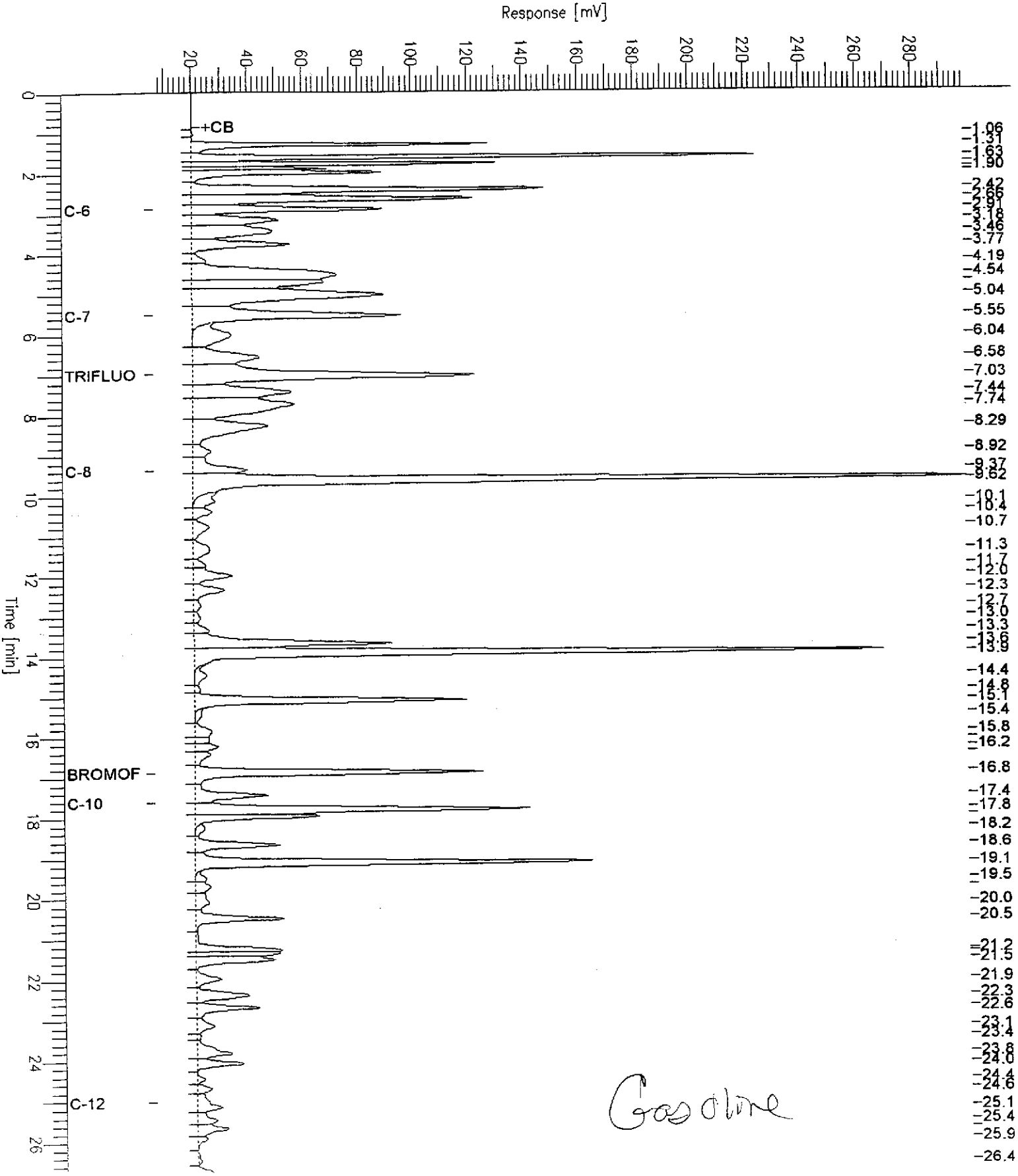
Sample #: A1 Page 1 of 1
Date : 6/20/02 01:26 PM
Time of Injection: 6/19/02 09:12 PM
Low Point : 3.33 mV High Point : 384.32 mV
Plot Scale: 381.0 mV



GC19 TVH 'X' Data File (FID)

Sample Name : ccv/lcs,gc181738,73147,02ws0906,5/5000
FileName : G:\GC19\DATA\170X003.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 26.80 min
Scale Factor: 1.0 Plot Offset: 6 mV

Sample #: Page 1 of 1
Date : 6/19/02 04:10 PM
Time of Injection: 6/19/02 03:43 PM
Low Point : 6.38 mV High Point : 298.70 mV
Plot Scale: 292.3 mV



Gasoline

Curtis & Tompkins, Ltd.

Total Volatile Hydrocarbons

Lab #:	159241	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:	QC181738	Batch#:	73147
Matrix:	Water	Analyzed:	06/19/02
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	2,000	1,820	91	79-120

Surrogate	%REC	Limits
Trifluorotoluene (FID)	116	68-145
Bromofluorobenzene (FID)	87	66-143

Curtis & Tompkins, Ltd.

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	159241	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:	QC181737	Batch#:	73147
Matrix:	Water	Analyzed:	06/19/02
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
MTBE	20.00	20.00	100	51-125
Benzene	20.00	17.57	88	65-122
Toluene	20.00	18.30	91	67-121
Ethylbenzene	20.00	19.00	95	70-121
m,p-Xylenes	40.00	39.44	99	72-125
o-Xylene	20.00	18.67	93	73-122

Surrogate	%REC	Limits
Trifluorotoluene (PID)	92	53-143
Bromofluorobenzene (PID)	85	52-142

Curtis & Tompkins, Ltd.

Total Volatile Hydrocarbons

Lab #:	159241	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:	QC181859	Batch#:	73184
Matrix:	Water	Analyzed:	06/20/02
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	2,000	1,864	93	79-120

Surrogate	%REC	Limits
Trifluorotoluene (FID)	116	68-145
Bromofluorobenzene (FID)	85	66-143

Curtis & Tompkins, Ltd.

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	159241	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:	QC181860	Batch#:	73184
Matrix:	Water	Analyzed:	06/20/02
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
MTBE	20.00	20.67	103	51-125
Benzene	20.00	17.96	90	65-122
Toluene	20.00	18.55	93	67-121
Ethylbenzene	20.00	18.99	95	70-121
m,p-Xylenes	40.00	40.04	100	72-125
o-Xylene	20.00	18.94	95	73-122

Surrogate	%REC	Limits
Trifluorotoluene (PID)	89	53-143
Bromofluorobenzene (PID)	81	52-142

Curtis & Tompkins, Ltd.

Total Volatile Hydrocarbons

Lab #:	159241	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2001-53	Analysis:	8015B(M)
Field ID:	ZZZZZZZZZZ	Batch#:	73147
MSS Lab ID:	159225-001	Sampled:	06/17/02
Matrix:	Water	Received:	06/17/02
Units:	ug/L	Analyzed:	06/20/02
Diln Fac:	1.000		

Type: MS Lab ID: QC181739

Analyte	MSS Result	Spiked	Result	%REC	Limits
Gasoline C7-C12	33.27	2,000	1,723	85	67-120

Surrogate	%REC	Limits
Trifluorotoluene (FID)	114	68-145
Bromofluorobenzene (FID)	84	66-143

Type: MSD Lab ID: QC181740

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	2,000	1,750	86	67-120	2	20

Surrogate	%REC	Limits
Trifluorotoluene (FID)	113	68-145
Bromofluorobenzene (FID)	83	66-143

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	159241	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2001-53	Analysis:	EPA 8021B
Field ID:	MW-8	Batch#:	73184
MSS Lab ID:	159241-008	Sampled:	06/18/02
Matrix:	Water	Received:	06/18/02
Units:	ug/L	Analyzed:	06/20/02
Diln Fac:	1.000		

Type: MS Lab ID: QC181861

Analyte	MSS Result	Spiked	Result	%REC	Limits
MTBE	18.98	20.00	39.45	102	33-131
Benzene	69.65	20.00	84.68	75	52-149
Toluene	2.028	20.00	22.21	101	69-130
Ethylbenzene	168.5	20.00	186.7	91 NM	70-131
m,p-Xylenes	144.8	40.00	176.9	80	68-137
o-Xylene	8.242	20.00	26.77	93	73-133

Surrogate	%REC	Limits
Trifluorotoluene (PID)	142	53-143
Bromofluorobenzene (PID)	80	52-142

Type: MSD Lab ID: QC181862

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	20.00	39.50	103	33-131	0	20
Benzene	20.00	83.34	68	52-149	2	30
Toluene	20.00	21.78	99	69-130	2	30
Ethylbenzene	20.00	180.3	59 NM	70-131	3	30
m,p-Xylenes	40.00	177.5	82	68-137	0	30
o-Xylene	20.00	26.71	92	73-133	0	30

Surrogate	%REC	Limits
Trifluorotoluene (PID)	141	53-143
Bromofluorobenzene (PID)	79	52-142

NM= Not Meaningful
RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	159241	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 3520C
Project#:	2001-53	Analysis:	EPA 8015B(M)
Matrix:	Water	Sampled:	06/18/02
Units:	ug/L	Received:	06/18/02
Diln Fac:	1.000	Prepared:	06/21/02
Batch#:	73220		

Field ID: MW-2 Lab ID: 159241-002
Type: SAMPLE Analyzed: 06/24/02

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	96	39-137

Field ID: MW-4 Lab ID: 159241-003
Type: SAMPLE Analyzed: 06/24/02

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	104	39-137

Field ID: MW-10 Lab ID: 159241-004
Type: SAMPLE Analyzed: 06/24/02

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	101	39-137

Field ID: MW-11 Lab ID: 159241-005
Type: SAMPLE Analyzed: 06/24/02

Analyte	Result	RL
Diesel C10-C24	2,600 L Y	50

Surrogate	%REC	Limits
Hexacosane	96	39-137

Field ID: MW-9 Lab ID: 159241-006
Type: SAMPLE Analyzed: 06/24/02

Analyte	Result	RL
Diesel C10-C24	2,500 L Y	50

Surrogate	%REC	Limits
Hexacosane	93	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

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	159241	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 3520C
Project#:	2001-53	Analysis:	EPA 8015B(M)
Matrix:	Water	Sampled:	06/18/02
Units:	ug/L	Received:	06/18/02
Diln Fac:	1.000	Prepared:	06/21/02
Batch#:	73220		

Field ID:	MW-7	Lab ID:	159241-007
Type:	SAMPLE	Analyzed:	06/24/02

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

Surrogate	%REC	Limits
Hexacosane	92	39-137

Field ID:	MW-8	Lab ID:	159241-008
Type:	SAMPLE	Analyzed:	06/24/02

Analyte	Result	RL
Diesel C10-C24	1,100 L Y	50

Surrogate	%REC	Limits
Hexacosane	86	39-137

Type:	BLANK	Analyzed:	06/23/02
Lab ID:	QC181978	Cleanup Method:	EPA 3630C

Analyte	Result	RL
Diesel C10-C24	ND	50

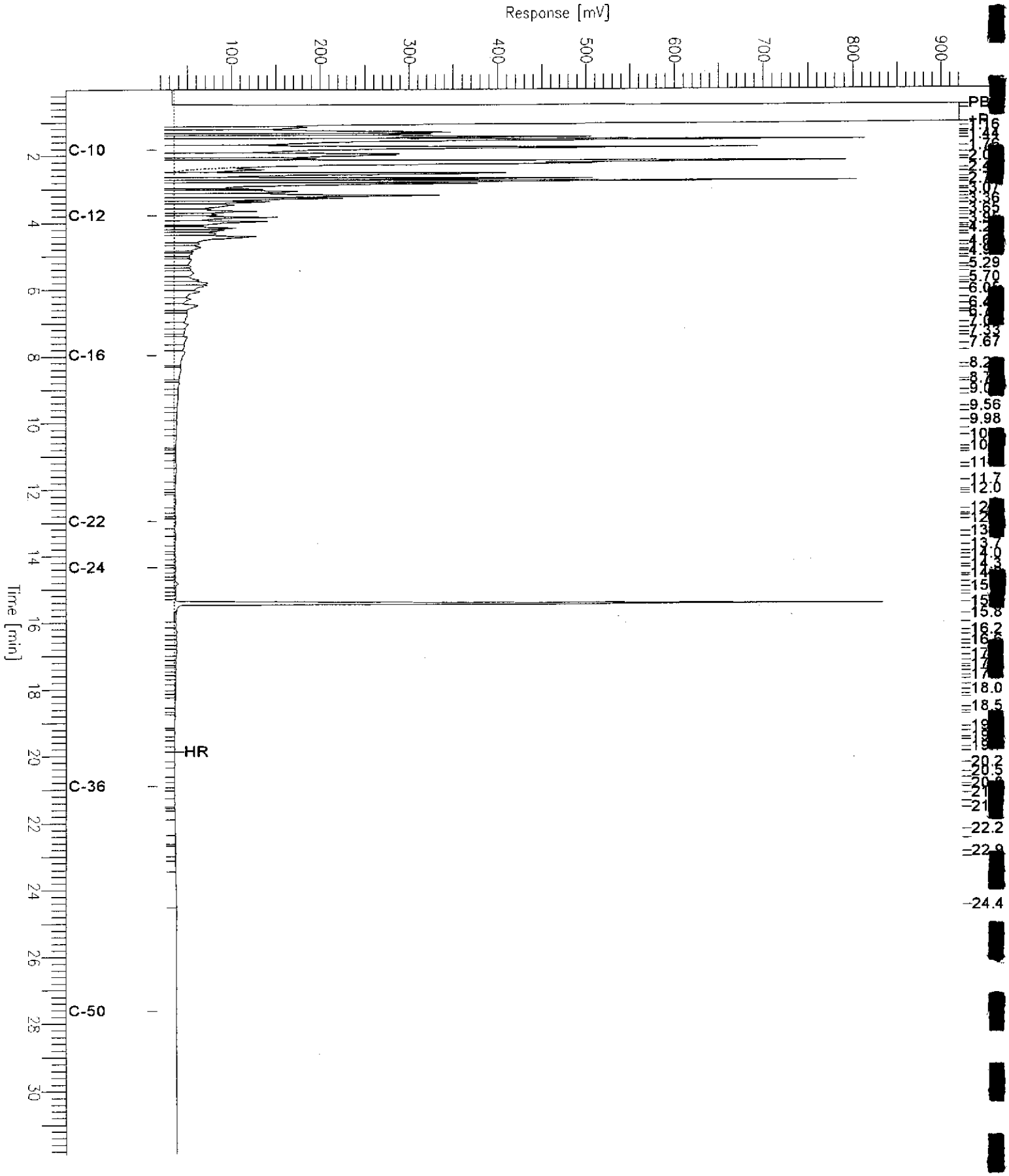
Surrogate	%REC	Limits
Hexacosane	79	39-137

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 : 159241-005,73220
FileName : G:\GC15\CHB\174B025.RAW
Method : BTEH174.MTH
Start Time : 0.01 min End Time : 31.91 min
Scale Factor: 0.0 Plot Offset: 15 mV

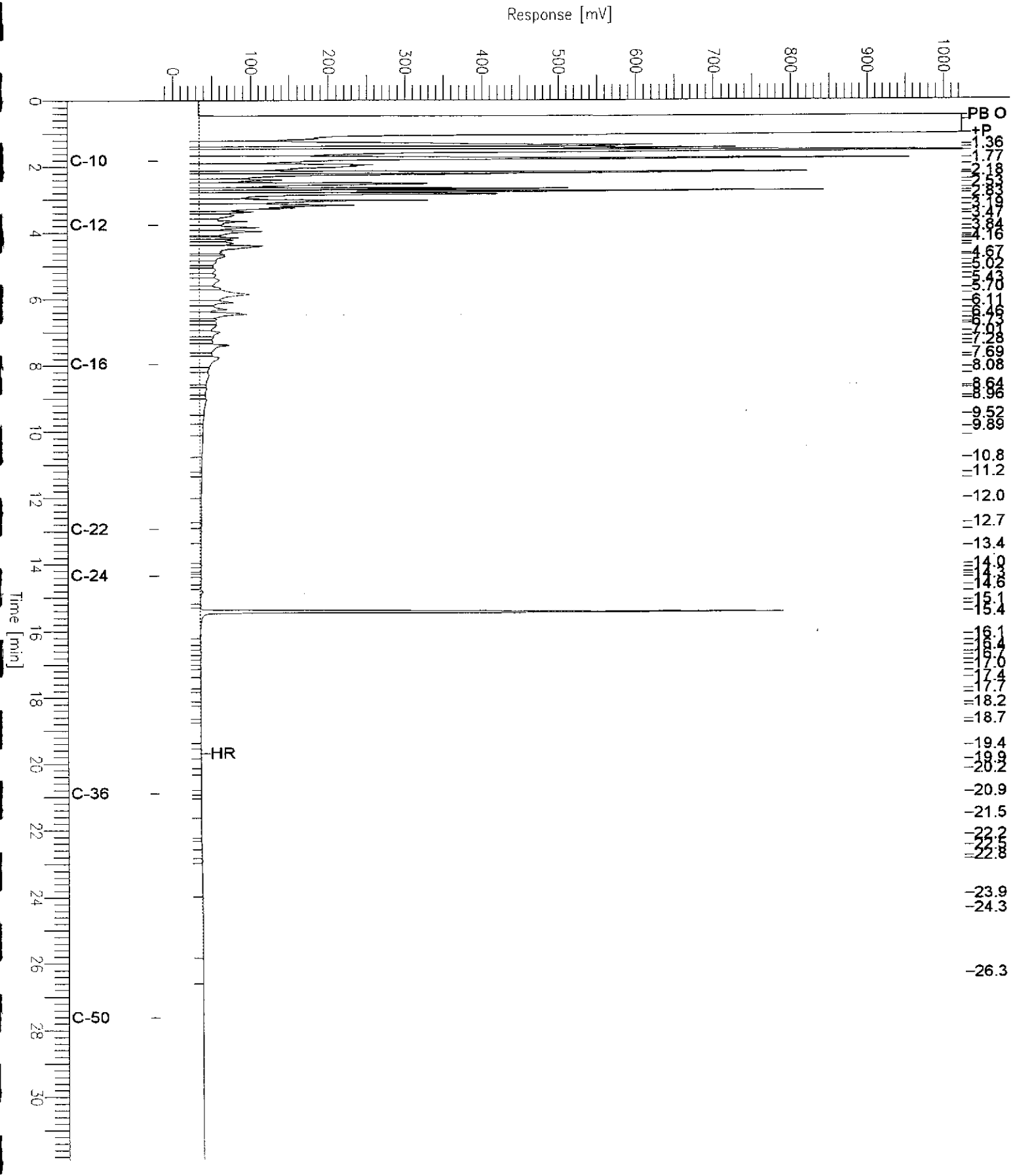
Sample #: 73220 Page 1 of 1
Date : 06/24/2002 10:29 AM
Time of Injection: 06/24/2002 08:55 AM
Low Point : 15.35 mV High Point : 920.82 mV
Plot Scale: 905.5 mV



Chromatogram

Sample Name : 159241-006,73220
FileName : G:\GC15\CHB\174B026.RAW
Method : BTEH174.MTH
Start Time : 0.00 min End Time : 31.90 min
Scale Factor: 0.0 Plot Offset: -19 mV

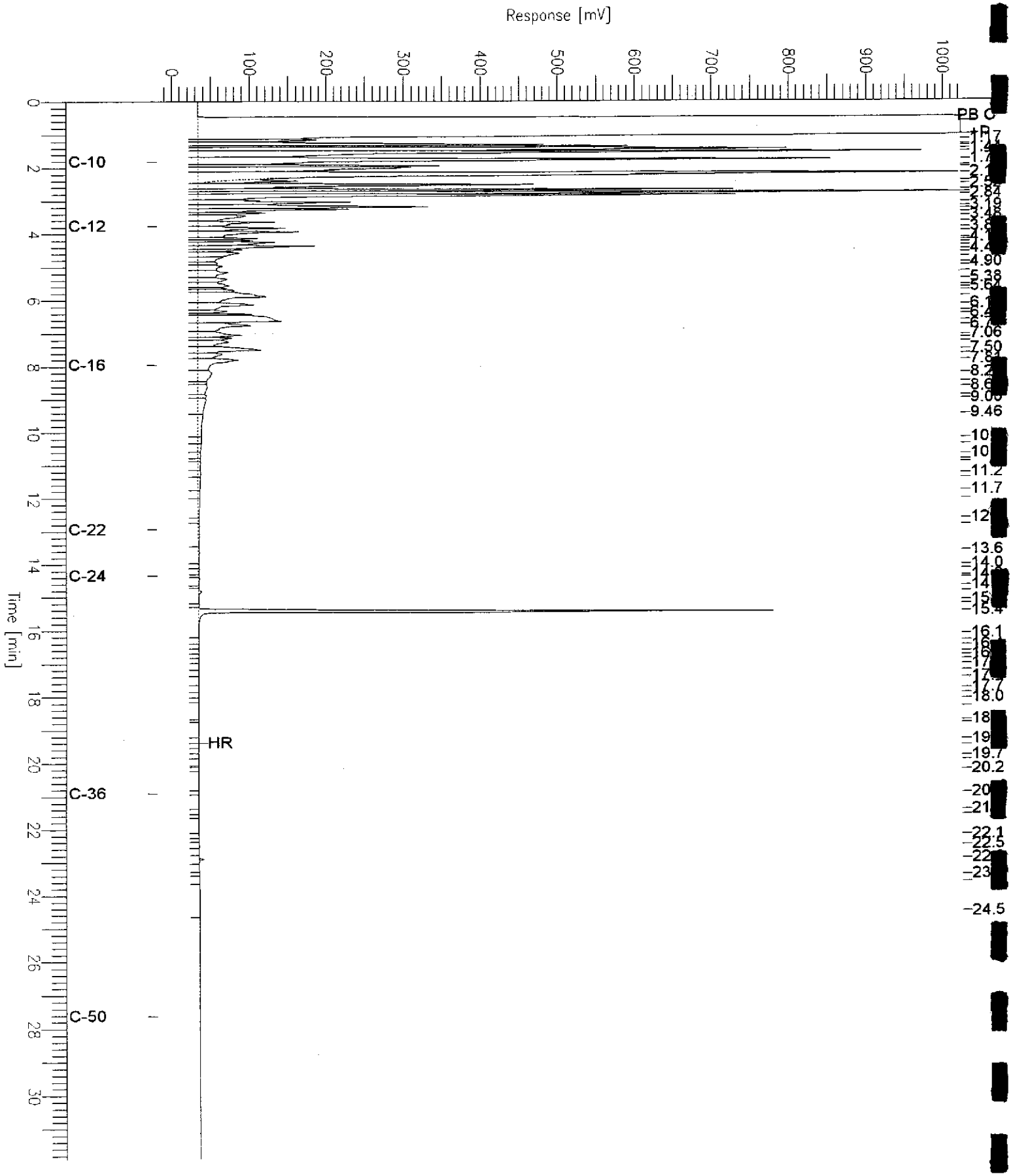
Sample #: 73220
Date : 06/24/2002 10:30 AM
Time of Injection: 06/24/2002 09:36 AM
Low Point : -18.93 mV High Point : 1024.00 mV
Plot Scale: 1042.9 mV



Chromatogram

Sample Name : 159241-007,73220
FileName : G:\GC15\CHB\174B027.RAW
Method : BTEH174.MTH
Start Time : 0.00 min End Time : 31.90 min
Scale Factor: 0.0 Plot Offset: -19 mV

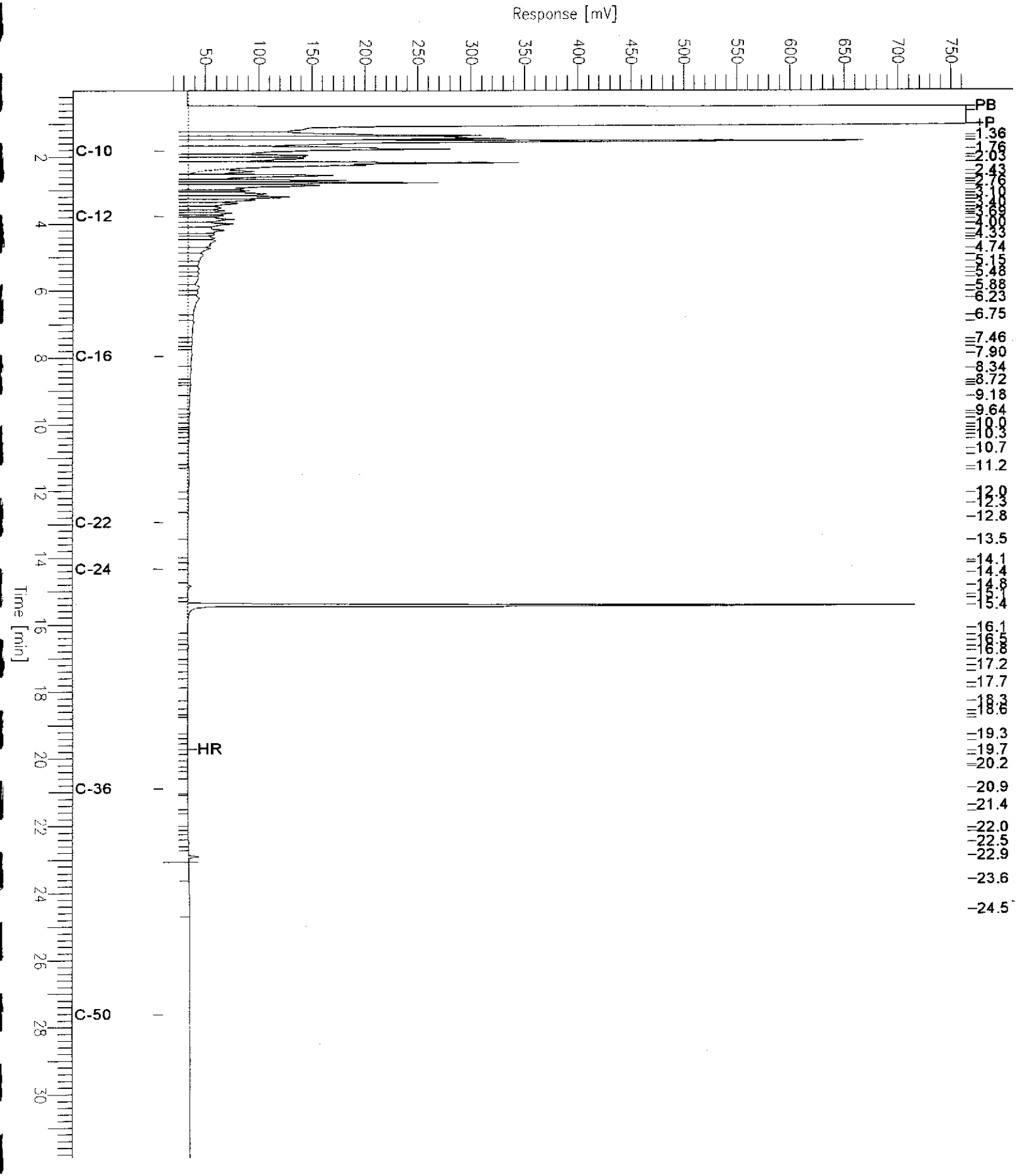
Sample #: 73220 Page 1 of 1
Date : 06/24/2002 12:11 PM
Time of Injection: 06/24/2002 10:17 AM
Low Point : -19.08 mV High Point : 1024.00 mV
Plot Scale: 1043.1 mV



Chromatogram

Sample Name : 159241-008,73220
FileName : G:\GC15\CHB\174B028.RAW
Method : BTEH174.MTH
Start Time : 0.01 min End Time : 31.91 min
Scale Factor: 0.0 Plot Offset: 11 mV

Sample #: 73220 Page 1 of 1
Date : 06/24/2002 12:12 PM
Time of Injection: 06/24/2002 10:57 AM
Low Point : 11.47 mV High Point : 764.25 mV
Plot Scale: 752.8 mV



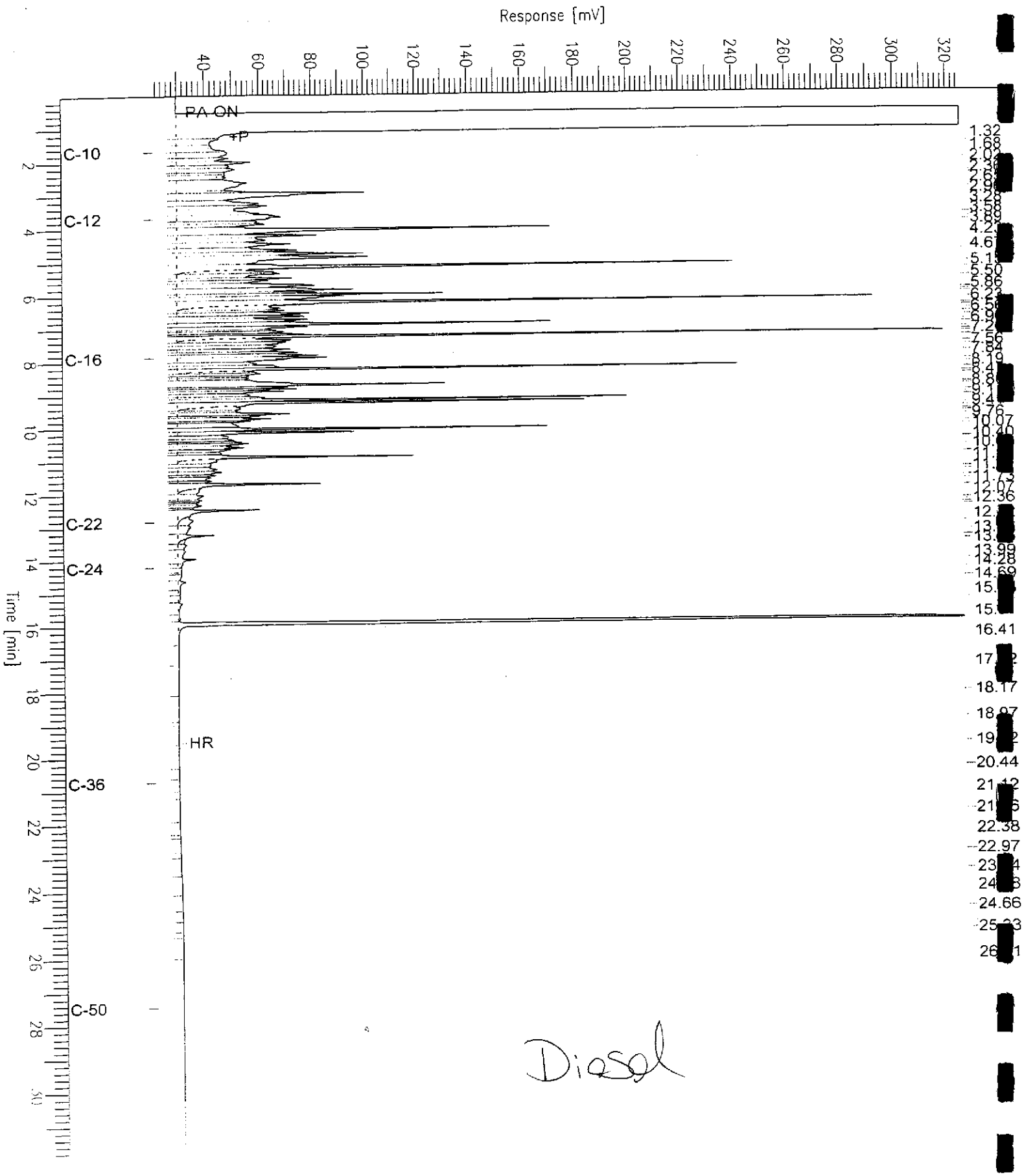
Chromatogram

Sample Name : ccv,02ws0995,dsl
FileName : G:\GC11\CHA\174A002.RAW
Method : ATEH168.MTH
Start Time : 0.01 min
Scale Factor: 0.0

End Time : 31.91 min
Plot Offset: 21 mV

Sample #: 500mg/L
Date : 6/23/02 05:30 PM
Time of Injection: 6/23/02 04:15 PM
Low Point : 21.18 mV
Plot Scale: 304.0 mV

High Point : 325.22 mV



Diesel

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	159241	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 3520C
Project#:	2001-53	Analysis:	EPA 8015B(M)
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC181979	Batch#:	73220
Matrix:	Water	Prepared:	06/21/02
Units:	ug/L	Analyzed:	06/24/02

Cleanup Method: EPA 3630C

Analyte	Spiked	Result	%REC	Limits
Diesel C10-C24	2,500	2,400	96	37-120

Surrogate	%REC	Limits
Hexacosane	103	39-137

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	159241	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 3520C
Project#:	2001-53	Analysis:	EPA 8015B(M)
Field ID:	ZZZZZZZZZZ	Batch#:	73220
MSS Lab ID:	159277-004	Sampled:	06/18/02
Matrix:	Water	Received:	06/20/02
Units:	ug/L	Prepared:	06/21/02
Diln Fac:	1.000	Analyzed:	06/24/02

Type: MS
Lab ID: QC181980

Cleanup Method: EPA 3630C

Analyte	MSS Result	Spiked	Result	%REC	Limits
Diesel C10-C24	<33.00	2,500	2,652	106	44-131

Surrogate	%REC	Limits
Hexacosane	111	39-137

Type: MSD
Lab ID: QC181981

Cleanup Method: EPA 3630C

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Diesel C10-C24	2,500	2,480	99	44-131	7	26

Surrogate	%REC	Limits
Hexacosane	104	39-137

RPD= Relative Percent Difference

22.0

Curtis & Tompkins, Ltd.

Nitrate Nitrogen

Lab #:	159241	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	METHOD
Project#:	2001-53	Analysis:	EPA 300.0
Analyte:	Nitrogen, Nitrate	Batch#:	73136
Matrix:	Water	Sampled:	06/18/02
Units:	mg/L	Received:	06/18/02
Diln Fac:	1.000	Analyzed:	06/19/02

Field ID	Type	Lab ID	Result	RL
MW-3	SAMPLE	159241-001	ND	0.05
MW-4	SAMPLE	159241-003	0.16	0.05
MW-10	SAMPLE	159241-004	1.2	0.05
MW-11	SAMPLE	159241-005	ND	0.05
MW-9	SAMPLE	159241-006	ND	0.05
MW-7	SAMPLE	159241-007	ND	0.05
MW-8	SAMPLE	159241-008	ND	0.05
	BLANK	QC181692	ND	0.05

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Sulfate

Lab #:	159241	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	METHOD
Project#:	2001-53	Analysis:	EPA 300.0
Analyte:	Sulfate	Sampled:	06/18/02
Matrix:	Water	Received:	06/18/02
Units:	mg/L	Analyzed:	06/19/02
Batch#:	73136		

Field ID	Type	Lab ID	Result	RL	Dilu Fac
MW-3	SAMPLE	159241-001	36	0.50	1.000
MW-4	SAMPLE	159241-003	44	0.50	1.000
MW-10	SAMPLE	159241-004	80	1.0	2.000
MW-11	SAMPLE	159241-005	70	1.0	2.000
MW-9	SAMPLE	159241-006	28	0.50	1.000
MW-7	SAMPLE	159241-007	3.4	0.50	1.000
MW-8	SAMPLE	159241-008	84	1.0	2.000
	BLANK	QC181692	ND	0.50	1.000

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Nitrate Nitrogen

Lab #:	159241	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	METHOD
Project#:	2001-53	Analysis:	EPA 300.0
Analyte:	Nitrogen, Nitrate	Batch#:	73136
Field ID:	MW-9	Sampled:	06/18/02
MSS Lab ID:	159241-006	Received:	06/18/02
Matrix:	Water	Analyzed:	06/19/02
Units:	mg/L		

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim	Diln Fac
BS	QC181693		2.000	2.036	102	90-110			1.000
BSD	QC181694		2.000	2.088	104	90-110	3	20	1.000
MS	QC181695	<0.05000	10.00	10.53	105	80-120			10.00
MSD	QC181696		10.00	10.28	103	80-120	2	20	10.00

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Sulfate

Lab #:	159241	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	METHOD
Project#:	2001-53	Analysis:	EPA 300.0
Analyte:	Sulfate	Batch#:	73136
Field ID:	MW-9	Sampled:	06/18/02
MSS Lab ID:	159241-006	Received:	06/18/02
Matrix:	Water	Analyzed:	06/19/02
Units:	mg/L		

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim	Dil'n Fac
BS	QC181693		20.00	20.11	101	90-110			1.000
BSD	QC181694		20.00	20.39	102	90-110	1	20	1.000
MS	QC181695	28.11	100.0	127.5	99	72-125			10.00
MSD	QC181696		100.0	126.1	98	72-125	1	20	10.00

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	1.24	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	11.6	7.5
15	Dec-99	57	<50	20	0.61	5.9	<0.5	26.5	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	27.4	10.0
19	Aug-01	260	120	30	6.7	1.6	6.4	44.7	27.0
20	Dec-01	74	69	14	0.76	3.7	3.5	22.0	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**

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**	**66.5**	**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**	**92.9**	**242**	*NA*
8	Feb-97	**3,300**	*< 50*	**120**	**1.0**	**150**	**102.5**	**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**	**52.6**	**143**	*NA*
11	Dec-97	**1,000**	**84**	**4.6**	**2.7**	**61**	**54.2**	**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**	**26.9**	**104**	**23**
14	Apr-99	**2,900**	**710**	**61**	**1.2**	**120**	**80.4**	**263**	**32**
15	Dec-99	**1,000**	**430**	**4**	**2**	**26**	**13.9**	**45.9**	*<2*
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**	**64.9**	**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**	**45.9**	<2
20	Dec-01	< 50	**110**	< 0.5	< 0.5	< 0.5	**1.2**	**1.2**	<2
21	Mar-02	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<2
22	Jun-02	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	<2

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	198.2	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	154.7	751	18

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	148.2	390	19

Well MW-9									
Event	Date	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	MTBE
1	Sep-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	66.8	244	20
4	Jun-02	11,000	2,500	200	16	600	509.3	1,325	85

Well MW-10									
Event	Date	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	MTBE
1	Sep-01	550	2,100	17	< 0.5	31	43.5	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	1.17	9.0

Well MW-11									
Event	Date	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	MTBE
1	Sep-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

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*
11	Apr-99	*< 50*	*<50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	—	*< 2*
Sampling at this location discontinued after April 1999.									

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	12.9	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	10.7	43.6	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
12	Apr-99	81	<50	2.0	< 0.5	2.5	1.3	5.8	2.3
13	Dec-99	1,300	250	10.0	1.0	47	27	85.0	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
16	Apr-01	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2
17	Sep-01	440	200	2.1	< 0.5	17	1.3	20.4	10
18	Dec-01	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	-	< 2
19	Mar-02	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	-	< 2
20	Jun-02	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	-	< 2

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
11	Apr-99	< 50	<50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2
12	Dec-99	< 50	<50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2
13	Sep-00	NS	NS	NS	NS	NS	NS	—	NS
14	Jan-01	< 50	<50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2
15	Apr-01	< 50	<50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2
16	Sep-01	NS	NS	NS	NS	NS	NS	—	NS
17	Dec-01	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2
18	Mar-02	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2
19	Jun-02	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	**2.4**

NS = Not Sampled (no surface water present during sampling event)
NA = Not Analyzed for this constituent

Figure C.1 - Historical Ground Water Analytical Results: Well MW-7
TVH-gasoline and TEH-Diesel
Redwood Regional Park Service Yard, Oakland, California

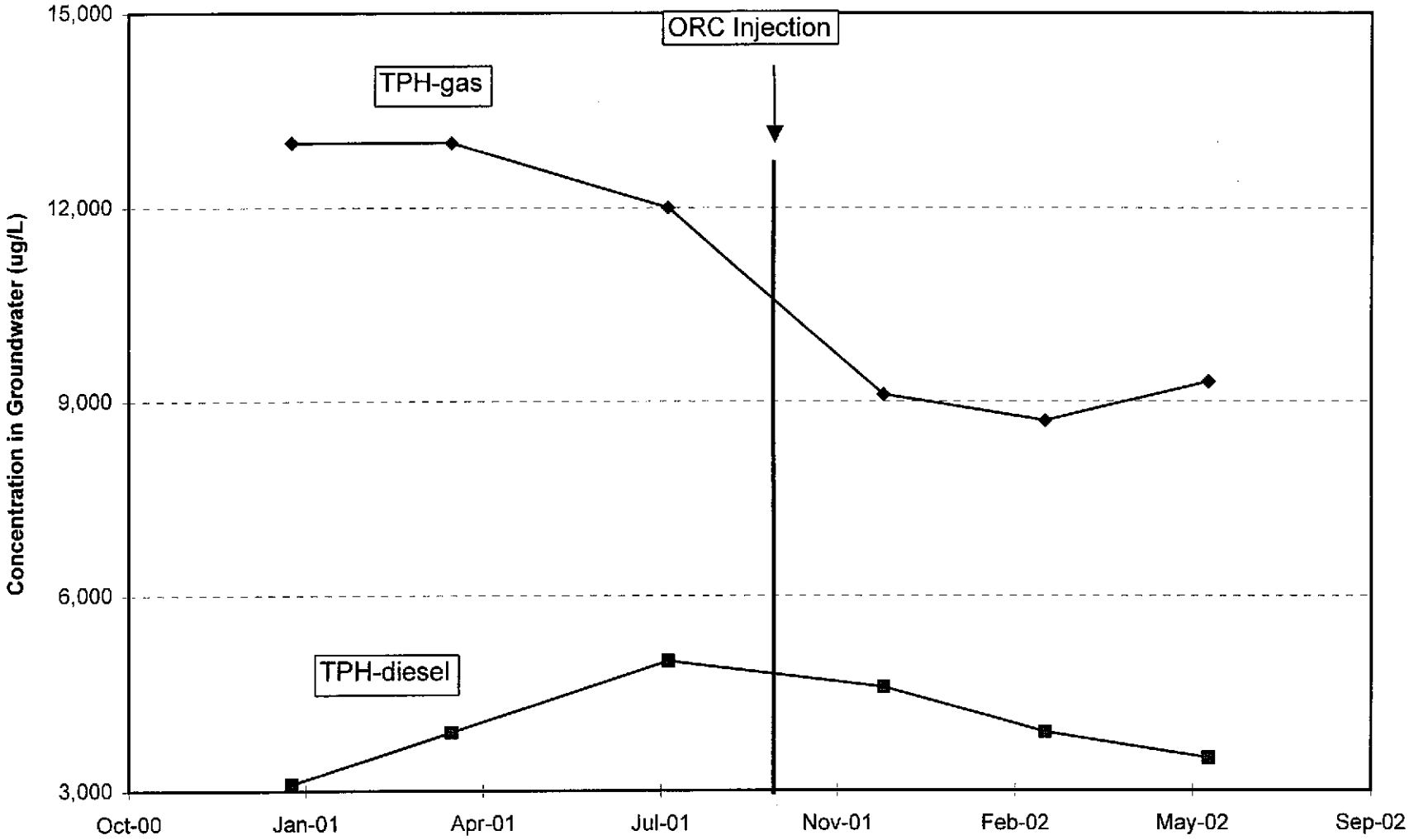


Figure C.2 - Historical Ground Water Analytical Results: Well MW-8
TVH-gasoline and TEH-diesel
Redwood Regional Park Service Yard, Oakland, California

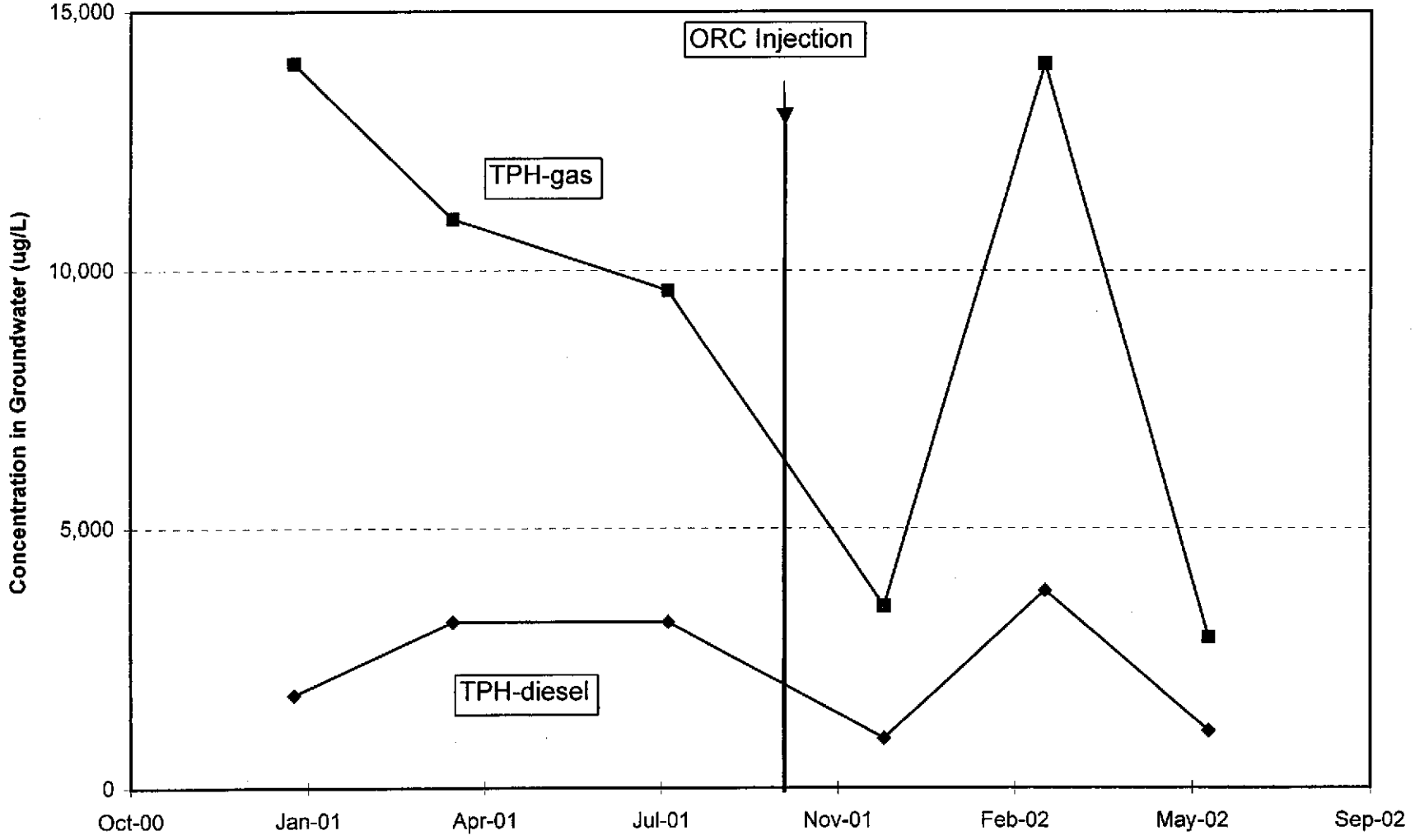


Figure C.3 - Historical Ground Water Analytical Results: Well MW-9
TVH-gasoline and TEH-diesel
Redwood Regional Park Service Yard, Oakland, California

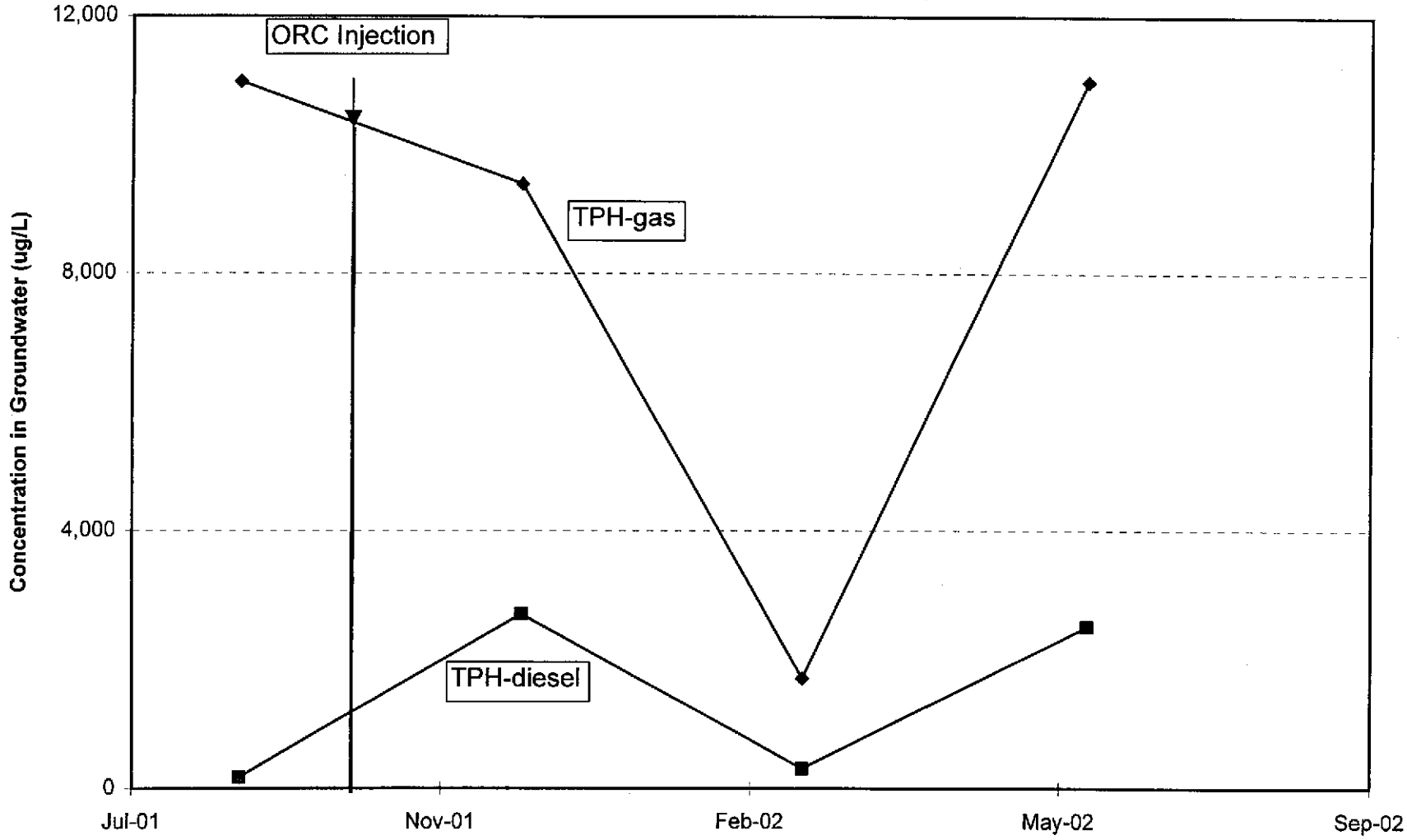


Figure C.4 - Historical Ground Water Analytical Results: Well MW-10
TVH-gasoline and TEH-diesel
Redwood Regional Park Service Yard, Oakland, California

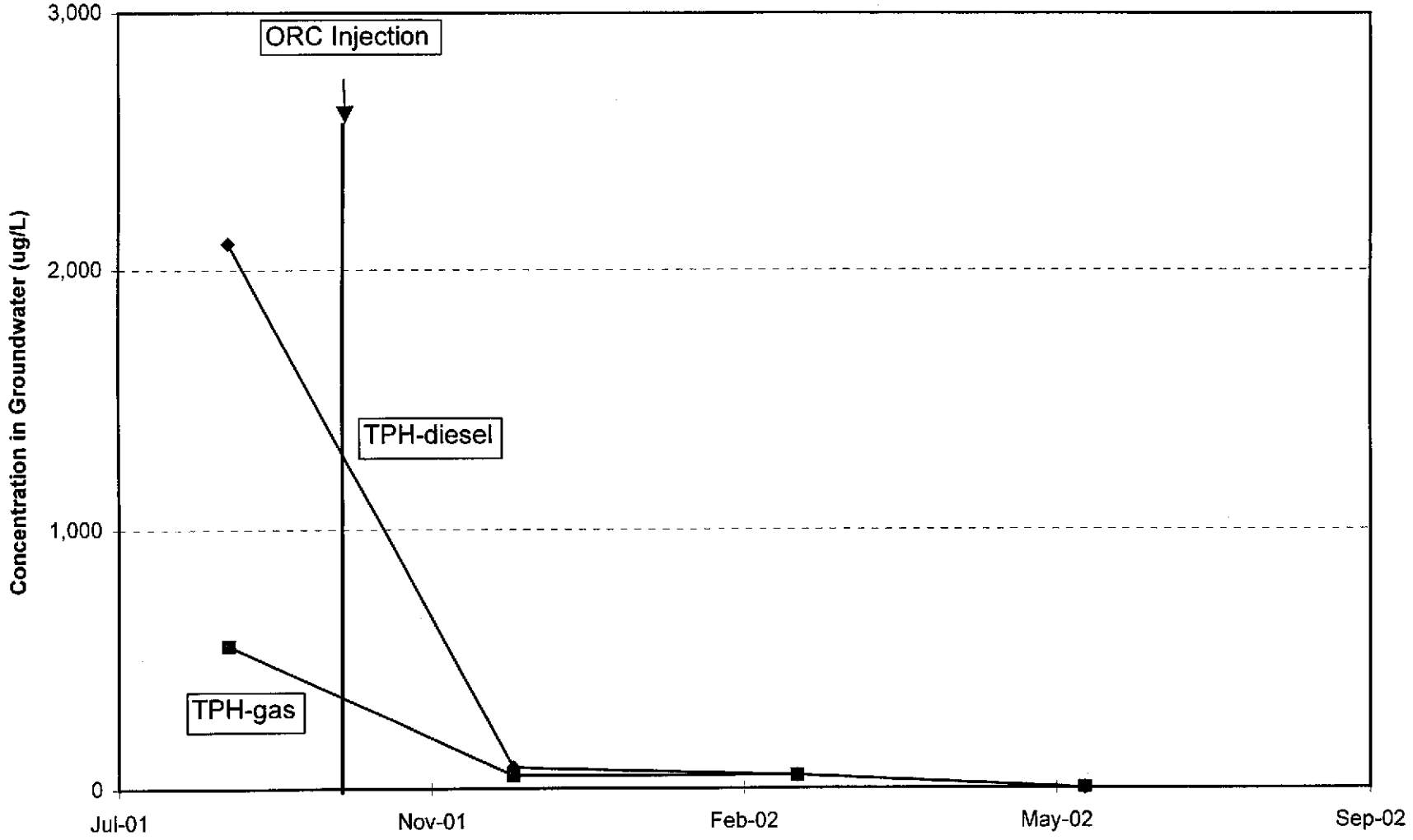


Figure C.5 - Historical Ground Water Analytical Results: Well MW-11
TVH-gasoline and TEH-diesel
Redwood Regional Park Service Yard, Oakland, California