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TRANSMITTAL MEMORANDUM

TO: ALAMEDA COUNTY HEALTH CARE SERVICES DATE: 02/13/01
AGENCY
DEPT. OF ENVIRONMENTAL HEALTH
HAZARDOUS MATERIALS DIVISION
1131 HARBOR BAY PKWY, SUITE 250
ALAMEDA, CA 94502

ATTENTION: SCOTT SEERY FILE: SES-2000-46
SUBJECT: REDWOOD REGIONAL PARK FUEL
LEAK SITE

WE ARE SENDING: HEREWITH ≤ UNDER SEPARATE COVER
 VIA MAIL ≤ VIA

THE FOLLOWING: MONITORING WELL INSTALLATION AND SITE MONITORING
 REPORT (FEB 2001)

 ≤ AS REQUESTED ≤ FOR YOUR APPROVAL
 ≤ FOR REVIEW FOR YOUR USE
 ≤ FOR SIGNATURE ≤ FOR YOUR FILES

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

BY: Bruce Rucker BR

February 8, 2001

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

Subject: Monitoring Well Installation and Site Monitoring Report for
Redwood Regional Park Service Yard Site - Oakland, California

Dear Mr. Seery:

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

This report summarizes installation of two groundwater monitoring wells in December 2000 and the subsequent January 2001 site monitoring event, which included groundwater and creek surface water sampling and analysis. If you have any questions regarding this report, please contact Mr. Ken Burger of the Park District, or contact us directly at (510) 644-3123.

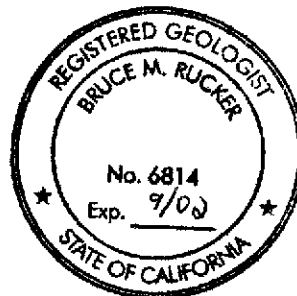
Sincerely,

Bruce M. Rucker

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

Richard S. Makdisi

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

**MONITORING WELL
INSTALLATION AND SITE
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**

February 8, 2001

Project No. 2000-46

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EXECUTIVE SUMMARY

BACKGROUND

Since 1993, site investigations and remediation associated with former underground fuel storage tanks (UFSTs) have been conducted at the East Bay Regional Park District's (EBRPD) Redwood Regional Park Service Yard (project site) located at 7867 Redwood Road in Oakland, Alameda County, California. These activities have been conducted under oversight of Alameda County Health Care Services Agency (ACHCSA), as the lead regulatory agency. The UFSTs and the source area contaminated soil have been removed, and several phases of exploratory borehole investigations have been completed to characterize the lateral and vertical extent of hydrocarbon contamination. Historical discharge of hydrocarbon-contaminated groundwater into Redwood Creek has been detected sporadically, generally at low creek flow periods.

Groundwater sampling has been conducted on an approximately quarterly basis since November 1994 (17 events total). The existing monitoring well network has defined the lateral limits of groundwater contamination. At the request of ACHCSA, two additional groundwater monitoring wells were installed at the site in December 2000 to allow for a more focused evaluation of contaminant migration and potential impacts to the creek.

Soil samples collected from the capillary fringe in each of the two newly installed well boreholes had contaminant concentrations comparable to those historically detected, reflecting the continued contribution of groundwater-sourced contamination to the capillary fringe at areas downgradient of the release.

Historical maximum monitoring well contaminant concentrations (for all analytes except diesel) were detected in new well MW-8, located approximately halfway between the former source area and Redwood Creek, indicating that the groundwater plume's center of mass has not reached Redwood Creek.

Current event contaminant concentrations in new well MW-7 exceeded those in nearby well MW-4, confirming that well MW-7 (located along the centerline of the plume) is the more appropriate sampling location for precise evaluation of downgradient maximum contaminant concentrations.

Natural attenuation is indicated to be occurring at the site, but it occurs mainly at the plume margins and former source area. Natural attenuation is likely minimal in the higher concentration portion along the centerline of the plume due to limited oxygen availability, suggesting that natural attenuation has not been, and will not be in the future, sufficient to attenuate the plume before it migrates downgradient to impact Redwood creek.

In the current creek monitoring event, only ethylbenzene was detected (at a trace concentration) at the creek sampling location at the area of historical groundwater discharge to the creek, which is typical of historical monitoring events conducted during high-flow conditions.

In accordance with an ACHCSA request, SES previously completed a Feasibility Study to determine the most appropriate and cost-effective remedial strategy. This was determined to be injection of oxygen-release compound (ORC) and compliance monitoring. The ACHCSA approved the remedial strategy in their January 8, 2001 letter to the EBRPD.

PROPOSED ACTIONS

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

- Implement the approved remedial strategy as delineated in the Feasibility Study, as soon as practical after funding is secured by the EBRPD.
- Continue the quarterly program of creek and groundwater sampling and reporting.

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 more of two former underground fuel storage tanks (UFSTs) that contained gasoline and diesel fuel. The Alameda County Health Care Services Agency (ACHCSA) has provided regulatory oversight of the investigation since its inception. Other involved regulatory agencies 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 December 2000 installation of two additional groundwater monitoring wells, as requested in the ACHCSA August 22, 2000 letter, and the results from the January 2001 surface water and groundwater monitoring event. While the existing groundwater monitoring well network and historical monitoring program have defined the lateral limits of the hydrocarbon plume, ACHCSA requested that two additional groundwater monitoring wells be installed and added to the quarterly groundwater monitoring program to provide a more focused evaluation of hydrochemical trends. An October 19, 2000 workplan for the well installations was previously submitted to and approved by ACHCSA (SES, 2000b).

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 previous most recent site monitoring event was conducted in September 2000.

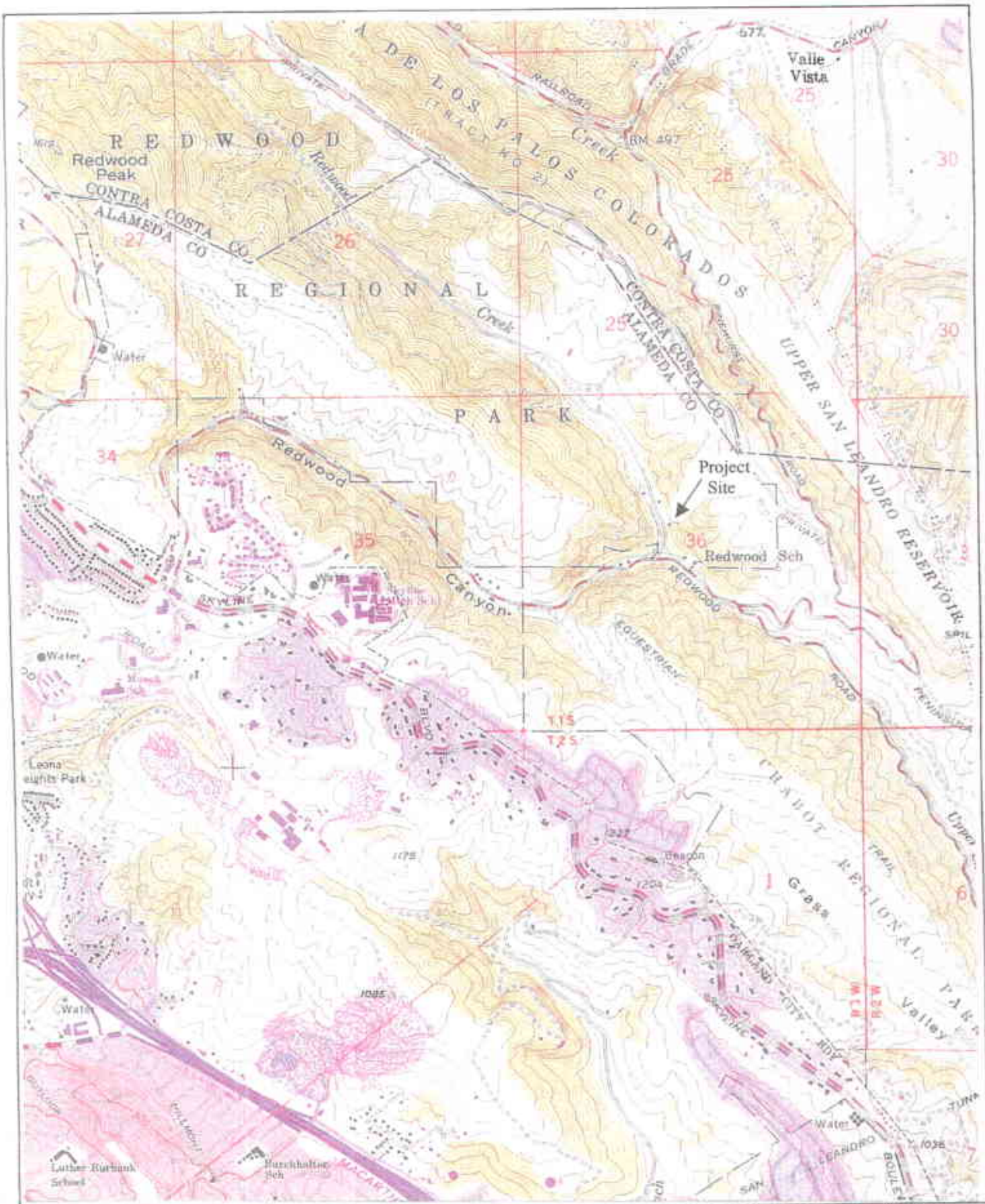
SITE DESCRIPTION

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

REGULATORY OVERSIGHT

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

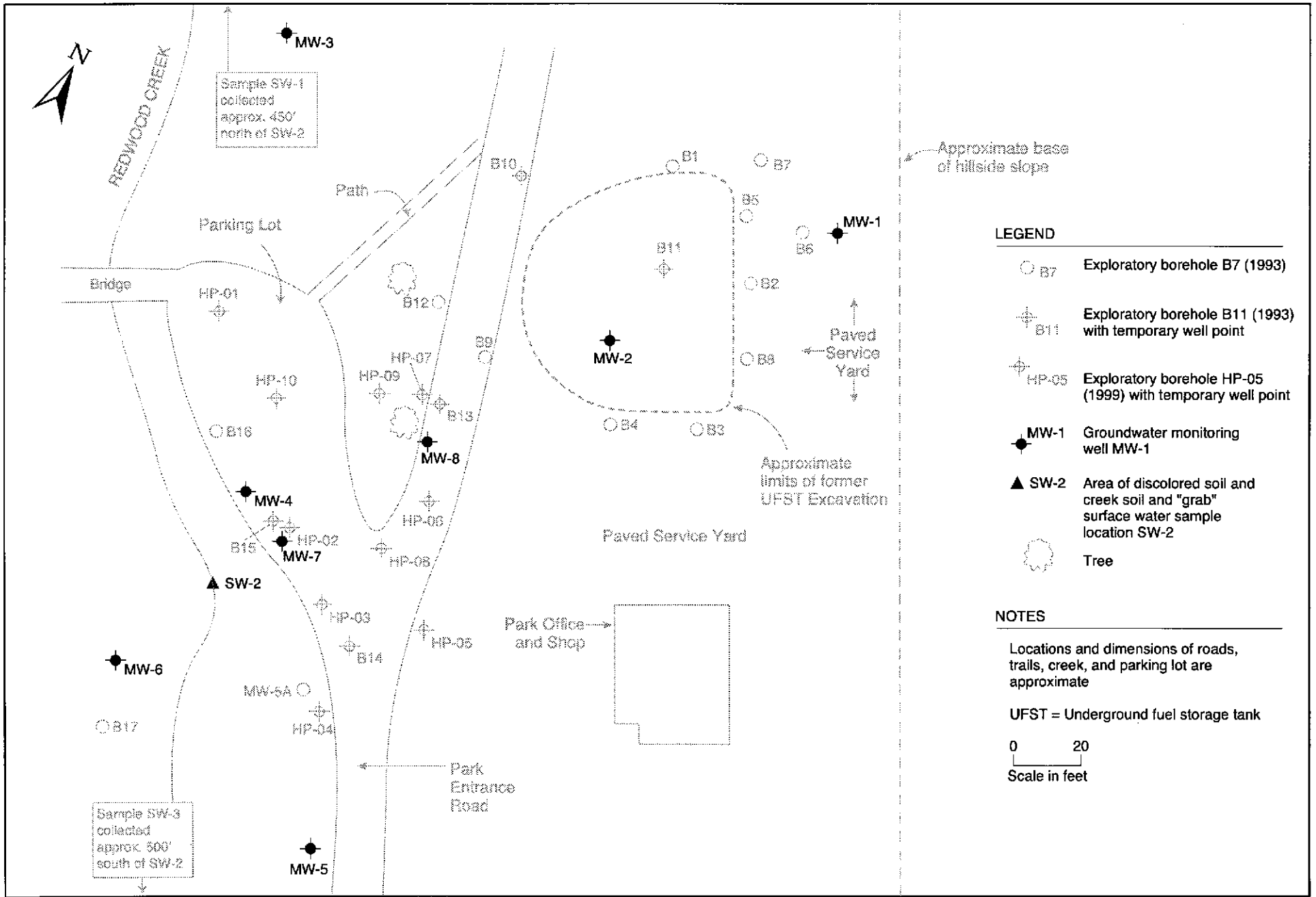
NOVEMBER 1997

Figure 1



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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

2000-46-04

2.0 PHYSICAL SETTING

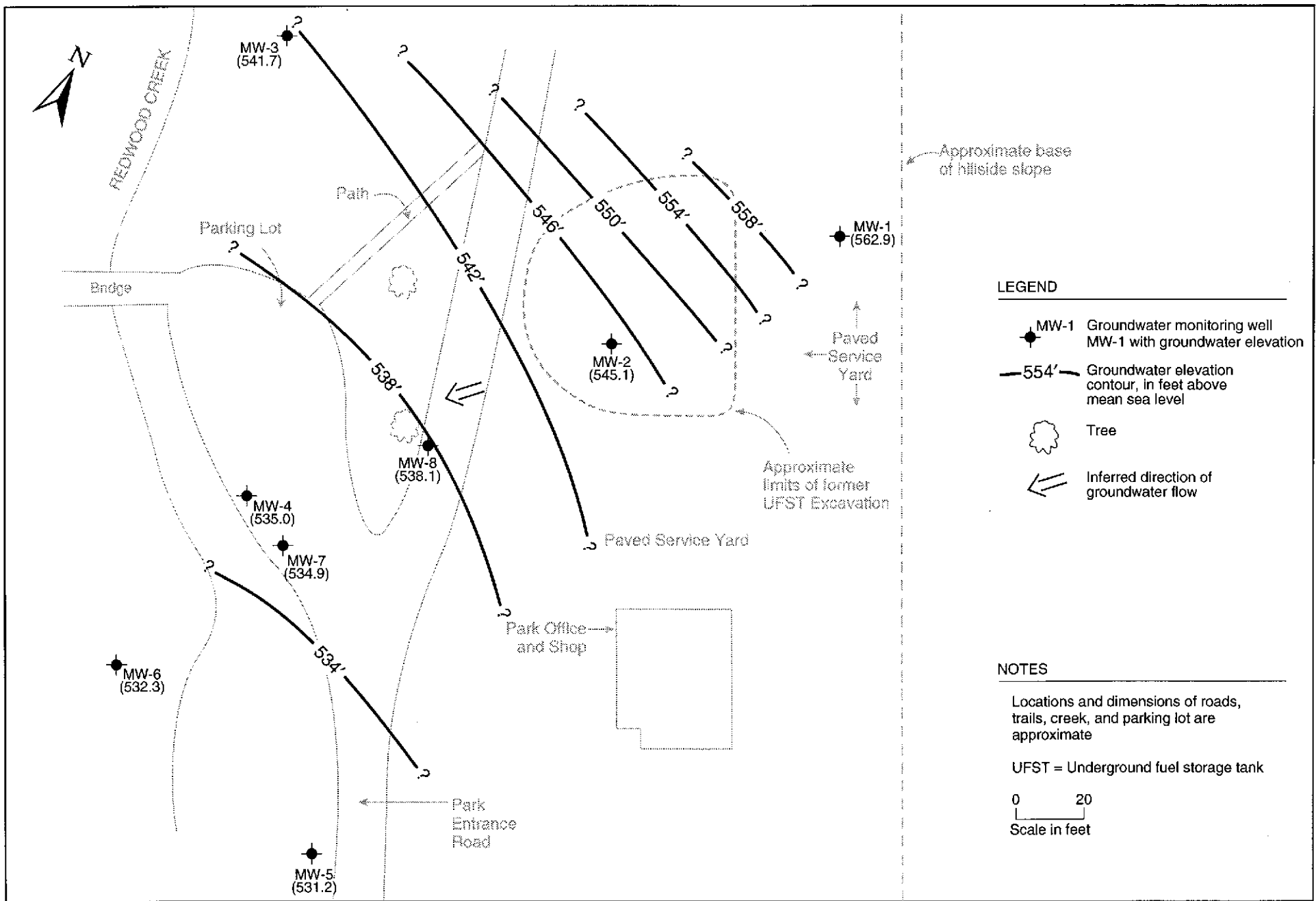
Following is a brief summary of the site hydrogeologic conditions based on geologic logging and water level measurements collected at the site since September 1993. A full discussion is presented in the SES June 1999 report.

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 all monitoring well boreholes, a 5- to 10-foot thick clayey coarse-grained sand and clayey gravel unit was encountered that laterally grades to a clay or silty clay. This unit overlies a weathered siltstone at the base of the observed soil profile. Soils in the vicinity of MW-1 are inferred to be landslide debris.

Groundwater at the site occurs under unconfined and semi-confined conditions at a depth between 12.5 and 19 feet below ground surface (bgs), corresponding to the top of the clayey, silty sand-gravel zone. 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 January 2001 monitoring well static water levels, and Table 2 (in Chapter 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.

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

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



2000-46-13

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GROUNDWATER ELEVATION MAP—JANUARY 11, 2001
Redwood Regional Park Service Yard, Oakland, CA

Figure 3

by: MJC	JANUARY 2001
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3.0 GROUNDWATER MONITORING WELL INSTALLATIONS

This section discusses the December 2000 installation of two additional groundwater monitoring wells at the site. The wells were installed in accordance with the October 2000 SES workplan (SES, 2000b).

RATIONALE FOR WELL INSTALLATIONS

The available site data indicate that the most downgradient impacted well (MW-4) may not be located on the axis of the highest groundwater contamination (as indicated by April 1999 hydropunch groundwater sample HP-02), and that maximum site hydrocarbon concentrations in groundwater exist upgradient of the HP-02 location (as indicated by hydropunch samples HP-06 and HP-07). While the existing groundwater monitoring well network and historical monitoring program have defined the lateral limits of the hydrocarbon plume, ACHCSA requested that two additional groundwater monitoring wells be installed and added to the quarterly groundwater monitoring program to provide a more focused evaluation of hydrochemical trends. In accordance with the ACHCSA August 22, 2000 letter, two groundwater monitoring wells (designated MW-7 and MW-8) were installed at the locations shown on Figure 2. Well MW-7 was installed in the immediate vicinity of hydropunch location HP-02, just south of existing well MW-4, which is the most downgradient location available within the inferred centerline of the contaminant plume. Well MW-8 was installed approximately halfway between MW-7 and the former UFST source area, within the inferred centerline of the contaminant plume.

WELL INSTALLATION ACTIVITIES

Prior to drilling, drilling permits were obtained from the Alameda County Public Works Agency (copies included as Appendix A). EBRPD-provided utility drawings were reviewed to identify potential underground utilities. Boreholes were drilled and wells were constructed by HEW Drilling (East Palo Alto, California) on December 11, 2000. The boreholes for the wells were drilled with 8-inch diameter hollow-stem augers. The boreholes were geologically logged in accordance with the visual method of the Unified Soils Classification System. Borehole geologic logs are included as Attachment B. One soil sample was collected for laboratory analysis from the capillary fringe from each borehole. Photodocumentation of well installation activities is included as Appendix B.

The wells were constructed in accordance with California Environmental Protection Agency (Cal/EPA) guidelines for sampling dissolved petroleum products in groundwater. The wells were not anticipated to be used for groundwater extraction, and were therefore constructed of 2-inch diameter casing. Table 2 (in the following Chapter 4.0) summarizes well construction details, as summarized below:

- 15 feet of 2-inch diameter PVC factory-slotted well screen (0.010 inch slots) from total well depth;
- Annular sand pack from total well depth to 2 feet above the top of the well screen, overlain by approximately 2 feet of hydrated bentonite pellets, overlain by neat Portland cement grout slurry;
- 2-inch-diameter PVC blank casing from top of well screen to surface with locking well caps; and
- Surface completion with a flush-mounted, Christy-type, traffic-rated well box (MW-8) and aboveground "stovepipe" type box with protective traffic bollards (MW-7).

The wells were developed on December 15, 2000 by Blaine Tech Services (San Jose, California) by surging and bailing to set the annular sand pack and reduce the potential for fine-grained native materials to infiltrate the sand pack. During development, aquifer stability parameters (temperature, pH, electrical conductivity, and turbidity) were measured. Copies of the well development field documentation report are included as Appendix C. The volumes of water purged included 21 wetted casing volumes for MW-7 (approximately 20 gallons) and 17 wetted casing volumes for MW-8 (approximately 16 gallons).

On behalf of the EBRPD, SES completed and submitted California Department of Water Resources Well Completion Forms for the two wells (copies included in Appendix A).

WELL SURVEYING

The vertical elevations of the well casing tops were surveyed by a licensed California land surveyor so that accurate groundwater elevations can be measured over time. Elevations of the new wells were surveyed using existing well elevations as datum. Surveying was conducted on January 8, 2001. A copy of the surveyor's plat showing vertical elevations is included as Appendix D.

WASTE DISPOSAL

The approximately 37 gallons of well development water was temporarily containerized in the EBRPD's onsite poly tank that has historically been used to containerize groundwater well development and purge water. That water will be properly disposed of at a permitted non-hazardous liquids treatment facility.

Two 55-gallon labeled drums of soil cuttings were temporarily stored onsite. A composite soil sample was collected from the drums for chemical profiling. The certified analytical laboratory report and chain-of-custody record for the profile sample is included in Appendix E. The soil was determined to be non-hazardous. The two drums were transported offsite on January 17, 2001 by Foss Environmental for disposal at the Altamont Landfill. Appendix F contains waste soil transport documentation.

GEOLOGIC AND HYDROGEOLOGIC CONDITIONS

Lithologic conditions in the two boreholes were substantially similar to those encountered in previous adjacent boreholes. As shown on the attached geologic logs, shallow lithology consisted of low permeability clayey silt and silty clay to approximately 16 feet bgs, underlain by approximately 5 feet of saturated clayey sand and sandy clay. The borehole for well MW-7 was terminated 4 feet below the top of a low plasticity clay unit. The borehole for well MW-8 was terminated at the top of a weathered siltstone unit (bedrock). Appendix G contains the borehole geologic logs for the two boreholes.

Groundwater was first encountered during drilling at approximately 16 feet bgs, and quickly equilibrated to approximately 12 feet bgs, indicating semi-confining conditions.

SOIL ANALYTICAL RESULTS

One soil sample was collected from each borehole at the capillary fringe (just above first occurrence of groundwater). The certified analytical laboratory report is included in Appendix E). Table 1 summarizes analytical results.

Table 1
Groundwater Monitoring Well Installation Soil Sample
Analytical Results - December 11, 2000
Redwood Regional Park Corporation Yard, Oakland, California^(a)

Borehole and Sample Depth (ft)	TPHg (mg/Kg)	TPHd (mg/Kg)	Benzene (µg/Kg)	Toluene (µg/Kg)	Ethyl-benzene (µg/Kg)	Total Xylenes (µg/Kg)	MTBE (µg/Kg)
MW-7-15.5'	640	170	3.0	< 0.1	5.1	4.4	< 0.4
MW-8-16'	1,800	780	6.2	< 1.3	23	43.7	< 5

Notes:

^(a) All concentrations in mg/Kg (equivalent to parts per million).

MTBE = Methyl *tertiary*-butyl ether.

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

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

4.0 JANUARY 2001 CREEK AND GROUNDWATER SAMPLING

This section presents the creek surface water and groundwater sampling and analytical methods for the current event. Groundwater and surface water analytical results are summarized in Section 5.0.

Monitoring and sampling protocols were in accordance with the ACHCSA-approved SES technical workplan (SES 1998a). Activities conducted include:

- 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 eight site wells;
- Collecting pre-purge groundwater samples for laboratory analysis of the natural attenuation indicators nitrate and sulfate from 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 and MW-8); and
- Collecting creek surface water samples for laboratory analysis from locations SW-2 and SW-3.

The current monitoring and sampling event was conducted on January 11, 2001. 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 2. Appendix H contains the groundwater monitoring field record.

GROUNDWATER LEVEL MONITORING AND SAMPLING

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

Table 2
Groundwater Monitoring Well Construction and Groundwater Elevation Data

Well	Well Depth	Screened Interval	TOC Elevation	Groundwater Elevation (1/11/01)
MW-1	18	7 to 17	565.9	562.9
MW-2	36	20 to 35	566.5	545.1
MW-3	42	7 to 41	560.9	541.7
MW-4	26	10 to 25	548.1	535.0
MW-5	26	10 to 25	547.5	531.2
MW-6	26	10 to 25	545.6	532.3
MW-7	24	9 to 24	547.7	534.9
MW-8	23	8 to 23	549.2	538.1

Notes:

TOC = Top of Casing. Well MW-1 through MW-6 are 4-inch diameter. Wells MW-7 and MW-8 are 2-inch diameter.

All elevations are feet above USGS mean sea level. Elevations of MW-1 through MW-6 were surveyed by EBRPD relative to USGS Benchmark No. JHF-49. Wells MW-7 and MW-8 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 in all eight site wells using an electric water level indicator. Pre-purge groundwater samples from all wells were field analyzed for indicators of natural attenuation including ferrous iron, dissolved oxygen, and oxygen reduction potential (ORP, or redox potential). In addition, pre-purge groundwater samples were collected from wells MW-3, MW-4, MW-7, and MW-8 for offsite laboratory analysis of the natural attenuation indicators nitrate and sulfate. The groundwater samples collected from wells MW-4, MW-7, and MW-8 had a noticeable petroleum odor and sheen.

A total of approximately 75 gallons of purge water and decontamination rinseate from the current groundwater sampling event was containerized in the onsite plastic tank. The purge water 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. A surface water sample was collected on January 11, 2001 from Redwood Creek locations SW-2 (immediately downgradient of the former UFST source area and within the area of documented creek bank soil contamination) and 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.

Fe 7/10

At the time of sampling (following a period of significant rainfall), the creek was flowing briskly and water depths ranged from 6 to 12 inches at the sampling locations. At the SW-2 location, where contaminated groundwater discharge to the creek has historically been observed, a petroleum sheen 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.

5.0 MONITORING EVENT ANALYTICAL RESULTS

This section presents the field and laboratory analytical results of the most recent (January 2001) monitoring event, including surface water and groundwater well sampling results. Table 3 and Figure 4 summarize the contaminant analytical results of the current monitoring event samples. Table 4 summarizes natural attenuation indicator results from the current event. Appendix E contains the certified analytical laboratory report and chain-of-custody record. A detailed discussion of hydrochemical and surface water trends was included in the October 2000 Feasibility Study report and continue to be addressed in upcoming annual summary reports. Appendix H contains a tabular summary of historical groundwater and surface water analytical results.

GROUNDWATER SAMPLE RESULTS

The current event data indicate the following:

- Maximum groundwater contaminant concentrations continue to be detected in downgradient site wells, with concentrations in the former source area well MW-2 generally 1 order of magnitude below downgradient well concentrations.
- Contaminant concentrations in new wells MW-7 and MW-8 exceeded historical maxima from site wells for all analytes.
- Contaminant concentrations in new well MW-7 (adjacent to and south of existing of well MW-4) are approximately 1 order of magnitude greater than in MW-4, confirming our previous hypothesis that well MW-7 more accurately represents maximum groundwater concentrations at the leading edge of the plume than does MW-4.
- New well MW-8 is located upgradient of new well MW-7, at the location where maximum historical groundwater contamination was detected in a 1993 borehole grab-groundwater sample. Contaminant concentrations at MW-8 exceeded those at MW-7 for all contaminants except diesel and ethylbenzene. This indicates that for the more toxic site contaminants (gasoline, BTEX and MTBE), the center of mass of the groundwater plume is located upgradient of MW-7.

Table 3
Groundwater and Surface Water Sample
Analytical Results - January 11, 2001
Redwood Regional Park Corporation Yard, Oakland, California

Compound	Concentrations in µg/L						
	TPHg	TPHd	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE
GROUNDWATER SAMPLES							
MW-2	51	< 50	8.3	< 0.5	1.5	< 0.5	8.0
MW-4	1,600	650	4.2	0.89	46	13.82	8.4
MW-7	13,000	3,100	95	4.0	500	289.1	95
MW-8	14,000	1,800	430	17	360	1,230	96
REDWOOD CREEK SURFACE WATER SAMPLES							
SW-2	< 50	< 50	< 0.5	< 0.5	0.53	< 0.5	< 2
SW-3	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 2

Notes:

MTBE = Methyl *tertiary*-butyl ether.

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

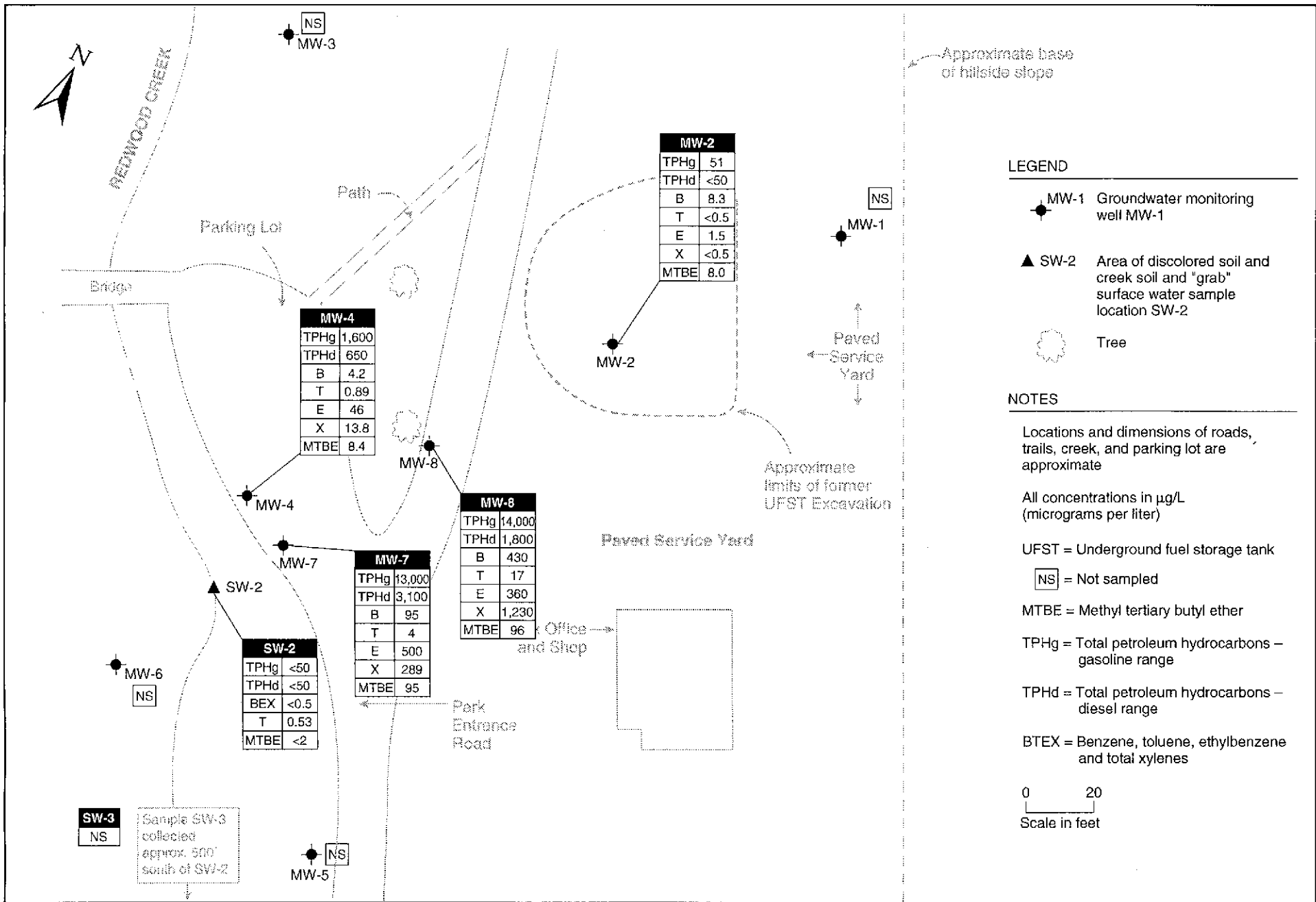
TPHd = Total petroleum hydrocarbons - diesel ranges (equivalent to total extractable hydrocarbons - diesel range).

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

As discussed in previous reports, these data indicate that the groundwater contaminant plume has migrated well beyond the former source area (represented by well MW-2) toward Redwood Creek, and that maximum groundwater contaminant concentrations has not reached Redwood Creek.

NATURAL ATTENUATION PARAMETERS MEASURED

Dissolved oxygen, ferrous iron, and redox potential were field-measured in all eight wells with electronic meters. Nitrogen and sulfate from well MW-3 (outside the contaminant plume) and wells MW-4, MW-7, and MW-8 (inside the contaminant plume) were analyzed in the laboratory. An inverse relationship between general minerals—including Fe²⁺, Mn²⁺, NO₃⁻, and SO₄²⁻—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. The mineral content from the wells measured were not indicative of natural attenuation with the iron being mainly non-detectable. The Mn²⁺, NO₃⁻, and SO₄²⁻ similarly had no significant correlations with the occurrence of natural attenuation.



Stellar Environmental Solutions

Geoscience & Engineering Consulting

GROUNDWATER MONITORING WELL AND SURFACE WATER ANALYTICAL RESULTS—JANUARY 11, 2001
Redwood Regional Park Service Yard, Oakland, CA

Figure 4

by: MJC

JANUARY 2001

Table 4
Groundwater Sample Analytical Results:
Natural Attenuation Indicators - January 11, 2001
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	1.2	0.00	142
MW-2	NA	NA	1.2	0.00	130
MW-3	< 0.05	28	0.9	0.00	142
MW-4	< 0.05	0.39	1.0	0.04	- 0.78
MW-5	NA	NA	0.8	0.00	113
MW-6	NA	NA	1.4	0.00	114
MW-7	< 0.05	86	0.7	0.05	- 0.39
MW-8	< 0.05	3.4	0.8	0.00	0.0

Notes:

mg/L = Milligrams per liter, equivalent to parts per million (ppm). NA = Not Analyzed.

Dissolved oxygen (DO) is the most thermodynamically-favored electron acceptor used in aerobic biodegradation of hydrocarbons. Active aerobic biodegradation of petroleum hydrocarbon compounds requires at least 1 to 2 mg/L of DO in groundwater. During aerobic biodegradation, DO levels are reduced in the hydrocarbon plume as respiration occurs. Therefore, DO levels that vary inversely to hydrocarbon concentrations are consistent with the occurrence of aerobic biodegradation. The site DO data does not reflect that any aerobic biodegradation is occurring, with the contaminated wells ranging from 0.7 to 1.0 mg/L DO and the background well MW-3 showing 0.9 mg/L.

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; under oxidizing conditions the ORP of groundwater is positive, while under 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 of the plume. The site data shows this characteristic most clearly with the most contaminated wells MW-4 and MW-7 having the only negative ORP values. Anaerobic conditions are indicated.

Future monitoring for bio-indicator analyses will allow for a more complete evaluation of the occurrence of biodegradation at the site. SES will further evaluate the occurrence of biodegradation, the influence of natural attenuation, and the ultimate extent of the hydrocarbon plume underlying the site.

CREEK SURFACE WATER SAMPLE RESULTS

Only one surface water contaminant was detected in the current event (ethylbenzene at 0.53 µg/L at well location SW-2).

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 all within the acceptance limits of the methods (Appendix E).

6.0 SUMMARY, CONCLUSIONS AND PROPOSED ACTIONS

The following conclusions and proposed actions presented are focused on the December 2000 monitoring well installations and the January 2001 surface water and groundwater monitoring report, as well as some salient historical findings.

SUMMARY AND CONCLUSIONS

- Two additional groundwater monitoring wells (MW-7 and MW-8) were installed at the site in December 2000. Well MW-7 was installed in the inferred centerline of the contaminant plume at the most downgradient available location, and well MW-8 was installed in the inferred centerline of the contaminant plume approximately halfway between the former source area and Redwood Creek (coincident with historical maximum detected groundwater concentrations).
- Soil samples collected from the capillary fringe in each of the two well boreholes had contaminant concentrations comparable to those historically detected, reflecting the continued contribution of groundwater-sourced contamination to the capillary fringe at areas downgradient of the release.
- Groundwater sampling has been conducted on an approximately quarterly basis since November 1994 (17 events). The existing monitoring well network has defined the lateral limits of groundwater contamination.
- Historical maximum monitoring well contaminant concentrations (for all analytes except diesel) were detected in new well MW-8, located approximately halfway between the former source area and Redwood Creek, indicating that the center of mass of the groundwater plume has not reached Redwood Creek.
- Current event contaminant concentrations in new well MW-7 exceeded those in nearby well MW-4, confirming that well MW-7 (located along the centerline of the plume) is the more appropriate sampling location for precise evaluation of downgradient maximum contaminant concentrations.
- Natural attenuation is indicated to be occurring at the site, mainly at the plume margins and former source area. Natural attenuation is likely minimal in the higher concentration portion

along the centerline of the plume due to limited oxygen content, suggesting that natural attenuation has not been, and will not be in the future, sufficient to mitigate impacts to the creek.

- Only ethylbenzene was detected (at a trace concentration) at the surface water sampling location at the area of groundwater discharge to the creek, which is typical of historical monitoring events conducted during high-flow conditions.
- In accordance with an ACHCSA request, SES completed a Feasibility Study to determine the most appropriate and cost-effective remedial strategy. This was determined to be injection of oxygen-release compound (ORC) and compliance monitoring. The ACHCSA approved the remedial strategy in its January 8, 2001 letter to the EBRPD.

PROPOSED ACTIONS

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

- Implement the approved remedial strategy as delineated in the Feasibility Study, as soon as practical after funding is secured by the EBRPD.
- Continue the quarterly program of creek and groundwater sampling and reporting.

7.0 REFERENCES AND BIBLIOGRAPHY

- Alameda County Health Care Services (ACHCSA), 2000. Letter to Mr. Ken Burger of EBRPD. August 22.
- 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

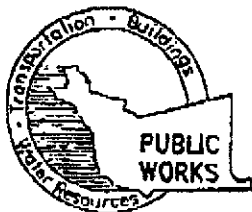
- Parsons, 1994a. Creek and Soil Sampling at Redwood Regional Park, Oakland, California. March 2
- Parsons, 1994b. Creek Surface Water at Redwood Regional Park, Oakland, California. May 13
- Parsons, 1994c. Workplan for Groundwater Characterization Program at East Bay Regional Park Service Yard, Oakland, 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
- Stellar Environmental Solutions (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

8.0 LIMITATIONS

This report has been prepared for the exclusive use of the East Bay Regional Park District, its authorized representatives, and the Regulators. 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 site 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 of the area. 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.



ALAMEDA COUNTY PUBLIC WORKS AGENCY

WATER RESOURCES SECTION

399 Elmhurst Street, HAYWARD, CA 94544

PHONE (510) 670-5554

FAX (510) 782-1935

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT 7867 Redwood Road
Oakland CA

California Coordinates Source _____ ft. Accuracy ± _____ ft.
CCN _____ ft. CCE _____ ft.
APN _____

CLIENT
Name East Bay Regional Parks District - Warm Gc
Address P.O. Box 5381 Phone 635-0135
City Oakland Zip 94605

APPLICANT
Name Stellar Environmental Solutions
Address 2174 Sixth Street Fax 510-644-3654
City Berkeley Phone 510-644-3103
Zip 94702

TYPE OF PROJECT
Well Construction
Cathodic Protection General
Water Supply Contamination
Monitoring Well Destruction

PROPOSED WATER SUPPLY WELL USE
New Domestic Replacement Domestic
Municipal Irrigation
Industrial Other _____

DRILLING METHOD:
Mud Rotary Air Rotary Auger
Cable Other

DRILLER'S LICENSE NO. 384167 HEW Drilling exp. 10-31-02
604987

WELL PROJECTS
Drill Hole Diameter 6 in. Maximum Depth 25 ft.
Casing Diameter 2 in. Number 2 MW-7
Surface Seal Depth 2 ft.

GEOTECHNICAL PROJECTS
Number of Borings _____ Maximum Depth _____ ft.
Hole Diameter _____ in.

ESTIMATED STARTING DATE 12/1/00
ESTIMATED COMPLETION DATE 12/15/00

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No 73-65

APPLICANT'S SIGNATURE Gina M. Ricker DATE 11/21/00
Gina M. Ricker

FOR OFFICE USE

PERMIT NUMBER W00-877
WELL NUMBER _____
APN _____

PERMIT CONDITIONS

Circled Permit Requirements Apply

- A. GENERAL**
 - 1. A permit application should be submitted so as to arrive at the ACPWA office five days prior to proposed starting date.
 - 2. Submit to ACPWA within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well projects, or drilling logs and location sketch for geotechnical projects.
 - 3. Permit is void if project not begun within 90 days of approval date.
- B. WATER SUPPLY WELLS**
 - 1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
 - 2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved.
- C. GROUNDWATER MONITORING WELLS INCLUDING PIEZOMETERS**
 - 1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
 - 2. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.
- D. GEOTECHNICAL**
Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.
- E. CATHODIC**
Fill hole above anode zone with concrete placed by tremie.
- F. WELL DESTRUCTION**
See attached.
- G. SPECIAL CONDITIONS**

APPROVED [Signature] DATE 11-30-00

CONFIDENTIAL

STATE OF CALIFORNIA DWR
WELL COMPLETION REPORT
(WELL LOGS)

REMOVED

CONFIDENTIAL

STATE OF CALIFORNIA DWR
WELL COMPLETION REPORT
(WELL LOGS)

REMOVED



Subject: Hollow-stem auger rig at well MW-7.

Site: Redwood Regional Park Service Yard Fuel Leak Site, Oakland California

Date Taken: December 11, 2000

Project No.: 2000-46

Photographer: S. Quayle

Photo No.: 01



Subject: Completed well MW-7.

Site: Redwood Regional Park Service Yard Fuel Leak Site, Oakland California

Date Taken: December 11, 2000

Project No.: 2000-46

Photographer: S. Quayle

Photo No.: 02



Subject: Hollow-stem auger rig at well MW-8.

Site: Redwood Regional Park Service Yard Fuel Leak Site, Oakland California

Date Taken: December 11, 2000

Project No.: 2000-46

Photographer: S. Quayle

Photo No.: 03



Subject: Completed well MW-8.

Site: Redwood Regional Park Service Yard Fuel Leak Site, Oakland California

Date Taken: December 11, 2000

Project No.: 2000-46

Photographer: S. Quayle

Photo No.: 04

WELL DEVELOPMENT DATA SHEET

Project #: <u>00 / 215 R1</u>	Client: <u>Steiner</u>
Developer: <u>Jared</u>	Date Developed: <u>12/15/00</u>
Well I.D. <u>MW - 7</u>	Well Diameter: (circle one) <u>(2)</u> 3 4 6
Total Well Depth:	Depth to Water:
Before <u>25.37</u> After <u>25.38</u>	Before <u>12.65</u> After <u>13.48</u>
Reason not developed:	If Free Product, thickness:
Additional Notations:	

Volume Conversion Factor (VCF):
 $(12 \times (d^2) \times \pi) / 231$
 where:
 12 = in / foot
 d = diameter (in.)
 $\pi = 3.1416$
 231 = in³/gal

Well dia.	VCF
2"	0.16
3"	0.37
4"	0.65
6"	1.47
10"	4.08
12"	6.37

well surged for 15 min

<u>2</u>	X	<u>10</u>	=	<u>20.3</u>
1 Case Volume		Specified Volumes		gallons

Purging Device: Bailer Electric Submersible
 Middleburg Suction Pump
 Type of Installed Pump 2" surge block
 Other equipment used _____

TIME	TEMP (F)	pH	COND.	TURBIDITY	VOLUME REMOVED:	NOTATIONS:
839	57.1	6.7	1400 μ S	> 200	1	<i>brown / murky / hard</i> <i>↓ fine brown silt</i> <i>↓ left in buckets</i> <i>↓</i>
843	56.9	6.8	1200	7200	2	
846	56.7	6.7	1120	7200	4	
850	56.7	6.7	980	7200	6	
854	56.5	6.8	940	150	8	<i>still silty / brown</i>
856	56.6	6.8	920	7200	10	<i>noticeably lighter brown</i>
900	56.6	6.8	890	7200	12	
903	56.3	6.6	880	7200	14	<i>slight TPH-g</i> <i>odor</i>
906	56.3	6.5	880	7200	16	
910	56.5	6.4	870	7200	18	
913	56.5	6.3	890	7200	20	<i>still silty / brown</i>
915	56.6	6.3	900	7200	21	

Did Well Dewater? no If yes, note above. Gallons Actually Evacuated: 21

WELL DEVELOPMENT DATA SHEET

Project #: 001215 R1 Client: Stellar
 Developer: Jared Date Developed: 12/15/00
 Well I.D. M4-8 Well Diameter: (circle one) (2) 3 4 6
 Total Well Depth: _____ Depth to Water: _____
 Before 22.08 After 22.32 Before 11.81 After 13.05
 Reason not developed: _____ If Free Product, thickness: _____
 Additional Notations: _____

Volume Conversion Factor (VCF):
 $(12 \times (d^2/4) \times \pi) / 231$
 where
 12 = in / foot
 d = diameter (in.)
 π = 3.1416
 231 = in³/gal

Well dia	VCF
3"	0.16
4"	0.37
6"	0.63
8"	1.47
10"	4.08
12"	6.87

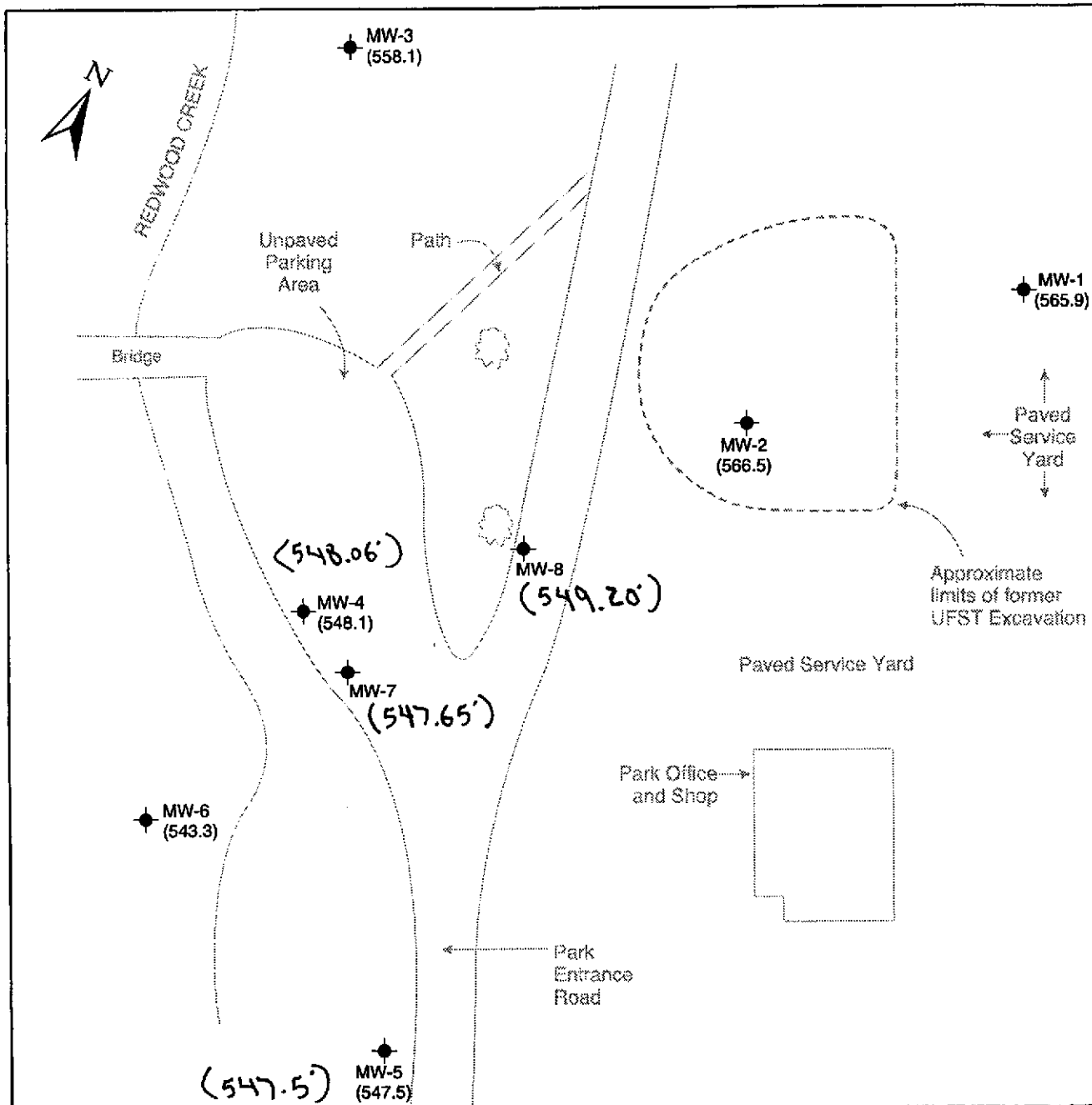
$\frac{1.6}{\text{1 Case Volume}} \times \frac{10}{\text{Specified Volumes}} = \frac{16.4}{\text{gallons}}$

Purging Device: Bailer Electric Submersible
 Middleburg Suction Pump *Well surged for 15 min.*



Type of Installed Pump _____
 Other equipment used 2" surge block

TIME	TEMP (F)	pH	COND.	TURBIDITY	VOLUME REMOVED:	NOTATIONS:
939	58.6	6.9	1750 us	>200	0.5	dark brown very silty
1023	56.4	7.1	1420	>200	2.0	hard bottom
1027	56.7	6.8	1180	>200	4.0	pump clogged by PVC shavings
1031	56.9	6.7	1050	>200	6	
1035	57.0	6.4	1030	>200	8	TPH-g odor
1045	56.7	6.4	1070	>200	10	
1050	56.8	7.0	1000	>200	12	
1056	57.1	6.9	950	>200	14	lighter brown
1100	57.2	6.8	940	>200	16	
1103	57.3	6.7	940	>200	17	

Did Well Dewater? no If yes, note above. Gallons Actually Evacuated: 17



LEGEND

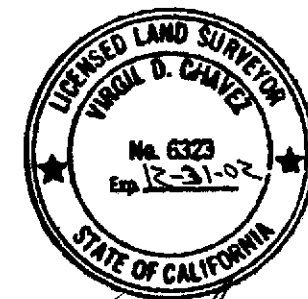
- 
MW-1 (565.9) Groundwater monitoring well MW-1 with top of casing elevation in feet above mean sea level
- 
Tree

NOTES

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

UFST = Underground fuel storage tank

0 20
Scale in feet



Virgil D. Chavez
1-23-01

★ **Stellar Environmental Solutions**
Geoscience & Engineering Consulting

SITE PLAN SHOWING GROUNDWATER MONITORING WELL ELEVATIONS
Redwood Regional Park Service Yard, Oakland, CA

by: MJC

JANUARY 2001



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

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

ANALYTICAL REPORT

Prepared for:

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


Date: 29-DEC-00
Lab Job Number: 149135
Project ID: N/A
Location: N/A

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: **149135**
Client: **Stellar Environmental Solutions**

Sampled Date: **12/11/00**
Received Date: **12/12/00**

CASE NARRATIVE

This hardcopy data package contains sample and QC results for three soil samples, which were received from the site referenced above on December 12, 2000. The samples were received cold and intact.

TEH :

No analytical problems were encountered.

TVH/BTXE:

High surrogate recoveries were observed for samples MW-7-15.5 (CT# 1419135-001) and MW-7&8 COMP (CT# 149135-003). This is due to hydrocarbons coeluting with the surrogate peaks. No other analytical problems were encountered.

Chain of Custody Record

Lab Job no. 199/55
 Date 12-11-00
 Page 1 of 1

Laboratory Curtis + Tompkins, Ltd.
 Address 2323 Fifth Street
Berkeley CA 94710
510-486-0900
 Project Owner East Bay Regional Park District
 Site Address 7867 Redwood Road
Oakland CA
 Project Name Redwood Regional Park
 Project Number 2000-46

Method of Shipment hand delivery
 Shipment No. _____
 Airbill No. _____
 Cooler No. _____
 Project Manager Bruce Rucker
 Telephone No. (510) 644-3123
 Fax No. (510) 644-3859
 Samplers: (Signature) Steph B. Quayle

Filtered	No. of Containers	Analysis Required										Remarks	
		TEH (diesel)	TVH (gasoline)	BTEX + HTOE									
		X	X	X									
		X	X	X									
		X	X	X									

Field Sample Number	Location/Depth	Date	Time	Sample Type	Type/Size of Container	Preservation								
						Cooler	Chemical							
MW-7-15.5	15.5'	12/11/00	1000	Soil	Brass 2.5x6"	✓	—							
MW-8-16.0	16.0'		1330		" "	✓	—							
MW-7#8 Composite	NA		1400		16oz Glass	✓	—							
— END —														

Relinquished by: Signature <u>Steph B. Quayle</u> Printed <u>Steph B. Quayle</u> Company <u>Stellar</u>	Date <u>12/12/00</u> Time <u>0800</u>	Received by: Signature <u>Steven E. Stanley</u> Printed <u>Steven E. Stanley</u> Company <u>C&T</u>	Date _____ Time _____	Relinquished by: Signature _____ Printed _____ Company _____	Date _____ Time _____	Received by: Signature _____ Printed _____ Company _____	Date _____ Time _____
Turnaround Time: <u>5 DAY</u> Comments: _____ _____ _____				Relinquished by: Signature _____ Printed _____ Company _____	Date _____ Time _____	Received by: Signature _____ Printed _____ Company _____	Date _____ Time _____

2000-00-01

Total Extractable Hydrocarbons

Lab #:	149135	Prep:	SHAKER TABLE
Client:	Stellar Environmental Solutions	Analysis:	EPA 8015M
Project#:	STANDARD		
Matrix:	Soil	Sampled:	12/11/00
Units:	mg/Kg	Received:	12/12/00
Basis:	wet	Prepared:	12/13/00
Batch#:	60196		

Field ID:	MW-7-15.5	Diln Fac:	5.000
Type:	SAMPLE	Analyzed:	12/18/00
Lab ID:	149135-001	Cleanup Method:	

Analyte	Result	RL
Diesel C10-C24	170 L Y	5.0

Surrogate	%REC	Limits
Hexacosane	98	60-136

Field ID:	MW-8-16.0	Diln Fac:	10.00
Type:	SAMPLE	Analyzed:	12/18/00
Lab ID:	149135-002	Cleanup Method:	

Analyte	Result	RL
Diesel C10-C24	780 L Y	10

Surrogate	%REC	Limits
Hexacosane	DO	60-136

Field ID:	MW-7&8 COMP	Diln Fac:	1.000
Type:	SAMPLE	Analyzed:	12/15/00
Lab ID:	149135-003	Cleanup Method:	

Analyte	Result	RL
Diesel C10-C24	11 L Y	0.99

Surrogate	%REC	Limits
Hexacosane	97	60-136

Type:	BLANK	Analyzed:	12/14/00
Lab ID:	QC132587	Cleanup Method:	EPA 3630c
Diln Fac:	1.000		

Analyte	Result	RL
Diesel C10-C24	ND	0.99

Surrogate	%REC	Limits
Hexacosane	109	60-136

Chromatogram

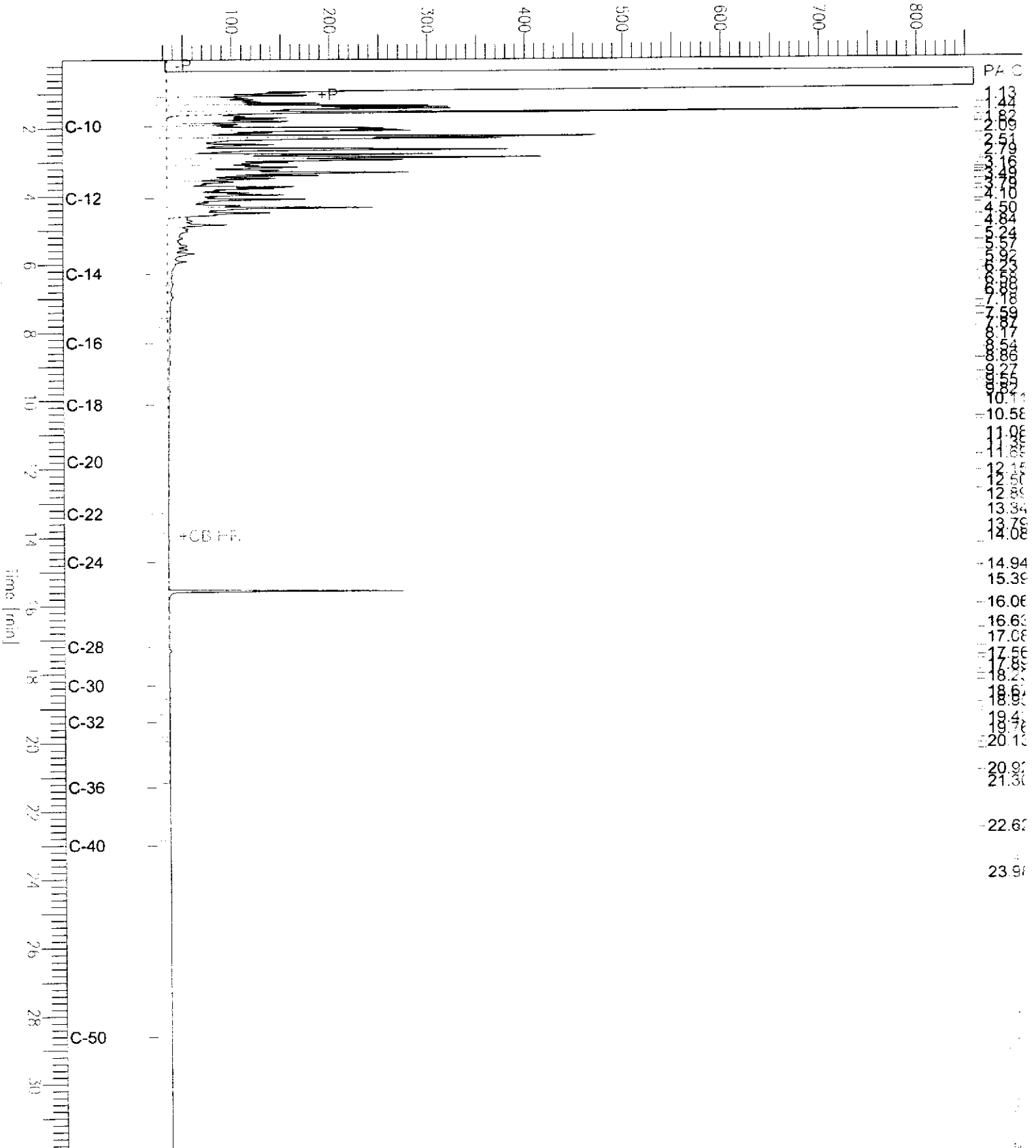
Sample Name : 149135-001,60196
FileName : G:\GC13\CHB\352B023.RAW
Method : BTEH343.MTH
Start Time : 0.01 min
Scale Factor : 0.0

End Time : 31.91 min
Plot Offset : 21 mV

Sample #: 60196
Date : 12/18/2000 09:44 AM
Time of Injection: 12/18/2000 09:10 AM
Low Point : 20.89 mV
Plot Scale: 837.9 mV
High Point : 858.77 mV

Page 1 of 1

Response [mV]



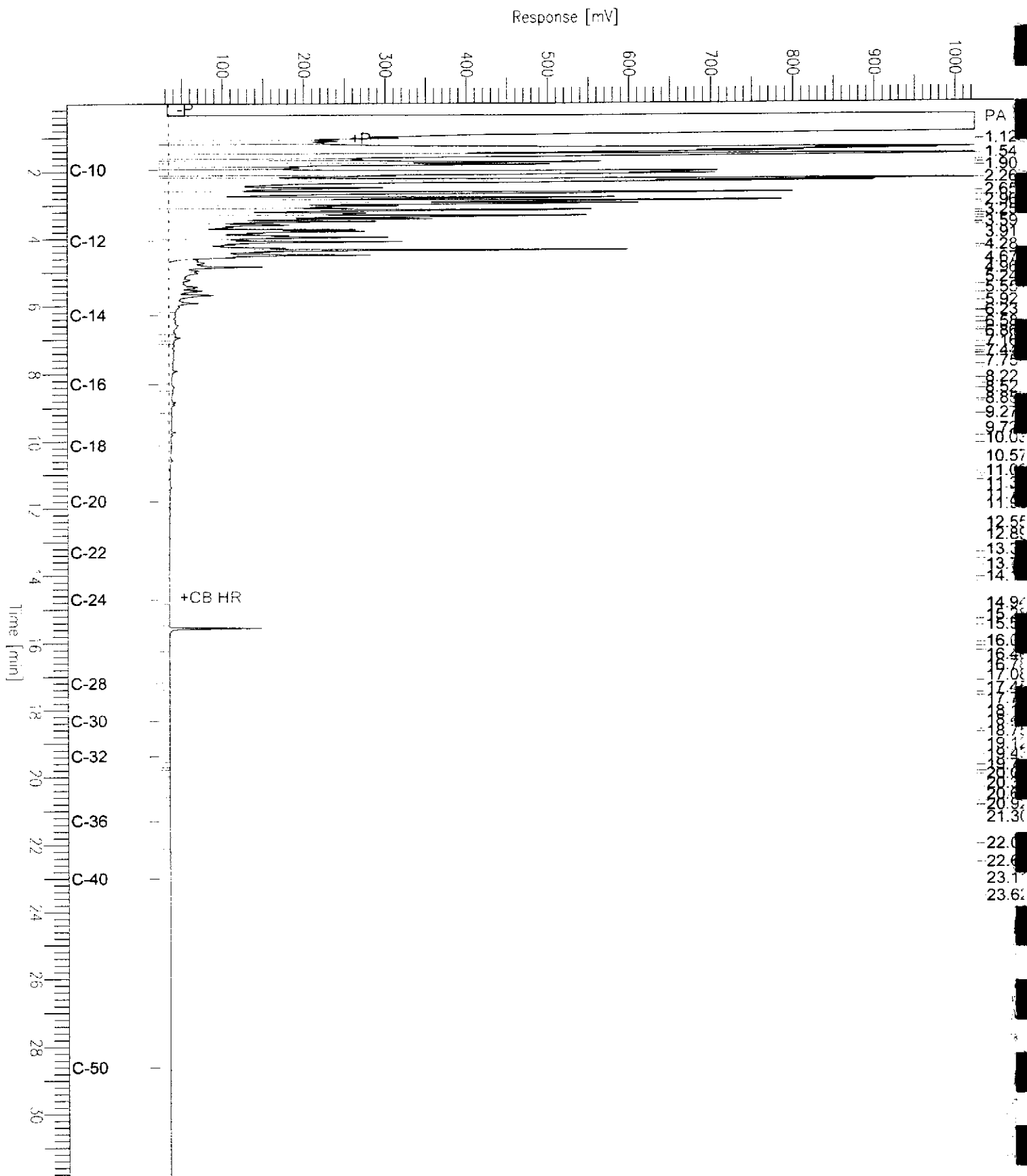
Chromatogram

Sample Name : 149135-002,60196
FileName : G:\GC13\CHB\352B024.RAW
Method : BTEH343.MTH
Start Time : 0.01 min
Scale Factor: 0.0

End Time : 31.91 min
Plot Offset: 21 mV

Sample #: 60196
Date : 12/18/2000 10:44 AM
Time of Injection: 12/18/2000 09:49 AM
Low Point : 21.49 mV
Plot Scale: 1002.5 mV

Page 1 of 1

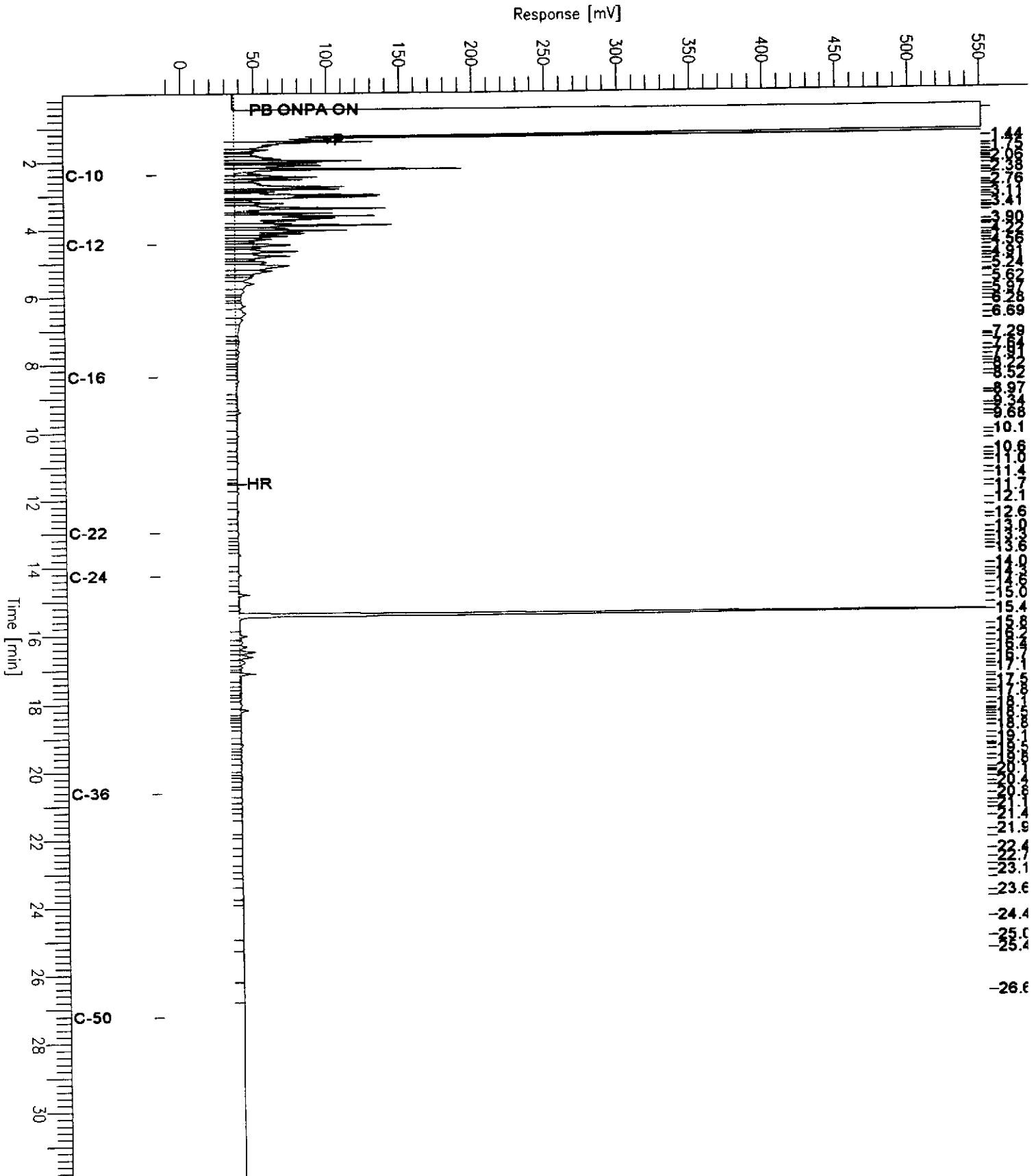


Chromatogram

Sample Name : 149135-003,60196
FileName : G:\GC15\CHB\348B072.RAW
Method : BTEH346.MTH
Start Time : 0.01 min
Scale Factor: 0.0

End Time : 31.91 min
Plot Offset: -17 mV

Sample #: 60196
Date : 12/17/2000 06:04 PM
Time of Injection: 12/15/2000 05:02 PM
Low Point : -16.74 mV
Plot Scale: 568.0 mV
High Point : 551.22 mV



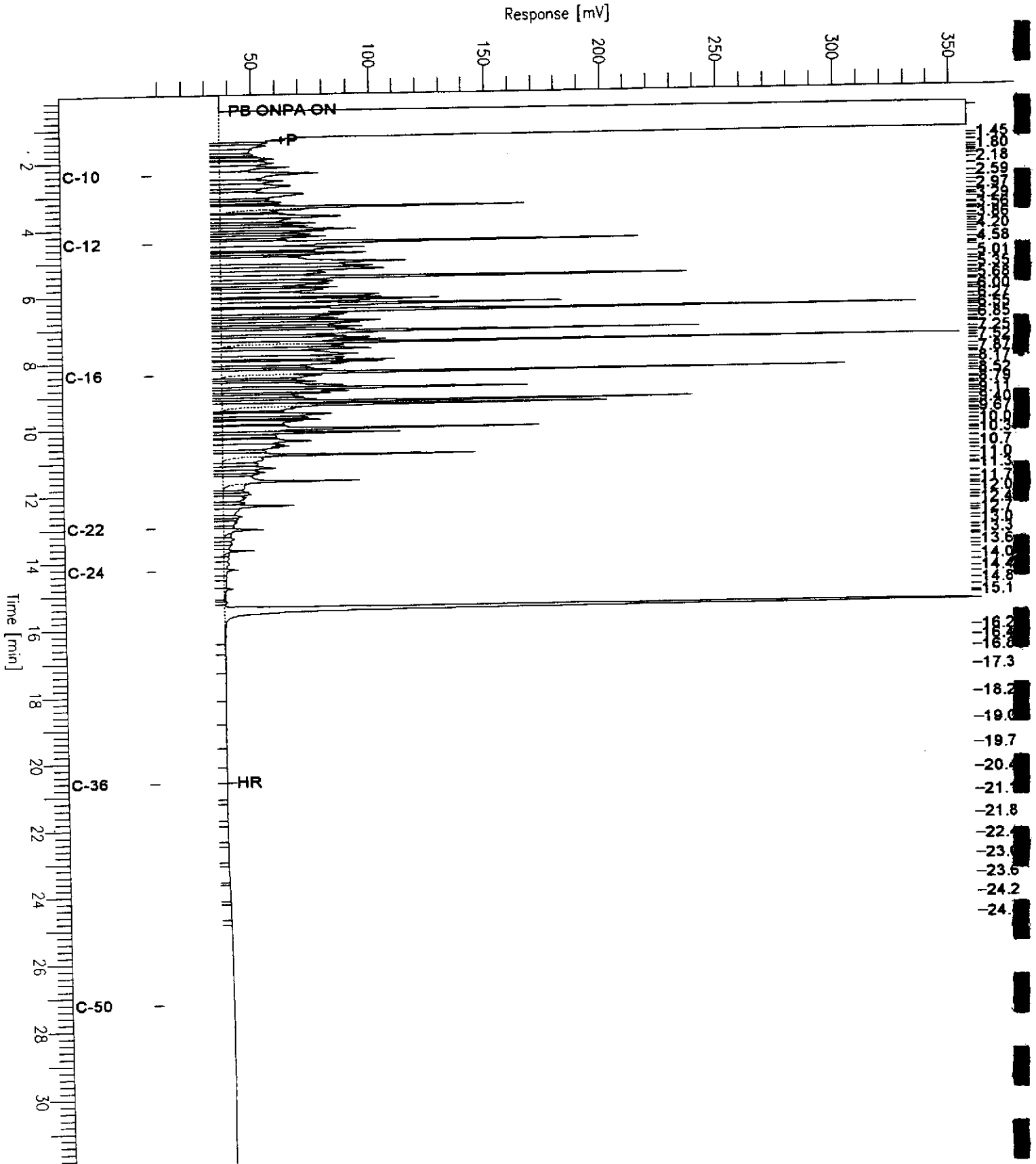
Chromatogram

Sample Name : ccv,00ws0033,ds1
FileName : G:\GC15\CHB\348B002.RAW
Method : BTEH346.MTH
Start Time : 0.01 min
Scale Factor: 0.0

End Time : 31.91 min
Plot Offset: 7 mV

Sample #: 500mg/l
Date : 12/13/2000 11:00 AM
Time of Injection: 12/13/2000 10:16 AM
Low Point : 7.23 mV
Plot Scale: 350.4 mV
High Point : 357.58 mV

Page 1 of 1



Total Extractable Hydrocarbons

Lab #: 149135	Prep: SHAKER TABLE
Client: Stellar Environmental Solutions	Cleanup Method: EPA 3630c
Project#: STANDARD	Analysis: EPA 8015M
Type: LCS	Diln Fac: 1.000
Lab ID: QC132588	Batch#: 60196
Matrix: Soil	Prepared: 12/13/00
Units: mg/Kg	Analyzed: 12/15/00
Basis: wet	

Analyte	Spiked	Result	%REC	Limits
Diesel C10-C24	46.44	38.51	83	67-121

Surrogate	%REC	Limits
Hexacosane	99	60-136

Total Extractable Hydrocarbons

Lab #:	149135	Prep:	SHAKER TABLE
Client:	Stellar Environmental Solutions	Analysis:	EPA 8015M
Project#:	STANDARD		
Field ID:	MW-7-15.5	Batch#:	60196
MSS Lab ID:	149135-001	Sampled:	12/11/00
Matrix:	Soil	Received:	12/12/00
Units:	mg/Kg	Prepared:	12/13/00
Basis:	wet	Analyzed:	12/18/00
Diln Fac:	5.000		

Type: MS Lab ID: QC132589

Analyte	MSS Result	Spiked	Result	%REC	Limits
Diesel C10-C24	169.8	46.57	228.7	126	35-146

Surrogate	%REC	Limits
Hexacosane	104	60-136

Type: MSD Lab ID: QC132590

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Diesel C10-C24	46.78	222.3	112	35-146	3	48

Surrogate	%REC	Limits
Hexacosane	102	60-136



Gasoline by GC/FID CA LUFT

Lab #:	149135	Prep:	EPA 5030
Client:	Stellar Environmental Solutions	Analysis:	EPA 8015M
Project#:	STANDARD		
Matrix:	Soil	Sampled:	12/11/00
Units:	mg/Kg	Received:	12/12/00
Basis:	wet	Analyzed:	12/19/00
Batch#:	60287		

Field ID: MW-7-15.5 Lab ID: 149135-001
 Type: SAMPLE Diln Fac: 20.00

Analyte	Result	RL
Gasoline C7-C12	640	20

Surrogate	%REC	Limits
Trifluorotoluene (FID)	215 *	>LR b 62-138
Bromofluorobenzene (FID)	173 *	46-150

Field ID: MW-8-16.0 Lab ID: 149135-002
 Type: SAMPLE Diln Fac: 250.0

Analyte	Result	RL
Gasoline C7-C12	1,800	250

Surrogate	%REC	Limits
Trifluorotoluene (FID)	126	62-138
Bromofluorobenzene (FID)	115	46-150

Field ID: MW-7&8 COMP Lab ID: 149135-003
 Type: SAMPLE Diln Fac: 25.00

Analyte	Result	RL
Gasoline C7-C12	1,100	25

Surrogate	%REC	Limits
Trifluorotoluene (FID)	172 *	62-138
Bromofluorobenzene (FID)	177 *	46-150

Type: BLANK Diln Fac: 1.000
 Lab ID: QC132942

Analyte	Result	RL
Gasoline C7-C12	ND	1.0

Surrogate	%REC	Limits
Trifluorotoluene (FID)	103	62-138
Bromofluorobenzene (FID)	128	46-150

* = Value outside of QC limits; see narrative
 b = See narrative
 ND = Not Detected
 RL = Reporting Limit
 >LR= Response exceeds instrument's linear range
 Page 1 of 1

Chromatogram

Sample Name : 149135-001.60287

FileName : G:\GC05\DATA\354G007.raw

Method : TVHBTXE

Start Time : 0.00 min

End Time : 31.00 min

Scale Factor: 1.0

Plot Offset: 6 mV

Sample #:

Date : 12/19/00 04:37 PM

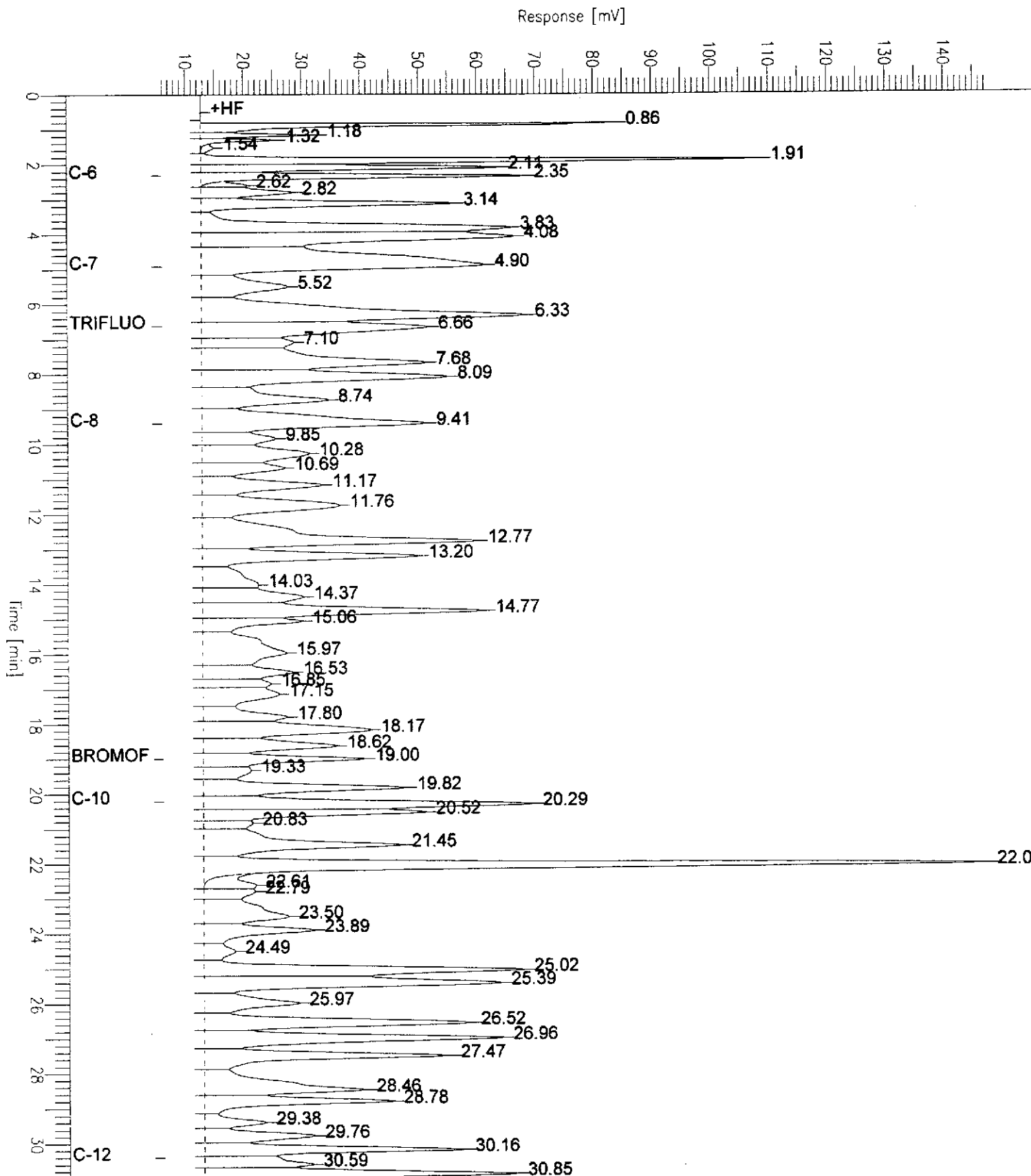
Time of Injection: 12/19/00 03:21 PM

Low Point : 5.95 mV

High Point : 147.18 mV

Plot Scale: 141.2 mV

Page 1 of 1



Chromatogram

Sample Name : 149135-002,60287

Sample #:

Page 1 of 1

FileName : G:\GC05\DATA\354G009.raw

Date : 12/19/00 05:23 PM

Method : TVHBTXE

Time of Injection: 12/19/00 04:44 PM

Start Time : 0.00 min

End Time : 31.00 min

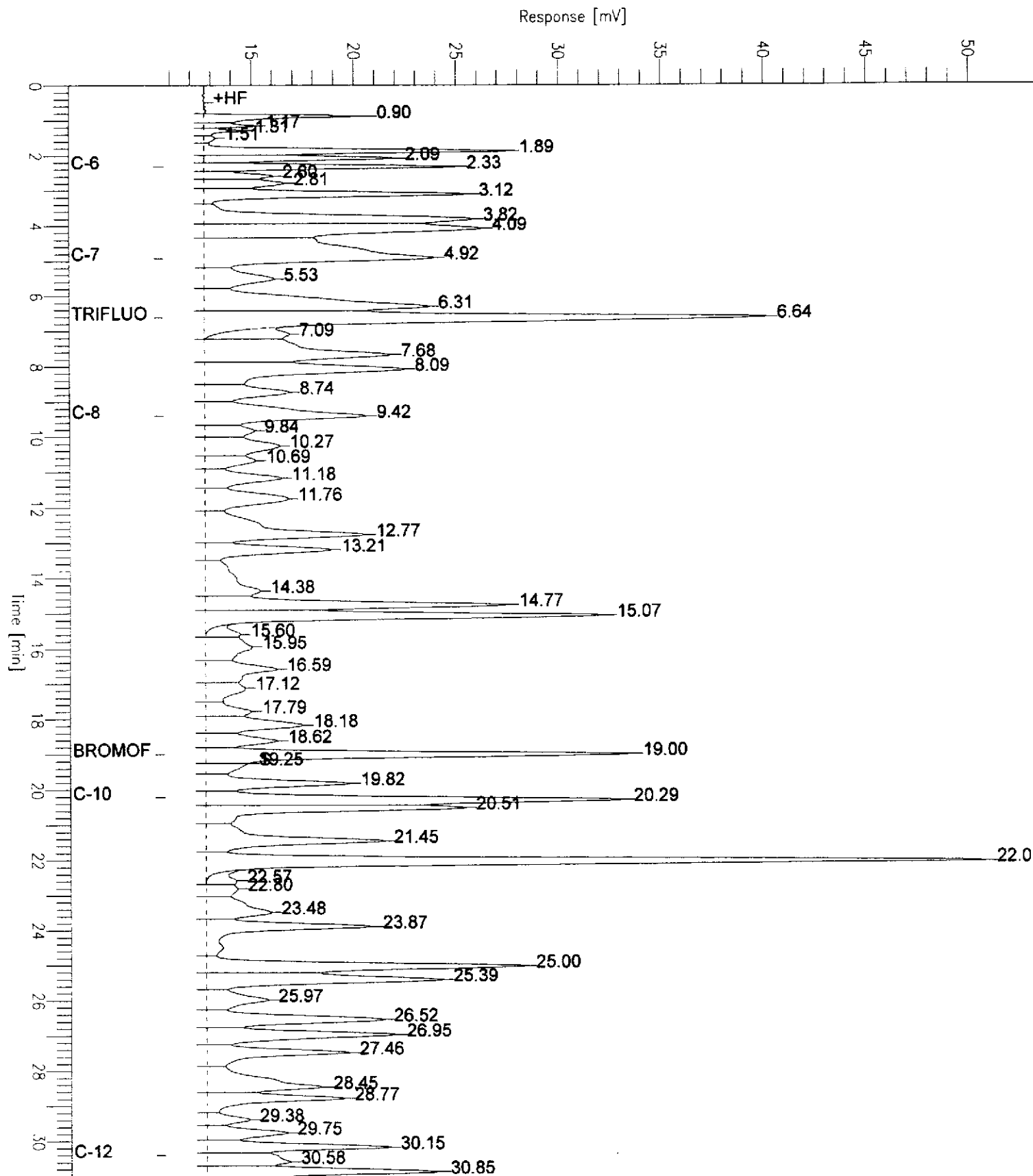
Low Point : 10.71 mV

High Point : 50.83 mV

Scale Factor: 1.0

Plot Offset: 11 mV

Plot Scale: 40.1 mV



Chromatogram

Sample Name : 149135-003,60287

FileName : G:\GC05\DATA\354G008.raw

Method : TVHBTXE

Start Time : 0.00 min

Scale Factor : 1.0

End Time : 31.00 min

Plot Offset : -0 mV

Sample #:

Date : 12/19/00 04:37 PM

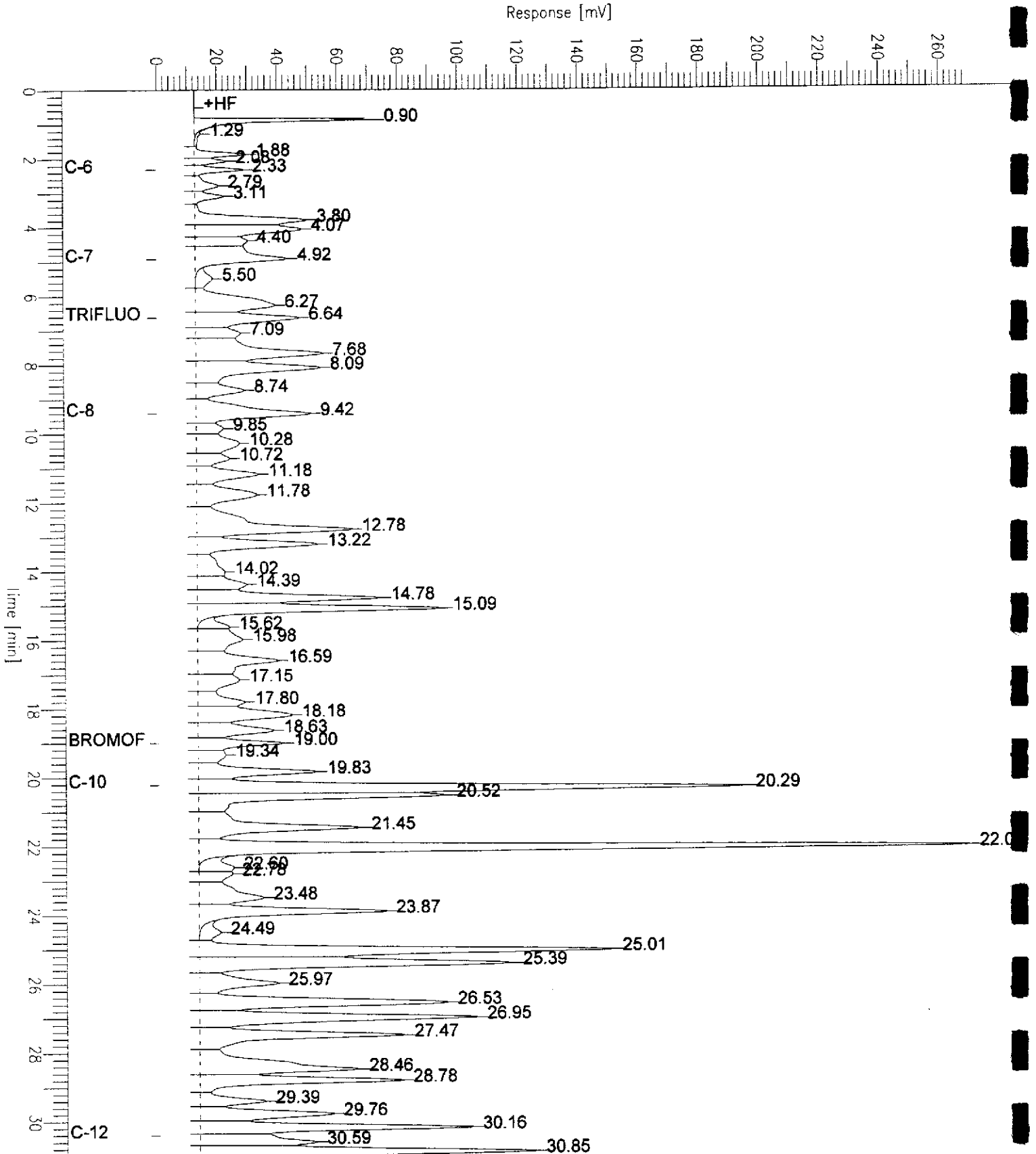
Time of Injection: 12/19/00 04:02 PM

Low Point : -0.25 mV

Plot Scale: 269.6 mV

Page 1 of 1

High Point : 269.31 mV

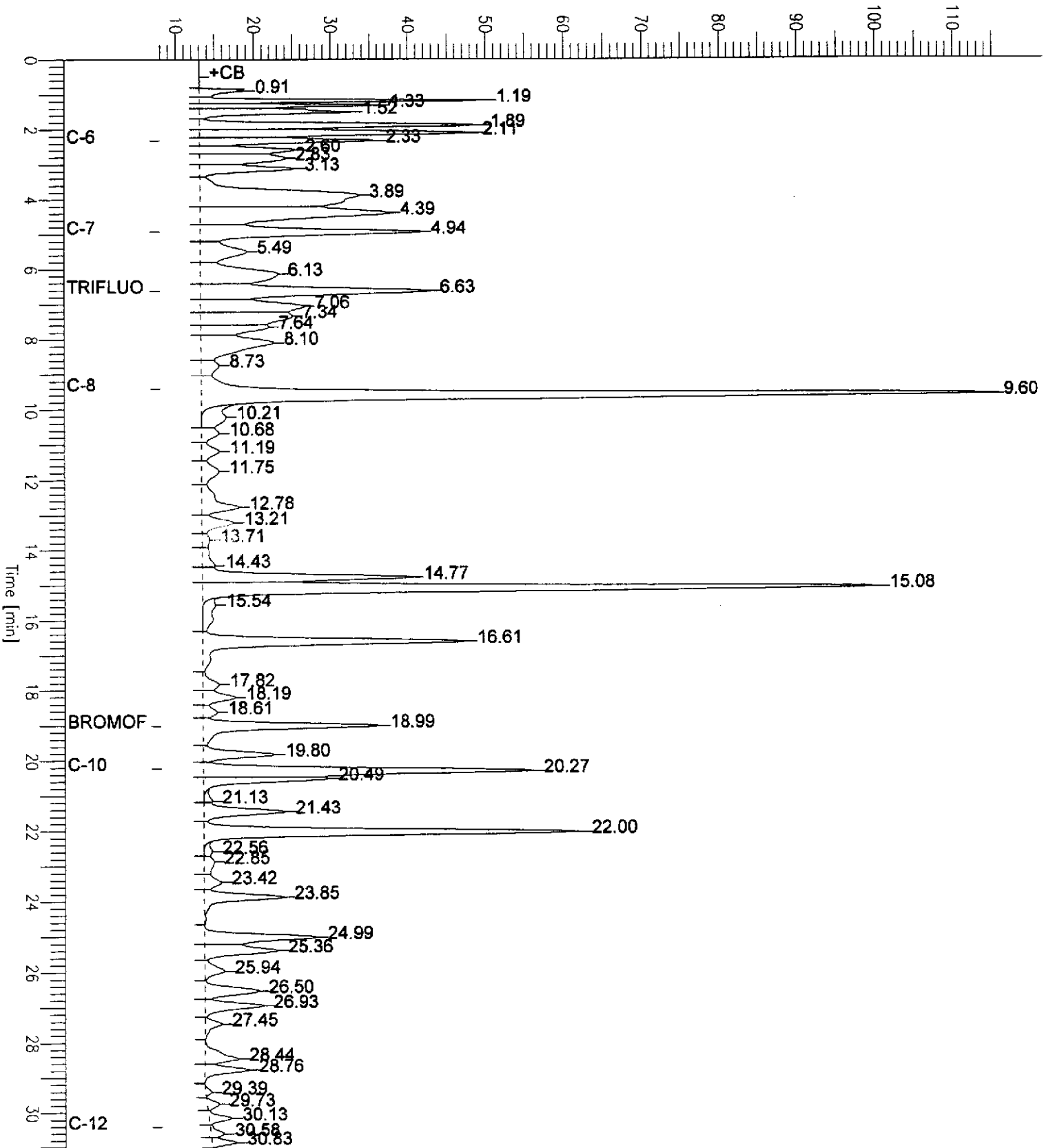


Chromatogram

Sample Name : CCV/LCS, QC132939, 60287, 00WS0025, 5/5000
FileName : G:\GC05\DATA\354G004.raw
Method : TVHBTXE
Start Time : 0.00 min
Scale Factor : 1.0

Sample # :
Date : 12/19/00 01:35 PM
Time of Injection: 12/19/00 01:04 PM
Low Point : 7.92 mV
Plot Scale: 107.2 mV

Response [mV]



Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	149135	Prep:	EPA 5030
Client:	Stellar Environmental Solutions	Analysis:	EPA 8021B
Project#:	STANDARD		
Matrix:	Soil	Sampled:	12/11/00
Units:	ug/Kg	Received:	12/12/00
Basis:	wet	Analyzed:	12/19/00
Batch#:	60287		

Field ID:	MW-7-15.5	Lab ID:	149135-001
Type:	SAMPLE	Diln Fac:	20.00

Analyte	Result	RL
MTBE	ND	400
Benzene	3,000 C	100
Toluene	ND	100
Ethylbenzene	5,100	100
m,p-Xylenes	2,500	100
o-Xylene	1,900	100

Surrogate	%REC	Limits
Trifluorotoluene (PID)	157 *	65-134
Bromofluorobenzene (PID)	129	55-138

Field ID:	MW-8-16.0	Lab ID:	149135-002
Type:	SAMPLE	Diln Fac:	250.0

Analyte	Result	RL
MTBE	ND	5,000
Benzene	6,200 C	1,300
Toluene	ND	1,300
Ethylbenzene	23,000	1,300
m,p-Xylenes	36,000	1,300
o-Xylene	7,700	1,300

Surrogate	%REC	Limits
Trifluorotoluene (PID)	112	65-134
Bromofluorobenzene (PID)	107	55-138

* = 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 #:	149135	Prep:	EPA 5030
Client:	Stellar Environmental Solutions	Analysis:	EPA 8021B
Project#:	STANDARD		
Matrix:	Soil	Sampled:	12/11/00
Units:	ug/Kg	Received:	12/12/00
Basis:	wet	Analyzed:	12/19/00
Batch#:	60287		

Field ID:	MW 7&8 COMP	Lab ID:	149135-003
Type:	SAMPLE	Diln Fac:	25.00

Analyte	Result	RL
MTBE	ND	500
Benzene	ND	130
Toluene	ND	130
Ethylbenzene	8,000	130
m,p-Xylenes	15,000	130
o-Xylene	5,900	130

Surrogate	%REC	Limits
Trifluorotoluene (PID)	142 *	65-134
Bromofluorobenzene (PID)	129	55-138

Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC132942		

Analyte	Result	RL
MTBE	ND	20
Benzene	ND	5.0
Toluene	ND	5.0
Ethylbenzene	ND	5.0
m,p-Xylenes	ND	5.0
o-Xylene	ND	5.0

Surrogate	%REC	Limits
Trifluorotoluene (PID)	104	65-134
Bromofluorobenzene (PID)	104	55-138

* = 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 2 of 2

Gasoline by GC/FID CA LUFT

Lab #:	149135	Prep:	EPA 5030
Client:	Stellar Environmental Solutions	Analysis:	EPA 8015M
Project#: STANDARD			
Type:	LCS	Basis:	wet
Lab ID:	QC132939	Diln Fac:	1.000
Matrix:	Soil	Batch#:	60287
Units:	mg/Kg	Analyzed:	12/19/00

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	10.00	10.58	106	75-123

Surrogate	%REC	Limits
Trifluorotoluene (FID)	125	62-138
Bromofluorobenzene (FID)	128	46-150

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	149135	Prep:	EPA 5030
Client:	Stellar Environmental Solutions	Analysis:	EPA 8021B
Project#:	STANDARD		
Matrix:	Soil	Diln Fac:	1.000
Units:	ug/Kg	Batch#:	60287
Basis:	wet	Analyzed:	12/19/00

Type: BS Lab ID: QC132940

Analyte	Spiked	Result	%REC	Limits
MTBE	100.0	99.79	100	58-115
Benzene	100.0	99.97	100	68-117
Toluene	100.0	94.76	95	70-120
Ethylbenzene	100.0	98.74	99	67-124
m,p-Xylenes	200.0	206.7	103	72-124
o-Xylene	100.0	99.63	100	72-123

Surrogate	%REC	Limits
Trifluorotoluene (PID)	116	65-134
Bromofluorobenzene (PID)	116	55-138

Type: BSD Lab ID: QC132941

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	100.0	100.6	101	58-115	1	20
Benzene	100.0	101.3	101	68-117	1	20
Toluene	100.0	94.53	95	70-120	0	20
Ethylbenzene	100.0	98.08	98	67-124	1	20
m,p-Xylenes	200.0	206.3	103	72-124	0	20
o-Xylene	100.0	100.5	101	72-123	1	20

Surrogate	%REC	Limits
Trifluorotoluene (PID)	111	65-134
Bromofluorobenzene (PID)	111	55-138

Gasoline by GC/FID CA LUFT

Lab #:	149135	Prep:	EPA 5030
Client:	Stellar Environmental Solutions	Analysis:	EPA 8015M
Project#:	STANDARD		
Field ID:	GW-2-12.5	Diln Fac:	1.000
MSS Lab ID:	149245-001	Batch#:	60287
Matrix:	Soil	Sampled:	12/13/00
Units:	mg/Kg	Received:	12/15/00
Basis:	wet	Analyzed:	12/20/00

Type: MS Lab ID: QC132943

Analyte	MSS Result	Spiked	Result	%REC	Limits
Gasoline C7-C12	1.783	9.174	13.74	130	41-132

Surrogate	%REC	Limits
Trifluorotoluene (FID)	126	62-138
Bromofluorobenzene (FID)	149	46-150

Type: MSD Lab ID: QC132944

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	9.174	11.37	105	41-132	19	25

Surrogate	%REC	Limits
Trifluorotoluene (FID)	123	62-138
Bromofluorobenzene (FID)	139	46-150



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

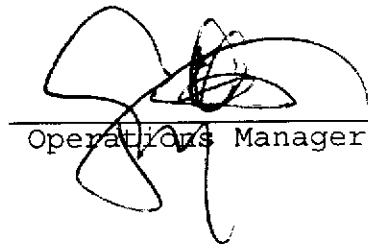
Date: 26-JAN-01
Lab Job Number: 149669
Project ID: 2000-46
Location: EBRPD

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: **149669**
Client: **Stellar Environmental Solutions**
Location: **EBRPD**

Sampled Date: **01/11/01**
Received Date: **01/12/01**

CASE NARRATIVE

This hardcopy data package contains sample and QC results for seven water samples, which were received from the site referenced above on January 12, 2001. The samples were received cold and intact.

TEH (EPA 8015M):

No analytical problems were encountered.

TVH/BTXE:

High trifluorotoluene surrogate recovery was observed in sample MW-8 (CT# 149669-004). This is due to hydrocarbons coeluting with the surrogate peak. No other analytical problems were encountered.

General Chemistry:

No analytical problems were encountered.

Chain of Custody Record

Lab job no. _____

Date _____

Page 2 of 2

Laboratory Curtis + Tompkins, Ltd.
 Address 2323 Fifth Street
Berkeley, CA 94710
510-486-0900
 Project Owner East Bay Regional Park District
 Site Address 7857 Redwood Road
Oakland CA
 Project Name Redwood Regional Park Service Yard
 Project Number 2000-46

Method of Shipment Hand delivery
 Shipment No. _____
 Airbill No. _____
 Cooler No. _____
 Project Manager Bruce Rucker
 Telephone No. (510) 644-3123
 Fax No. (510) 644-3859
 Samplers: (Signature) _____

Filtered	No. of Containers	Analysis Required										Remarks
Tetra	2											
Tetra	2											

Field Sample Number	Location/Depth	Date	Time	Sample Type	Type/Size of Container	Preservation										
						Cooler	Chemical									
6 SW-2		1/11/01	115	H ₂ O	40 ml VOA's 2 L amber glass	X	HCl	2	X							
"							-	2	X							
7 SW-3			900		40 ml VOA's 1 L amber glass		HCl	2	X							
"							-	2	X							

Received On Ice
 Cold Ambient Intact

Preservation Correct?
 Yes No N/A

Relinquished by: Signature <u>Bruce M. Rucker</u> Printed <u>Bruce M. Rucker</u> Company <u>Stellar Env. Solutions</u>	Date 1/11/01 Time 1540	Received by: Signature <u>Bennett's</u> Printed <u>Bennett's</u> Company <u>C&T LTD</u>	Date 1/11/01 Time 1510	Relinquished by: Signature _____ Printed _____ Company _____	Date _____ Time _____	Received by: Signature _____ Printed _____ Company _____	Date _____ Time _____		
Turnaround Time: <u>5 Day</u> Comments: _____ _____ _____				Relinquished by: Signature _____ Printed _____ Company _____				Received by: Signature _____ Printed _____ Company _____	

2000-00-01

Total Extractable Hydrocarbons

Lab #: 149669	Location: EBRPD
Client: Stellar Environmental Solutions	Prep: EPA 3520
Project#: 2000-46	Analysis: EPA 8015M
Matrix: Water	Sampled: 01/11/01
Units: ug/L	Received: 01/12/01

Field ID: MW-2	Batch#: 60840
Type: SAMPLE	Prepared: 01/16/01
Lab ID: 149669-001	Analyzed: 01/19/01
Diln Fac: 1.000	

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	96	44-121

Field ID: MW-4	Batch#: 60840
Type: SAMPLE	Prepared: 01/16/01
Lab ID: 149669-003	Analyzed: 01/19/01
Diln Fac: 1.000	

Analyte	Result	RL
Diesel C10-C24	650 L Y	50

Surrogate	%REC	Limits
Hexacosane	92	44-121

Field ID: MW-7	Batch#: 60810
Type: SAMPLE	Prepared: 01/15/01
Lab ID: 149669-004	Analyzed: 01/18/01
Diln Fac: 2.000	

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

Surrogate	%REC	Limits
Hexacosane	89	44-121

Field ID: MW-8	Batch#: 60810
Type: SAMPLE	Prepared: 01/15/01
Lab ID: 149669-005	Analyzed: 01/17/01
Diln Fac: 1.000	

Analyte	Result	RL
Diesel C10-C24	1,800 L Y	50

Surrogate	%REC	Limits
Hexacosane	88	44-121

L= Lighter hydrocarbons contributed to the quantitation
 Y= Sample exhibits fuel pattern which does not resemble standard
 ND= Not Detected
 RL= Reporting Limit
 Page 1 of 2



Total Extractable Hydrocarbons

Lab #:	149669	Location:	EBRPD
Client:	Stellar Environmental Solutions	Prep:	EPA 3520
Project#:	2000-46	Analysis:	EPA 8015M
Matrix:	Water	Sampled:	01/11/01
Units:	ug/L	Received:	01/12/01

Field ID:	SW-2	Batch#:	60810
Type:	SAMPLE	Prepared:	01/15/01
Lab ID:	149669-006	Analyzed:	01/17/01
Diln Fac:	1.000		

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	92	44-121

Field ID:	SW-3	Batch#:	60810
Type:	SAMPLE	Prepared:	01/15/01
Lab ID:	149669-007	Analyzed:	01/17/01
Diln Fac:	1.000		

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	94	44-121

Type:	BLANK	Batch#:	60810
Lab ID:	QC134919	Prepared:	01/15/01
Diln Fac:	1.000	Analyzed:	01/16/01

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	89	44-121

Type:	BLANK	Prepared:	01/16/01
Lab ID:	QC135026	Analyzed:	01/18/01
Diln Fac:	1.000	Cleanup Method:	EPA 3630C
Batch#:	60840		

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	85	44-121

Chromatogram

Sample Name : 149669-003,60840

FileName : G:\GC15\CHB\016B102.RAW

Method : BTEH362.MTH

Start Time : 0.01 min

Scale Factor: 0.0

End Time : 31.91 min

Plot Offset: -14 mV

Sample #: 60840

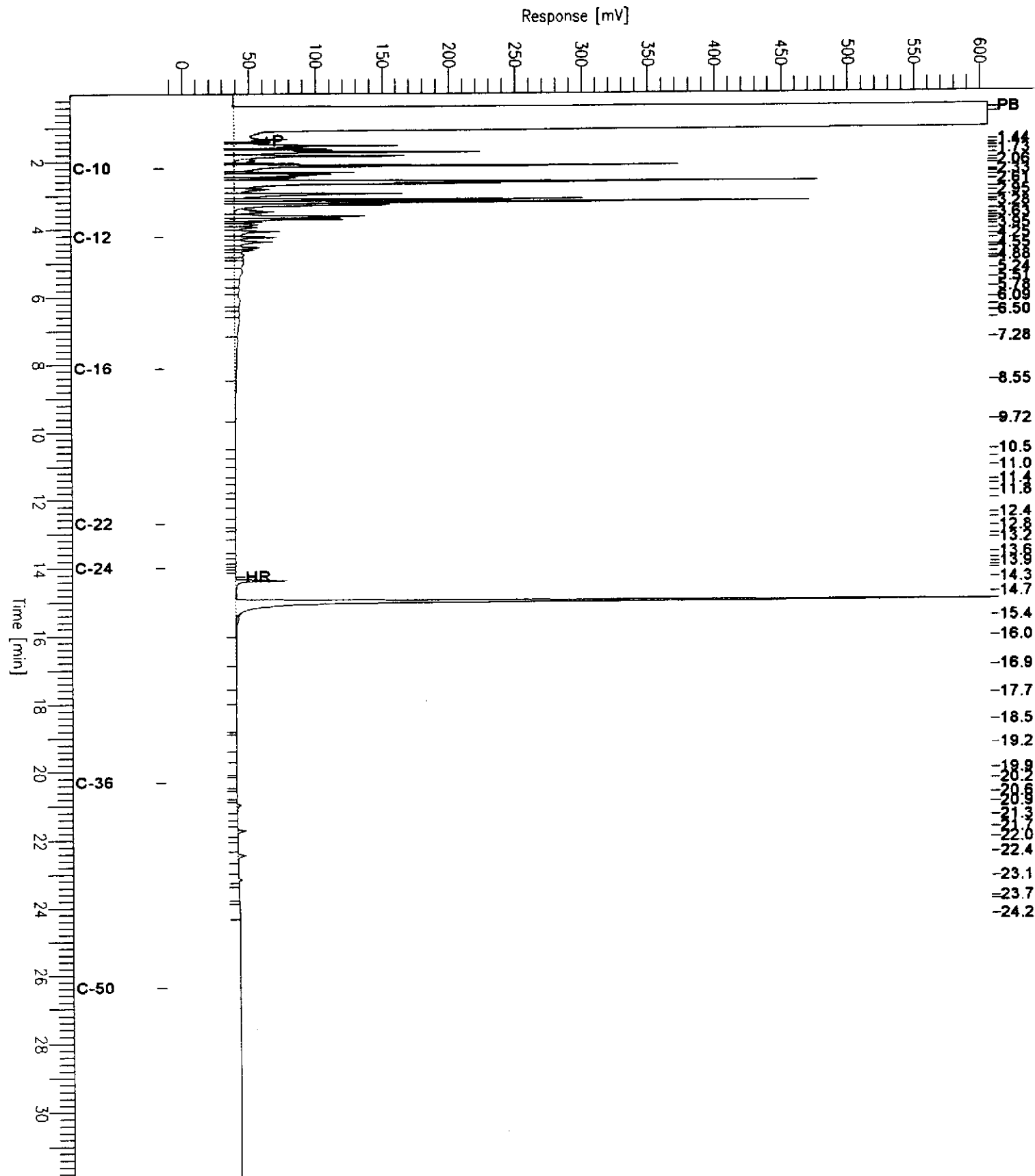
Date : 01/19/2001 09:09 AM

Time of Injection: 01/19/2001 01:19 AM

Low Point : -13.82 mV

Plot Scale: 619.7 mV

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Chromatogram

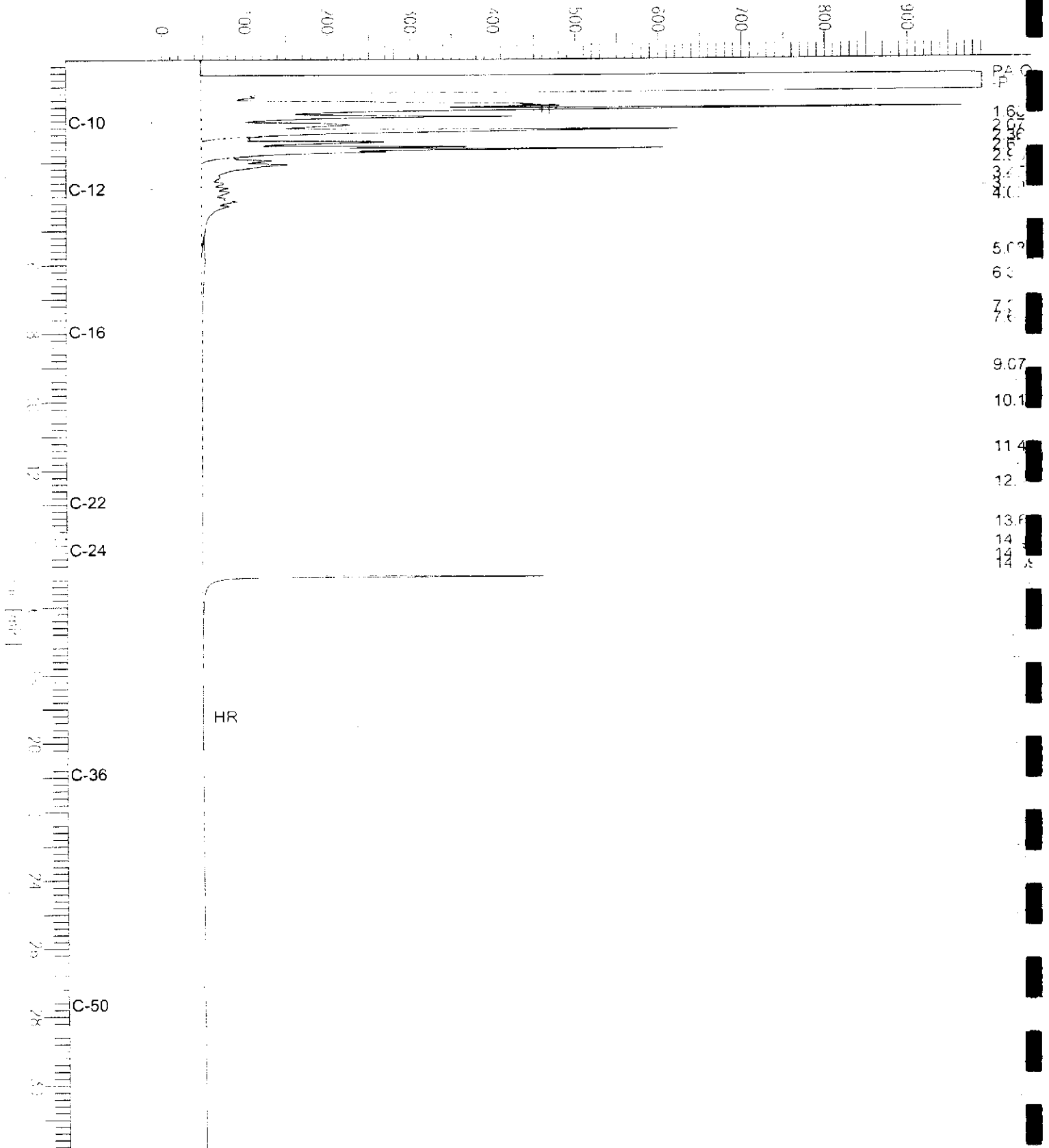
Sample Name : 149669-004,60810
FileName : G:\GCC11\CHA\017A009.RAW
Method : ATEH364.MTH
Start Time : 0.01 min
Scale Factor : 0.0

End Time : 31.91 min
Plot Offset: -0.0 mV

Sample #: 60810
Date : 1/18/01 09:04 AM
Time of Injection: 1/18/01 12:00 AM
Low Point : -4.71 mV
Plot Scale: 995.4 mV
High Point : 990.69 mV

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Retention Time [min]

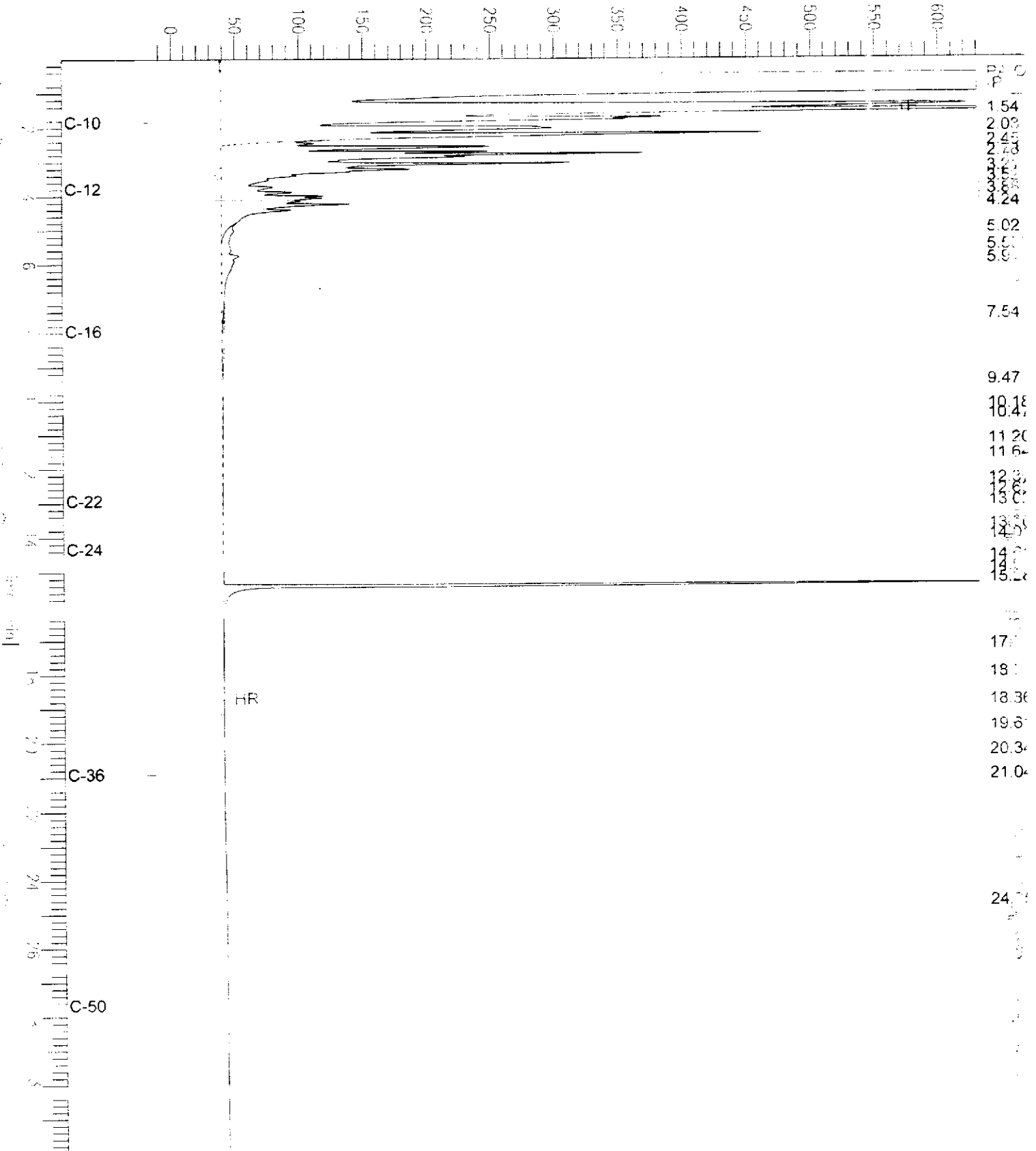


Chromatogram

Sample Name : 149669-005,60810
 FileName : G:\GC11\CHA\015A069.RAW
 Start Time : 0.01 min
 Scale Factor: 0.0

Sample #: 60810
 Date : 1/17/01 01:28 PM
 Time of Injection: 1/17/01 12:17 PM
 Low Point : -13.42 mV
 High Point : 630.25 mV
 Plot Scale: 643.7 mV

Response [mV]



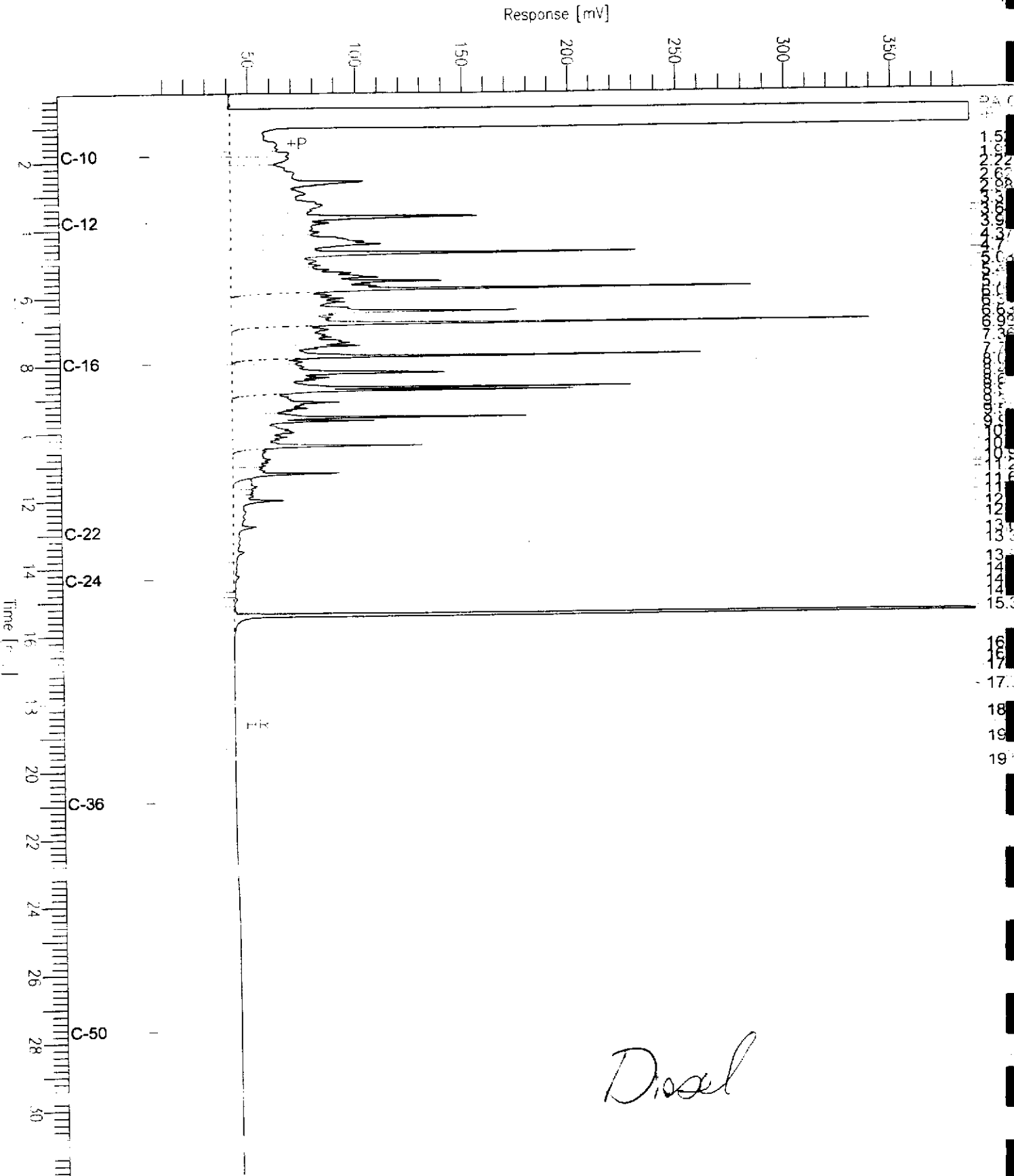
Chromatogram

Sample Name : ccv,00ws0263,dsl
FileName : G:\GC11\CHA\015A002.RAW
Method :
Start Time : 0.01 min
Scale Factor : 0.0

End Time : 31.91 min
Plot Offset : 4 mV

Sample #: 500mg/L
Date : 01/17/2001 11:08 AM
Time of Injection: 01/15/2001 07:08 AM
Low Point : 4.10 mV
Plot Scale: 383.3 mV
High Point : 387.44 mV

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Total Extractable Hydrocarbons

Lab #:	149669	Location:	EBRPD
Client:	Stellar Environmental Solutions	Prep:	EPA 3520
Project#:	2000-46	Analysis:	EPA 8015M
Matrix:	Water	Batch#:	60840
Units:	ug/L	Prepared:	01/16/01
Diln Fac:	1.000	Analyzed:	01/18/01

Type: BS Cleanup Method: EPA 3630C
Lab ID: QC135027

Analyte	Spiked	Result	%REC	Limits
Diesel C10-C24	2,339	1,422	61	45-110

Surrogate	%REC	Limits
Hexacosane	90	44-121

Type: BSD Cleanup Method: EPA 3630C
Lab ID: QC135028

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Diesel C10-C24	2,339	1,506	64	45-110	6	22

Surrogate	%REC	Limits
Hexacosane	91	44-121

Curtis & Tompkins Laboratories Analytical Report

Lab #:	149669	Location:	EBRPD
Client:	Stellar Environmental Solutions	Prep:	EPA 5030
Project#:	2000-46		
Matrix:	Water	Sampled:	01/11/01
Units:	ug/L	Received:	01/12/01

Field ID:	MW-2	Diln Fac:	1.000
Type:	SAMPLE	Batch#:	60807
Lab ID:	149669-001	Analyzed:	01/16/01

Analyte	Result	RL	Analysis
Gasoline C7-C12	51	50	EPA 8015M
MTBE	8.0	2.0	EPA 8021B
Benzene	8.3	0.50	EPA 8021B
Toluene	ND	0.50	EPA 8021B
Ethylbenzene	1.5	0.50	EPA 8021B
m,p-Xylenes	ND	0.50	EPA 8021B
o-Xylene	ND	0.50	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	119	59-135	EPA 8015M
Bromofluorobenzene (FID)	129	60-140	EPA 8015M
Trifluorotoluene (PID)	115	56-142	EPA 8021B
Bromofluorobenzene (PID)	120	55-149	EPA 8021B

Field ID:	MW-4	Lab ID:	149669-003
Type:	SAMPLE	Diln Fac:	1.000

Analyte	Result	RL	Batch#	Analyzed	Analysis
Gasoline C7-C12	1,600	50	60807	01/16/01	EPA 8015M
MTBE	8.4	2.0	60848	01/17/01	EPA 8021B
Benzene	1.2 C	0.50	60848	01/17/01	EPA 8021B
Toluene	0.89 C	0.50	60848	01/17/01	EPA 8021B
Ethylbenzene	46	0.50	60848	01/17/01	EPA 8021B
m,p-Xylenes	13	0.50	60848	01/17/01	EPA 8021B
o-Xylene	0.82 C	0.50	60848	01/17/01	EPA 8021B

Surrogate	%REC	Limits	Batch#	Analyzed	Analysis
Trifluorotoluene (FID)	122	59-135	60807	01/16/01	EPA 8015M
Bromofluorobenzene (FID)	119	60-140	60807	01/16/01	EPA 8015M
Trifluorotoluene (PID)	115	56-142	60848	01/17/01	EPA 8021B
Bromofluorobenzene (PID)	122	55-149	60848	01/17/01	EPA 8021B

Curtis & Tompkins Laboratories Analytical Report

Lab #: 149669	Location: EBRPD
Client: Stellar Environmental Solutions	Prep: EPA 5030
Project#: 2000-46	
Matrix: Water	Sampled: 01/11/01
Units: ug/L	Received: 01/12/01

Field ID: MW-7	Lab ID: 149669-004
Type: SAMPLE	Diln Fac: 5.000

Analyte	Result	RL	Batch#	Analyzed	Analysis
Gasoline C7-C12	13,000	250	60807	01/16/01	EPA 8015M
MTBE	95 C	10	60848	01/17/01	EPA 8021B
Benzene	95 C	2.5	60848	01/17/01	EPA 8021B
Toluene	4.0 C	2.5	60848	01/17/01	EPA 8021B
Ethylbenzene	500	2.5	60848	01/17/01	EPA 8021B
m,p-Xylenes	280	2.5	60848	01/17/01	EPA 8021B
o-Xylene	9.1	2.5	60848	01/17/01	EPA 8021B

Surrogate	%REC	Limits	Batch#	Analyzed	Analysis
Trifluorotoluene (FID)	141 *	59-135	60807	01/16/01	EPA 8015M
Bromofluorobenzene (FID)	120	60-140	60807	01/16/01	EPA 8015M
Trifluorotoluene (PID)	125	56-142	60848	01/17/01	EPA 8021B
Bromofluorobenzene (PID)	123	55-149	60848	01/17/01	EPA 8021B

Field ID: MW-8	Diln Fac: 5.000
Type: SAMPLE	Batch#: 60807
Lab ID: 149669-005	Analyzed: 01/16/01

Analyte	Result	RL	Analysis
Gasoline C7-C12	14,000	250	EPA 8015M
MTBE	96	10	EPA 8021B
Benzene	430	2.5	EPA 8021B
Toluene	17	2.5	EPA 8021B
Ethylbenzene	360	2.5	EPA 8021B
m,p-Xylenes	1,100	2.5	EPA 8021B
o-Xylene	130	2.5	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	134	59-135	EPA 8015M
Bromofluorobenzene (FID)	121	60-140	EPA 8015M
Trifluorotoluene (PID)	129	56-142	EPA 8021B
Bromofluorobenzene (PID)	115	55-149	EPA 8021B

Curtis & Tompkins Laboratories Analytical Report

Lab #: 149669	Location: EBRPD
Client: Stellar Environmental Solutions	Prep: EPA 5030
Project#: 2000-46	
Matrix: Water	Sampled: 01/11/01
Units: ug/L	Received: 01/12/01

Field ID: SW-2	Lab ID: 149669-006
Type: SAMPLE	Diln Fac: 1.000

Analyte	Result	RL	Batch#	Analyzed	Analysis
Gasoline C7-C12	ND	50	60807	01/16/01	EPA 8015M
MTBE	ND	2.0	60848	01/17/01	EPA 8021B
Benzene	ND	0.50	60848	01/17/01	EPA 8021B
Toluene	ND	0.50	60848	01/17/01	EPA 8021B
Ethylbenzene	0.53	0.50	60848	01/17/01	EPA 8021B
m,p-Xylenes	ND	0.50	60848	01/17/01	EPA 8021B
o-Xylene	ND	0.50	60848	01/17/01	EPA 8021B

Surrogate	%REC	Limits	Batch#	Analyzed	Analysis
Trifluorotoluene (FID)	118	59-135	60807	01/16/01	EPA 8015M
Bromofluorobenzene (FID)	129	60-140	60807	01/16/01	EPA 8015M
Trifluorotoluene (PID)	107	56-142	60848	01/17/01	EPA 8021B
Bromofluorobenzene (PID)	105	55-149	60848	01/17/01	EPA 8021B

Field ID: SW-3	Diln Fac: 1.000
Type: SAMPLE	Batch#: 60807
Lab ID: 149669-007	Analyzed: 01/16/01

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

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	115	59-135	EPA 8015M
Bromofluorobenzene (FID)	134	60-140	EPA 8015M
Trifluorotoluene (PID)	107	56-142	EPA 8021B
Bromofluorobenzene (PID)	117	55-149	EPA 8021B

*= 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 4

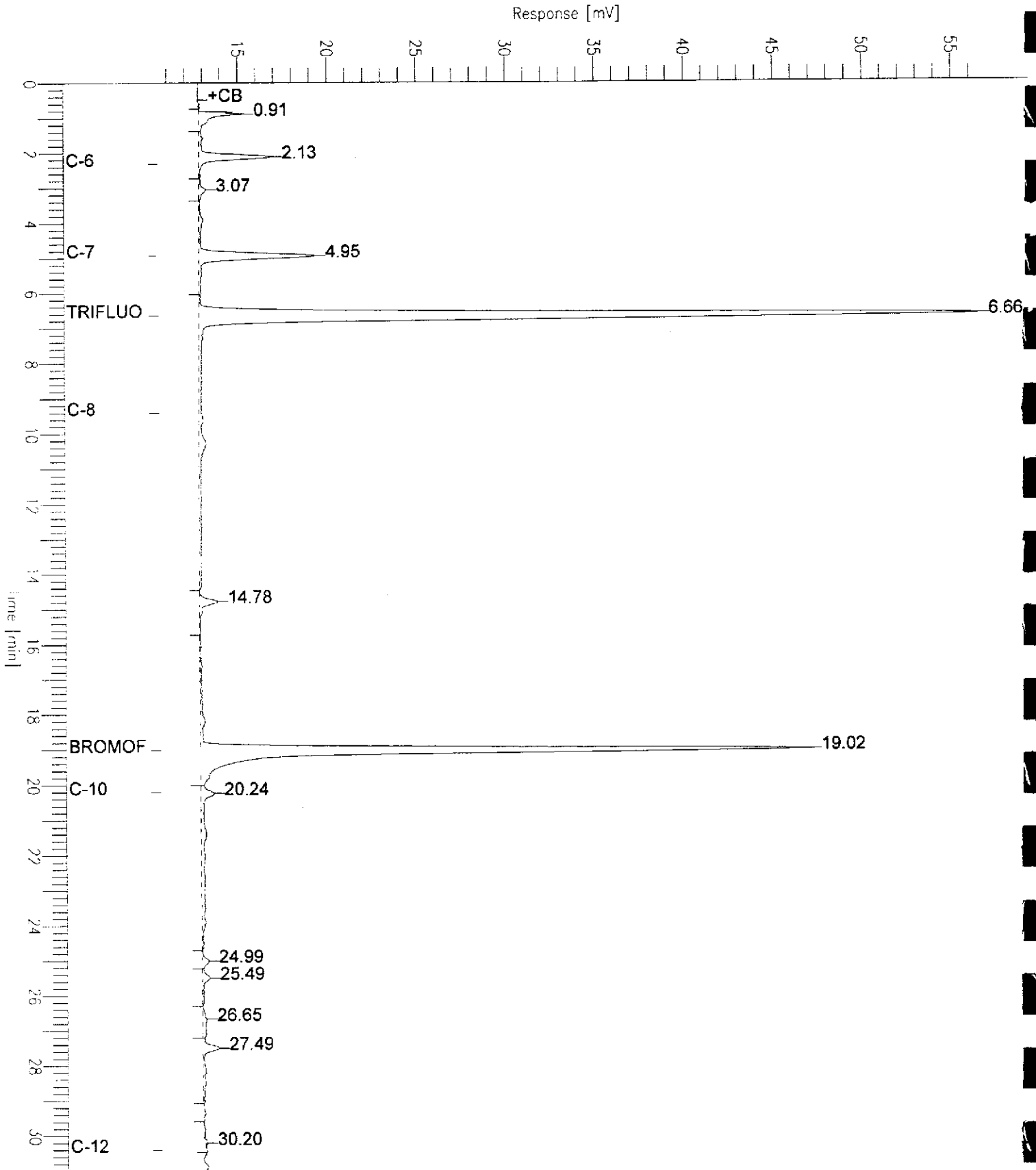
Chromatogram

Sample Name : 149669-001,60807,+mtbe
FileName : G:\GC05\DATA\015G026.raw
Method : TVHBTXE
Start Time : 0.00 min
Scale Factor: 1.0

End Time : 31.00 min
Plot Offset: 11 mV

Sample #: a1
Date : 1/16/01 12:10 PM
Time of Injection: 1/16/01 11:39 AM
Low Point : 10.52 mV
Plot Scale: 46.0 mV
High Point : 56.53 mV

Page 1 of 1

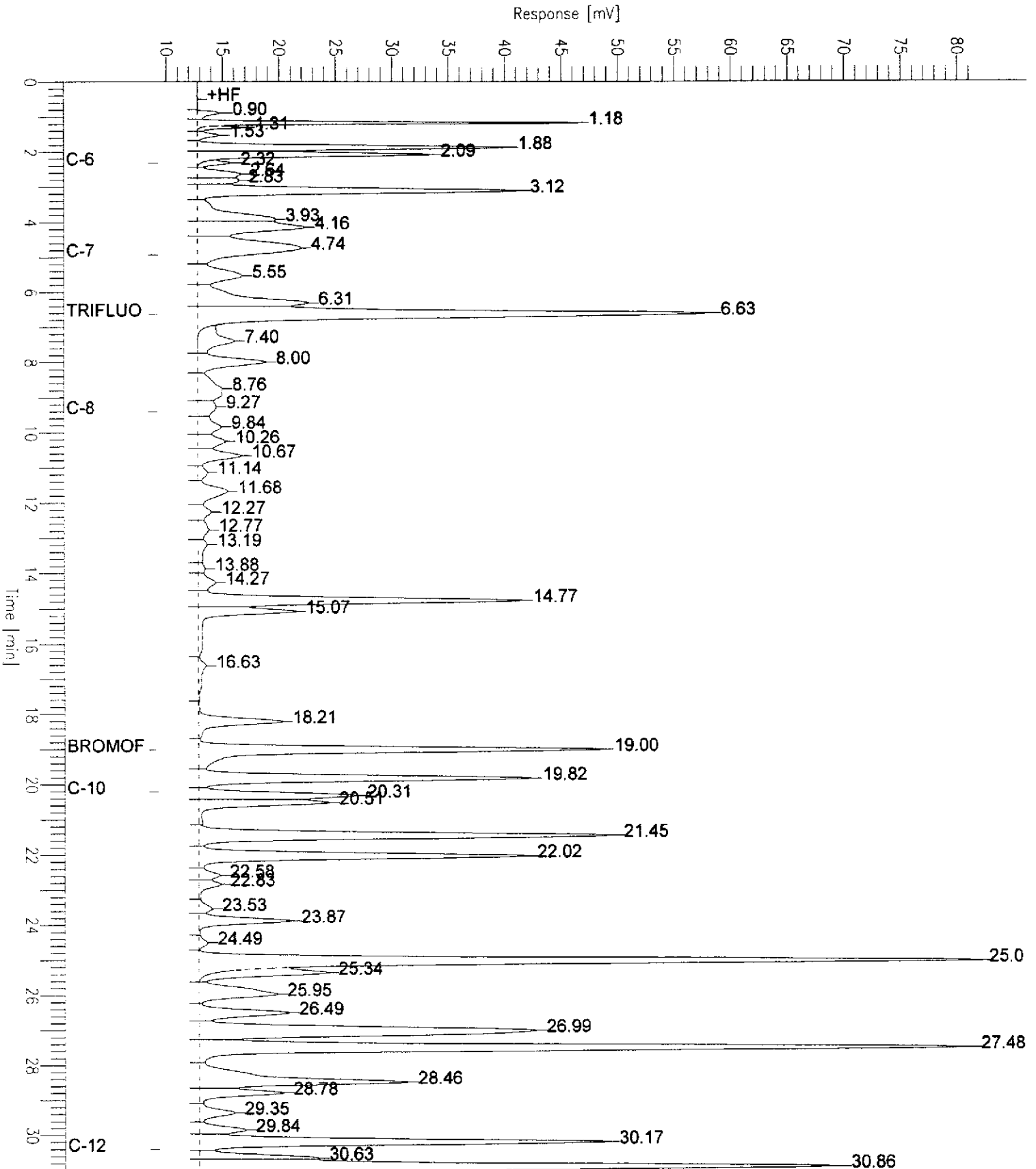


Chromatogram

Sample Name : 149669-003,60807,+mtbe
FileName : G:\GC05\DATA\015G027.raw
Method : TVHBTXE
Start Time : 0.00 min
Scale Factor: 1.0

End Time : 31.00 min
Plot Offset: 9 mV

Sample #: a1
Date : 1/17/01 11:48 AM
Time of Injection: 1/16/01 12:20 PM
Low Point : 9.27 mV
Plot Scale: 72.6 mV
High Point : 81.84 mV



Chromatogram

Sample Name : 149669-004,60807

FileName : G:\GC05\DATA\015G030.raw

Method : TVHBTXE

Start Time : 0.00 min

Scale Factor: 1.0

End Time : 31.00 min

Plot Offset: 5 mV

Sample #: b1

Date : 1/17/01 11:48 AM

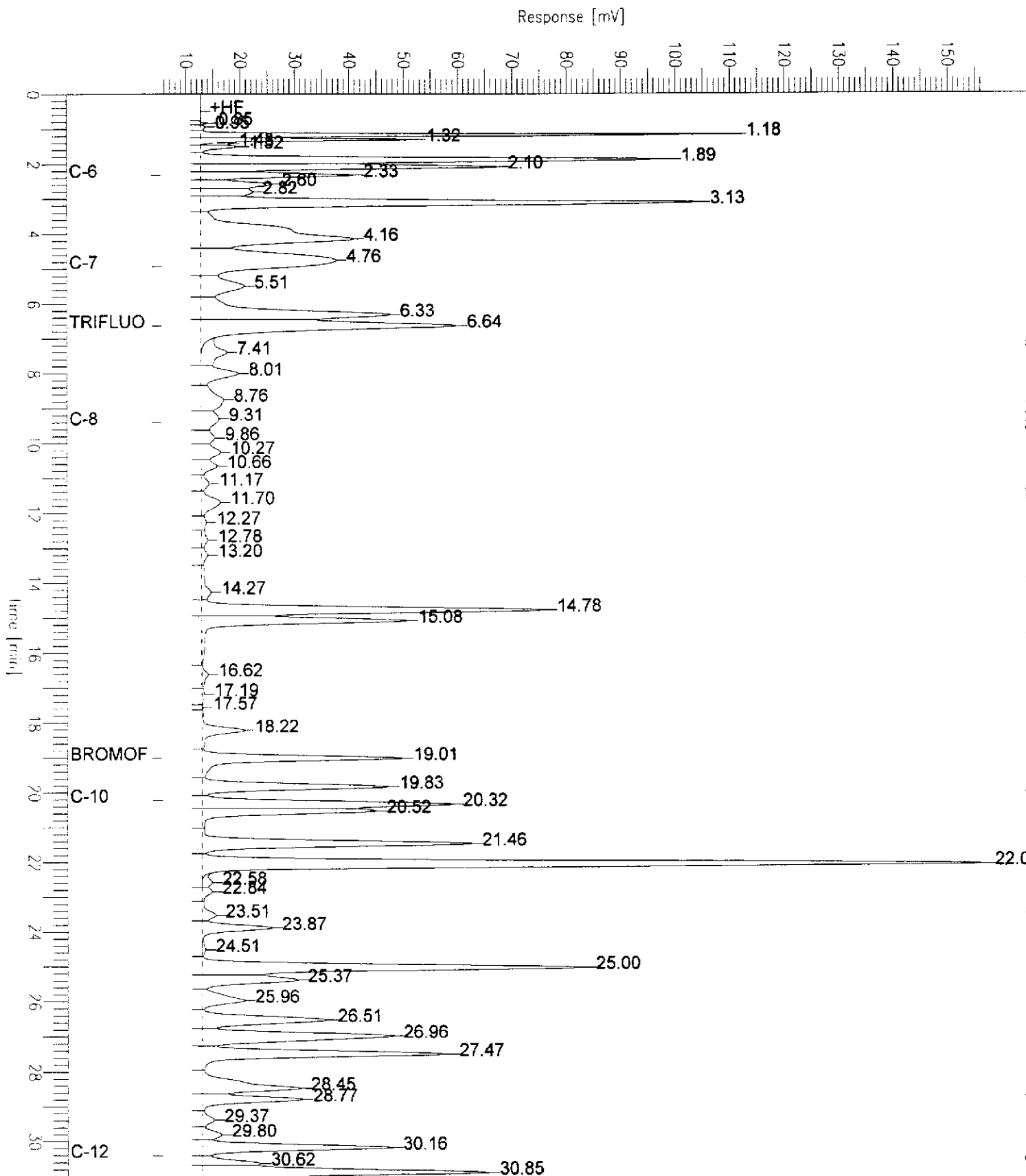
Time of Injection: 1/16/01 02:24 PM

Low Point : 5.42 mV

Plot Scale: 151.2 mV

Page 1 of 1

High Point : 156.64 mV



Chromatogram

Sample Name : 149669-005,60807

Sample #: b1

Page 1 of 1

FileName : G:\GC05\DATA\015G034.raw

Date : 1/17/01 11:48 AM

Method : TVHBTXE

Time of Injection: 1/16/01 05:09 PM

Start Time : 0.00 min

End Time : 31.00 min

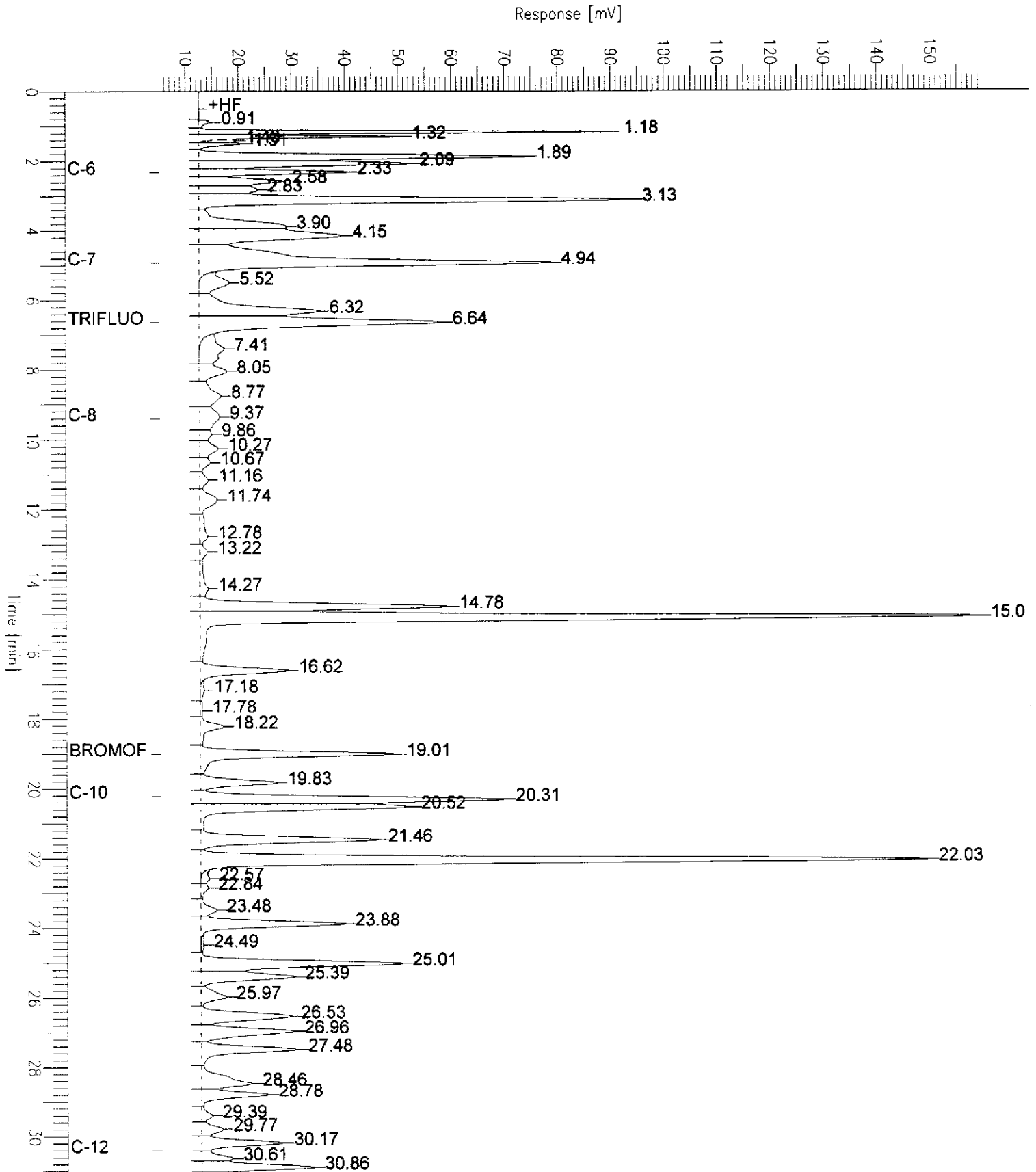
Low Point : 5.15 mV

High Point : 159.31 mV

Scale Factor: 1.0

Plot Offset: 5 mV

Plot Scale: 154.2 mV

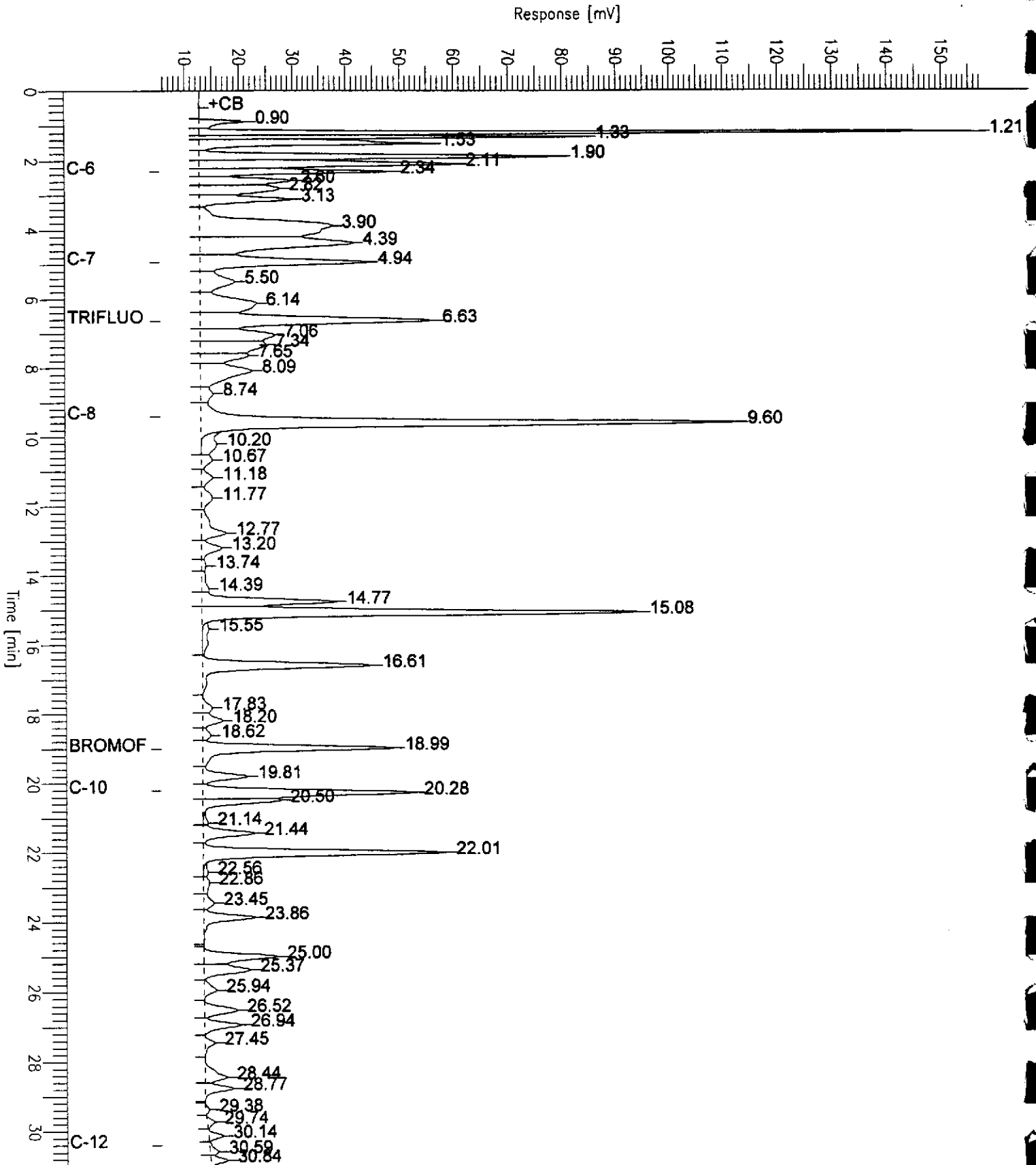


Chromatogram

Sample Name : ccv/lcs,qc134908,60807,00ws0244,5/5000
FileName : G:\GC05\DATA\015G002.raw
Method : TVHBTXE
Start Time : 0.00 min
Scale Factor : 1.0

Sample #: gas
Date : 1/15/01 07:46 PM
Time of Injection: 1/15/01 07:15 PM
Low Point : 5.42 mV
Plot Scale : 151.8 mV

Page 1 of 1



Curtis & Tompkins Laboratories Analytical Report

Lab #: 149669	Location: EBRPD	EPA 5030
Client: Stellar Environmental Solutions	Prep: EPA 5030	EPA 8015M
Project#: 2000-46	Analysis: EPA 8015M	
Type: LCS	Diln Fac: 1.000	
Lab ID: QC134908	Batch#: 60807	
Matrix: Water	Analyzed: 01/15/01	
Units: ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	2,000	1,885	94	73-121
MTBE		NA		
Benzene		NA		
Toluene		NA		
Ethylbenzene		NA		
m,p-Xylenes		NA		
o-Xylene		NA		

Surrogate	Result	%REC	Limits
Trifluorotoluene (FID)		116	59-135
Bromofluorobenzene (FID)		115	60-140
Trifluorotoluene (PID)	NA		
Bromofluorobenzene (PID)	NA		

Curtis & Tompkins Laboratories Analytical Report

Lab #: 149669	Location: EBRPD
Client: Stellar Environmental Solutions	Prep: EPA 5030
Project#: 2000-46	Analysis: EPA 8021B
Matrix: Water	Batch#: 60807
Units: ug/L	Analyzed: 01/15/01
Diln Fac: 1.000	

Type: BS Lab ID: QC134909

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12		NA		
MTBE	20.00	16.67	83	51-125
Benzene	20.00	17.34	87	67-117
Toluene	20.00	17.77	89	69-117
Ethylbenzene	20.00	19.90	99	68-124
m,p-Xylenes	40.00	40.56	101	70-125
o-Xylene	20.00	19.90	99	65-129

Surrogate	Result	%REC	Limits
Trifluorotoluene (FID)	NA		
Bromofluorobenzene (FID)	NA		
Trifluorotoluene (PID)		112	56-142
Bromofluorobenzene (PID)		112	55-149

Type: BSD Lab ID: QC134910

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12		NA				
MTBE	20.00	16.37	82	51-125	2	20
Benzene	20.00	17.03	85	67-117	2	20
Toluene	20.00	17.80	89	69-117	0	20
Ethylbenzene	20.00	20.03	100	68-124	1	20
m,p-Xylenes	40.00	41.57	104	70-125	2	20
o-Xylene	20.00	20.05	100	65-129	1	20

Surrogate	Result	%REC	Limits
Trifluorotoluene (FID)	NA		
Bromofluorobenzene (FID)	NA		
Trifluorotoluene (PID)		117	56-142
Bromofluorobenzene (PID)		118	55-149

NA= Not Analyzed

RPD= Relative Percent Difference

Curtis & Tompkins Laboratories Analytical Report

Lab #: 149669	Location: EBRPD	EPA 5030
Client: Stellar Environmental Solutions	Prep:	EPA 8021B
Project#: 2000-46	Analysis:	
Type: BS	Diln Fac: 1.000	
Lab ID: QC135050	Batch#: 60848	
Matrix: Water	Analyzed: 01/17/01	
Units: ug/L		

Analyte	Spiked	Result	%REC	Limits
MTBE	20.00	16.97	85	51-125
Benzene	20.00	15.90	80	67-117
Toluene	20.00	17.51	88	69-117
Ethylbenzene	20.00	18.60	93	68-124
m,p-Xylenes	40.00	40.46	101	70-125
o-Xylene	20.00	18.98	95	65-129

Surrogate	%REC	Limits
Trifluorotoluene (PID)	106	56-142
Bromofluorobenzene (PID)	104	55-149

Curtis & Tompkins Laboratories Analytical Report

Lab #:	149669	Location:	EBRPD
Client:	Stellar Environmental Solutions	Prep:	EPA 5030
Project#:	2000-46	Analysis:	EPA 8021B
Type:	BSD	Diln Fac:	1.000
Lab ID:	QC135091	Batch#:	60848
Matrix:	Water	Analyzed:	01/17/01
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	20.00	16.19	81	51-125	5	20
Benzene	20.00	14.23	71	67-117	11	20
Toluene	20.00	15.61	78	69-117	11	20
Ethylbenzene	20.00	16.47	82	68-124	12	20
m,p-Xylenes	40.00	35.71	89	70-125	12	20
o-Xylene	20.00	17.07	85	65-129	11	20

Surrogate	%REC	Limits
Trifluorotoluene (PID)	106	56-142
Bromofluorobenzene (PID)	105	55-149

Curtis & Tompkins Laboratories Analytical Report

Lab #: 149669	Location: EBRPD
Client: Stellar Environmental Solutions	Prep: EPA 5030
Project#: 2000-46	Analysis: EPA 8015M
Field ID: ZZZZZZZZZZ	Diln Fac: 1.000
MSS Lab ID: 149727-003	Batch#: 60807
Matrix: Water	Sampled: 01/15/01
Units: ug/L	Received: 01/15/01

Type: MS Analyzed: 01/15/01
 Lab ID: QC134911

Analyte	MSS Result	Spiked	Result	%REC	Limits
Gasoline C7-C12	<24.00	2,000	1,812	91	65-131
MTBE			NA		
Benzene			NA		
Toluene			NA		
Ethylbenzene			NA		
m,p-Xylenes			NA		
o-Xylene			NA		

Surrogate	Result	%REC	Limits
Trifluorotoluene (FID)		120	59-135
Bromofluorobenzene (FID)		123	60-140
Trifluorotoluene (PID)	NA		
Bromofluorobenzene (PID)	NA		

Type: MSD Analyzed: 01/16/01
 Lab ID: QC134912

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	2,000	1,888	94	65-131	4	20
MTBE			NA			
Benzene			NA			
Toluene			NA			
Ethylbenzene			NA			
m,p-Xylenes			NA			
o-Xylene			NA			

Surrogate	Result	%REC	Limits
Trifluorotoluene (FID)		122	59-135
Bromofluorobenzene (FID)		123	60-140
Trifluorotoluene (PID)	NA		
Bromofluorobenzene (PID)	NA		



Nitrate Nitrogen

Lab #:	149669	Location:	EBRPD
Client:	Stellar Environmental Solutions	Prep:	METHOD
Project#:	2000-46	Analysis:	EPA 300.0
Analyte:	Nitrogen, Nitrate	Batch#:	60741
Matrix:	Water	Sampled:	01/11/01
Units:	mg/L	Received:	01/12/01
Diln Fac:	1.000	Analyzed:	01/12/01

Field ID	Type	Lab ID	Result	RL
MW-3	SAMPLE	149669-002	ND	0.05
MW-4	SAMPLE	149669-003	ND	0.05
MW-7	SAMPLE	149669-004	ND	0.05
MW-8	SAMPLE	149669-005	ND	0.05
	BLANK	QC134670	ND	0.05



Sulfate

Lab #:	149669	Location:	EBRPD
Client:	Stellar Environmental Solutions	Prep:	METHOD
Project#:	2000-46	Analysis:	EPA 300.0
Analyte:	Sulfate	Sampled:	01/11/01
Matrix:	Water	Received:	01/12/01
Units:	mg/L	Analyzed:	01/12/01
Batch#:	60741		

Field ID	Type	Lab ID	Result	RL	Diln Fac
MW-3	SAMPLE	149669-002	28	0.50	1.000
MW-4	SAMPLE	149669-003	0.39 J	0.50	1.000
MW-7	SAMPLE	149669-004	86	5.0	10.00
MW-8	SAMPLE	149669-005	3.4	0.50	1.000
	BLANK	QC134670	ND	0.50	1.000



Nitrate Nitrogen

Lab #:	149669	Location:	EBRPD
Client:	Stellar Environmental Solutions	Prep:	METHOD
Project#:	2000-46	Analysis:	EPA 300.0
Analyte:	Nitrogen, Nitrate	Batch#:	60741
Field ID:	ZZZZZZZZZZ	Sampled:	01/11/01
MSS Lab ID:	149650-014	Received:	01/11/01
Matrix:	Water	Analyzed:	01/12/01
Units:	mg/L		

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim	Diln	Fac
BS	QC134671		2.000	2.030	101	90-110				1.000
BSD	QC134672		2.000	2.020	101	90-110	0	20		1.000
MS	QC134673	6.278	10.00	16.58	103	80-120				10.00
MSD	QC134674		10.00	16.44	102	80-120	1	20		10.00



Sulfate

Lab #:	149669	Location:	EBRPD
Client:	Stellar Environmental Solutions	Prep:	METHOD
Project#:	2000-46	Analysis:	EPA 300.0
Analyte:	Sulfate	Batch#:	60741
Field ID:	ZZZZZZZZZZ	Sampled:	01/11/01
MSS Lab ID:	149650-014	Received:	01/11/01
Matrix:	Water	Analyzed:	01/12/01
Units:	mg/L		

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim Diff	Fac
BS	QC134671		20.00	20.12	101	90-110			1.000
BSD	QC134672		20.00	20.13	101	90-110	0	20	1.000
MS	QC134673	82.06	100.0	184.9	103	80-120			10.00
MSD	QC134674		100.0	184.4	102	80-120	0	20	10.00

NON-HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.

N.A.

Manifest Doc. No.

00001

2. Page 1 of 1

3. Generator's Name and Mailing Address

EAST BAY REGIONAL PARK DISTRICT
7867 REDWOOD ROAD, OAKLAND, CA 94619

4. Generator's Phone

(510) 749-1390

5. Transporter 1 Company Name

FOSS ENVIRONMENTAL SERV

6.

US EPA ID Number

KAR000030114

A. Transporter's Phone

510-749-1390

7. Transporter 2 Company Name

8.

US EPA ID Number

B. Transporter's Phone

9. Designated Facility Name and Site Address

ALTAMONT LANDFILL
10840 ALTA MONT PASS RD
LIVERMORE, CA 94550-9715 NA

10.

US EPA ID Number

C. Facility's Phone

925-455-7300

11. Waste Shipping Name and Description

12. Containers

No.

Type

13. Total Quantity

14. Unit W/Vol

a. NON-HAZARDOUS WASTE SOLID

002 DM 1700 P

b.

c.

d.

D. Additional Descriptions for Materials Listed Above

SOL

E. Handling Codes for Wastes Listed Above

15. Special Handling Instructions and Additional Information

APPROVAL NO 54943800

DISPOSAL 7/0 A1034-01

16. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.

Printed/Typed Name

Signature

Month Day Year

Stellar Environmental Solutions

Printed/Typed Name

Signature

Month Day Year

EARVIN PATTERSON

Earvin Patterson

01 11 7101

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name

Signature

Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of waste materials covered by this manifest except as noted in Item 19.

Printed/Typed Name

Signature

Month Day Year

11 18 01

GENERATOR

TRANSPORTER

FACILITY

ALLIANCE LABORERS & NAT

DATE: 01/18/2001

TICKET: 07382-1

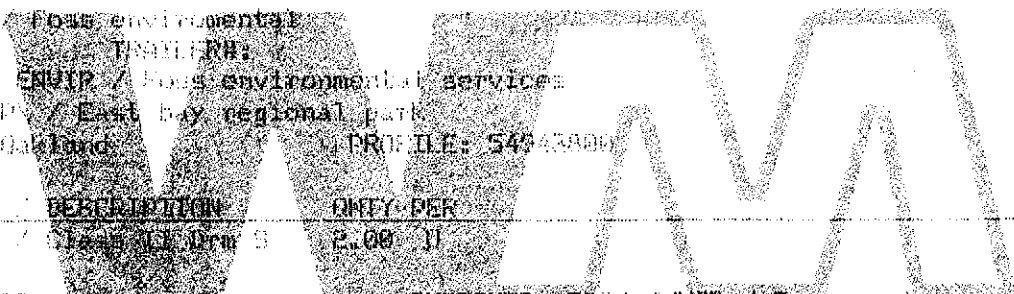
TIME IN: 09:33

700 1

TIME OUT: 09:49

STAGE NUMBER: 28419

CARRIER: FORD / Ford environmental
VEHICLE: 2050 TRAILER:
CUSTOMER: FORD ENVI / Ford environmental services
GENERATOR: EARTH / East bay regional park
DIVISION: ORK / Oakland PROFILE: 5400000



MANIFEST NUMBER	DESCRIPTION	WEIGHT PER
40000	WOOD /	2.00 Y

GROSS: 20000 LBS
TARE: 20000 LBS
NET: 0 LBS

CUSTOMER: FORD ENVI / Ford environmental

WASTE MANAGEMENT

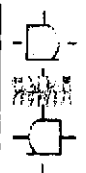
CUSTOMER: *Ken De*

WEIGHT IN CLASS: Brown, Ken De

WEIGHT OUT CLASS: Brown, Ken De

WASTE MASTER CERTIFICATE

THIS IS TO CERTIFY THAT THE FOLLOWING DESCRIBED AMPLITY WAS WEIGHED, MEASURED
, OR COUNTED BY A WASTE MASTER WHOSE SIGNATURE IS ON THIS CERTIFICATE, AND IS
PERSONIFIED AUTHORITY OF ACCURACY, AS PRESCRIBED BY CHAPTER 7 COMMENCING WITH
SECTION 17700 OF DIVISION 5 OF THE CALIFORNIA BUSINESS AND PROFESSIONS CODE
ADMINISTERED BY THE DIVISION OF MEASUREMENTS STANDARDS OF THE CALIFORNIA
DEPARTMENT OF FOOD AND AGRICULTURE.



7000

7000

7000

BORING NUMBER MW-7 Page 1 of 2

PROJECT Redwood Regional Park OWNER EBRPD
 LOCATION 7867 Redwood Road PROJECT NUMBER 2000-46
 TOTAL DEPTH 24 feet bgs BOREHOLE DIA. 8-inch
 SURFACE ELEV. Unknown WATER FIRST ENCOUNTERED 16 bgs (in sample)
 DRILLING COMPANY HEW Drilling DRILLING METHOD 8-inch HSA, (2.5" Sampler)
 DRILLER Robert GEOLOGIST S. Quayle DATE DRILLED 12/11/00

DEPTH (feet)	GRAPHIC LOG	SAMPLE INTERVAL/RECOVERY	BLOW COUNTS	INSTRUMENT READING	DESCRIPTION/SOIL CLASSIFICATION	REMARKS
0		100	3		Clayey Silt (ML), moist, light brown, firm, trace fine gravel, minor organics @3' fine to coarse gravel, also pieces of friable silt/sandstone ----- Silty Clay (CL), moist, orange brown, firm to stiff, low to med. plasticity, trace fine sand @13' color change, orange brown with blue/gray mottling, hydrocarbon odor @14.5' color change, blue/gray w/orange mottling, hydrocarbon odor 16-16.5' sample wet, increasing some fine to coarse sand, some fine gravel ----- Sandy Clay (CL) wet, blue/gray w/orange mottling, stiff, low to med. plasticity, some fine to coarse sand, some fine to coarse gravel, hydrocarbon odor. ----- Clayey Sand (SC) gray, wet, loose, fine to coarse sand, hydrocarbon odor	
1		100	6			
2		50	2			
3		100	3			
4		100	4			
5		50	6			
6		100	4			
7		100	5			
8		50	3			
9		100	4			
10		100	5			
11		25	3			
12		100	6			
13		100	4			
14		25	4			
15		100	6			
16		100	9			
17		100	3			
18		100	5			
19	100	7				
	25	2				
	100	5				
	100	7				
	100	5				
	100	6				
	100	13				
	50	4				
	100	7				
	100	12				
	0	3				
	0	4				
	100	5				

▽ 11.7' bgs (equilibrated)

▽ 16.0' bgs (first occurrence)



BORING NUMBER MW-8 Page 1 of 2

PROJECT Redwood Regional Park OWNER EBRPD
 LOCATION 7867 Redwood Road PROJECT NUMBER 2000-46
 TOTAL DEPTH 23 feet bgs BOREHOLE DIA. 8-inch
 SURFACE ELEV. Unknown WATER FIRST ENCOUNTERED 16.5 bgs (in sample)
 DRILLING COMPANY HEW Drilling DRILLING METHOD 8-inch HSA, (2.5" Sampler)
 DRILLER Robert GEOLOGIST S. Quayle DATE DRILLED 12/11/00

DEPTH (feet)	GRAPHIC LOG	SAMPLE INTERVAL/RECOVERY	BLOW COUNTS	INSTRUMENT READING	DESCRIPTION/SOIL CLASSIFICATION	REMARKS
0.5	Asphalt	0	14		3" of asphalt	
0		90	12		Clayey Silt (ML), brown, dry to moist, stiff to v. stiff, minor organics, some fine gravel	
1		100	10			
1		50	5			
2		100	5			
2		100	7			
3		0	4			
3		100	5			
4		100	11			
4		100	6		@5' thin layer of light brown colored silt stone	
5		100	7			
5		100	10			
6		50	4			
6		100	6		In shoe @8'; color change to gray, hydrocarbon odor	
7		100	5			
7		50	5			
8		50	4			
8		100	9		Silty Clay (CH), moist, dark gray-brown, soft to firm, low to med. plasticity, hydrocarbon odor	
9		25	5			
9		100	5			
10		100	10			
10		0	3		@14', shoe slightly wet, blue/green stains, hydrocarbon odor	
11		0	5			
11		25	8			
12		50	3			
12		100	7		SAA/Silty Clay (CH) with chunks of blue/green siltstone, hydrocarbon odor, some fine sand	▼ 12.0' bgs (equilibrated)
13		100	11			
13		0	7			
14		0	7			
14		50	2		@16.5-17' sample wet	
15		50	9			
15		100	12			
16	MW-8-16'	100	6			
16		50	4		Clayey Sand (SC), wet, gray/blue loose, fine to coarse sand, with firm to coarse gravel, hydrocarbon odor	▽ 16.5' bgs (first occurrence)
17		100	6			
17		100	9			
18		100	3			
18		100	5			
19		100	8			



BORING NUMBER MW-8 Page 2 of 2

PROJECT Redwood Regional Park OWNER EBRPD

LOCATION 7867 Redwood Road PROJECT NUMBER 2000-46

TOTAL DEPTH 23 feet bgs BOREHOLE DIA. 8-inch

SURFACE ELEV. Unknown WATER FIRST ENCOUNTERED 16.5 bgs (in sample)

DRILLING COMPANY HEW Drilling DRILLING METHOD 8-inch HSA, (2.5" Sampler)

DRILLER Robert GEOLOGIST S. Quayle DATE DRILLED 12/11/00

DEPTH (feet)	GRAPHIC LOG	SAMPLE INTERVAL/RECOVERY	BLOW COUNTS	RECOVERY	DESCRIPTION/SOIL CLASSIFICATION	REMARKS
-20			6		@20.5', color change to light brown, no hydrocarbon odor	
-21			8			
-22			16			
			9			
			20			
-23			28		Siltstone, light brown	
-24					23' bottom of boring	
-25						

WELL GAUGING DATA

Project # 010112-X1 Date 1/12/01 Client Stellar Env. Solutions

Site Redwood Regional Park Service Yard Oakland CAL

Well ID	Well Size (in.)	Sheen / Odor	Depth to Immiscible Liquid (ft.)	Thickness of Immiscible Liquid (ft.)	Volume of Immiscibles Removed (ml)	Depth to water (ft.)	Depth to well bottom (ft.)	Survey Point: TOB or TOC	DO ^{mg/l} / ORP ^{mv} Readings
MW-1	4					3.04	18.85		1.2 / 142mv
MW-2	4					21.43	38.82		1.2 / 130
MW-3	4					19.22	44.10		0.9 / 142
MW-4	4					13.14	26.51		1.0 / -78mv
MW-5	4					16.26	26.92		0.8 / 113mv
MW-6	4					13.31	27.39		1.4 / 114mv
MW-7	2					12.78	25.33		0.7 / -39mv
MW-8	2					11.09	22.21	↓	0.8 / 0mv

WELL MONITORING DATA SHEET

Project #: <i>010112-X1</i>	Client: <i>Stellar Env. Solutions</i>
Sampler: <i>HOYT</i>	Start Date: <i>1/12/01</i>
Well I.D.: <i>mw-1</i>	Well Diameter: 2 3 <u>4</u> 6 8
Total Well Depth: <i>18.85</i>	Depth to Water: <i>3.04</i>
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> HACH

Purge Method:

Bailer
 Disposable Bailer
 Middleburg
 Electric Submersible
 Waterra
 Peristaltic
 Extraction Pump
 Other _____

Sampling Method: Bailer

Disposable Bailer
 Extraction Port
 Dedicated Tubing
 Other: _____

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

_____ (Gals.) X _____ = _____ Gals.
 I Case Volume Specified Volumes Calculated Volume

Time	Temp (°F)	pH	Cond.	Turbidity	Gals. Removed	Observations
<i>0919</i>	<i>49.3</i>	<i>7.17</i>	<i>881</i>	—	—	
						<i>Ferrous Iron 0.00 mg/L</i>

Did well dewater? Yes No Gallons actually evacuated: _____

Sampling Time: _____ Sampling Date: _____

Sample I.D.: _____ Laboratory: _____

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

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

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

D.O. (if req'd):	<u>Pre-purge:</u> <i>1.2</i> mg/L	Post-purge: _____ mg/L
ORP (if req'd):	<u>Pre-purge:</u> <i>142</i> mV	Post-purge: _____ mV

WELL MONITORING DATA SHEET

Project #: <i>010112-X1</i>	Client: <i>Stellar Env. Solutions</i>
Sampler: <i>HOYT</i>	Start Date: <i>1/12/01</i>
Well I.D.: <i>MW-2</i>	Well Diameter: 2 3 <u>4</u> 6 8
Total Well Depth: <i>38.82</i>	Depth to Water: <i>21.43</i>
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> HACH

Purge Method:

Bailer
 Disposable Bailer
 Middleburg
 Electric Submersible
 Waterra
 Peristaltic
 Extraction Pump
 Other _____

Sampling Method:

Bailer
 Disposable Bailer
 Extraction Port
 Dedicated Tubing
 Other: _____

11.3 (Gals.) X *3* = *33.9* Gals.
 Case Volume Specified Volumes Calculated Volume

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

Time	Temp (°F)	pH	Cond.	Turbidity	Gals. Removed	Observations
<i>1035</i>	<i>57.2</i>	<i>6.87</i>	<i>917</i>	<i>>200</i>	<i>12</i>	
<i>1037</i>	<i>58.2</i>	<i>7.01</i>	<i>889</i>	<i>>200</i>	<i>24</i>	
<i>1039</i>	<i>58.7</i>	<i>7.11</i>	<i>880</i>	<i>>200</i>	<i>34</i>	
<i>1025</i>	<i>57.7</i>	<i>7.01</i>	<i>865</i>	<i>Pre-purge</i>	<i>Ferrus Iron</i>	<i>0.00 mg/L</i>

Did well dewater? Yes No Gallons actually evacuated: *34*

Sampling Time: *1042* Sampling Date: *1/12/01*

Sample I.D.: *MW-2* Laboratory: *Curtis & Tompkins*

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

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

Analyzed for: TPH-G BTEX MIBE TPH-D Other: _____

D.O. (if req'd):	<u>Pre-purge:</u> <i>1.2</i> mg/L	Post-purge:	mg/L
ORP (if req'd):	<u>Pre-purge:</u> <i>130</i> mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: 010112-X1	Client: Stellar Env. Solutions
Sampler: HOYT	Start Date: 1/12/01
Well I.D.: MW-3	Well Diameter: 2 3 (4) 6 8
Total Well Depth: 44.10	Depth to Water: 19.22
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: _____ Sampling Method: **Bailer**

<p>Bailer</p> <p>Disposable Bailer</p> <p>Middleburg</p> <p>Electric Submersible</p> <p>Waterra</p> <p>Peristaltic</p> <p>Extraction Pump</p> <p>Other _____</p>	<p>(Disposable Bailer)</p> <p>Extraction Port</p> <p>Dedicated Tubing</p> <p>Other: _____</p>
--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------

_____ (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 ² * 0.163

Time	Temp (°F)	pH	Cond.	Turbidity	Gals. Removed	Observations
1109	55.8	7.25	624	—	Ferrous Iron	0.00 mg/L

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

Sampling Time: **1111** Sampling Date: **1/12/01**

Sample I.D.: **MW-3** Laboratory: **Curtis & Tompkins**

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

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

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

D.O. (if req'd):	Pre-purge: 0.9 mg/L	Post-purge: _____ mg/L
ORP (if req'd):	Pre-purge: 142 mV	Post-purge: _____ mV

WELL MONITORING DATA SHEET

Project #: <u>010112-X1</u>	Client: <u>Stellar Env. Solutions</u>
Sampler: <u>HOYT</u>	Start Date: <u>1/12/01</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>13.14</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>VSI</u> HACH

Purge Method:

- Bailer
- Disposable Bailer
- Middleburg
- Electric Submersible
- Waterra
- Peristaltic
- Extraction Pump
- Other _____

Sampling Method:

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

<u>8.6</u>	(Gals.) X	<u>3</u>	=	<u>26.0</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 ² * 0.163

Time	Temp (°F)	pH	Cond.	Turbidity	Gals. Removed	Observations
<u>1209</u>	<u>58.0</u>	<u>6.71</u>	<u>713</u>	<u>7200</u>	<u>9</u>	
<u>1211</u>	<u>58.2</u>	<u>6.73</u>	<u>742</u>	<u>85.2</u>	<u>18</u>	
<u>1213</u>	<u>58.7</u>	<u>6.78</u>	<u>747</u>	<u>126.5</u>	<u>27</u>	
<u>1151</u>	<u>56.8</u>	<u>6.72</u>	<u>719</u>	<u>-</u>		<u>Ferrous Iron 0.04 mg/L</u>

Did well dewater? Yes No Gallons actually evacuated: 27

Sampling Time: 1217 Sampling Date: 1/12/01

Sample I.D.: MW-4 Laboratory: Curtis & Tompkins

Analyzed for: TPH-G BTEX MIBE TPH-D Other: Nitrate & Sulfate @ 11:51

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

Analyzed for: TPH-G BTEX MIBE TPH-D Other: _____

D.O. (if req'd): Pre-purge: 1.0 mg/L Post-purge: _____ mg/L

ORP (if req'd): Pre-purge: -78 mV Post-purge: _____ mV

WELL MONITORING DATA SHEET

Project #: <u>010112-X1</u>	Client: <u>Stellar Env. Solutions</u>
Sampler: <u>Hoyt</u>	Start Date: <u>1/12/01</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>16.26</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> HACH

Purge Method:

- | | |
|---------------------------------|----------------------------|
| Bailer | Waterra |
| Disposable Bailer | Peristaltic |
| Middleburg | Extraction Pump |
| Electric Submersible | Other _____ |

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 ² * 0.163

Time	Temp (°F)	pH	Cond.	Turbidity	Gals. Removed	Observations
<u>0942</u>	<u>54.5</u>	<u>7.53</u>	<u>608</u>	—	—	
						<u>Ferrous Iron 0.00 mg/L</u>

Did well dewater? Yes No Gallons actually evacuated: _____

Sampling Time: _____ Sampling Date: _____

Sample I.D.: _____ Laboratory: _____

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

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

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

D.O. (if req'd):	<u>Pre-purge:</u>	<u>0.8</u> mg/L	<u>Post-purge:</u>	_____ mg/L
ORP (if req'd):	<u>Pre-purge:</u>	<u>113</u> mV	<u>Post-purge:</u>	_____ mV

WELL MONITORING DATA SHEET

Project #: <i>010112-X1</i>	Client: <i>Stellar Env. Solutions</i>
Sampler: <i>HOYT</i>	Start Date: <i>1/12/01</i>
Well I.D.: <i>MW-6</i>	Well Diameter: 2 3 <u>4</u> 6 8
Total Well Depth: <i>27.39</i>	Depth to Water: <i>13.31</i>
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> HACH

Purge Method:

Bailer
 Disposable Bailer
 Middleburg
 Electric Submersible
 Waterra
 Peristaltic
 Extraction Pump
 Other _____

Sampling Method:

Bailer

Disposable Bailer
 Extraction Port
 Dedicated Tubing
 Other: _____

_____ (Gals.) X _____ = _____ Gals.
 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 ² * 0.163

Time	Temp (°F)	pH	Cond.	Turbidity	Gals. Removed	Observations
<i>1006</i>	<i>53.1</i>	<i>6.87</i>	<i>588</i>	—	—	
						<i>Ferrus Iron 0.00 mg/L</i>

Did well dewater? Yes No Gallons actually evacuated: _____

Sampling Time: _____ Sampling Date: _____

Sample I.D.: _____ Laboratory: _____

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

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

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

D.O. (if req'd):	<u>Pre-purge:</u> <i>1.4</i> mg/L	Post-purge:	
ORP (if req'd):	<u>Pre-purge:</u> <i>114</i> mV	Post-purge:	

WELL MONITORING DATA SHEET

Project #: 010112-X1	Client: Stellar ENV. Solutions
Sampler: HOYT	Start Date: 1/12/01
Well I.D.: MW-7	Well Diameter: <input checked="" type="radio"/> 2 3 4 6 8
Total Well Depth: 25.33	Depth to Water: 12.78
Before: _____ After: _____	Before: _____ After: _____
Depth to Free Product: _____	Thickness of Free Product (feet): _____
Referenced to: <input checked="" type="radio"/> PVE Grade	D.O. Meter (if req'd): <input checked="" type="radio"/> YSI <input type="radio"/> HACH

Purge Method:

- Bailer
- Disposable Bailer**
- Middleburg
- Electric Submersible

- Waterra
- Peristaltic
- Extraction Pump
- Other _____

Sampling Method:

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

2.0 (Gals.) X 3 = 6.0 Gals.
 1 Case Volume Specified Volumes Calculated Volume

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

Time	Temp (°F)	pH	Cond.	Turbidity	Gals. Removed	Observations
12:48	58.6	6.73	787	7200	2	
12:52	58.7	6.74	813	7200	4	
12:56	58.5	6.75	790	7200	0	
12:35	59.8	6.78	735	-		ferrous iron 0.05 mg/L

Did well dewater? Yes No Gallons actually evacuated: **6**

Sampling Time: **1300** Sampling Date: **1/12/01**

Sample I.D.: **MW-7** Laboratory: **Curtis & Tompkins**

Analyzed for: **TPH-G** BTEX MTBE TPH-D Other: **Nitrate & sulfate @ 12:35**

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

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

D.O. (if req'd):	Pre-purge: 0.7 mg/L	Post-purge: _____ mg/L
ORP (if req'd):	Pre-purge: -39 mV	Post-purge: _____ mV

WELL MONITORING DATA SHEET

Project #: <u>010112-X1</u>	Client: <u>Stellar Env. Solutions</u>
Sampler: <u>HOYT</u>	Start Date: <u>1/12/01</u>
Well I.D.: <u>mw-8</u>	Well Diameter: <u>2</u> 3 4 6 8
Total Well Depth: <u>22.21</u>	Depth to Water: <u>11.09</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> HACH

Purge Method:

- Bailer
 Disposable Bailer
 Middleburg
 Electric Submersible
 Waterra
 Peristaltic
 Extraction Pump
 Other _____

Sampling Method:

- Bailer
 Disposable Bailer
 Extraction Port
 Dedicated Tubing
 Other: _____

<u>1.7</u>	(Gals.) X	<u>3</u>	=	<u>5.3</u>	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 ² * 0.163

Time	Temp (°F)	pH	Cond.	Turbidity	Gals. Removed	Observations
<u>1345</u>	<u>57.6</u>	<u>7.05</u>	<u>1001</u>	<u>7200</u>	<u>2</u>	<u>odor</u>
<u>1349</u>	<u>57.2</u>	<u>7.07</u>	<u>980</u>	<u>7200</u>	<u>4</u>	↓
<u>1353</u>	<u>57.4</u>	<u>7.10</u>	<u>951</u>	<u>7200</u>	<u>6</u>	↓
<u>13.31</u>	<u>57.1</u>	<u>7.17</u>	<u>827</u>	—	<u>Ferrous Iron</u>	<u>0.00 mg/L</u>

Did well dewater? Yes No

Gallons actually evacuated: 6

Sampling Time: 1357 Sampling Date: 1/12/01

Sample I.D.: mw-8 Laboratory: Curtis & Tompkins

Analyzed for: TPH-G BTEX MTBE TPH-D Other: Nitrate & Sulfate @ 13:31

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>0.8</u> mg/L	Post-purge: _____ mg/L
ORP (if req'd):	Pre-purge: <u>-0</u> mV	Post-purge: _____ mV

Table A.1
Summary of Historical Soil Sample Analytical Results
Redwood Regional Park Service Yard
Oakland, California

Sample I.D.	Depth (ft bgs)	Sample Concentration (mg/kg)					
		TPHg	TPHd	Benzene	Toluene	Ethyl-benzene	Total Xylenes
<i>UFST Excavation Confirmation Samples – May & June 1993 (*indicates soil at that location was removed)</i>							
DT-1*	10	NA	4	< 0.005	< 0.005	< 0.005	< 0.005
DT-2*	10	NA	3	< 0.005	< 0.005	< 0.005	< 0.005
GT-1*	12	800	NA	6.3	43	18	94
GT-2	12	2,200	NA	19	120	45	250
E1-17	17	< 1	NA	< 0.005	< 0.005	< 0.005	< 0.005
E2-16	16	< 1	NA	< 0.005	< 0.005	< 0.005	< 0.005
E3-16	16	12,000	NA	80	390	230	1,100
E4-13	13	6	NA	0.37	0.006	0.1	0.1
E5-7.5	7.5	< 1	NA	< 0.005	< 0.005	< 0.005	< 0.005
<i>Exploratory Borehole Samples – September and October 1994</i>							
B1-11	11	< 1	NA	< 0.005	< 0.005	< 0.005	< 0.005
B1-27	27	< 1	NA	< 0.005	< 0.005	< 0.005	< 0.005
B2-11	11	< 1	NA	< 0.005	< 0.005	< 0.005	< 0.005
B2-15	15	< 1	NA	< 0.005	< 0.005	< 0.005	< 0.005
B3-12	12	< 1	NA	< 0.005	< 0.005	< 0.005	< 0.005
B3-18	18	< 1	NA	< 0.005	< 0.005	< 0.005	< 0.005
B4-18	18	< 1	NA	< 0.005	< 0.005	< 0.005	< 0.005
B4-23	23	< 1	NA	< 0.005	< 0.005	< 0.005	< 0.005
B5-11	11	< 1	NA	< 0.005	< 0.005	< 0.005	< 0.005
B7-12	12	< 1	NA	< 0.005	< 0.005	< 0.005	< 0.005
B8-4	4	< 1	NA	< 0.005	< 0.005	< 0.005	< 0.005
B8-10	10	< 1	NA	< 0.005	< 0.005	< 0.005	< 0.005
B9-11	11	370	NA	1.7	7.9	6.9	34
B9-21	21	< 1	NA	0.1	0.011	0.017	0.069
B9-28	28	< 1	NA	< 0.005	0.033	0.035	0.14
B10-6	6	< 1	NA	< 0.005	< 0.005	< 0.005	< 0.005

Sample I.D.	Depth (ft bgs)	Sample Concentration (mg/kg)					
		TPHg	TPHd	Benzene	Toluene	Ethyl-benzene	Total Xylenes
B10-21	21	< 1	7	< 0.005	< 0.005	< 0.005	< 0.005
B11-11.5	11.5	< 1	< 2	0.021	< 0.005	< 0.005	< 0.005
B12-14.5	14.5	150	NA	0.24	0.44	1.7	4.6
B12-15	15	77	NA	0.15	0.24	0.9	2.7
B12-21	21	97	NA	0.46	1.2	2	5.4
B13-12	12	1,500	NA	< 0.4	< 0.4	13	78
B13-15	15	1,800	420	8.8	39	30	120
B14-18	18	210	50	0.017	0.1	0.34	0.63
B15-17	17	1,900	1,300	1.1	0.8	9.1	14
B16-17.5	17.5	50	NA	< 0.1	< 0.1	0.2	0.2
B17-12.5	12.5	< 1	NA	< 0.005	< 0.005	< 0.005	< 0.005
<i>Monitoring Well Installation Borehole Samples – October 1994</i>							
MW1-5	5	< 1	3	< 0.005	< 0.005	< 0.005	< 0.005
MW-21	21	130	48	0.31	0.18	1.3	4.4
MW3-10	10	< 1	3	< 0.005	< 0.005	< 0.005	< 0.005
MW3-25	25	< 1	5	< 0.005	< 0.005	< 0.005	< 0.005
MW4-15.5	15.5	22	4	< 0.005	0.038	< 0.005	0.49
MW4-16.5	16.5	10	43	< 0.005	0.009	0.11	0.21
MW5A-15	15	570	200	< 0.005	1.1	1.9	2.9
MW5-15	15	< 1	2	< 0.005	< 0.005	< 0.005	< 0.005
MW6-19	19	< 1	2	< 0.005	< 0.005	< 0.005	< 0.005
<i>Exploratory Borehole Samples - April 1999</i>							
HP-01-17.5'	17.5'	< 1.0	3.8	< 0.005	< 0.005	< 0.005	< 0.005
HP-02-14'	14'	970	640	1.3	1.3	5.5	8.7
HP-03-13'	13'	< 1.0	5.8	< 0.005	< 0.005	< 0.005	< 0.005
HP-04-15'	15'	< 1.0	1.7	< 0.005	< 0.005	< 0.005	< 0.005
HP-05-15'	15'	< 1.0	4.3	< 0.005	< 0.005	< 0.005	< 0.005
HP-06-11'	11'	1,700	360	1.4	2.7	21	81
HP-07-12'	12'	2.9	340	0.028	< 0.005	0.13	0.347
HP-08-15.5'	15.5'	580	83	< 0.1	1.0	4.7	4.7

Sample I.D.	Depth (ft bgs)	Sample Concentration (mg/kg)					
		TPHg	TPHd	Benzene	Toluene	Ethyl-benzene	Total Xylenes
HP-09-15'	15'	610	630	1.5	1.5	3.8	11.2
HP-10-14'	14'	500	76	0.19	1.6	2.0	3.21
<i>Monitoring Well Installation Borehole Samples – December 1999</i>							
MW-7-15.5' (a)	15.5'	640	170	3.0	< 0.1	5.1	4.4
MW-8-16' (a)	16'	1,800	780	6.2	< 1.3	23	43.7

Notes:

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

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

NA = Not Analyzed

mg/kg = milligrams per kilogram (equivalent to parts per million – ppm)

(a) MTBE (methyl tertiary butyl ether) analyzed for and not detected in this sample.

TABLE A.2
HISTORICAL GROUNDWATER MONITORING WELLS ANALYTICAL RESULTS
REDWOOD REGIONAL PARK SERVICE YARD, OAKLAND, CALIFORNIA

(wells MW-1, MW-3 and MW-6 not sampled after August 1995 based on absence of detected contamination)

(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

NA = Not Analyzed for this constituent

TABLE A.2 (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

NA = Not Analyzed for this constituent

TABLE A.2 (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

TABLE A.2 (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	289.1	888.1	95

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	1,230	2037	96

TABLE A.3
HISTORICAL SURFACE WATER ANALYTICAL RESULTS
REDWOOD REGIONAL PARK SERVICE YARD, OAKLAND, CALIFORNIA

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

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

NA = Not Analyzed for this constituent

TABLE A.3 (continued)

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
11	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

NA = Not Analyzed for this constituent

TABLE A.3 (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

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

NA = Not Analyzed for this constituent