

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

**TRANSMITTAL MEMORANDUM**

APR 19 2002

TO: ALAMEDA COUNTY HEALTH CARE SERVICES      DATE: 4/16/02  
AGENCY  
DEPT. OF ENVIRONMENTAL HEALTH  
HAZARDOUS MATERIALS DIVISION  
1131 HARBOR BAY PKWY, SUITE 250  
ALAMEDA, CA 94502

ATTENTION: 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: FIRST QUARTER 2002 GROUNDWATER MONITORING REPORT  
FOR REDWOOD REGIONAL PARK SERVICE YARD SITE –  
OAKLAND, CALIFORNIA (APRIL 2002)

- |  |  |
|--|--|
| <input type="checkbox"/> AS REQUESTED  | <input type="checkbox"/> FOR YOUR APPROVAL       |
| <input type="checkbox"/> FOR REVIEW    | <input checked="" type="checkbox"/> FOR YOUR USE |
| <input type="checkbox"/> FOR SIGNATURE | <input type="checkbox"/> FOR YOUR FILES          |

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

BY: Bruce Rucker

April 16, 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

APR 16 2002

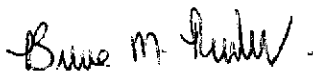
Subject: First Quarter 2002 Groundwater Monitoring Report  
Redwood Regional Park Service Yard Site – Oakland, California

Dear Mr. Seery:

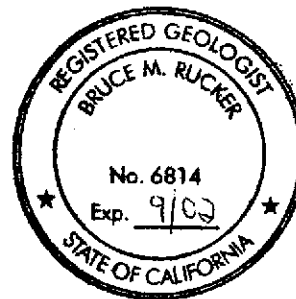
Attached is the Stellar Environmental Solutions First Quarter 2002 Groundwater Monitoring Report for the underground fuel storage tank site at the Redwood Regional Park Service Yard, located at 7867 Redwood Road, Oakland, California. This project is being conducted for the East Bay Regional Park District, 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 monitoring and sampling activities of site wells conducted in March 2002 (First Quarter 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

**FIRST QUARTER 2002  
GROUNDWATER MONITORING  
REPORT**

**REDWOOD REGIONAL PARK  
SERVICE YARD  
OAKLAND, CALIFORNIA**

*Prepared For:*

**EAST BAY REGIONAL PARK DISTRICT  
OAKLAND, CALIFORNIA**

*Prepared By:*

**STELLAR ENVIRONMENTAL SOLUTIONS  
2198 SIXTH STREET  
BERKELEY, CALIFORNIA 94710**

**April 16, 2002**

**Project No. 2001-53**

# TABLE OF CONTENTS

---

Section	Page
1.0 INTRODUCTION.....	4
Project Background.....	4
Objectives and Scope of Work.....	4
Site Description.....	4
Regulatory Oversight.....	5
2.0 PHYSICAL SETTING.....	8
3.0 CURRENT EVENT ACTIVITIES.....	11
Groundwater Level Monitoring and Sampling.....	11
Creek Surface Water Sampling.....	12
4.0 REGULATORY CONSIDERATIONS.....	14
Groundwater Contamination.....	14
Surface Water Contamination.....	14
5.0 MONITORING EVENT ANALYTICAL RESULTS.....	16
Current Event Groundwater Results.....	16
Current Event Natural Attenuation Parameters Results.....	18
Quality Control Sample Analytical Results.....	20
6.0 DATA EVALUATION.....	221
Historical Investigation and Remediation Activities.....	21
Hydrochemical Trend Analysis.....	23
7.0 SUMMARY, CONCLUSIONS, AND PROPOSED ACTIONS.....	27
Summary and Conclusions.....	27
Proposed Actions.....	28

## TABLE OF CONTENTS (continued)

---

Section	Page
8.0 REFERENCES AND BIBLIOGRAPHY.....	29
9.0 LIMITATIONS.....	32
<b>Appendices</b>	
Appendix A	Groundwater Monitoring Field Documentation
Appendix B	Analytical Laboratory Reports and Chain-of-Custody Records
Appendix C	Historical Analytical Results and Hydrochemical Trend Plots

# TABLES AND FIGURES

---

<b>Tables</b>	<b>Page</b>
Table 1 Groundwater Monitoring Well Construction and Groundwater Elevation Data, Redwood Regional Park Corporation Yard, Oakland, California .....	12
Table 2 Groundwater and Surface Water Sample Analytical Results – March 14, 2002, Redwood Regional Park Corporation Yard, Oakland, California .....	17
Table 3 Groundwater Sample Analytical Results Natural Attenuation Indicators – March 14, 2002, Redwood Regional Park Corporation Yard, Oakland, California .....	18

<b>Figures</b>	<b>Page</b>
Figure 1 Site Location Map .....	6
Figure 2 Site Plan and Historical Sampling Locations .....	7
Figure 3 Groundwater Elevation Map – March 14, 2002 .....	9
Figure 4 ORC™ Injection Area Layout .....	23
Figure 5 Groundwater and Surface Water Analytical Results – March 14, 2002 .....	26

## 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 by Stellar Environmental Solutions (SES) on March 14, 2002:

- Collecting water levels in site wells to determine shallow groundwater flow direction;
- Sampling site wells for contaminant analysis and natural attenuation indicators; and
- Collecting surface water samples for contaminant analysis.

Previous SES reports submitted in June 1999 and April 2000 provided a full discussion of previous site remediation and investigations; site geology and hydrogeology; residual site contamination; conceptual model for contaminant fate and transport; and evaluation of hydrochemical trends and plume stability. An October 2000 Feasibility Study report for the site, submitted to ACHCSA, provided detailed analyses of the regulatory implications of the site contamination and an assessment of viable corrective actions (SES, 2000d). The well installations and ORC™ injection activities proposed by SES were approved by the ACHCSA in its January 8, 2001 letter to the EBRPD. The most recent previous site monitoring event was conducted in December 2001.

### SITE DESCRIPTION

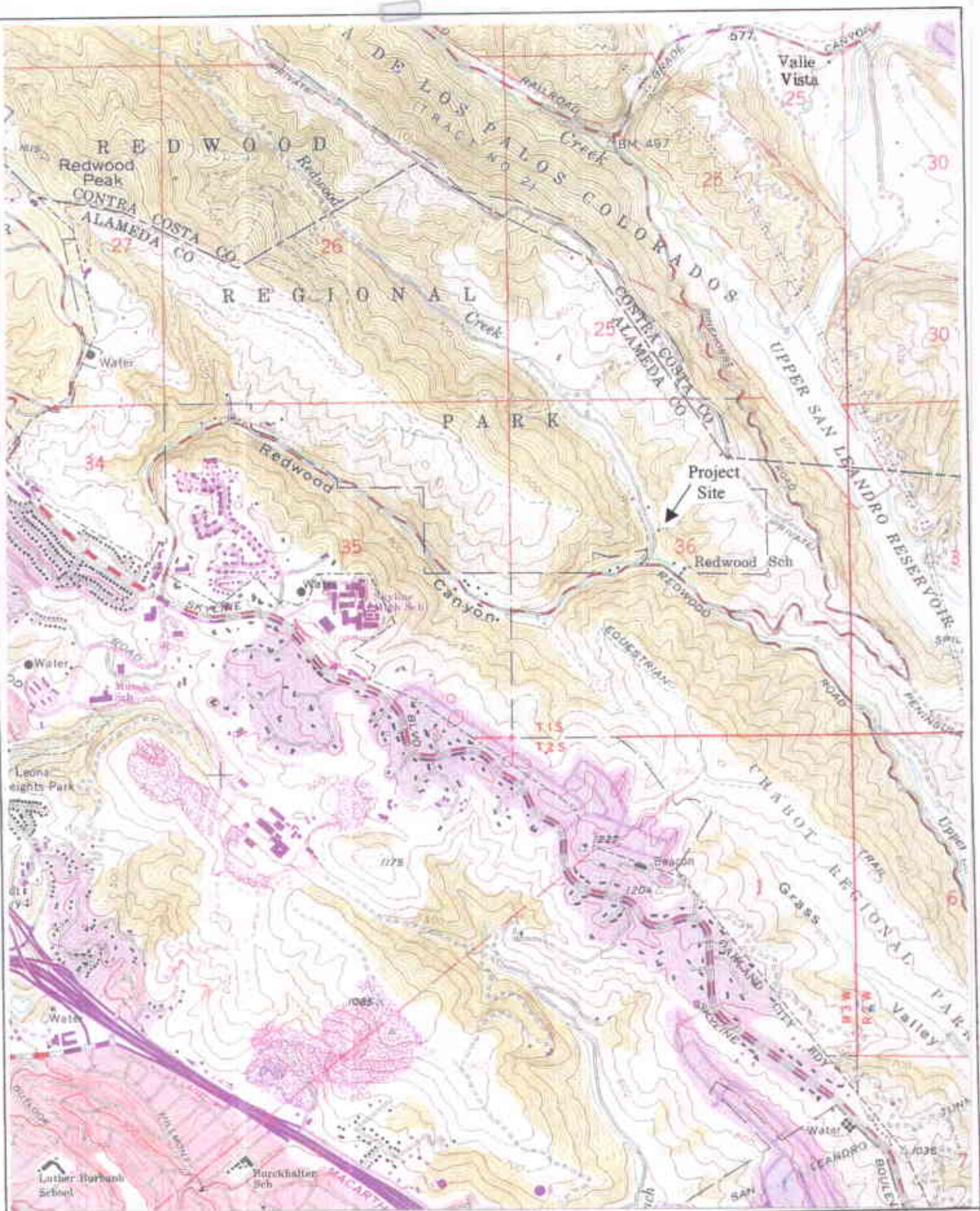
Figure 1 shows the location of the project site. The site slopes to the west, from an elevation of approximately 564 feet above mean sea level (amsl) at the eastern edge of the service yard to

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.





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

Redwood Regional Park Service Yard  
Oakland, Alameda County, California

By: MJC

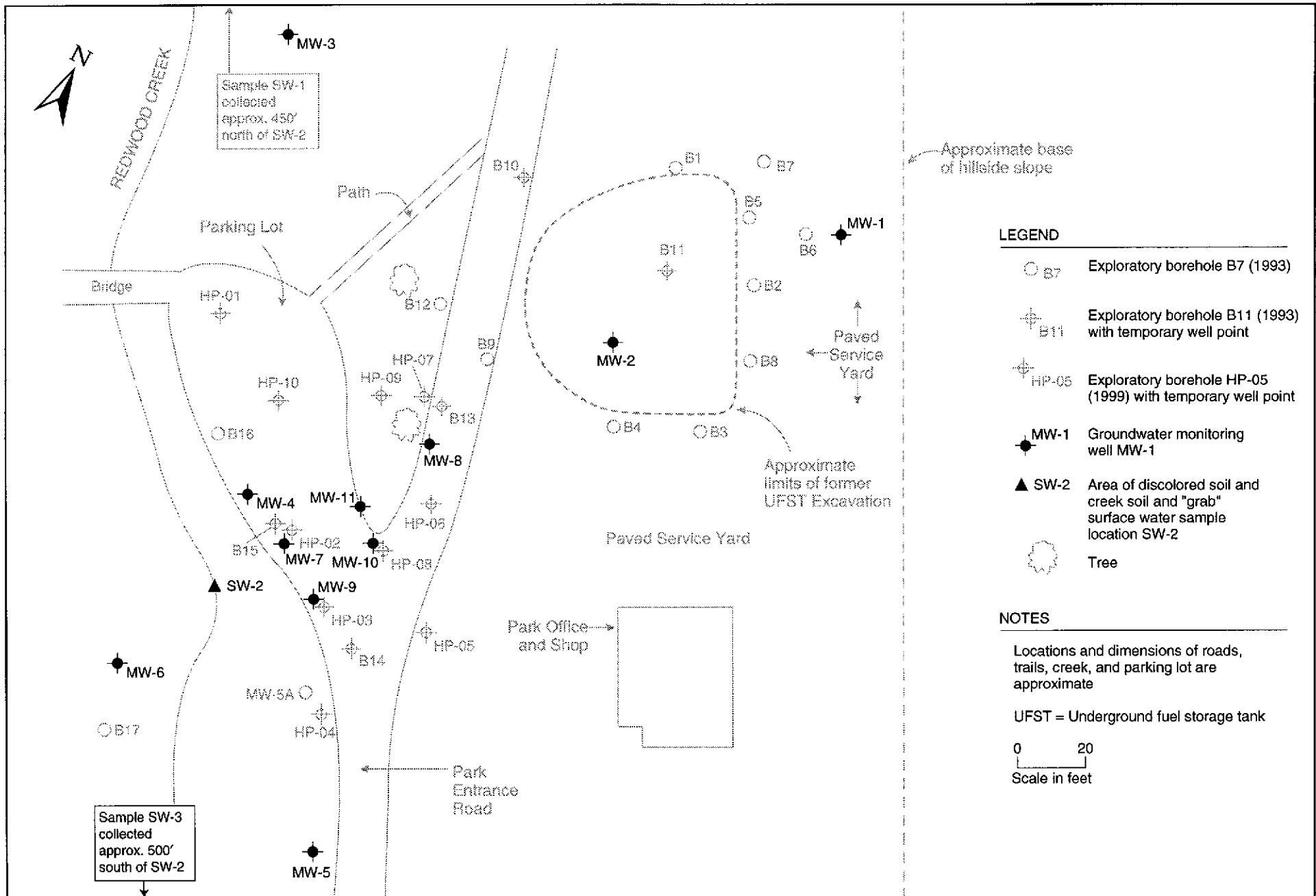
NOVEMBER 1997

**Figure 1**



**Stellar Environmental Solutions**

Geoscience & Engineering Consulting



- LEGEND**
- B7 Exploratory borehole B7 (1993)
  - ⊕ B11 Exploratory borehole B11 (1993) with temporary well point
  - ⊕ HP-05 Exploratory borehole HP-05 (1999) with temporary well point
  - MW-1 Groundwater monitoring well MW-1
  - ▲ SW-2 Area of discolored soil and creek soil and "grab" surface water sample location SW-2
  - 🌳 Tree

**NOTES**

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

UFST = Underground fuel storage tank

0 20  
Scale in feet

## 2.0 PHYSICAL SETTING

---

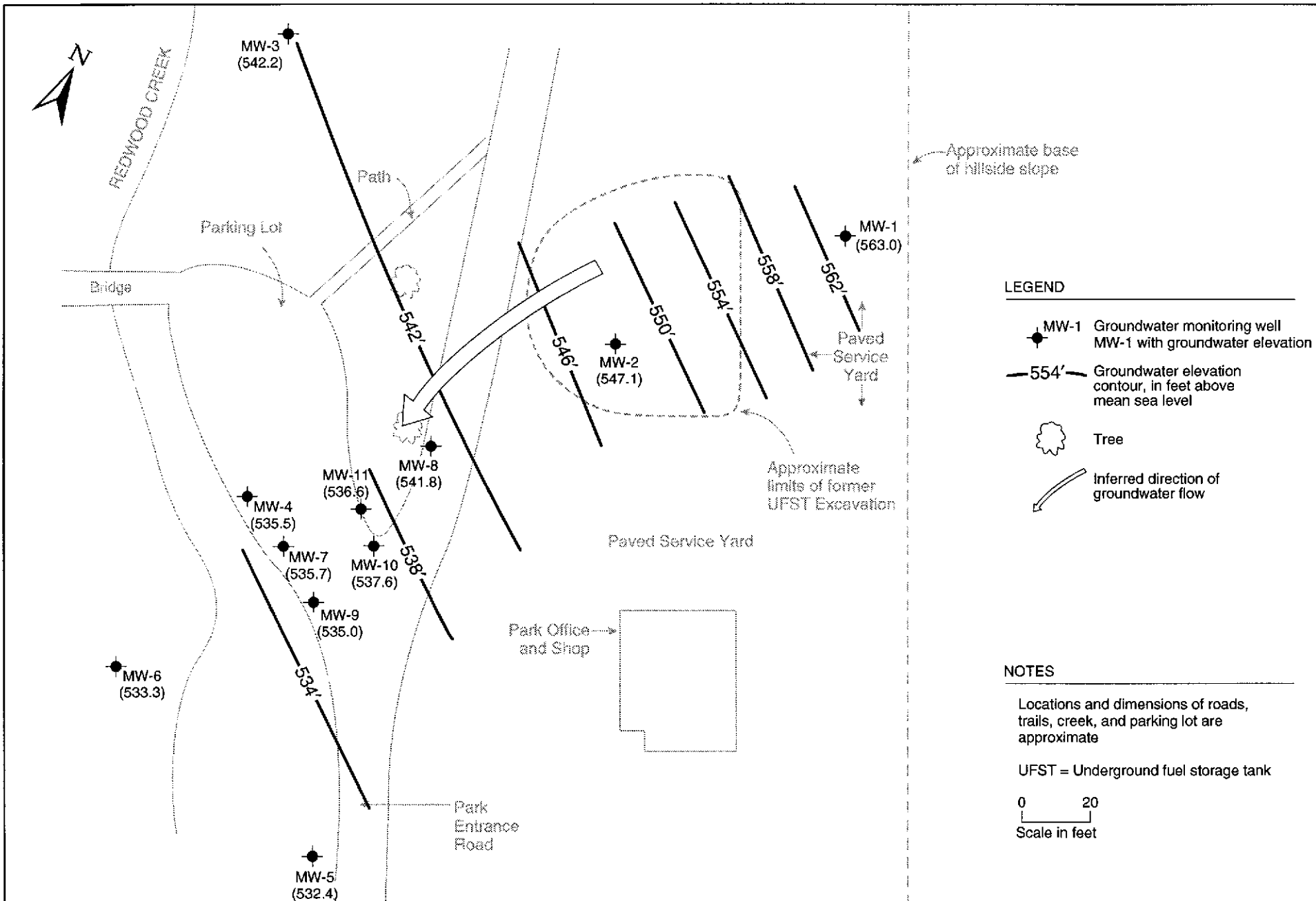
Following is a brief summary of the site hydrogeologic conditions based on geologic logging and water level measurements collected at the site since September 1993. A full discussion is presented in the SES June 1999 report.

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 site historical groundwater flow direction.

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



**Stellar Environmental Solutions**  
Geoscience & Engineering Consulting

**GROUNDWATER ELEVATION MAP—MARCH 14, 2002**  
**Redwood Regional Park Service Yard, Oakland, CA**

**Figure 3**

by: MJC

APRIL 2002

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 EVENT ACTIVITIES**

---

This section presents the creek surface water and groundwater sampling and analytical methods for the current event. Groundwater and surface water analytical results are summarized in Section 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 March 14, 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 (3/02)
MW-1	18	7 to 17	565.9	563.0
MW-2	36	20 to 35	566.5	547.1
MW-3	42	7 to 41	560.9	542.2
MW-4	26	10 to 25	548.1	535.5
MW-5	26	10 to 25	547.5	532.4
MW-6	26	10 to 25	545.6	533.3
MW-7	24	9 to 24	547.7	535.7
MW-8	23	8 to 23	549.2	541.8
MW-9	26	11 to 26	549.4	535.0
MW-10	26	11 to 26	547.3	537.6
MW-11	26	11 to 26	547.9	536.6

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 100 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 March 14, 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 briskly with water depths between approximately 0.5 and 1 feet. 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 inferred that this algae is utilizing the petroleum as a carbon source, and is therefore a good indicator of the presence of petroleum contamination.



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, provided that 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 TPHd were detected in well MW-8 (approximately 40 feet downgradient of the former USTs and approximately 60 upgradient of Redwood Creek). The maximum concentration of TPHd was detected in downgradient well MW-7 (just upgradient of Redwood Creek). Concentrations in former source area well MW-2 (approximately 130 feet upgradient of Redwood Creek) are 1 order of magnitude below downgradient well concentrations. The zone of greatest contamination (TPHg greater than 10,000  $\mu\text{g/L}$ ) is centered around well MW-8.

The area of groundwater contamination in excess of screening level criteria is no greater than 120 feet long by 80 feet wide, and is likely to be less.

The existing well layout fully constrains the lateral extent of groundwater contamination, and the vertical limit is very likely the top of the near-surface (25 to 28 feet) siltstone bedrock. The saturated interval extends approximately 12 to 15 feet from top of bedrock through the capillary fringe.

No site-sourced contaminants were detected in the SW-2 or SW-3 surface water samples.

**Table 2**  
**Groundwater and Surface Water Sample**  
**Analytical Results –March 14, 2002**  
**Redwood Regional Park Corporation Yard, Oakland, California**

Compound	Concentrations in $\mu\text{g/L}$						
	TPHg	TPHd	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE
<b>GROUNDWATER SAMPLES</b>							
MW-2	< 50	< 50	2.3	0.51	1.9	1.3	8.2
MW-4	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 2.0
MW-7	8,700	3,900	220	6.2	450	191	200
MW-8	14,000	3,800	650	17	1,200	1,510	240
MW-9	1,700	300	53	4.2	120	66.8	20
MW-10	< 50	< 50	0.61	< 0.5	< 0.5	< 0.5	6.0
MW-11	100	94	< 0.5	< 0.5	0.64	< 0.5	2.4
Groundwater RBSLs <sup>(a)</sup>	100/500	100/640	1.0/46	40/130	30/290	13/13	5/1,800
<b>REDWOOD CREEK SURFACE WATER SAMPLES</b>							
SW-2	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 2.0
SW-3	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 2.0
Surface Water Screening Levels <sup>(a, b)</sup>	500	640	46	130	290	13	8,000

**Notes:**

<sup>(a)</sup> RWQCB Risk-Based Screening Levels (drinking water resource threatened/not threatened) (RWQCB, 2000).

<sup>(b)</sup> 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).

$\mu\text{g/L}$  = Micrograms per liter, equivalent to parts per billion (ppb).

**Table 3**  
**Groundwater Sample Analytical Results**  
**Natural Attenuation Indicators – March 14, 2002**  
**Redwood Regional Park Corporation Yard, Oakland, California**

Sample I.D.	Nitrogen (as Nitrate) (mg/L)	Sulfate (mg/L)	Dissolved Oxygen (mg/L)	Ferrous Iron (mg/L)	Redox Potential (milliVolts)
MW-1	NA	NA	1.6	0.0	-534
MW-2	NA	NA	1.4	0.0	24
MW-3	< 0.05	37	2.6	0.0	-68
MW-4	0.15	44	> 15.0	0.0	-107
MW-5	NA	NA	3.0	0.0	198
MW-6	NA	NA	3.6	0.0	171
MW-7	< 0.05	15	0.8	3.0	-69
MW-8	< 0.05	14	2.2	3.6	-105
MW-9	< 0.05	57	2.4	1.0	-23
MW-10	0.54	76	14.5	0.0	71
MW-11	0.06	69	2.2	0.0	-1

**Notes:**

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

NA = Not analyzed.

**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. 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. Current monitoring event DO concentrations ranged from 2.2 mg/L to > 15 mg/L. The highest concentrations of total hydrocarbons in the current quarter were in wells MW-7, MW-8 and MW-9. Dissolved oxygen in these wells ranged from 2.4 mg/L to 4.0 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 9.0 mg/L). All site wells had sufficient DO levels to support aerobic biodegradation (> 1 mg/L), even within the area of greatest groundwater contamination, suggesting that the September 2001 ORC™ injection program is still providing supplemental oxygen to the system.

### **Oxidation-Reduction Potential**

The oxidation-reduction potential (ORP) of groundwater is a measure of electron activity, and is an indicator of the relative tendency of a solute species to gain or lose electrons. The ORP of groundwater generally ranges from -400 millivolts (mV) to +800 mV. In oxidizing conditions, the ORP of groundwater is positive; while in reducing conditions, the ORP is typically negative (or less positive). Reducing conditions (less positive ORP) are consistent with occurrence of anaerobic biodegradation. Therefore, ORP values of groundwater inside a hydrocarbon plume are typically less than those measured outside the plume. Current monitoring event ORP concentrations ranged from a low of -534 mV to 198 mV. Of the three wells with pronounced hydrocarbon contamination (MW-7, MW-8 and MW-9) the ORP values ranged from -23 mV to -105 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 ( $\text{Fe}_2^+$ ), nitrate ( $\text{NO}_3^-$ ), and sulfate ( $\text{SO}_4^{2-}$ )—and hydrocarbon concentrations is also indicative of the occurrence of

biodegradation. Specifically, anaerobic degradation and oxidation of compounds is implied where general mineral concentrations are low and TPH concentrations are high. In the current site monitoring event, the  $\text{Fe}_2^+$  results did not show the expected inverse correlation with hydrocarbon concentrations. The lowest  $\text{SO}_4^{2-}$  concentrations were detected in the two wells with the greatest contamination (MW-7 and MW-8), exhibiting the expected inverse correlation.  $\text{NO}_3^-$  concentrations did not show 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.

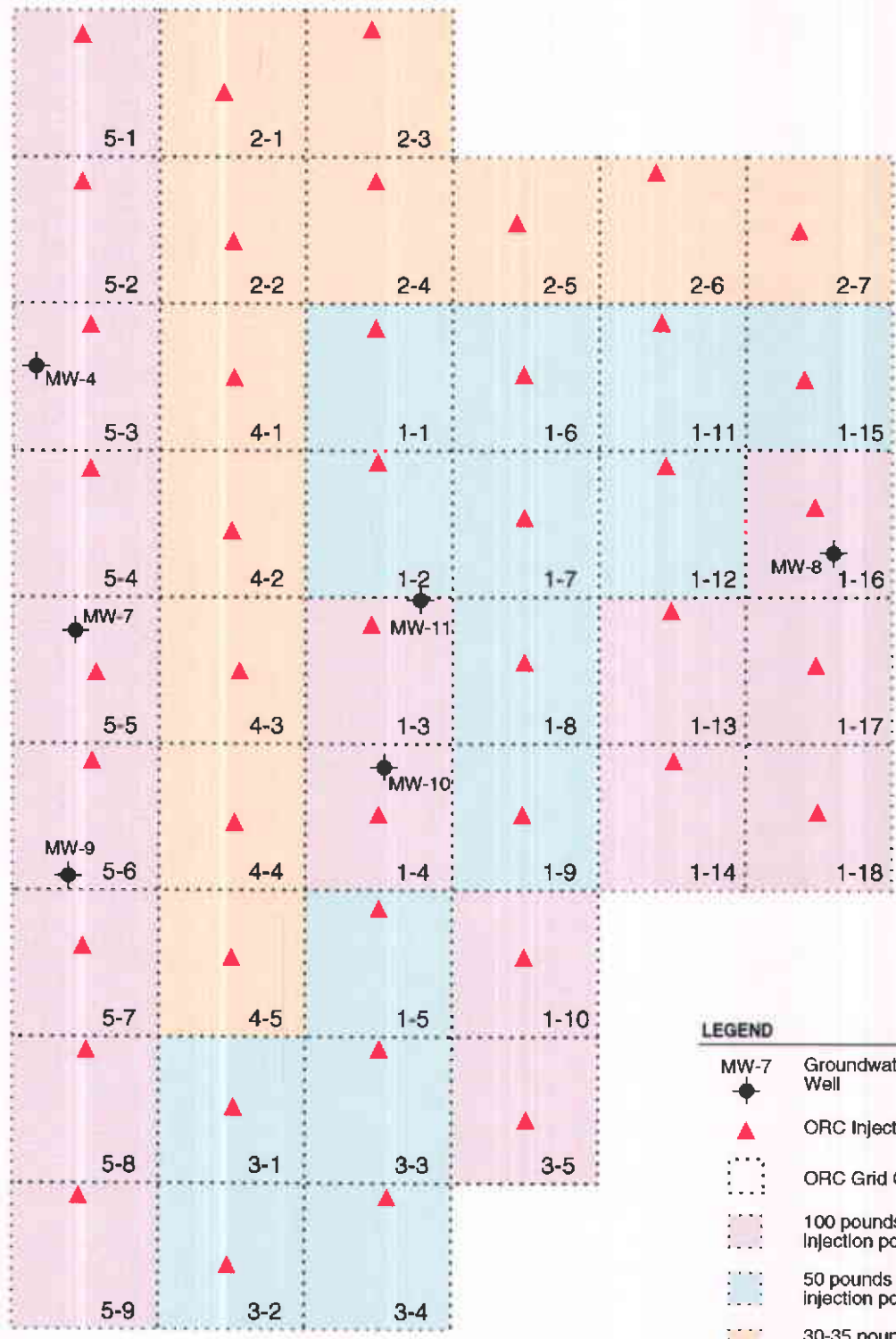
### HISTORICAL INVESTIGATION AND REMEDIATION ACTIVITIES

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 ORC™ via 44 exploratory injection boreholes. Figure 4 is a layout of the ORC™ injection area.
- 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).
- Electronic Data Format (EDF) groundwater analytical results from the recent and two previous events (Third Quarter and Fourth Quarter 2001) have been uploaded to the State of

California Water Resources Control Board's GeoTracker database, in accordance with that agency's requirements for EDF submittals.





**LEGEND**

- MW-7 Groundwater Monitoring Well
- ORC Injection Point
- ORC Grid Cell with Cell I.D.
- 100 pounds of ORC per injection point
- 50 pounds of ORC per injection point
- 30-35 pounds of ORC per injection point

See Table 4 for ORC injection intervals and injected mass



**ORC INJECTION LAYOUT—REDWOOD REGIONAL PARK SERVICE YARD**

7867 Redwood Rd.  
Oakland, CA

By: MJC

APRIL 2002

**Figure 4**

**Stellar Environmental Solutions**  
Geoscience & Engineering Consulting

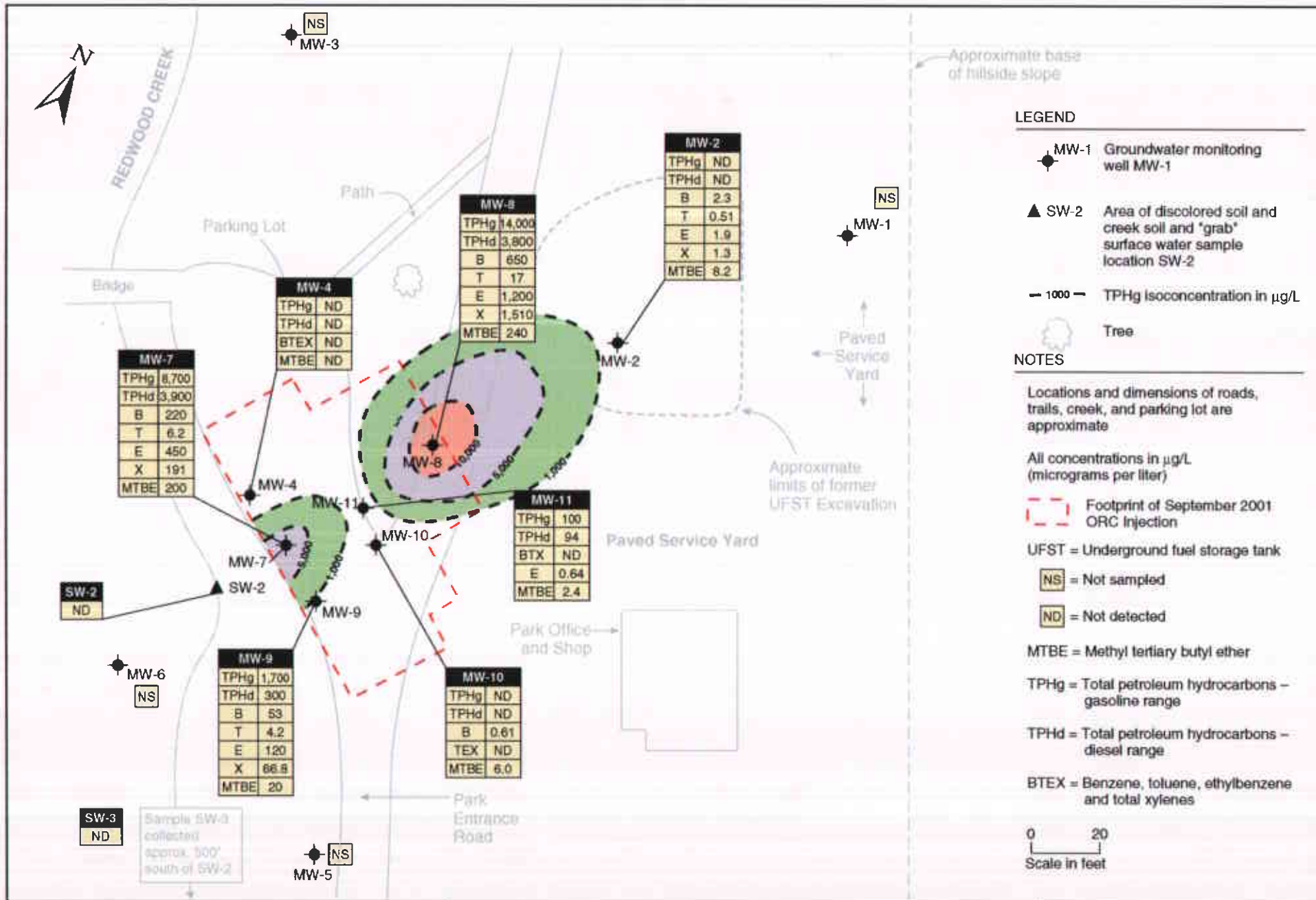
2001-53-04

## HYDROCHEMICAL TREND ANALYSIS

Figure 5 shows the analytical results of the most recent groundwater and surface water event. Figures C.1 through C.9 (Appendix C) show hydrochemical trends (TPHg and TPHd) for wells within the contaminant plume. A detailed discussion of hydrochemical and surface water trends was included in the October 2000 Feasibility Study report, and will continue to be addressed in upcoming annual summary reports. 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 well beyond the former source area (represented by well MW-2) toward Redwood Creek.
- The groundwater contaminant plume has been severed, based on the absence of elevated contaminant concentrations in wells MW-10 and MW-11, located approximately 40 feet upgradient of Redwood Creek. It is inferred that localized conditions in this area (e.g., increased permeability) allowed for maximum efficacy of the ORC™ injection. Site maximum concentrations are currently centered around well MW-8 (approximately 70 feet upgradient of the creek) and a separate zone of contamination is centered around well MW-7 (just upgradient of the creek).
- Concentrations of site contaminants have shown a downward trend since the September 2001 ORC™ injection program in all wells except MW-8 (located at the upgradient edge of the ORC™ injection area) suggesting that the ORC™ injection program has been effective. It is inferred that the increase in concentrations in well MW-8 is due to desorption from the capillary fringe due to the recent rainy conditions, and is unaffected by the ORC™ due to the upgradient location of the well relative to the ORC™ injection area.
- Maximum concentrations for the majority of the contaminants have not reached the creek, and would reach the creek within 1 to 2 years if unabated. Continued discharge of elevated concentrations could continue for at least several years.
- 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.
- Future monitoring for bio-indicator analyses will allow for a more complete evaluation of the occurrence of enhanced biodegradation at the site as a result of the ORC™ injection. SES

will further evaluate the occurrence of biodegradation, the influence of natural attenuation, and the ultimate extent of the hydrocarbon plume underlying the site.



**LEGEND**

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

**NOTES**

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

All concentrations in µg/L (micrograms per liter)

Footprint of September 2001 ORC Injection

UFST = Underground fuel storage tank

NS = Not sampled

ND = Not detected

MTBE = Methyl tertiary butyl ether

TPHg = Total petroleum hydrocarbons – gasoline range

TPHd = Total petroleum hydrocarbons – diesel range

BTEX = Benzene, toluene, ethylbenzene and total xylenes

0 20  
Scale in feet

## **7.0 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 (up to 21 events in the original wells).
- Three additional groundwater monitoring wells (MW-9 through MW-11) were installed in August 2001 in the area of the plume and where the ORC™ injection was to take place, in order to collect both baseline and post-ORC™ injection data to evaluate the effectiveness of the remedy. The three new wells encountered significant groundwater contamination.
- 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.
- Maximum groundwater contaminant concentrations for all site contaminants except TPHd were detected in well MW-8 (approximately 40 feet downgradient of the former USTs and approximately 60 upgradient of Redwood Creek). The maximum concentration of TPHd was detected in downgradient well MW-7 (just upgradient of Redwood Creek). Concentrations in former source area well MW-2 (approximately 130 feet upgradient of Redwood Creek) are 1 order of magnitude below downgradient well concentrations.
- 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.
- The area of groundwater contamination in excess of screening level criteria is no greater than 120 feet long by 80 feet wide, and is likely to be less.
- 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 contamination (TPHg greater than 10,000  $\mu\text{g/L}$ ) is centered around well MW-8. Current and historical data suggest that maximum contaminant concentrations have not reached the creek and would reach the creek within 1 to 2 years if unabated, and that continued discharge of elevated concentrations could continue for at least several years.
- No site-sourced contaminants were detected in the SW-2 or SW-3 surface water samples.
- 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 first phase of an anticipated two-phase ORC™ injection corrective action program was implemented in September 2001. Approximately 3,000 pounds of ORC™ was injected into 44 boreholes over a 4,400-square foot area of the maximum groundwater contamination. The ORC™ was injected over the full saturated interval (including capillary fringe). The corrective action is designed to facilitate biodegradation within the central area of the plume, with the ultimate objective of reducing or eliminating continued discharge of contaminated groundwater to Redwood Creek. Results of the initial post-injection groundwater monitoring events have shown a downward trend in contaminant concentrations in all wells within the area of the ORC™ injection.

## **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.
- A second ORC™ injection phase will be conducted shortly after the next quarterly groundwater monitoring event (scheduled for June 2002). The results of the next groundwater monitoring event will be used to determine the layout and injection specifications. The results of subsequent quarterly monitoring events will be evaluated in the context of the need for future corrective action.

## **8.0 REFERENCES AND BIBLIOGRAPHY**

---

- California State Water Resources Control Board, 1989. Leaking Underground Fuel Tank Field Manual: Guidelines for Site Assessment, Cleanup, and Underground Storage Tank Closure. State of California Leaking Underground Fuel Tank Task Force. October.
- Parsons Engineering Science (Parsons), 1998. Quarterly Progress Report 11, Redwood Regional Park Service Yard, Oakland, California. January 28.
- Parsons, 1997a. Quarterly Progress Report 7, Redwood Regional Park Service Yard, Oakland, California. January 31.
- Parsons, 1997b. Quarterly Progress Report 8 and Annual Summary Assessment, Redwood Regional Park Service Yard, Oakland, California. April 4.
- Parsons, 1997c. Quarterly Progress Report 9, Redwood Regional Park Service Yard, Oakland, California. June 30.
- Parsons, 1997d. Quarterly Progress Report 10, Redwood Regional Park Service Yard, Oakland, California. September 22.
- Parsons, 1996a. Quarterly Progress Report 5, Redwood Regional Park Service Yard, Oakland, California. June 6.
- Parsons, 1996b. Quarterly Progress Report 6, Redwood Regional Park Service Yard, Oakland, California. September 24.
- Parsons, 1995a. Quarterly Progress Report 2, Redwood Regional Park Service Yard, Oakland, California. March 8.
- Parsons, 1995b. Quarterly Progress Report 3, Redwood Regional Park Service Yard, Oakland, California. June 23.
- Parsons, 1995c. Quarterly Progress Report 4 and Annual Summary Assessment (November 1994 - August 1995), Redwood Regional Park Service Yard, Oakland, California. November 13.

- Parsons, 1994a. Creek and Soil Sampling at Redwood Regional Park, Oakland, California. March 2.
- Parsons, 1994b. Creek Surface Water at Redwood Regional Park, Oakland, California. May 13.
- Parsons, 1994c. Workplan for Groundwater Characterization Program at East Bay Regional Park Service Yard, Oakland, California. August 17.
- Parsons, 1994d. Quarterly Progress Report 1, Redwood Regional Park Service Yard, Oakland, California. December 28.
- Parsons, 1993a. Closure of Underground Fuel Storage Tanks and Initial Site Characterization at Redwood Regional Park Service Yard, Oakland, California. December 16.
- Parsons, 1993b. Workplan for Site Characterization at East Bay Regional Park District, Redwood Regional Park Corporation Yard, Oakland, Alameda County, California. September 3.
- Regional Water Quality Control Board, San Francisco Bay Region, 2000. Application of Risk-Based Screening Levels and Decision Making to Sites With Impacted Soil and Groundwater, Interim Final. August.
- Stellar Environmental Solutions (SES), 2002a. Year 2001 Annual Summary Report, Redwood Regional Park Service Yard, Oakland, California. January 15.
- SES, 2001a. Monitoring Well Installation and Site Monitoring Report, Redwood Regional Park Service Yard, Oakland, California. February 8.
- SES, 2001b. Site Monitoring Report, Redwood Regional Park Service Yard, Oakland, California. May 4.
- SES, 2001c. Well Installation, Site Monitoring, and Corrective Action Report, Redwood Regional Park Service Yard, Oakland, California. October 26.
- SES, 2000a. Site Monitoring Report, Redwood Regional Park Service Yard, Oakland, California. April 21.
- SES, 2000b. Workplan for Groundwater Monitoring Well Installations, Redwood Regional Park Service Yard, Oakland, California. October 19.
- SES, 2000c. Site Monitoring Report, Redwood Regional Park Service Yard, Oakland, California. October 19.



SES, 2000d. Site Feasibility Study Report, Redwood Regional Park Service Yard, Oakland, California. October 20.

SES, 1999a. Workplan for Subsurface Investigation, Redwood Regional Park Service Yard, Oakland, California. April 8.

SES, 1999b. Residual Contamination Investigation and Remedial Action Assessment Report, Redwood Regional Park Service Yard, Oakland, California. June 9.

SES, 1998a. Workplan for Continued Site Investigation and Closure Assessment, Redwood Regional Park Service Yard, Oakland, California. October 9.

SES, 1998b. Site Investigation and Closure Assessment Report, Redwood Regional Park Service Yard, Oakland, California. December 4.

## 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 # 020314-MM1 Date 3/14/02 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	D.O.
MW-1	4					2.88	18.85	}	1.6
MW-2	4					19.37	38.82		1.4
MW-3	4					18.66	44.10		2.6
MW-4	4					12.65	26.51		7.5
MW-5	4					15.13	26.92		3.0
MW-6	4					12.35	27.93		3.6
MW-7	2					11.897	25.33		0.8
MW-8	2					7.45	22.21		2.2
MW-9	2					14.39	26.00		2.4
MW-10	2					9.77	28.75		14.5
MW-11	2					11.32	26.00		2.2

## WELL MONITORING DATA SHEET

Project #: <u>020314-MM1</u>	Client: <u>Stellar</u>
Sampler: <u>MTM</u>	Start Date: <u>3/14/02</u>
Well I.D.: <u>MW-1</u>	Well Diameter: 2 3 <u>4</u> 6 8
Total Well Depth: <u>1885</u>	Depth to Water: <u>288</u>
Before: _____ After: _____	Before: _____ After: _____
Depth to Free Product: _____	Thickness of Free Product (feet): _____
Referenced to: <u>PVC</u> Grade	D.O. Meter (if req'd): <del>YSI</del> <u>HACH</u>

Purge Method:

- |   |  |
|---|--|
| <input type="checkbox"/> Bailer<br><input checked="" type="checkbox"/> Disposable Bailer<br><input type="checkbox"/> Middleburg<br><input type="checkbox"/> Electric Submersible<br><u>No purge</u> | <input type="checkbox"/> Waterra<br><input type="checkbox"/> Peristaltic<br><input type="checkbox"/> Extraction Pump<br><input type="checkbox"/> Other _____ |
|---|--|

Sampling Method:

- Bailer
- Disposable Bailer
- Extraction Port
- Dedicated Tubing

Other: \_\_\_\_\_

Well Diameter	Multiplier	Well Diameter	Multiplier
1"	0.04	4"	0.65
2"	0.16	6"	1.47
3"	0.37	Other	radius <sup>2</sup> * 0.163

\_\_\_\_\_ (Gals.) X \_\_\_\_\_ = \_\_\_\_\_ Gals.

1 Case Volume      Specified Volumes      Calculated Volume

Time	Temp (°F)	pH	Cond.	Turbidity	Gals. Removed	Observations
<u>1114</u>	<u>55.1</u>	<u>7.63</u>	<u>858</u>	<u>59</u>	<u>0</u>	<u>Clear</u>

Ferrous Iron = 0-0

Did well dewater? Yes  No      Gallons actually evacuated: 0

Sampling Time: \_\_\_\_\_      Sampling Date: 3/14/02

Sample I.D.: MW-1      Laboratory: C+T

Analyzed for: TPH-G BTEX MTBE TPH-D Other: Nitrate / Sulfate (pre-purge)

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

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

D.O. (if req'd):	<u>Pre-purge:</u> <u>1.6</u> mg/L	Post-purge:	mg/L
------------------	-----------------------------------	-------------	------

ORP (if req'd):	<u>Pre-purge:</u> <u>-534</u> mV	Post-purge:	mV
-----------------	----------------------------------	-------------	----

**.. ELL MONITORING DATA SHEET**

Project #: <u>020314-MM1</u>	Client: <u>Stellar</u>
Sampler: <u>MTM</u>	Start Date: <u>3/14/02</u>
Well I.D.: <u>MW-2</u>	Well Diameter: 2 3 <u>4</u> 6 8
Total Well Depth: <u>3882</u>	Depth to Water: <u>19.37</u>
Before: _____ After: _____	Before: _____ After: _____
Depth to Free Product: _____	Thickness of Free Product (feet): _____
Referenced to: <u>PVC</u> Grade	D.O. Meter (if req'd): <del>YSI</del> <u>HACH</u>

Purge Method:

- Bailer
- Disposable Bailer
- Middleburg
- Electric Submersible
- Waterra
- Peristaltic
- Extraction Pump
- Other \_\_\_\_\_

Sampling Method:

- Bailer
- Disposable Bailer
- Extraction Port
- Dedicated Tubing
- Other: \_\_\_\_\_

<u>12.5</u> (Gals.) X	<u>3</u>	=	<u>37.5</u> 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 <sup>2</sup> * 0.163

Time	Temp (°F)	pH	Cond.	Turbidity	Gals. Removed	Observations
<u>1134</u>	<u>56.3</u>	<u>7.61</u>	<u>861</u>	<u>2</u>	<u>φ</u>	
<u>1133</u>	<u>57.5</u>	<u>7.63</u>	<u>853</u>	<u>27</u>		<u>← 12.5 clear</u>
<u>1134</u>	<u>58.3</u>	<u>7.47</u>	<u>875</u>	<u>120</u>		<u>← 25 cloudy</u>
<u>1140</u>	<u>58.2</u>	<u>7.68</u>	<u>873</u>	<u>197</u>		<u>← 37.5 "</u>
						<u>Ferrous Ion = 0.0</u>

Did well dewater? Yes  No  Gallons actually evacuated: 37.5

Sampling Time: 1145 Sampling Date: 3/14/02

Sample I.D.: MW-2 Laboratory: C+T

Analyzed for: TPH-G BTEX MTBE TPH-D Other: Nitrate / sulfate (pre-purge)

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

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

D.O. (if req'd):	<u>Pre-purge:</u> <u>1.4</u> mg/L	Post-purge:	
ORP (if req'd):	<u>Pre-purge:</u> <u>24</u> mV	Post-purge:	

# WELL MONITORING DATA SHEET

Project #: <u>020314-mm1</u>	Client: <u>Stellar</u>
Sampler: <u>WTM</u>	Start Date: <u>3/14/02</u>
Well I.D.: <u>MW-3</u>	Well Diameter: 2 3 <u>(4)</u> 6 8
Total Well Depth: <u>44.10</u>	Depth to Water: <u>18.60</u>
Before: _____ After: _____	Before: _____ After: _____
Depth to Free Product: _____	Thickness of Free Product (feet): _____
Referenced to: <u>(PVC)</u> Grade	D.O. Meter (if req'd): <del>YSI</del> <u>(HACH)</u>

Purge Method:

- Bailor
- Disposable Bailer
- Middleburg
- Electric Submersible
- Watera
- Peristaltic
- Extraction Pump
- Other \_\_\_\_\_

no purge

Sampling Method:

Bailer

- (Disposable Bailer)
- Extraction Port
- Dedicated Tubing

Other: \_\_\_\_\_

_____ (Gals.) X _____	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 <sup>2</sup> * 0.163

Time	Temp (°F)	pH	Cond.	Turbidity	Gals. Removed	Observations
1055	59.1	7.99	692	27	<u>0</u>	—
					Ferrous Iron =	0.0

Did well dewater? Yes  No

Gallons actually evacuated: 0

Sampling Time: 1055

Sampling Date: 3/14/02

Sample I.D.: MW-3

Laboratory: C+T

Analyzed for: TPH-G / BTEX / MTBE / TRH-D

Other: Nitrate / Sulfate (pre-purge)

Equipment Blank I.D.: \_\_\_\_\_ @ \_\_\_\_\_ Time

Duplicate I.D.: \_\_\_\_\_

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

D.O. (if req'd):	<u>Pre-purge:</u> <u>7.6</u> mg/L	Post-purge:	
ORP (if req'd):	<u>Pre-purge:</u> <u>-68</u> mV	Post-purge:	

## WELL MONITORING DATA SHEET

Project #: <u>020314-mm1</u>	Client: <u>Stellar</u>
Sampler: <u>WTM</u>	Start Date: <u>3/14/02</u>
Well I.D.: <u>MW-4</u>	Well Diameter: 2 3 <u>4</u> 6 8
Total Well Depth: <u>26.51</u>	Depth to Water: <u>12.65</u>
Before: _____ After: _____	Before: _____ After: _____
Depth to Free Product: _____	Thickness of Free Product (feet): _____
Referenced to: <u>PVC</u> Grade	D.O. Meter (if req'd): <u>YSI</u> <u>HACH</u>

Purge Method:

- |                             |                 |
|-----------------------------|-----------------|
| Bailer                      | Waterra         |
| Disposable Bailer           | Peristaltic     |
| Middleburg                  | Extraction Pump |
| <u>Electric Submersible</u> | Other _____     |

Sampling Method:

Bailer

Disposable Bailer

Extraction Port

Dedicated Tubing

Other: \_\_\_\_\_

<u>9</u>	(Gals.) X	<u>3</u>	=	<u>27</u>	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 <sup>2</sup> * 0.163

Time	Temp (°F)	pH	Cond.	Turbidity	Gals. Removed	Observations
<u>1018</u>	<u>55.3</u>	<u>9.59</u>	<u>681</u>	<u>9</u>	<u>0</u>	<u>clear</u>
<u>1206</u>	<u>55.9</u>	<u>7.23</u>	<u>698</u>	<u>10</u>	<u>9</u>	<u>clear</u>
<u>1209</u>	<u>56.9</u>	<u>8.94</u>	<u>708</u>	<u>80</u>	<u>18</u>	<u>cloudy</u>
<u>1215</u>	<u>59.0</u>	<u>9.08</u>	<u>725</u>	<u>72</u>	<u>27</u>	
					<u>Ferrous /oz = 0.0</u>	

Did well dewater? Yes  No  Gallons actually evacuated: 27

Sampling Time: 1018 / 1220 Sampling Date: 3/14/02

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

Analyzed for: TPH-G BTEX MTBE TPH-D Other: Nitrate / sulfate (pre-purge)

Equipment Blank I.D.: \_\_\_\_\_ @ \_\_\_\_\_ Duplicate I.D.: \_\_\_\_\_

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

D.O. (if req'd):	<u>Pre-purge:</u> <u>215</u> mg/L	Post-purge:		
ORP (if req'd):	<u>Pre-purge:</u> <u>-107</u> mV	Post-purge:		mV

## WELL MONITORING DATA SHEET

Project #: <u>020314-MM1</u>	Client: <u>Stellar</u>
Sampler: <u>WTM</u>	Start Date: <u>3/14/02</u>
Well I.D.: <u>MW-5</u>	Well Diameter: 2 3 <u>4</u> 6 8
Total Well Depth: <u>26.92</u>	Depth to Water: <u>15.13</u>
Before: _____ After: _____	Before: _____ After: _____
Depth to Free Product: _____	Thickness of Free Product (feet): _____
Referenced to: <u>PVC</u> Grade	D.O. Meter (if req'd): <u>YSI</u> <u>HACH</u>

Purge Method:

- Bailer
- Disposable Bailer
- Middleburg
- Electric Submersible
- Waterra
- Peristaltic
- Extraction Pump
- Other \_\_\_\_\_

No purge

Sampling Method:

Bailer

Disposable Bailer

Extraction Port

Dedicated Tubing

Other: \_\_\_\_\_

(Gals.) X _____	=	_____ 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 <sup>2</sup> * 0.163

Time	Temp (°F)	pH	Cond.	Turbidity	Gals. Removed	Observations
855	53.4	7.45	668	54		clear
					Ferrous Iron =	0.0

Did well dewater? Yes  No

Gallons actually evacuated: 0

Sampling Time: 855

Sampling Date: 3/14/02

Sample I.D.: MW-5

Laboratory: CTT

Analyzed for: ~~TPH-G BTEX MTBE TPH-D~~ Other: Nitrate / Sulfate (pre-purge)

Equipment Blank I.D.: \_\_\_\_\_ @ \_\_\_\_\_ Duplicate I.D.: \_\_\_\_\_

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

D.O. (if req'd): Pre-purge: 38.0 mg/L Post-purge: \_\_\_\_\_ mg/L

ORP (if req'd): Pre-purge: 198 mV Post-purge: \_\_\_\_\_ mV





**WELL MONITORING DATA SHEET**

Project #: <u>020314-mm1</u>	Client: <u>Stellar</u>
Sampler: <u>MTM</u>	Start Date: <u>3/14/02</u>
Well I.D.: <u>MW-7</u>	Well Diameter: 2 3 <u>4</u> 6 8
Total Well Depth: <u>25.33</u>	Depth to Water: <u>11.97</u>
Before:                      After:	Before:                      After:
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: <u>PVC</u> Grade	D.O. Meter (if req'd): <u>SL</u> <u>HACH</u>

Purge Method:	Sampling Method: <u>Bailer</u>
Bailer	<u>Disposable Bailer</u>
Disposable Bailer	Extraction Port
<u>Middleburg</u>	Dedicated Tubing
Electric Submersible	Other: _____
Waterra	
Peristaltic	
Extraction Pump	
Other _____	

2.1 (Gals.) X 3 = 6.3 Gals.  
 I 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 <sup>2</sup> * 0.163

Time	Temp (°F)	pH	Cond.	Turbidity	Gals. Removed	Observations
1000	59.6	7.10	557	32	4	odor
1230	61.2	7.79	768	7200	2.1	odor / grayish brk
1233	58.5	8.03	764	7200	4.2	"
1235	58.9	7.86	782	7200	6.3	"
					Ferrous Ion =	3.0

Did well dewater? Yes  No  Gallons actually evacuated: 6.3

Sampling Time: 1000 / 1240 Sampling Date: 3/14/02

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

Analyzed for: TPH-G BTEX MTBE TPH-D Other: Nitrate / sulfate (pre-purge)

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

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

D.O. (if req'd): Pre-purge: 0.8 mg/L Post-purge: \_\_\_\_\_ mg/L

ORP (if req'd): Pre-purge: -69 mV Post-purge: \_\_\_\_\_ mV

## WELL MONITORING DATA SHEET

Project #: 020314-MM1	Client: Stellar
Sampler: WTM	Start Date: 3/14/02
Well I.D.: MW-8	Well Diameter: ② 3 4 6 8
Total Well Depth: 22.21	Depth to Water: 7.45
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               | Waterra         |
| Disposible Bailer    | Peristaltic     |
| Middleburg           | Extraction Pump |
| Electric Submersible | Other _____     |

Sampling Method:

- Bailer
- Disposible Bailer
- Extraction Port
- Dedicated Tubing
- Other: \_\_\_\_\_

2.4 (Gals.) X 3 = 7.2 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 <sup>2</sup> * 0.163

Time	Temp (°F)	pH	Cond.	Turbidity	Gals. Removed	Observations
1043	57.6	7.26	961	74	e	odor: cloudy
1356	57.3	7.18	975	87	2.4	cloudy/glo
1359	56.5	7.41	1004	118	4.8	"
1402	56.4	7.06	1002	131	7.2	"
					Ferrous Iron =	3.6

Did well dewater? Yes  No  Gallons actually evacuated: 7.2

Sampling Time: 1043/1402      Sampling Date: 3/14/02

Sample I.D.: MW-8      Laboratory: C+T

Analyzed for: TPH-G BTEX MTBE TPH-D      Other: Nitrate / Sulfate (pre-purge)

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

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

D.O. (if req'd):	Pre-purge: 2.2 mg/L	Post-purge:	mg/L
ORP (if req'd):	Pre-purge: -105 mV	Post-purge:	mV

## WELL MONITORING DATA SHEET

Project #: <u>020314-MM1</u>	Client: <u>Stellar</u>
Sampler: <u>WJM</u>	Start Date: <u>3/14/02</u>
Well I.D.: <u>MW-9</u>	Well Diameter: <u>2</u> 3 4 6 8
Total Well Depth: <u>26.00</u>	Depth to Water: <u>14.34</u>
Before:                      After:	Before:                      After:
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: <u>PVC</u> Grade	D.O. Meter (if req'd): <del>YSI</del> <u>HACH</u>

Purge Method:

Bailer  
 Disposable Bailer  
 Middleburg  
 Electric Submersible

Waterra  
 Peristaltic  
 Extraction Pump  
 Other \_\_\_\_\_

Sampling Method: Bailer

Disposable Bailer  
 Extraction Port  
 Dedicated Tubing  
 Other: \_\_\_\_\_

$$1.9 \text{ (Gals.)} \times 3 = 5.7 \text{ Gals.}$$

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 <sup>2</sup> * 0.163

Time	Temp (°F)	pH	Cond.	Turbidity	Gals. Removed	Observations
930	52.1	7.20	789	2191	0	cloudy
1251	60.9	7.79	797	2200	20	grayish/brown
1253	58.3	7.79	804	2200	40	"
1255	57.9	7.69	813	2200	60	"
					Ferrous Iron =	1.0

Did well dewater? Yes  No  Gallons actually evacuated: 6

Sampling Time: 930/1300 Sampling Date: 3/14/02

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

Analyzed for: TPH-G / BTEX / MTBE / TPH-D Other: nitrate / sulfate (pre-purge)

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

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

D.O. (if req'd):	Pre-purge: <u>2.4</u> mg/L	Post-purge: _____ mg/L	
ORP (if req'd):	Pre-purge: <u>-23</u> mV	Post-purge: _____ mV	

## WELL MONITORING DATA SHEET

Project #: 020314-mm1	Client: Stellar
Sampler: MTR	Start Date: 3/14/02
Well I.D.: MW-10	Well Diameter: ② 3 4 6 8
Total Well Depth: 28.75	Depth to Water: 9.77
Before:                      After:	Before:                      After:
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: PVC Grade	D.O. Meter (if req'd): <del>YSI</del> HACH

Purge Method:

- Bailer
- Disposable Bailer
- Middleburg
- Electric Submersible
- Waterra
- Peristaltic
- Extraction Pump
- Other \_\_\_\_\_

Sampling Method:

Bailer

Disposable Bailer

Extraction Port

Dedicated Tubing

Other: \_\_\_\_\_

3	(Gals.) X	3	=	9	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 <sup>2</sup> * 0.163

Time	Temp (°F)	pH	Cond.	Turbidity	Gals. Removed	Observations
1030	57.6	8.57	649	3	4	clear
1331	57.5	8.99	653	7200	3	cloudy/brown
1334	57.2	8.96	658	7200	6	4
1337	57.3	8.99	655	7200	9	4
					Ferrous Iron =	0.0

Did well dewater? Yes  No  Gallons actually evacuated: 9

Sampling Time: 1030/1342                      Sampling Date: 3/14/02

Sample I.D.: MW-10                      Laboratory: C+T

Analyzed for: TPH-G BTEX MTBE TPH-D                      Other: Nitrate / Sulfate (pre-purge)

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

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

D.O. (if req'd): Pre-purge: 14.5 mg/L                      Post-purge: mg/L

ORP (if req'd): Pre-purge: 71 mV                      Post-purge: mV

## WELL MONITORING DATA SHEET

Project #: <u>020314-MM1</u>	Client: <u>Stellar</u>
Sampler: <u>MTM</u>	Start Date: <u>3/14/02</u>
Well I.D.: <u>MW-11</u>	Well Diameter: <u>2</u> 3 4 6 8
Total Well Depth: <del>1130</del> <u>2600</u>	Depth to Water: <del>2600</del> <u>11.30</u>
Before: _____ After: _____	Before: _____ After: _____
Depth to Free Product: _____	Thickness of Free Product (feet): _____
Referenced to: <u>PVC</u> Grade	D.O. Meter (if req'd): <del>XSI</del> <u>HACH</u>

Purge Method:

- Bailer
- Disposable Bailer
- Middleburg
- Electric Submersible
- Waterra
- Peristaltic
- Extraction Pump
- Other \_\_\_\_\_

Sampling Method:

Bailer

- Disposable Bailer
- Extraction Port
- Dedicated Tubing

Other: \_\_\_\_\_

Well Diameter	Multiplier	Well Diameter	Multiplier
1"	0.04	4"	0.65
2"	0.16	6"	1.47
3"	0.37	Other	radius <sup>2</sup> * 0.163

<u>2.4</u> (Gals.) X	<u>3</u>	<u>= 7.2</u> Gals.
1 Case Volume	Specified Volumes	Calculated Volume

Time	Temp (°F)	pH	Cond.	Turbidity	Gals. Removed	Observations
950	53.4	7.46	708	707	0	cloudy
1312	59.2	7.37	700	117	2.4	clearly
1314	57.3	7.32	698	71	4.8	"
1317	58.0	7.30	696	96	7.2	"
						Ferrous Iron = 0.0

Did well dewater? Yes  No

Gallons actually evacuated: 7.2

Sampling Time: 950/1322

Sampling Date: 3/14/02

Sample I.D.: MW-11

Laboratory: C+T

Analyzed for: TPH-G BTEX MTBE TPH-D

Other: Nitrate / Sulfate (pre-purge)

Equipment Blank I.D.: \_\_\_\_\_ @ \_\_\_\_\_ Time

Duplicate I.D.: \_\_\_\_\_

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

D.O. (if req'd):	<u>Pre-purge:</u> <u>2.2</u> mg/L	Post-purge:	mg/L
ORP (if req'd):	<u>Pre-purge:</u> <u>-1</u> mV	Post-purge:	mV



Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878

2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

A N A L Y T I C A L   R E P O R T

Prepared for:

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

Date: 02-APR-02  
Lab Job Number: 157539  
Project ID: N/A  
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

This package may be reproduced only in its entirety.

Laboratory Numbers: **157539**  
Client: **Stellar Environmental Solutions**  
Location: **Redwood Park Service Yard**

Sampled Date: **03/14/02**  
Received Date: **03/14/02**

### **CASE NARRATIVE**

This hardcopy data package contains sample and QC results for eight water samples, which were received from the site referenced above on March 14, 2002. The samples were received cold and intact.

#### **TVH/BTXE:**

High Trifluorotoluene surrogate recoveries were observed for samples MW-7 (CT# 1257539-004), MW-8 (CT# 157539-005) and MW-9 (CT# 157539-006) as a result of hydrocarbons coeluting with the surrogate peaks. No other analytical problems were encountered.

#### **TEH (EPA 8015M):**

No analytical problems were encountered.



STEEL ENVIRONMENTALS  
Chain of Custody Record

Lab Job no.:  
Date 3/14/02  
Page 1 of 1

Laboratory Custos of Tomskine Method of Shipment hand delivered  
Address 2323 FIVE ST Shipment No. /  
BERKELEY, CA Airbill No. /  
Client JRRAZ ENV. SERV. INC. Cooler No. /  
Address 7867 Redwood Rd. Project Manager Blaine Miller  
Oakland CA Telephone No. 510-644-3123  
Project Name Redwood Park Service Yard Fax No. 510-644-3839  
Project Number 020314-m01 Samplers: (Signature) Matthew Miller

Field Sample Number	Location/Depth	Date	Time	Sample Type	Type/Size of Container	Preservation		Filtrated ✓	No. of Containers	Analyte Required			Remarks
						Temp.	Chemical			TVA	BERX	M7BE	
MW-2		3/14	1145	W	varied 5	ice			X	X			1 of the 12 Amber was broken Jan 3-14-02
MW-3			1055	W	1						X		
MW-4		1018	1220	W	6				X	X	X		
MW-7		1000	1240	W	6				X	X	X		
MW-8		1043	1407	W	6				X	X	X		
MW-9		930	1300	W	6				X	X	X		
MW-10		1030	1342	W	6				X	X	X		
MW-11		950	1322	W	6				X	X	X		

-1-  
-2-  
-3-  
-4-  
-5-  
-6-  
-7-  
-8-

Received  On Ice  
 Gold  Ambient  Intact

Preservation Correct?  
 Yes  No  N/A

Relinquished by: Matthew Miller  
Signature Matthew J. Miller  
Printed BlainTech Serv.  
Company BlainTech Serv.  
Reason \_\_\_\_\_

Date 3/14  
Received by: A. Alvarez  
Signature A. Alvarez  
Printed COT  
Company COT  
Date 3/14/02  
Time 2:41

Relinquished by:  
Signature \_\_\_\_\_  
Printed \_\_\_\_\_  
Company \_\_\_\_\_  
Reason \_\_\_\_\_

Date \_\_\_\_\_  
Received by:  
Signature \_\_\_\_\_  
Printed \_\_\_\_\_  
Company \_\_\_\_\_

Comments: Need an EDF Report + hard copy

Relinquished by:  
Signature \_\_\_\_\_  
Printed \_\_\_\_\_  
Company \_\_\_\_\_  
Reason \_\_\_\_\_

Date \_\_\_\_\_  
Received by:  
Signature \_\_\_\_\_  
Printed \_\_\_\_\_  
Company \_\_\_\_\_

**Gasoline by GC/FID CA LUFT**

Lab #:	157539	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	STANDARD	Analysis:	8015B (M)
Matrix:	Water	Sampled:	03/14/02
Units:	ug/L	Received:	03/14/02

Field ID:	MW-2	Diln Fac:	1.000
Type:	SAMPLE	Batch#:	71090
Lab ID:	157539-001	Analyzed:	03/24/02

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Trifluorotoluene (FID)	118	68-145
Bromofluorobenzene (FID)	114	66-143

Field ID:	MW-4	Diln Fac:	1.000
Type:	SAMPLE	Batch#:	71090
Lab ID:	157539-003	Analyzed:	03/24/02

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Trifluorotoluene (FID)	122	68-145
Bromofluorobenzene (FID)	118	66-143

Field ID:	MW-7	Diln Fac:	5.000
Type:	SAMPLE	Batch#:	71105
Lab ID:	157539-004	Analyzed:	03/25/02

Analyte	Result	RL
Gasoline C7-C12	8,700	250

Surrogate	%REC	Limits
Trifluorotoluene (FID)	179 *	68-145
Bromofluorobenzene (FID)	130	66-143

\*= Value outside of QC limits; see narrative

ND= Not Detected

RL= Reporting Limit

# GC19 TVH 'X' Data File (FID)

Sample Name : 157539-004,71105

Sample #: c1

Page 1 of 1

FileName : G:\GC19\DATA\083X031.raw

Date : 3/26/02 10:24 AM

Method : TVHBTXE

Time of Injection: 3/25/02 04:00 PM

Start Time : 0.00 min

End Time : 26.80 min

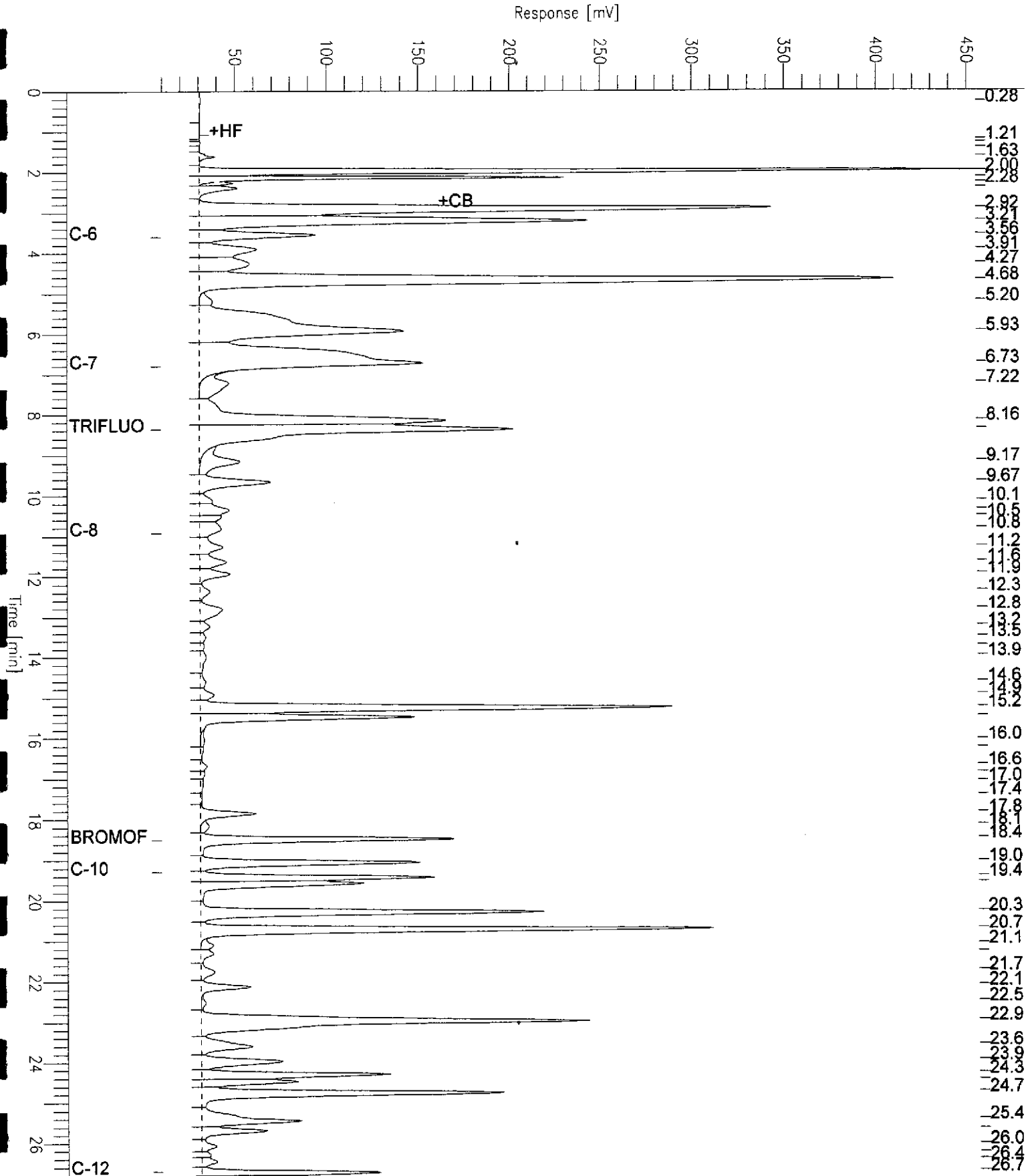
Low Point : 9.55 mV

High Point : 454.91 mV

Scale Factor: 1.0

Plot Offset: 10 mV

Plot Scale: 445.4 mV





## Gasoline by GC/FID CA LUFT

Lab #:	157539	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	STANDARD	Analysis:	8015B(M)
Matrix:	Water	Sampled:	03/14/02
Units:	ug/L	Received:	03/14/02

Field ID:	MW-8	Diln Fac:	5.000
Type:	SAMPLE	Batch#:	71090
Lab ID:	157539-005	Analyzed:	03/24/02

Analyte	Result	RL
Gasoline C7-C12	14,000	250

Surrogate	%REC	Limits
Trifluorotoluene (FID)	146 *	68-145
Bromofluorobenzene (FID)	124	66-143

Field ID:	MW-9	Diln Fac:	1.000
Type:	SAMPLE	Batch#:	71090
Lab ID:	157539-006	Analyzed:	03/24/02

Analyte	Result	RL
Gasoline C7-C12	1,700	50

Surrogate	%REC	Limits
Trifluorotoluene (FID)	160 *	68-145
Bromofluorobenzene (FID)	122	66-143

Field ID:	MW-10	Diln Fac:	1.000
Type:	SAMPLE	Batch#:	71090
Lab ID:	157539-007	Analyzed:	03/24/02

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Trifluorotoluene (FID)	123	68-145
Bromofluorobenzene (FID)	116	66-143

\*= Value outside of QC limits; see narrative

ND= Not Detected

RL= Reporting Limit

# GC19 TVH 'X' Data File (FID)

Sample Name : 157539-005,71090

Sample #: a1

Page 1 of 1

FileName : G:\GC19\DATA\082X034.raw

Date : 3/24/02 09:38 AM

Method : TVHBTXE

Time of Injection: 3/24/02 09:11 AM

Start Time : 0.00 min

End Time : 26.80 min

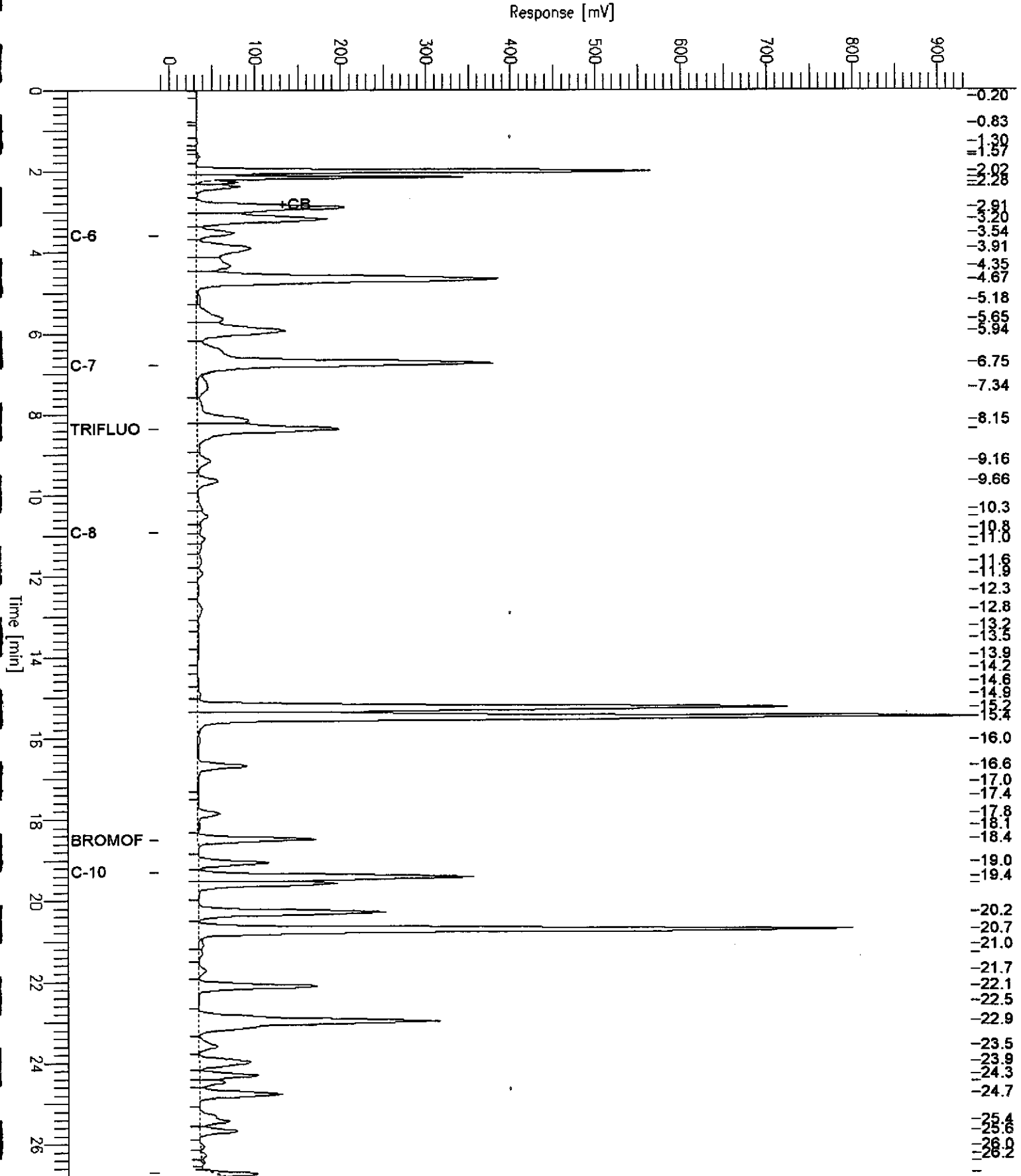
Low Point : -12.82 mV

High Point : 936.08 mV

Scale Factor: 1.0

Plot Offset: -13 mV

Plot Scale: 948.9 mV



# GC19 TVH 'X' Data File (FID)

Sample Name : 157539-006,71090

FileName : G:\GC19\DATA\082X032.raw

Method : TVHBTXE

Start Time : 0.00 min

Scale Factor : 1.0

End Time : 26.80 min

Plot Offset : -3 mV

Sample #: a1

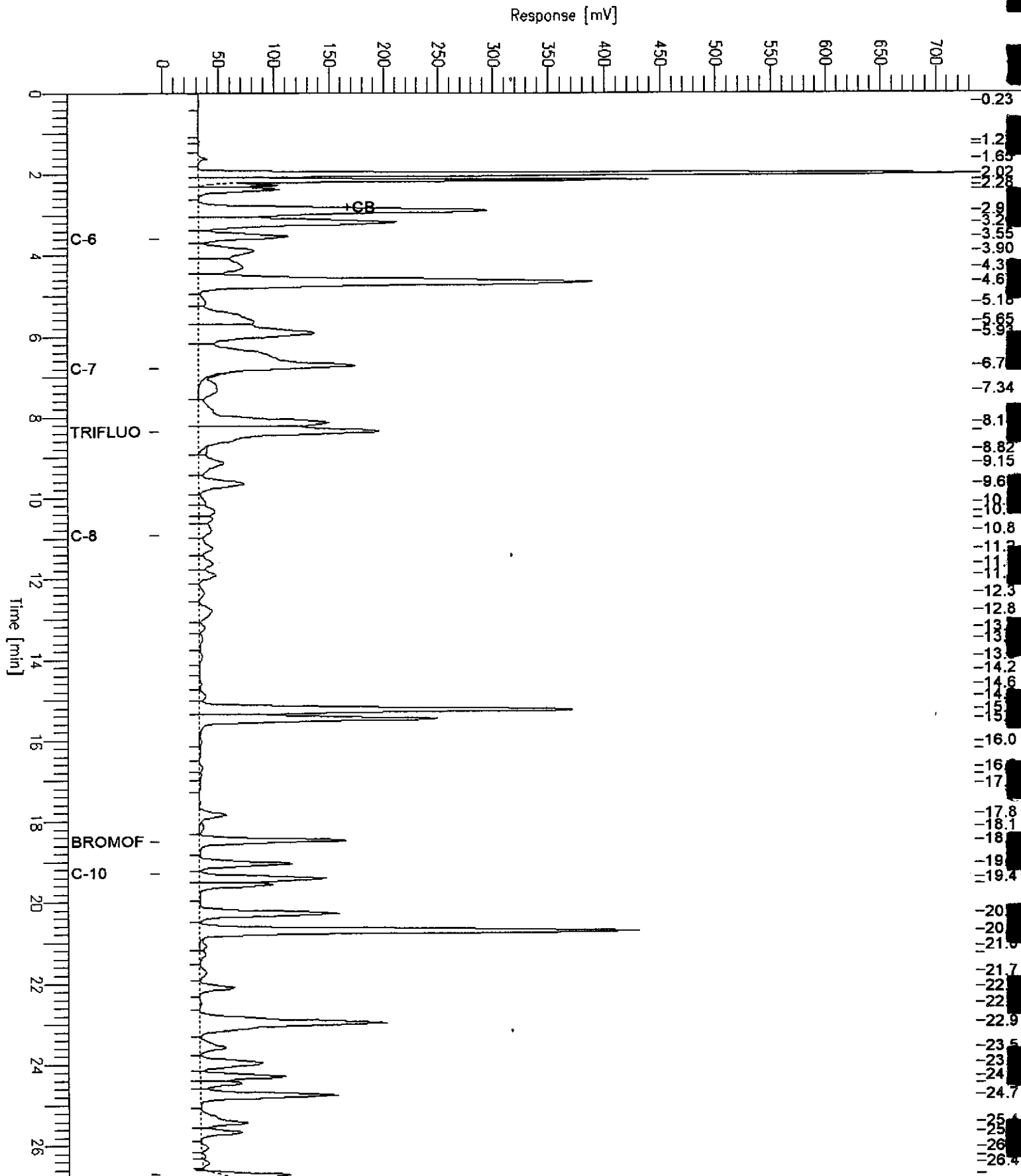
Date : 3/24/02 08:11 AM

Time of Injection: 3/24/02 07:44 AM

Low Point : -3.24 mV

Plot Scale: 735.6 mV

Page 1 of 1



## Gasoline by GC/FID CA LUFT

Lab #:	157539	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	STANDARD	Analysis:	8015B (M)
Matrix:	Water	Sampled:	03/14/02
Units:	ug/L	Received:	03/14/02

Field ID:	MW-11	Diln Fac:	1.000
Type:	SAMPLE	Batch#:	71090
Lab ID:	157539-008	Analyzed:	03/24/02

Analyte	Result	RL
Gasoline C7-C12	100	50

Surrogate	%REC	Limits
Trifluorotoluene (FID)	121	68-145
Bromofluorobenzene (FID)	119	66-143

Type:	BLANK	Batch#:	71090
Lab ID:	QC173968	Analyzed:	03/23/02
Diln Fac:	1.000		

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Trifluorotoluene (FID)	113	68-145
Bromofluorobenzene (FID)	106	66-143

Type:	BLANK	Batch#:	71105
Lab ID:	QC174003	Analyzed:	03/24/02
Diln Fac:	1.000		

Analyte	Result	RL
Gasoline C7-C12	ND	50

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

\*= Value outside of QC limits; see narrative

ND= Not Detected

RL= Reporting Limit

# GC19 TVH 'X' Data File (FID)

Sample Name : 157539-008,71090

Sample #: a1

Page 1 of 1

FileName : G:\GC19\DATA\082X033.raw

Date : 3/24/02 08:55 AM

Method : TVHBTXE

Time of Injection: 3/24/02 08:28 AM

Start Time : 0.00 min

End Time : 26.80 min

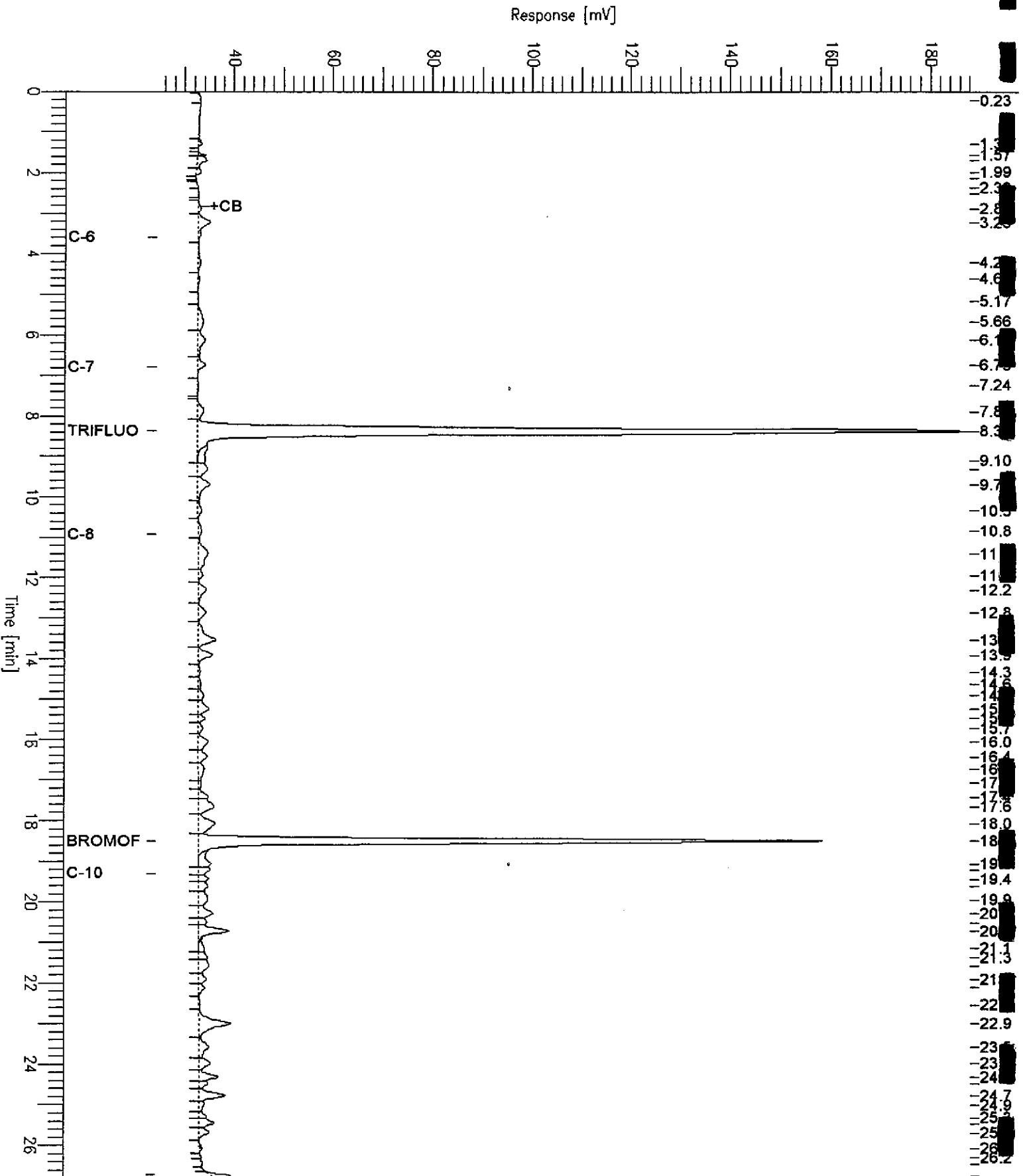
Low Point : 24.31 mV

High Point : 188.04 mV

Scale Factor: 1.0

Plot Offset: 24 mV

Plot Scale: 163.7 mV







**Benzene, Toluene, Ethylbenzene, Xylenes**

Lab #: 157539	Location: Redwood Park Service Yard
Client: Stellar Environmental Solutions	Prep: EPA 5030B
Project#: STANDARD	Analysis: EPA 8021B
Matrix: Water	Sampled: 03/14/02
Units: ug/L	Received: 03/14/02

Field ID: MW-2	Diln Fac: 1.000
Type: SAMPLE	Batch#: 71090
Lab ID: 157539-001	Analyzed: 03/24/02

Analyte	Result	RL
MTBE	8.2	2.0
Benzene	2.3	0.50
Toluene	0.51	0.50
Ethylbenzene	1.9	0.50
m,p-Xylenes	1.3	0.50
o-Xylene	ND	0.50

Surrogate	%REC	Limits
Trifluorotoluene (PID)	115	53-143
Bromofluorobenzene (PID)	113	52-142

Field ID: MW-4	Diln Fac: 1.000
Type: SAMPLE	Batch#: 71090
Lab ID: 157539-003	Analyzed: 03/24/02

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)	117	53-143
Bromofluorobenzene (PID)	115	52-142

Field ID: MW-7	Diln Fac: 5.000
Type: SAMPLE	Batch#: 71105
Lab ID: 157539-004	Analyzed: 03/25/02

Analyte	Result	RL
MTBE	200	10
Benzene	220	2.5
Toluene	6.2	2.5
Ethylbenzene	450	2.5
m,p-Xylenes	180	2.5
o-Xylene	11	2.5

Surrogate	%REC	Limits
Trifluorotoluene (PID)	151 *	53-143
Bromofluorobenzene (PID)	128	52-142

**Benzene, Toluene, Ethylbenzene, Xylenes**

Lab #:	157539	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	STANDARD	Analysis:	EPA 8021B
Matrix:	Water	Sampled:	03/14/02
Units:	ug/L	Received:	03/14/02

Field ID:	MW-8	Diln Fac:	5.000
Type:	SAMPLE	Batch#:	71090
Lab ID:	157539-005	Analyzed:	03/24/02

Analyte	Result	RL
MTBE	240	10
Benzene	650	2.5
Toluene	17	2.5
Ethylbenzene	1,200	2.5
m,p-Xylenes	1,400	2.5
o-Xylene	110	2.5

Surrogate	%REC	Limits
Trifluorotoluene (PID)	157 *	53-143
Bromofluorobenzene (PID)	124	52-142

Field ID:	MW-9	Diln Fac:	1.000
Type:	SAMPLE	Batch#:	71090
Lab ID:	157539-006	Analyzed:	03/24/02

Analyte	Result	RL
MTBE	20 C	2.0
Benzene	53	0.50
Toluene	4.2 C	0.50
Ethylbenzene	120	0.50
m,p-Xylenes	65	0.50
o-Xylene	1.8	0.50

Surrogate	%REC	Limits
Trifluorotoluene (PID)	137	53-143
Bromofluorobenzene (PID)	121	52-142

Field ID:	MW-10	Diln Fac:	1.000
Type:	SAMPLE	Batch#:	71090
Lab ID:	157539-007	Analyzed:	03/24/02

Analyte	Result	RL
MTBE	6.0	2.0
Benzene	0.61 C	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)	114	53-143
Bromofluorobenzene (PID)	111	52-142

\*= Value outside of QC limits; see narrative

C= Presence confirmed, but confirmation concentration differed by more than a factor of two

ND= Not Detected

RL= Reporting Limit

**Benzene, Toluene, Ethylbenzene, Xylenes**

Lab #:	157539	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	STANDARD	Analysis:	EPA 8021B
Matrix:	Water	Sampled:	03/14/02
Units:	ug/L	Received:	03/14/02

Field ID:	MW-11	Diln Fac:	1.000
Type:	SAMPLE	Batch#:	71090
Lab ID:	157539-008	Analyzed:	03/24/02

Analyte	Result	RL
MTBE	2.4 C	2.0
Benzene	ND	0.50
Toluene	ND	0.50
Ethylbenzene	0.64	0.50
m,p-Xylenes	ND	0.50
o-Xylene	ND	0.50

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

Type:	BLANK	Batch#:	71090
Lab ID:	QC173968	Analyzed:	03/23/02
Diln Fac:	1.000		

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)	108	53-143
Bromofluorobenzene (PID)	103	52-142

Type:	BLANK	Batch#:	71105
Lab ID:	QC174003	Analyzed:	03/24/02
Diln Fac:	1.000		

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)	115	53-143
Bromofluorobenzene (PID)	111	52-142

\*= Value outside of QC limits; see narrative  
 C= Presence confirmed, but confirmation concentration differed by more than a factor of two  
 ND= Not Detected  
 RL= Reporting Limit  
 Page 3 of 3

## Gasoline by GC/FID CA LUFT

Lab #:	157539	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	STANDARD	Analysis:	8015B(M)
Type:	BS	Diln Fac:	1.000
Lab ID:	QC173969	Batch#:	71090
Matrix:	Water	Analyzed:	03/23/02
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	2,000	1,856	93	79-120

Surrogate	%REC	Limits
Trifluorotoluene (FID)	129	68-145
Bromofluorobenzene (FID)	114	66-143

## Gasoline by GC/FID CA LUFT

Lab #:	157539	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	STANDARD	Analysis:	8015B(M)
Type:	BSD	Diln Fac:	1.000
Lab ID:	QC173973	Batch#:	71090
Matrix:	Water	Analyzed:	03/23/02
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits	RPD	Li
Gasoline C7-C12	2,000	1,916	96	79-120	3	20

Surrogate	%REC	Limits
Trifluorotoluene (FID)	129	68-145
Bromofluorobenzene (FID)	115	66-143

**Gasoline by GC/FID CA LUFT**

Lab #:	157539	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	STANDARD	Analysis:	8015B (M)
Type:	BS	Diln Fac:	1.000
Lab ID:	QC174004	Batch#:	71105
Matrix:	Water	Analyzed:	03/24/02
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	2,000	1,978	99	79-120

Surrogate	%REC	Limits
Trifluorotoluene (FID)	135	68-145
Bromofluorobenzene (FID)	124	66-143

## Gasoline by GC/FID CA LUFT

Lab #:	157539	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	STANDARD	Analysis:	8015B(M)
Type:	BSD	Diln Fac:	1.000
Lab ID:	QC174008	Batch#:	71105
Matrix:	Water	Analyzed:	03/24/02
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits	RPD	Lin
Gasoline C7-C12	2,000	1,955	98	79-120	1	20

Surrogate	%REC	Limits
Trifluorotoluene (FID)	130	68-145
Bromofluorobenzene (FID)	119	66-143



**Benzene, Toluene, Ethylbenzene, Xylenes**

Lab #:	157539	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	STANDARD	Analysis:	EPA 8021B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC173970	Batch#:	71090
Matrix:	Water	Analyzed:	03/23/02
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
MTBE	20.00	18.39	92	51-125
Benzene	20.00	19.78	99	65-122
Toluene	20.00	20.74	104	67-121
Ethylbenzene	20.00	21.37	107	70-121
m,p-Xylenes	40.00	39.73	99	72-125
o-Xylene	20.00	20.63	103	73-122

Surrogate	%REC	Limits
Trifluorotoluene (PID)	109	53-143
Bromofluorobenzene (PID)	105	52-142

**Benzene, Toluene, Ethylbenzene, Xylenes**

Lab #:	157539	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	STANDARD	Analysis:	EPA 8021B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC174005	Batch#:	71105
Matrix:	Water	Analyzed:	03/24/02
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
MTBE	20.00	18.82	94	51-125
Benzene	20.00	19.63	98	65-122
Toluene	20.00	20.79	104	67-121
Ethylbenzene	20.00	21.06	105	70-121
m,p-Xylenes	40.00	40.57	101	72-125
o-Xylene	20.00	21.11	106	73-122

Surrogate	%REC	Limits
Trifluorotoluene (PID)	110	53-143
BromoFluorobenzene (PID)	108	52-142



## Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	157539	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	STANDARD	Analysis:	EPA 8021B
Field ID:	ZZZZZZZZZZ	Batch#:	71090
MSS Lab ID:	157573-005	Sampled:	03/14/02
Matrix:	Water	Received:	03/15/02
Units:	ug/L	Analyzed:	03/23/02
Diln Fac:	1.000		

Type: MS Lab ID: QC173971

Analyte	MSS Result	Spiked	Result	%REC	Limits
MTBE	3.253	20.00	21.55	91	33-131
Benzene	<0.2200	20.00	20.16	101	52-149
Toluene	0.4376	20.00	20.95	103	69-130
Ethylbenzene	<0.05200	20.00	21.61	108	70-131
m,p-Xylenes	0.6328	40.00	41.14	101	68-137
o-Xylene	<0.1200	20.00	21.32	107	73-133

Surrogate	%REC	Limits
Trifluorotoluene (PID)	116	53-143
Bromofluorobenzene (PID)	110	52-142

Type: MSD Lab ID: QC173972

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	20.00	22.24	95	33-131	3	20
Benzene	20.00	19.84	99	52-149	2	30
Toluene	20.00	20.87	102	69-130	0	30
Ethylbenzene	20.00	21.85	109	70-131	1	30
m,p-Xylenes	40.00	40.15	99	68-137	2	30
o-Xylene	20.00	21.10	105	73-133	1	30

Surrogate	%REC	Limits
Trifluorotoluene (PID)	115	53-143
Bromofluorobenzene (PID)	109	52-142

**Benzene, Toluene, Ethylbenzene, Xylenes**

Lab #: 157539	Location: Redwood Park Service Yard
Client: Stellar Environmental Solutions	Prep: EPA 5030B
Project#: STANDARD	Analysis: EPA 8021B
Field ID: ZZZZZZZZZZ	Batch#: 71105
MSS Lab ID: 157507-014	Sampled: 03/12/02
Matrix: Water	Received: 03/13/02
Units: ug/L	Analyzed: 03/24/02
Diln Fac: 1.000	

Type: MS Lab ID: QC174009

Analyte	MSS Result	Spiked	Result	%REC	Limits
MTBE	<0.3800	20.00	20.29	101	33-131
Benzene	<0.2200	20.00	19.93	100	52-149
Toluene	<0.1100	20.00	21.43	107	69-130
Ethylbenzene	<0.05200	20.00	21.72	109	70-131
m,p-Xylenes	<0.1400	40.00	41.86	105	68-137
o-Xylene	<0.1200	20.00	21.74	109	73-133

Surrogate	%REC	Limits
Trifluorotoluene (PID)	114	53-143
Bromofluorobenzene (PID)	115	52-142

Type: MSD Lab ID: QC174010

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	20.00	20.00	100	33-131	1	20
Benzene	20.00	19.85	99	52-149	0	30
Toluene	20.00	21.34	107	69-130	0	30
Ethylbenzene	20.00	21.66	108	70-131	0	30
m,p-Xylenes	40.00	41.62	104	68-137	1	30
o-Xylene	20.00	21.68	108	73-133	0	30

Surrogate	%REC	Limits
Trifluorotoluene (PID)	114	53-143
Bromofluorobenzene (PID)	116	52-142

### Total Extractable Hydrocarbons

Lab #: 157539	Location: Redwood Park Service Yard
Client: Stellar Environmental Solutions	Prep: EPA 3520C
Project#: STANDARD	Analysis: EPA 8015B(M)
Matrix: Water	Sampled: 03/14/02
Units: ug/L	Received: 03/14/02
Diln Fac: 1.000	Prepared: 03/26/02
Batch#: 71162	

Field ID: MW-2	Lab ID: 157539-001
Type: SAMPLE	Analyzed: 03/27/02

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	105	39-137

Field ID: MW-4	Lab ID: 157539-003
Type: SAMPLE	Analyzed: 03/27/02

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	98	39-137

Field ID: MW-7	Lab ID: 157539-004
Type: SAMPLE	Analyzed: 03/27/02

Analyte	Result	RL
Diesel C10-C24	3,900 L Y	50

Surrogate	%REC	Limits
Hexacosane	93	39-137

Field ID: MW-8	Lab ID: 157539-005
Type: SAMPLE	Analyzed: 03/27/02

Analyte	Result	RL
Diesel C10-C24	3,800 L Y	50

Surrogate	%REC	Limits
Hexacosane	84	39-137

Field ID: MW-9	Lab ID: 157539-006
Type: SAMPLE	Analyzed: 03/27/02

Analyte	Result	RL
Diesel C10-C24	300 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

**Total Extractable Hydrocarbons**

Lab #:	157539	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 3520C
Project#:	STANDARD	Analysis:	EPA 8015B (M)
Matrix:	Water	Sampled:	03/14/02
Units:	ug/L	Received:	03/14/02
Diln Fac:	1.000	Prepared:	03/26/02
Batch#:	71162		

Field ID:	MW-10	Lab ID:	157539-007
Type:	SAMPLE	Analyzed:	03/28/02

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	97	39-137

Field ID:	MW-11	Analyzed:	03/28/02
Type:	SAMPLE	Cleanup Method:	EPA 3630C
Lab ID:	157539-008		

Analyte	Result	RL
Diesel C10-C24	94 L Y	50

Surrogate	%REC	Limits
Hexacosane	93	39-137

Type:	BLANK	Analyzed:	03/27/02
Lab ID:	QC174217		

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	112	39-137

# Chromatogram

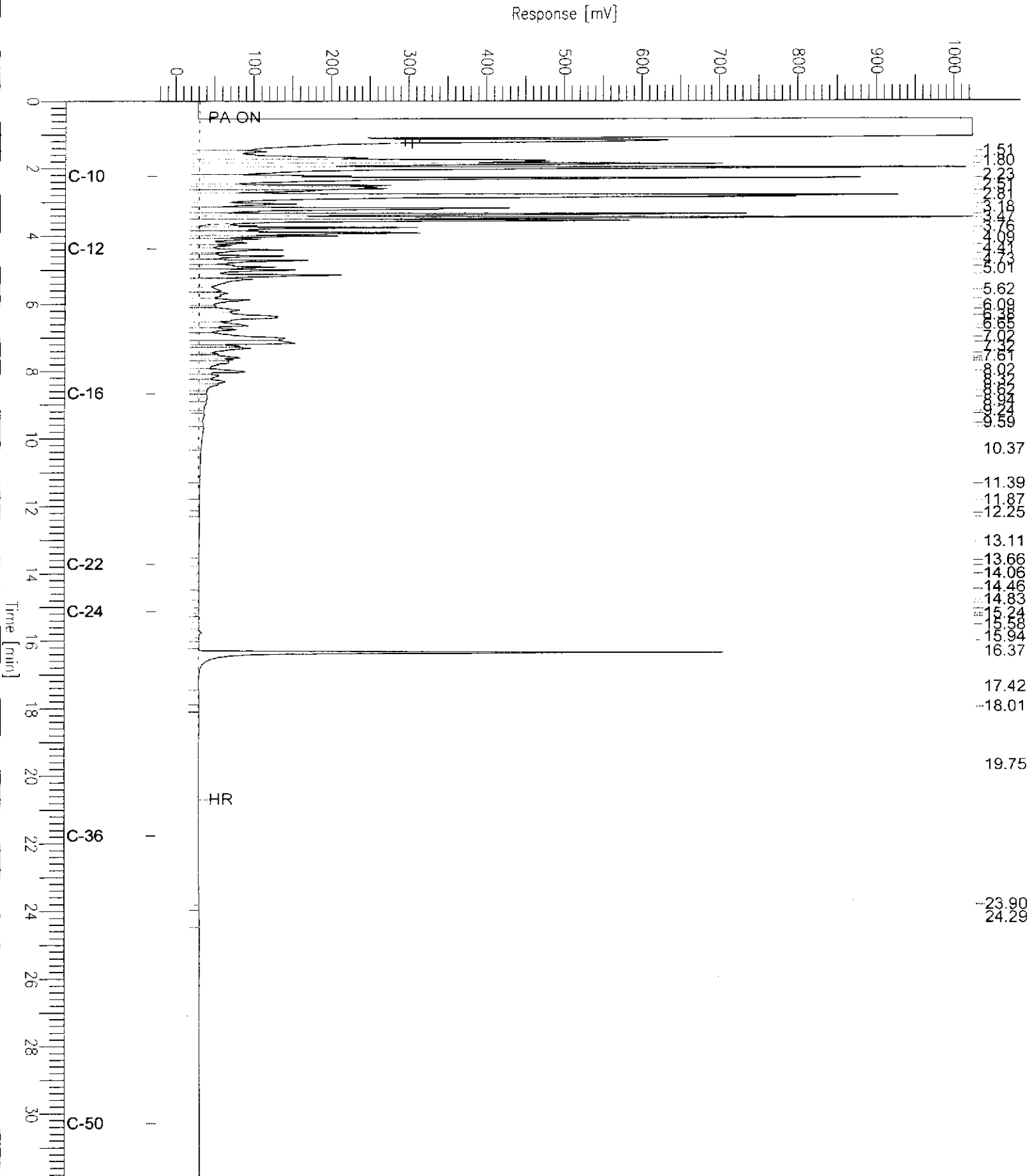
Sample Name : 157539-004,71162  
FileName : G:\GC11\CHA\084A069.RAW  
Method : ATEH057.MTH  
Start Time : 0.00 min  
Scale Factor: 0.0

End Time : 31.90 min  
Plot Offset: -24 mV

Sample #: 71162  
Date : 3/28/02 07:59 AM  
Time of Injection: 3/27/02 08:34 PM  
Low Point : -23.66 mV  
Plot Scale: 1047.7 mV

Page 1 of 1

High Point : 1024.00 mV







# Chromatogram

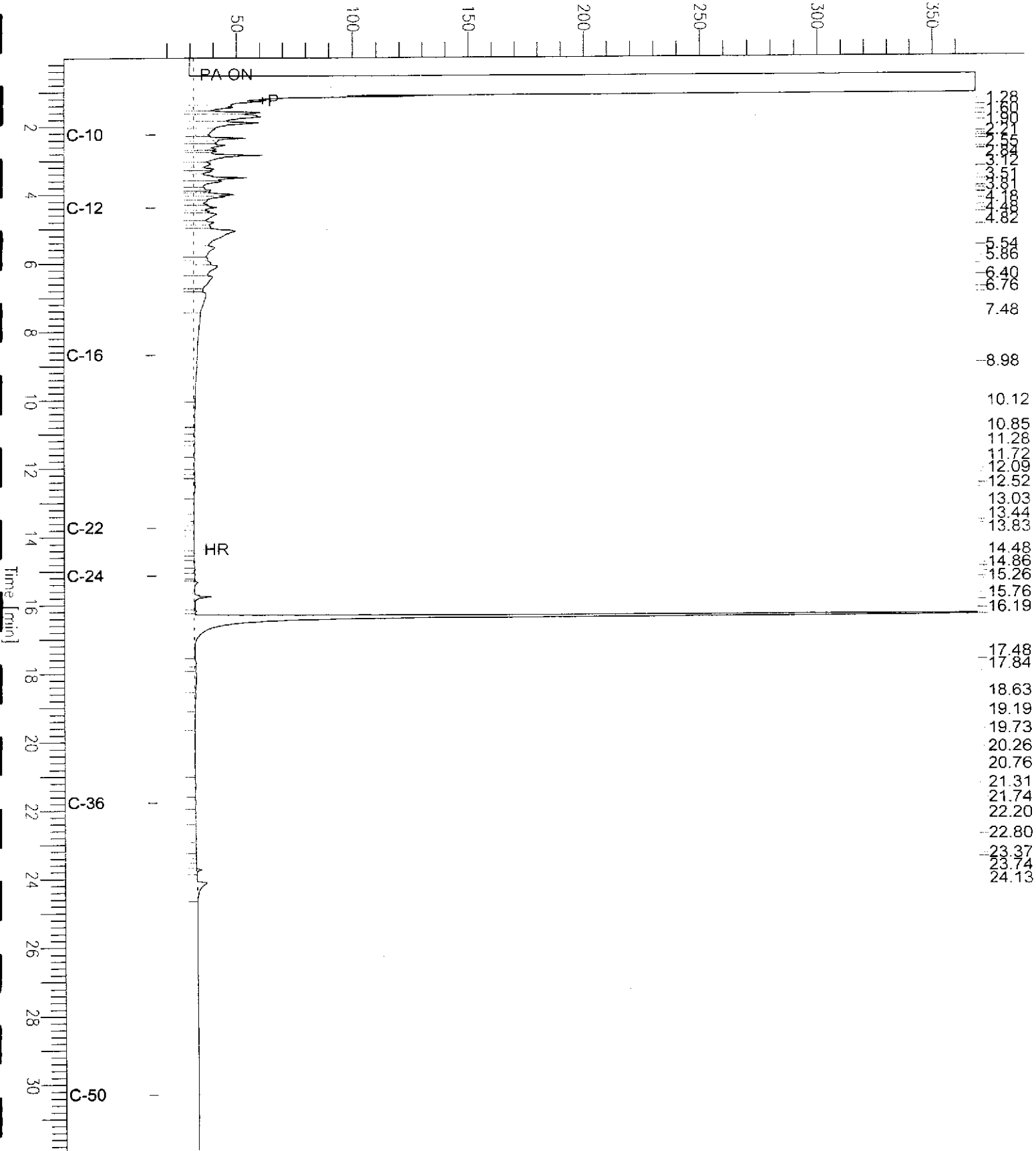
Sample Name : 157539-006,71162  
FileName : G:\GC11\CHA\084A074.RAW  
Method : ATEH057.MTH  
Start Time : 0.01 min  
Scale Factor: 0.0

End Time : 31.91 min  
Plot Offset: 15 mV

Sample #: 71162  
Date : 3/28/02 08:02 AM  
Time of Injection: 3/27/02 11:54 PM  
Low Point : 15.07 mV  
High Point : 368.85 mV  
Plot Scale: 353.8 mV

Page 1 of 1

Response [mV]

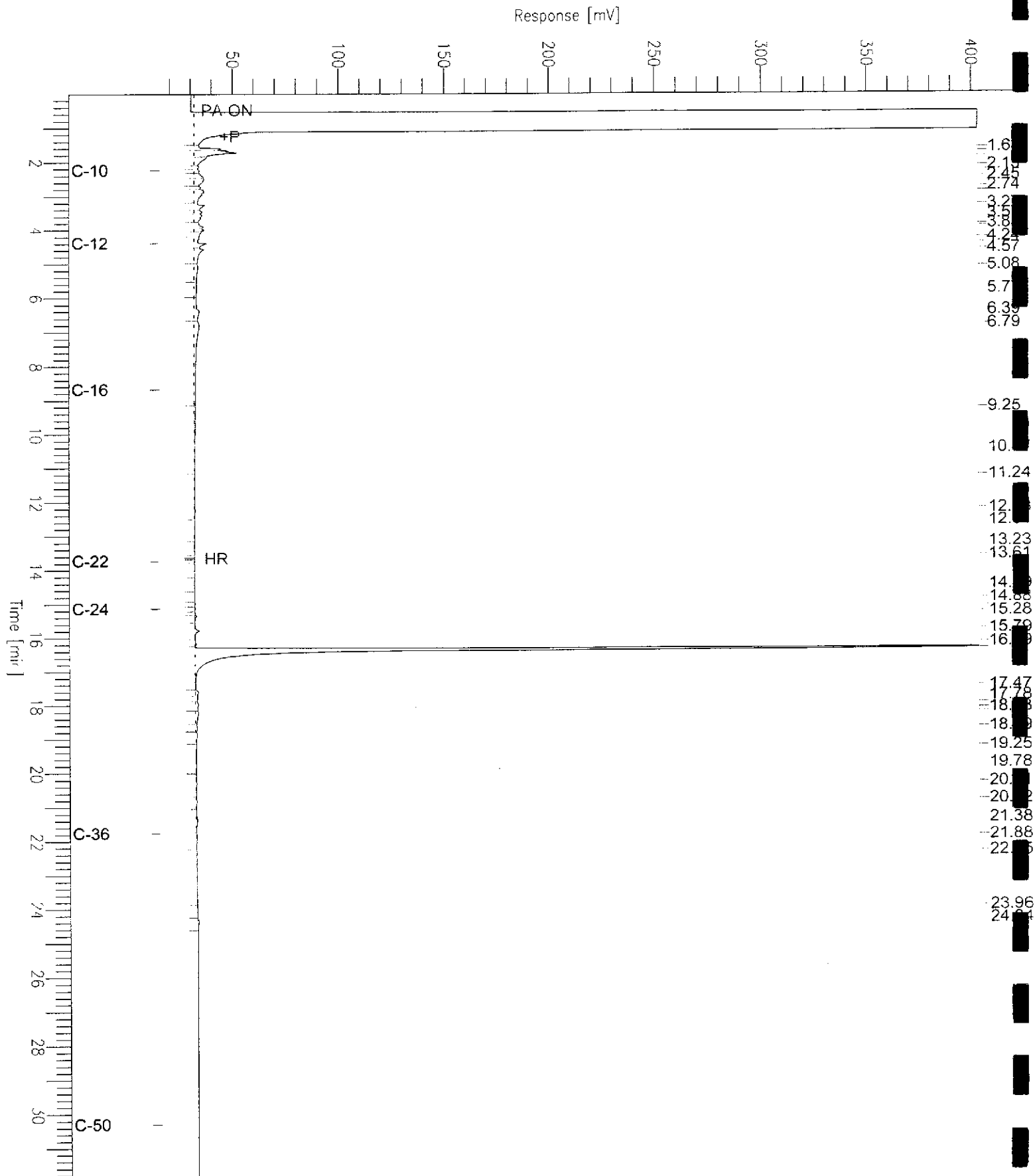


# Chromatogram

Sample Name : 157539-008,71162  
FileName : G:\GC11\CHA\084A076.RAW  
Method : ATEH057.MTH  
Start Time : 0.01 min  
Scale Factor: 0.0

End Time : 31.91 min  
Plot Offset: 16 mV

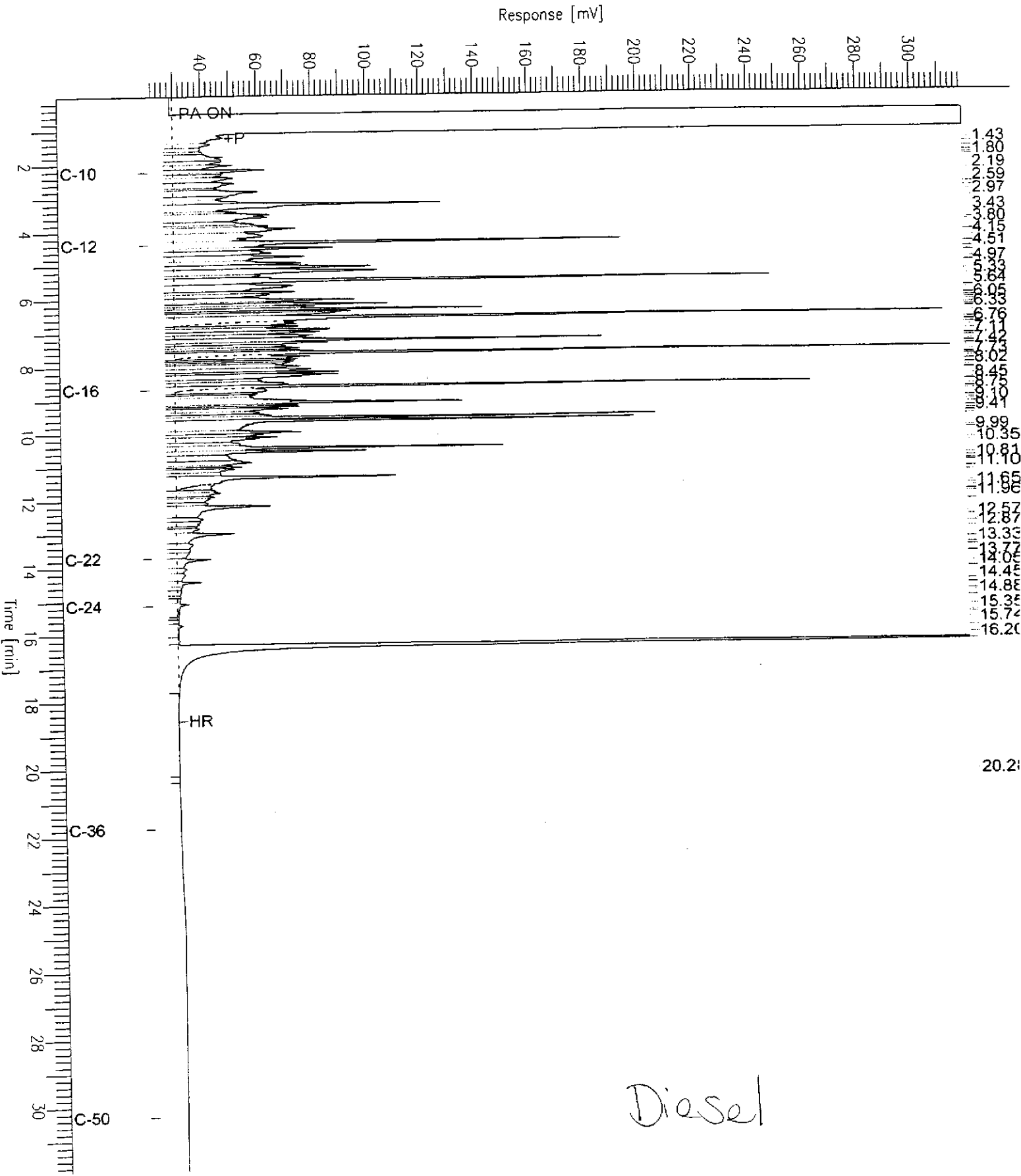
Sample #: 71162  
Date : 3/28/02 08:03 AM  
Time of Injection: 3/28/02 01:14 AM  
Low Point : 15.52 mV  
Plot Scale: 387.6 mV  
High Point : 403.11 mV



# Chromatogram

Sample Name : ccv,02ws0309,ds1  
FileName : G:\GC11\CHA\084A002.RAW  
Method : ATEH057.MTH  
Start Time : 0.01 min  
Scale Factor : 0.0

Sample #: 500mg/L  
Date : 3/25/02 01:41 PM  
Time of Injection: 3/25/02 12:34 PM  
Low Point : 20.97 mV  
High Point : 319.00 mV  
End Time : 31.91 min  
Plot Offset: 21 mV  
Plot Scale: 298.0 mV



Diesel



**Nitrate Nitrogen**

Lab #:	157539	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	METHOD
Project#:	STANDARD	Analysis:	EPA 300.0
Analyte:	Nitrogen, Nitrate	Diln Fac:	1.000
Matrix:	Water	Sampled:	03/14/02
Units:	mg/L	Received:	03/14/02

Field ID	Type	Lab ID	Result	RL	Batch#	Prepared	Analyzed
MW-3	SAMPLE	157539-002	ND	0.05	70853	03/14/02	03/14/02
MW-4	SAMPLE	157539-003	0.15	0.05	70853	03/14/02	03/14/02
MW-7	SAMPLE	157539-004	ND	0.05	70853	03/14/02	03/14/02
MW-8	SAMPLE	157539-005	ND	0.05	70853	03/14/02	03/15/02
MW-9	SAMPLE	157539-006	ND	0.05	70853	03/14/02	03/15/02
MW-10	SAMPLE	157539-007	0.54	0.05	70853	03/14/02	03/15/02
MW-11	SAMPLE	157539-008	0.06	0.05	70893	03/15/02	03/15/02
	BLANK	QC173010	ND	0.05	70853	03/14/02	03/14/02
	BLANK	QC173149	ND	0.05	70893	03/15/02	03/15/02

ND= Not Detected  
 RL= Reporting Limit  
 Page 1 of 1

## Sulfate

Lab #:	157539	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	METHOD
Project#:	STANDARD	Analysis:	EPA 300.0
Analyte:	Sulfate	Sampled:	03/14/02
Matrix:	Water	Received:	03/14/02
Units:	mg/L		

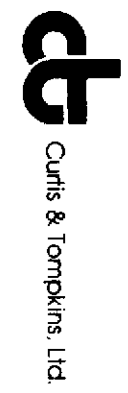
Field ID	Type	Lab ID	Result	RL	Diln Fac	Batch#	Prepared	Analyzed
MW-3	SAMPLE	157539-002	37	0.50	1.000	70853	03/14/02	03/14/02
MW-4	SAMPLE	157539-003	44	0.50	1.000	70853	03/14/02	03/14/02
MW-7	SAMPLE	157539-004	15	0.50	1.000	70853	03/14/02	03/14/02
MW-8	SAMPLE	157539-005	14	0.50	1.000	70853	03/14/02	03/15/02
MW-9	SAMPLE	157539-006	57	5.0	10.00	70853	03/14/02	03/15/02
MW-10	SAMPLE	157539-007	76	5.0	10.00	70853	03/14/02	03/15/02
MW-11	SAMPLE	157539-008	69	5.0	10.00	70893	03/15/02	03/15/02
	BLANK	QC173010	ND	0.50	1.000	70853	03/14/02	03/14/02
	BLANK	QC173149	ND	0.50	1.000	70893	03/15/02	03/15/02

**Nitrate Nitrogen**

Lab #:	157539	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	METHOD
Project#:	STANDARD	Analysis:	EPA 300.0
Analyte:	Nitrogen, Nitrate	Matrix:	Water
Field ID:	ZZZZZZZZZZ	Units:	mg/L

Type	MSS	Lab ID	Lab ID	MSS Result	Spiked	Result	%RBC	Limits	RPD	Lim	Diln	Fac	Batch#	Sampled	Received	Analyzed
BS			QC173011		2.000	2.020	101	90-110				1.000	70853			03/14/02
BSD			QC173012		2.000	2.050	102	90-110	1	20		1.000	70853			03/14/02
MS	157523-001		QC173013	79.87	100.0	184.0	104	80-120				100.0	70853	03/13/02	03/14/02	03/14/02
MSD	157523-001		QC173014		100.0	186.4	107	80-120	1	20		100.0	70853	03/13/02	03/14/02	03/14/02
BS			QC173150		2.000	2.081	104	90-110				1.000	70893			03/15/02
BSD			QC173151		2.000	2.062	103	90-110	1	20		1.000	70893			03/15/02
MS	157385-001		QC173152	<1.000	20.00	21.73	109	80-120				20.00	70893	03/07/02	03/07/02	03/15/02
MSD	157385-001		QC173153		20.00	20.17	101	80-120	7	20		20.00	70893	03/07/02	03/07/02	03/15/02

RPD= Relative Percent Difference  
Page 1 of 1

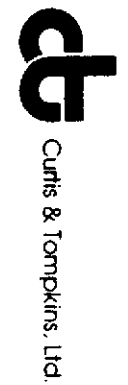


**Sulfate**

Lab #:	157539	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	METHOD
Project#:	STANDARD	Analysis:	EPA 300.0
Analyte:	Sulfate	Matrix:	Water
Field ID:	ZZZZZZZZZZ	Units:	mg/L

Type	MSS	Lab ID	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim	Diln	Fac	Batch#	Sampled	Received	Analyzed
BS			QC173011		20.00	20.34	102	90-110			1.000		70853			03/14/02
BSD			QC173012		20.00	20.49	102	90-110	1	20	1.000		70853			03/14/02
MS	157523-001		QC173013	491.0	1,000	1,498	101	72-125			100.0		70853	03/13/02	03/14/02	03/14/02
MSD	157523-001		QC173014		1,000	1,535	104	72-125	2	20	100.0		70853	03/13/02	03/14/02	03/14/02
BS			QC173150		20.00	20.40	102	90-110			1.000		70893			03/15/02
BSD			QC173151		20.00	20.53	103	90-110	1	20	1.000		70893			03/15/02
MS	157385-001		QC173152	523.7	200.0	717.5	97	72-125			20.00		70893	03/07/02	03/07/02	03/15/02
MSD	157385-001		QC173153		200.0	723.3	100	72-125	1	20	20.00		70893	03/07/02	03/07/02	03/15/02

RPD= Relative Percent Difference  
Page 1 of 1







Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878

2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

A N A L Y T I C A L   R E P O R T

Prepared for:

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

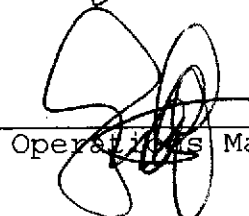
Date: 29-MAR-02  
Lab Job Number: 157556  
Project ID: N/A  
Location: Redwood Park Service Yard

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

This package may be reproduced only in its entirety.



Laboratory Numbers: **157556**  
Client: **Stellar Environmental Solutions**  
Project #: **001-07965**  
Location: **SF/A North Terminal**  
COC#: **100061**

Sampled Date: **03/14/02**  
Received Date: **03/14/02**

### **CASE NARRATIVE**

This hardcopy data package contains samples and QC results for two water samples, which were received from the site referenced above on March 14, 2002. The samples were received cold and intact.

#### **TVH/BTXE:**

m,p-Xylenes were detected in the method blank (QC173355) for batch# 70943. These compounds were not detected in the associated samples therefore; the quality of the data is not affected. The MTBE matrix spike recoveries, of sample CT# 157576-001, are considered not meaningful (NM) as 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.

157550

# Chain of Custody Record

Lab job no. \_\_\_\_\_  
 Date 3/14/02  
 Page 1 of 1

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

Method of Shipment hand delivery  
 Shipment No. \_\_\_\_\_  
 Airbill No. \_\_\_\_\_  
 Cooler No. \_\_\_\_\_  
 Project Manager Bivee Rudees  
 Telephone No. (510) 644-3123  
 Fax No. (510) 644-3859  
 Samplers: (Signature) B.M. Fluh

Field Sample Number	Location/Depth	Date	Time	Sample Type	Type/Size of Container	Preservation		Filtered	No. of Containers	Analysis Required	Remarks
						Cooler	Chemical				
-1 SW-2	-	3/14/02	9:10	H2O	2 40ml Vials	✓	HCl	2	X		
					1-L amber glass	✓	-	1	X		
-2 SW-3	-	↓	9:35	↓	" "	✓	HCl	2	X		
					" "	✓	-	1	X		

Preservation Correct?  
 Yes  No  N/A

Received  On Ice  
 Cold  Ambient  Intact

Relinquished by: Signature <u>B.M. Fluh</u> Printed <u>Bivee M. Rudees</u> Company <u>Stellar ENV. Solns</u>	Date <u>3/14/02</u> Time <u>9:55</u>	Received by: Signature <u>[Signature]</u> Printed <u>A. Alvarez</u> Company <u>CiT</u>	Date <u>3/14/02</u> Time <u>9:35</u>	Relinquished by: Signature _____ Printed _____ Company _____	Date _____ Time _____	Received by: Signature _____ Printed _____ Company _____	Date _____ Time _____
Turnaround Time: <u>5 DAY</u>				Relinquished by: Signature _____ Printed _____ Company _____			
Comments: _____				Relinquished by: Signature _____ Printed _____ Company _____			

2000-00-01





## Gasoline by GC/FID CA LUFT

Lab #:	157556	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	STANDARD	Analysis:	8015B(M)
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC173356	Batch#:	70943
Matrix:	Water	Analyzed:	03/19/02
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	2,000	1,866	93	79-120

Surrogate	%REC	Limits
Trifluorotoluene (FID)	103	68-145
Bromofluorobenzene (FID)	86	66-143



**Benzene, Toluene, Ethylbenzene, Xylenes**

Lab #:	157556	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	STANDARD	Analysis:	EPA 8021B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC173357	Batch#:	70943
Matrix:	Water	Analyzed:	03/19/02
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
MTBE	20.00	19.78	99	51-125
Benzene	20.00	20.52	103	65-122
Toluene	20.00	20.15	101	67-121
Ethylbenzene	20.00	20.21	101	70-121
m,p-Xylenes	40.00	37.13	93	72-125
o-Xylene	20.00	19.51	98	73-122

Surrogate	%REC	Limits
Trifluorotoluene (PID)	87	53-143
Bromofluorobenzene (PID)	80	52-142

**Benzene, Toluene, Ethylbenzene, Xylenes**

Lab #:	157556	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	STANDARD	Analysis:	EPA 8021B
Field ID:	ZZZZZZZZZZ	Batch#:	70943
MSS Lab ID:	157576-001	Sampled:	03/13/02
Matrix:	Water	Received:	03/14/02
Units:	ug/L	Analyzed:	03/19/02
Diln Fac:	1.000		

Type: MS Lab ID: QC173358

Analyte	MSS Result	Spiked	Result	%REC	Limits
MTBE	203.3	20.00	220.4	85 NM	33-131
Benzene	6.481	20.00	27.38	104	52-149
Toluene	2.385	20.00	23.34	105	69-130
Ethylbenzene	4.132	20.00	24.63	102	70-131
m,p-Xylenes	8.207	40.00	47.52	98	68-137
o-Xylene	3.218	20.00	24.18	105	73-133

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

Type: MSD Lab ID: QC173359

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	20.00	216.7	67 NM	33-131	2	20
Benzene	20.00	27.08	103	52-149	1	30
Toluene	20.00	22.95	103	69-130	2	30
Ethylbenzene	20.00	24.39	101	70-131	1	30
m,p-Xylenes	40.00	45.68	94	68-137	4	30
o-Xylene	20.00	23.22	100	73-133	4	30

Surrogate	%REC	Limits
Trifluorotoluene (PID)	92	53-143
Bromofluorobenzene (PID)	83	52-142



**Total Extractable Hydrocarbons**

Lab #:	157556	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 3520C
Project#:	STANDARD	Analysis:	8015B(M)
Matrix:	Water	Sampled:	03/14/02
Units:	ug/L	Received:	03/14/02
Diln Fac:	1.000	Prepared:	03/20/02
Batch#:	71020	Analyzed:	03/21/02

Field ID: SW-2                      Lab ID: 157556-001  
 Type: SAMPLE

Analyte	Result	RL
Diesel C10-C24	ND	50
Surrogate	%REC	Limits
Hexacosane	103	39-137

Field ID: SW-3                      Lab ID: 157556-002  
 Type: SAMPLE

Analyte	Result	RL
Diesel C10-C24	ND	50
Surrogate	%REC	Limits
Hexacosane	100	39-137

Type: BLANK                      Cleanup Method: EPA 3630C  
 Lab ID: QC173679

Analyte	Result	RL
Diesel C10-C24	ND	50
Surrogate	%REC	Limits
Hexacosane	79	39-137

**Total Extractable Hydrocarbons**

Lab #:	157556	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 3520C
Project#:	STANDARD	Analysis:	8015B(M)
Matrix:	Water	Batch#:	71020
Units:	ug/L	Prepared:	03/20/02
Diln Fac:	1.000	Analyzed:	03/21/02

Type: BS Cleanup Method: EPA 3630C  
 Lab ID: QC173680

Analyte	Spiked	Result	%REC	Limits
Diesel C10-C24	2,500	1,945	78	37-120
Surrogate	%REC	Limits		
Hexacosane	86	39-137		

Type: BSD Cleanup Method: EPA 3630C  
 Lab ID: QC173681

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Diesel C10-C24	2,500	2,118	85	37-120	9	26
Surrogate	%REC	Limits				
Hexacosane	91	39-137				

Figure C.1 - Year 2001 Ground Water Analytical Results: Well MW-7  
TPH-gasoline and TPH-Diesel  
Redwood Regional Park Service Yard, Oakland, California

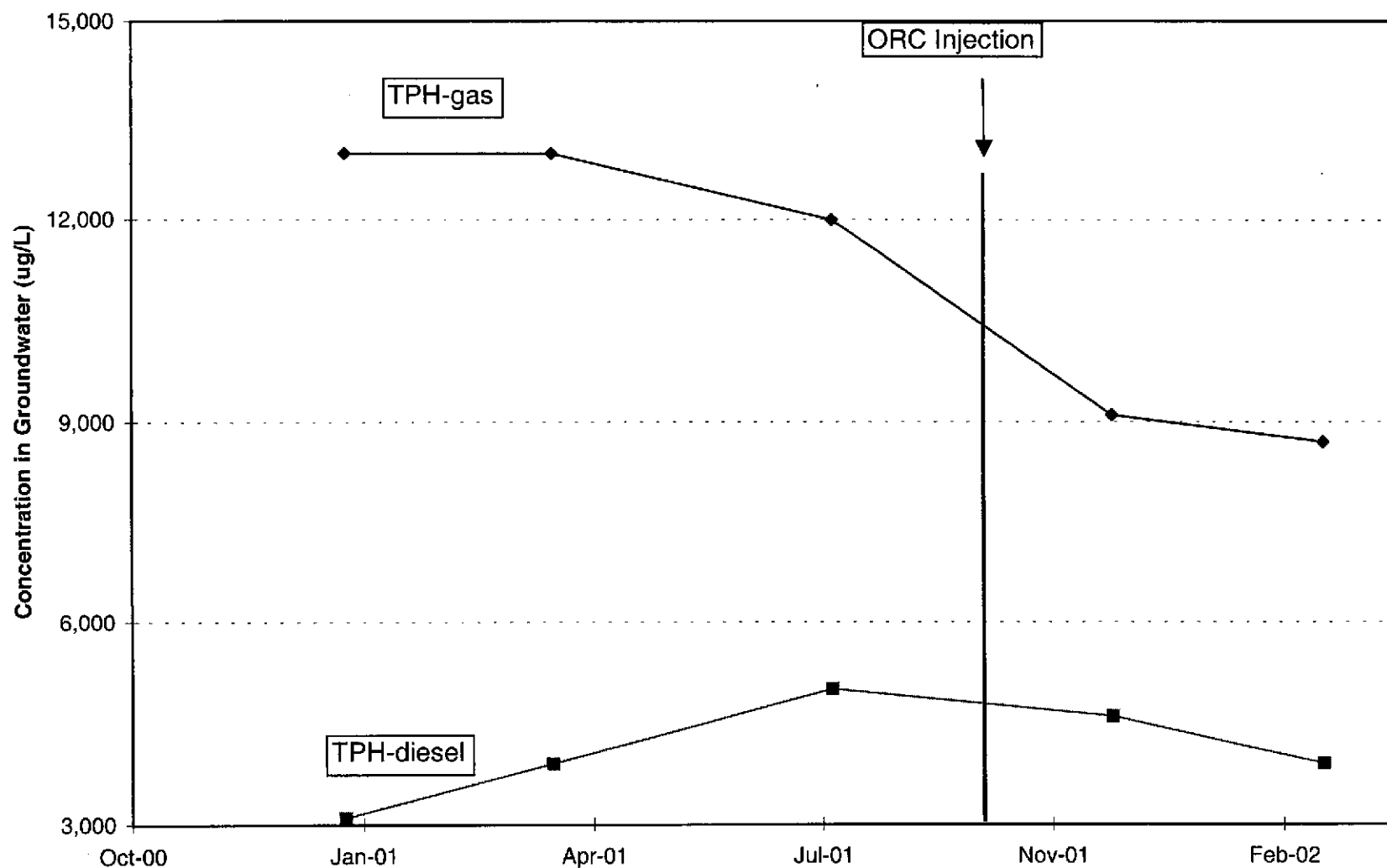


Figure C.2 - Year 2001 Ground Water Analytical Results: Well MW-8  
TPH-gasoline and TPH-diesel  
Redwood Regional Park Service Yard, Oakland, California

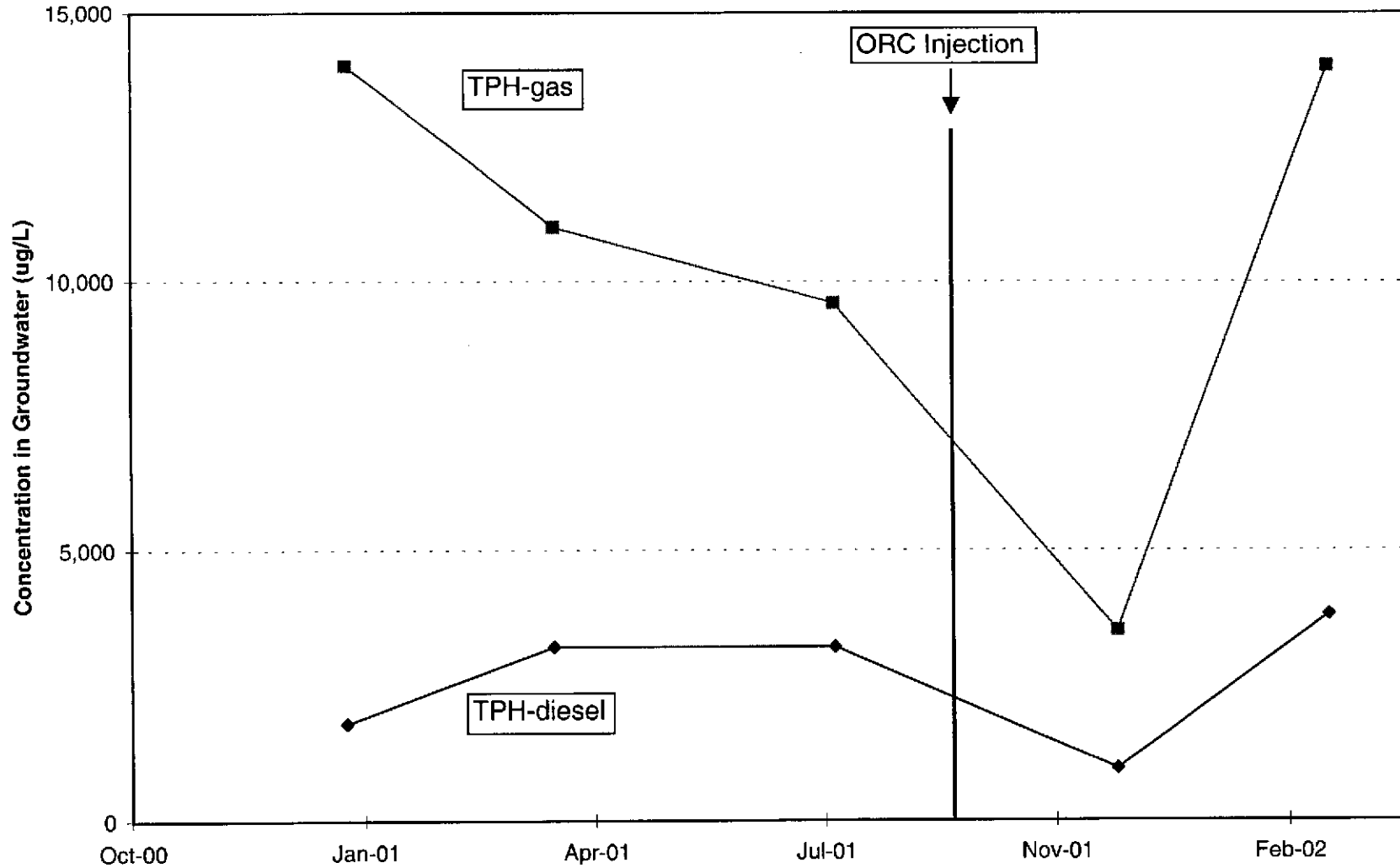


Figure C.3 - Year 2001 Ground Water Analytical Results: Well MW-9  
TPH-gasoline and TPH-diesel  
Redwood Regional Park Service Yard, Oakland, California

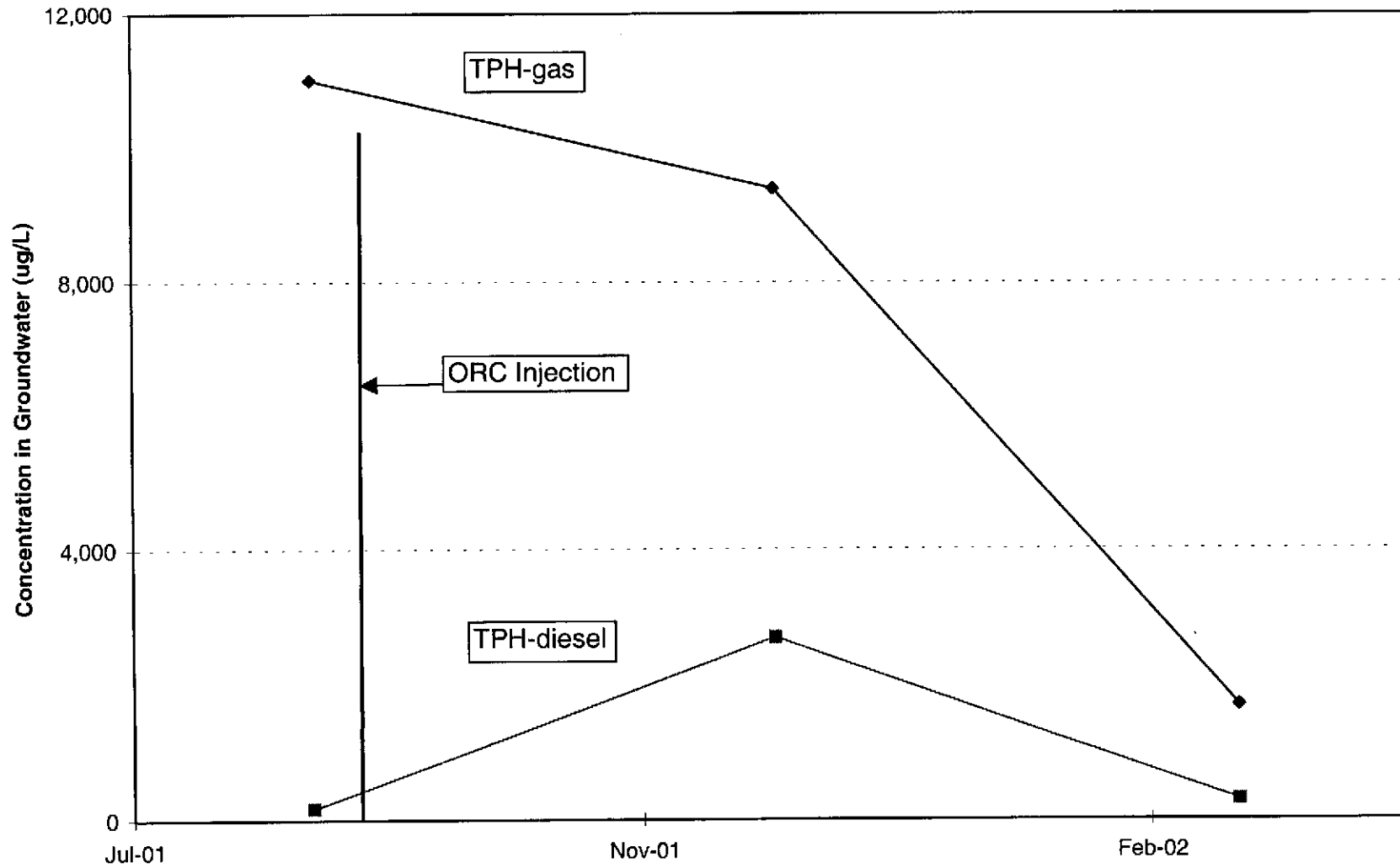


Figure C.4 - Year 2001 Ground Water Analytical Results: Well MW-10  
TPH-gasoline and TPH-diesel  
Redwood Regional Park Service Yard, Oakland, California

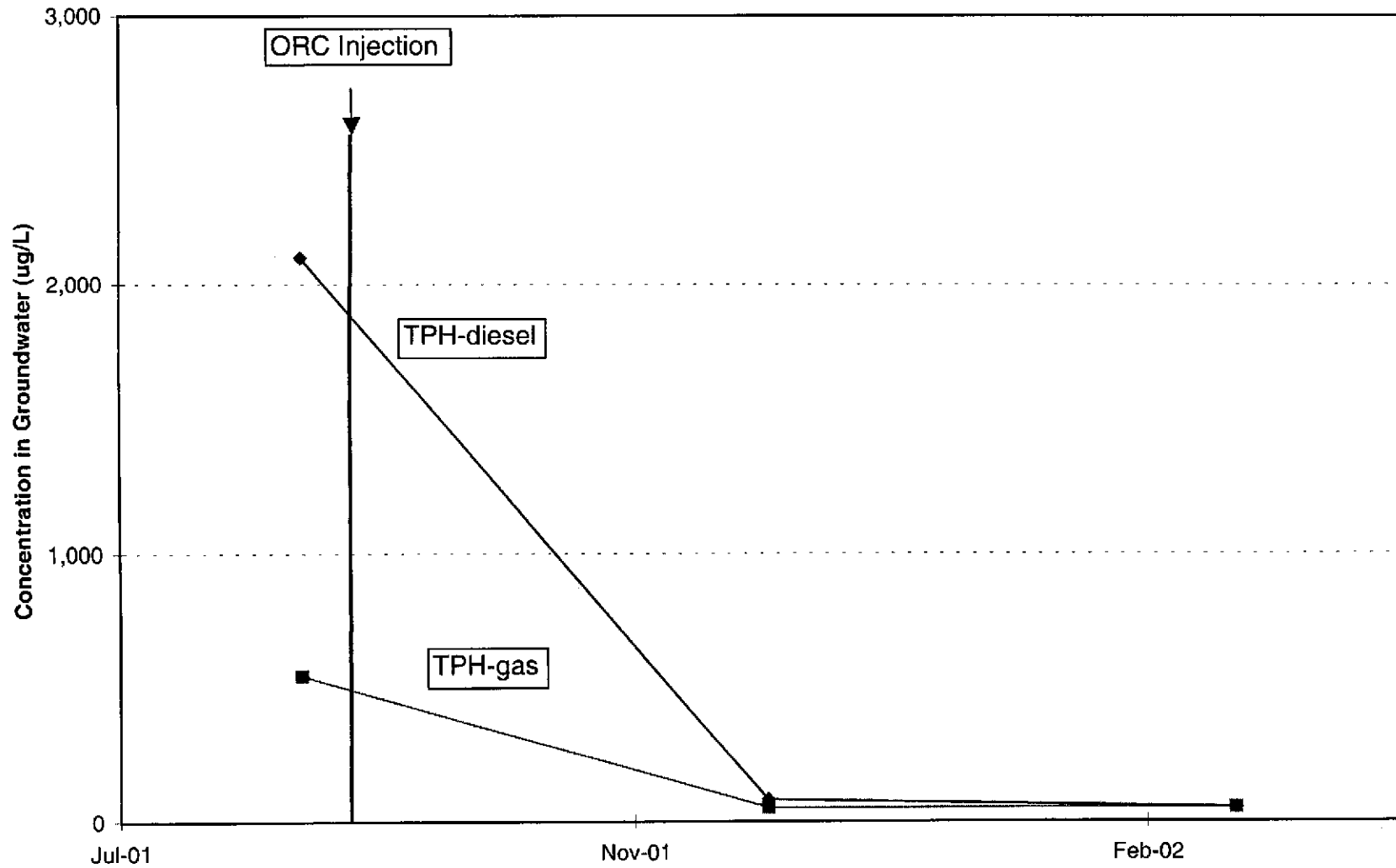
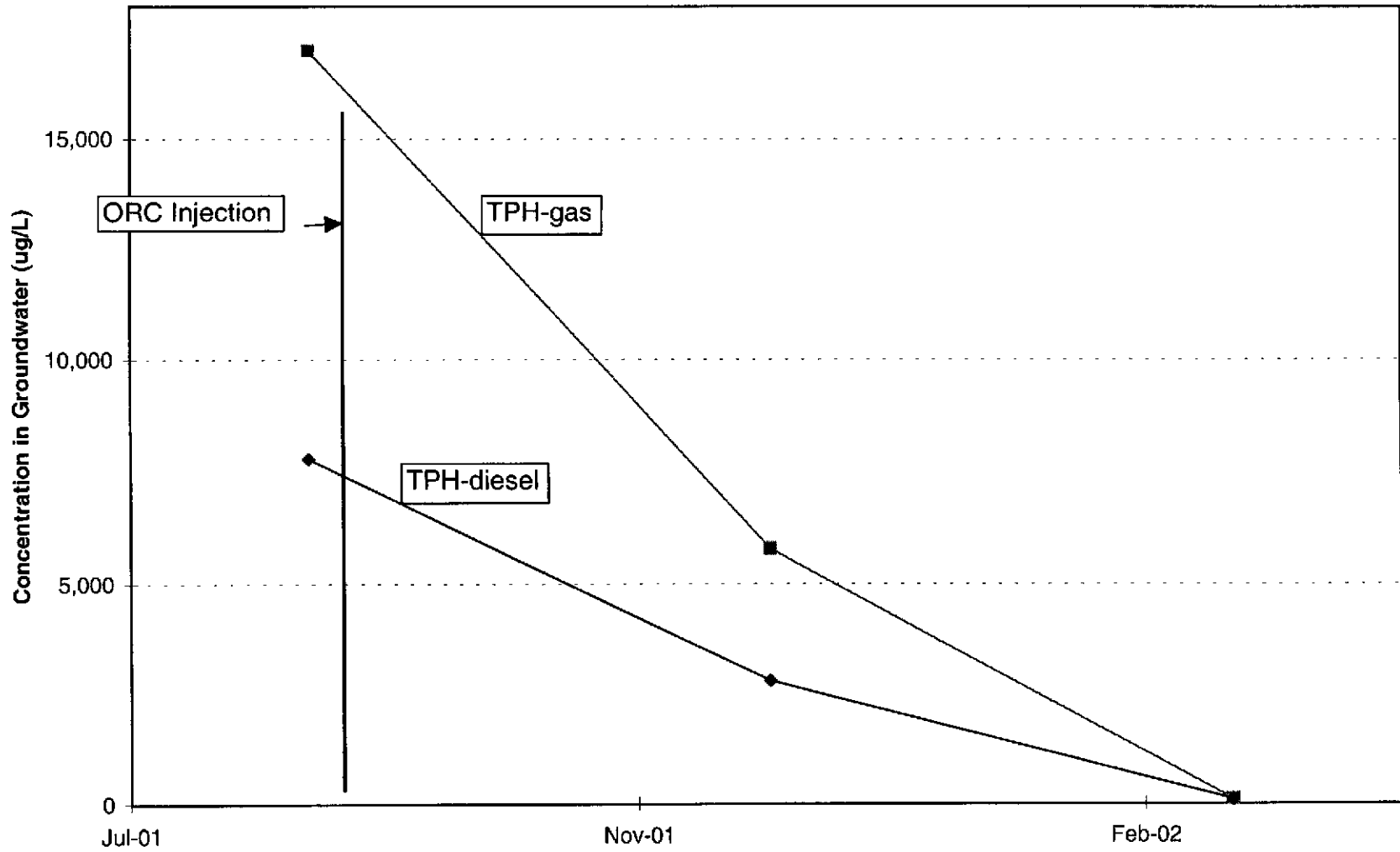


Figure C.5 - Year 2001 Ground Water Analytical Results: Well MW-11  
TPH-gasoline and TPH-diesel  
Redwood Regional Park Service Yard, Oakland, California



**HISTORICAL GROUNDWATER MONITORING WELLS ANALYTICAL RESULTS**  
**REDWOOD REGIONAL PARK SERVICE YARD, OAKLAND, CALIFORNIA**  
(all concentrations in µg/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
21	Mar-02	< 50	< 50	2.3	0.51	1.9	1.3	8.3	8.2

NA = Not Analyzed for this constituent



(continued)

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
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

NA = Not Analyzed for this constituent

(continued)

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

(continued)

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

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

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

(continued)

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

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

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

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

<b>Sampling Location SW-1 (Upstream of Contaminated Groundwater Discharge Location SW-2)</b>									
<b>Event</b>	<b>Date</b>	<b>TPHg</b>	<b>TPHd</b>	<b>Benzene</b>	<b>Toluene</b>	<b>Ethylbenzene</b>	<b>Total Xylenes</b>	<b>Total BTEX</b>	<b>MTBE</b>
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

NA = Not Analyzed for this constituent

(continued)

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

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

NA = Not Analyzed for this constituent