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Alameda County
OCT 21 2002
Environmental Health

TRANSMITTAL MEMORANDUM

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

DATE: 10/16/02

ATTENTION: MR. SCOTT SEERY

FILE: SES-2001-53

SUBJECT: REDWOOD REGIONAL PARK FUEL LEAK SITE

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

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

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

510 - 644 - 3123

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

BY: Bruce Rucker BMR x 12

★ **Stellar Environmental Solutions**

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

October 14, 2002

Alameda County
OCT 21 2002
Environmental Health

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: Third Quarter 2002 Site Monitoring Report
Redwood Regional Park Service Yard Site – Oakland, California

Dear Mr. Seery:

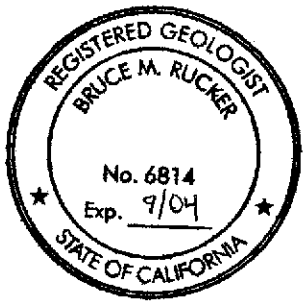
Attached is the referenced Stellar Environmental Solutions report for the underground fuel storage tank site at the Redwood Regional Park Service Yard, located at 7867 Redwood Road, Oakland, California. This project is being conducted for the East Bay Regional Park District, and follows previous site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

This report summarizes groundwater and surface monitoring and sampling activities conducted in September 2002 (Third Quarter 2002). If you have any questions regarding this report, please contact Mr. Ken Burger of the East Bay Regional Park District, or contact us directly at (510) 644-3123.

Sincerely,

Bruce M. Rucker

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



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

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

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THIRD QUARTER 2002
SITE MONITORING REPORT

REDWOOD REGIONAL PARK
SERVICE YARD
OAKLAND, CALIFORNIA

Prepared for:

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

Prepared by:

STELLAR ENVIRONMENTAL SOLUTIONS
2198 SIXTH STREET
BERKELEY, CALIFORNIA 94710

October 14, 2002

Project No. 2001-53

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1.0 INTRODUCTION

PROJECT BACKGROUND

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

OBJECTIVES AND SCOPE OF WORK

This report discusses the following activities conducted/coordinated by Stellar Environmental Solutions (SES) in September 2002:

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

Previous SES reports (see References section) have provided a full discussion of previous site remediation and investigations; site geology and hydrogeology; residual site contamination; conceptual model for contaminant fate and transport; and evaluation of hydrochemical trends and plume stability. An October 2000 Feasibility Study report for the site, submitted to ACHCSA, provided detailed analyses of the regulatory implications of the site contamination and an assessment of viable corrective actions (SES, 2000d). Additional monitoring well installations and corrective action by ORC™ injection proposed by SES were approved by the ACHCSA in its January 8, 2001 letter to the EBRPD. Two phases of ORC™ injection have been conducted: September 2001 and July 2002. A total of 23 groundwater monitoring events have been conducted on a quarterly basis since inception (November 1994), and a total of 11 groundwater monitoring wells are currently available for monitoring.

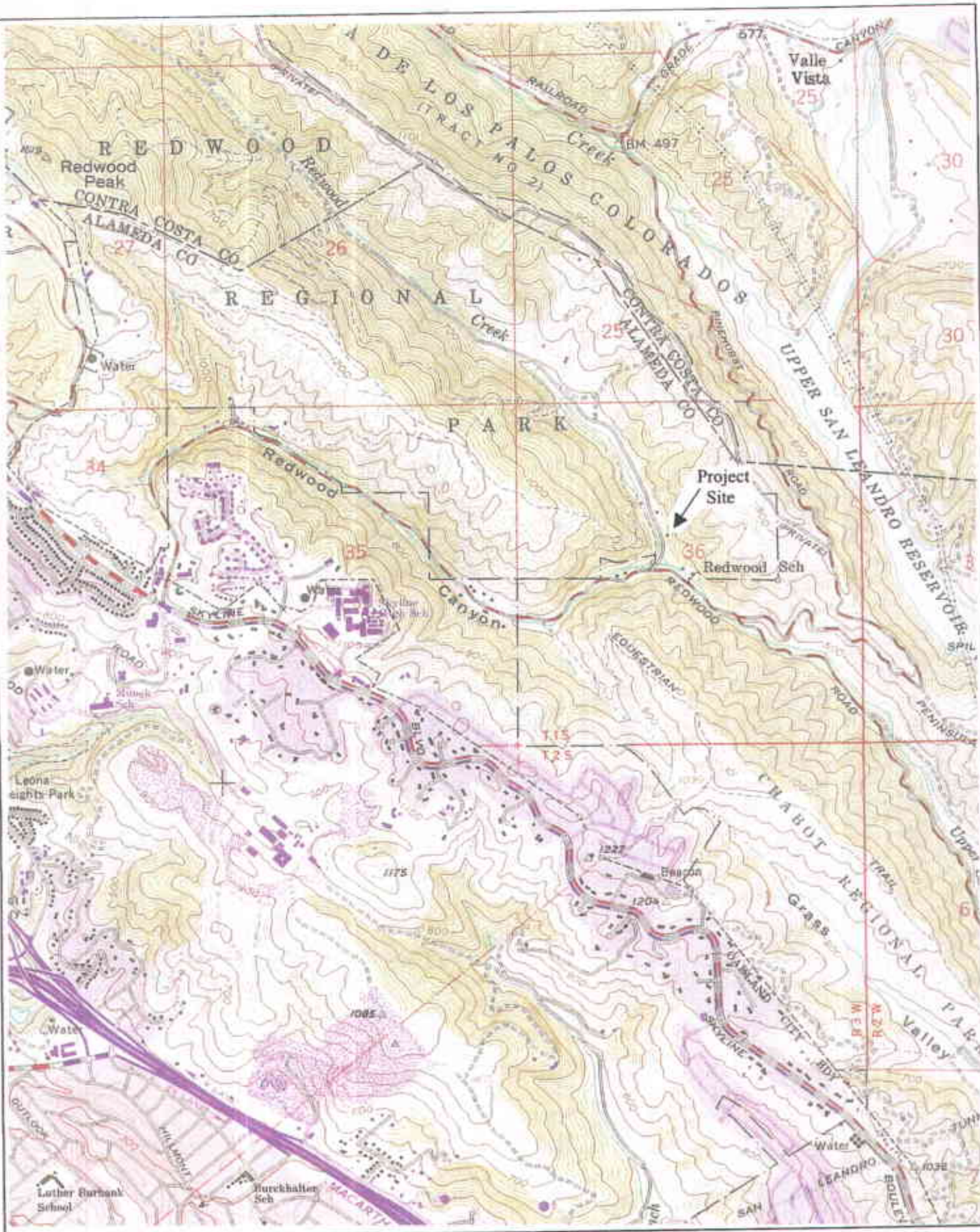
SITE DESCRIPTION

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

REGULATORY OVERSIGHT

The lead regulatory agency for the site investigation and remediation is ACHCSA, with oversight provided by the RWQCB. The CDFG is also involved with regard to water quality impacts to Redwood Creek. All workplans and reports are submitted to these agencies. The most recent ACHCSA directive regarding the site (letter dated January 8, 2001) approved the ORC™ injection corrective action and requested continued quarterly groundwater monitoring and sampling. Historical ACHCSA-approved revisions to the groundwater sampling program have included: 1) discontinuing hydrochemical sampling and analysis in wells MW-1, MW-3, MW-5, and MW-6; 2) discontinuing creek surface water sampling at upstream location SW-1; and 3) reducing the frequency of creek surface water sampling from quarterly to semi-annually (ACHCSA, 1996). The latter recommendation has not yet been implemented due to continued concern over potential impacts to Redwood Creek.

Electronic Data Format (EDF) groundwater analytical results from the groundwater monitoring events beginning in the third quarter of 2001 have been successfully uploaded to the State of California Water Resources Control Board's GeoTracker database, in accordance with that agency's requirements for EDF submittals.



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

Redwood Regional Park Service Yard
Oakland, Alameda County, California

By: MJC | NOVEMBER 1997

Figure 1

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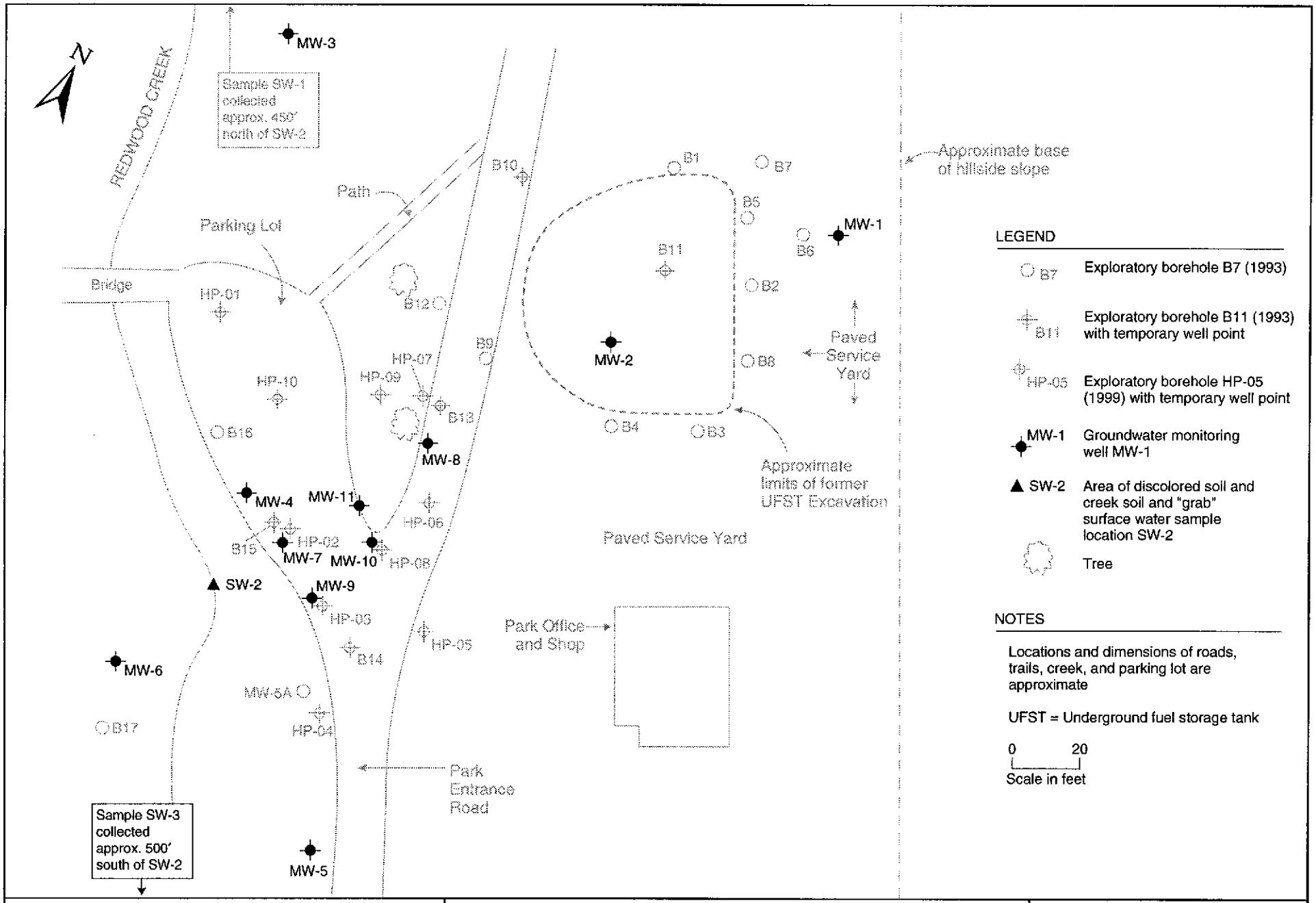


Stellar Environmental Solutions

Geoscience & Engineering Consulting

SITE PLAN AND HISTORICAL SAMPLING LOCATIONS

Redwood Regional Park Service Yard, Oakland, CA

Figure 2

by: MJC

OCTOBER 2002

2001-53-01

2.0 PHYSICAL SETTING

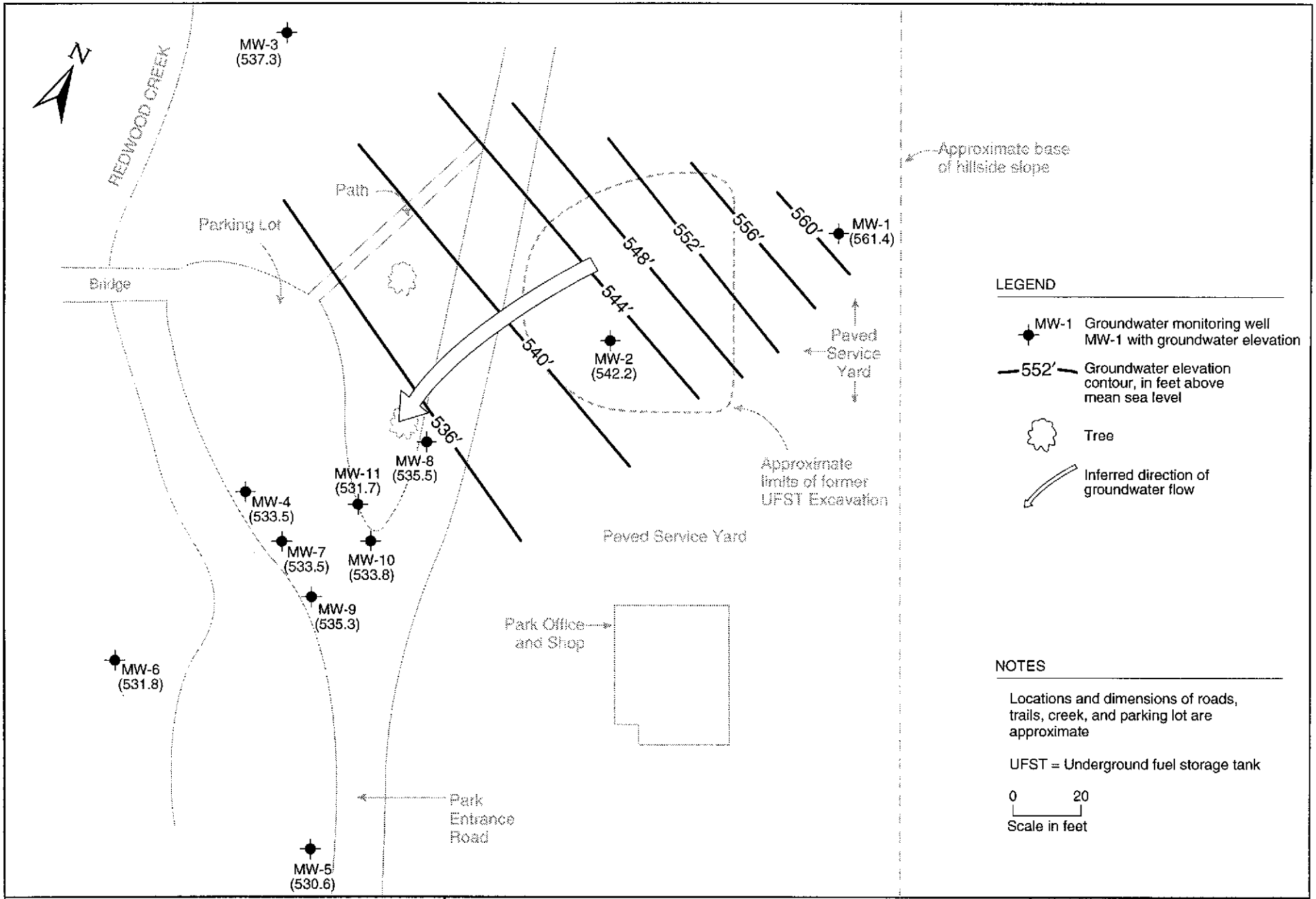
Following is a brief summary of the site hydrogeologic conditions based on geologic logging and water level measurements collected at the site since September 1993. A full discussion is presented in the SES June 1999 report.

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

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

Figure 3 is a groundwater elevation map constructed from the current event monitoring well static water levels, and Table 1 (in Section 3.0) summarizes current event groundwater elevation data. The groundwater gradient is relatively steep—approximately 2 feet per foot—between well MW-1 and the former UFST source area, resulting from the topography and the highly disturbed nature of sediments in the landslide debris. Downgradient from (west of) the UFST source area (between MW-2 and Redwood Creek) the groundwater gradient is approximately 0.1 feet per foot. The direction of shallow groundwater flow during the current event was to the west-southwest (toward Redwood Creek), which is consistent with historical site groundwater flow direction.

We estimated site groundwater velocity at 7 to 10 feet per year using site-specific empirical data, from the date of UST installation in the late 1970s to the date when contamination was first observed in Redwood Creek (1993).



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GROUNDWATER ELEVATION MAP—SEPT. 2002

Redwood Regional Park Service Yard, Oakland, CA

Figure 3

by: MJC | OCTOBER 2002

2001-53-26

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

3.0 CURRENT GROUNDWATER AND SURFACE WATER MONITORING EVENT ACTIVITIES

This section presents the creek surface water and groundwater sampling and analytical methods for the most recent event. Groundwater and surface water analytical results are summarized in Section 5.0. Monitoring and sampling protocols were in accordance with the ACHCSA-approved SES technical workplan (SES 1998a). Current event activities included:

- Measuring static water levels and field analyzing pre-purge groundwater samples for indicators of natural attenuation (dissolved oxygen, ferrous iron, and redox potential) in all 11 site wells;
- Collecting pre-purge groundwater samples for laboratory analysis of the natural attenuation indicators nitrate and sulfate from monitoring wells MW-3, MW-4, MW-7, and MW-8;
- Collecting post-purge groundwater samples for laboratory analysis of site contaminants from wells located within the groundwater plume (MW-2, MW-4, MW-7, MW-8, MW-9, MW-10, and MW-11); and
- Collecting Redwood Creek surface water samples for laboratory analysis from locations SW-2 and SW-3.

Creek sampling and monitoring/sampling was conducted on September 24, 2002. The locations of all site monitoring wells and creek water sampling locations are shown on Figure 2. Well construction information and water level data are summarized in Table 1. Appendix A contains the groundwater monitoring field records.

GROUNDWATER LEVEL MONITORING AND SAMPLING

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

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

Well	Well Depth	Screened Interval	TOC Elevation	Groundwater Elevation (9/24/02)
MW-1	18	7 to17	565.9	561.4
MW-2	36	20 to 35	566.5	542.2
MW-3	42	7 to 41	560.9	537.3
MW-4	26	10 to 25	548.1	533.5
MW-5	26	10 to 25	547.5	530.6
MW-6	26	10 to 25	545.6	531.8
MW-7	24	9 to24	547.7	533.5
MW-8	23	8 to 23	549.2	535.5
MW-9	26	11 to 26	549.4	535.3
MW-10	26	11 to 26	547.3	533.8
MW-11	26	11 to 26	547.9	531.7

Notes:

TOC = Top of casing.

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

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

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

The well development, purge water, and decontamination rinseate (approximately 80 gallons) from the current event was containerized in the onsite plastic tank. Purge water from future events will continue to be accumulated in the onsite tank until it is full, at which time it will be transported offsite for proper disposal.

CREEK SURFACE WATER SAMPLING

Surface water sampling was conducted by SES on September 24, 2002. Surface water samples were collected from Redwood Creek location SW-2 (immediately downgradient of the former UFST source area and within the area of documented creek bank soil contamination). The creek was dry at,

and several hundred feet upstream/downstream of, location SW-3 (approximately 500 feet downstream from SW-2); therefore, no surface water sample was collected. In accordance with a previous ACHCSA-approved SES recommendation, upstream sample location SW-1 was not sampled.

At the time of sampling, the creek was not flowing and water was present only in the vicinity of SW-2, at depths of less than 1 foot. Locations SW-1 and SW-3 were dry, which is consistent with historical conditions in the dry season. At the SW-2 location, where contaminated groundwater discharge to the creek has historically been observed, a petroleum odor was noted, as was an orange algae growing on the saturated portion of the creek bank. It is likely that this algae is utilizing the petroleum as a carbon source, and is therefore a good indicator of the presence of petroleum contamination.

4.0 REGULATORY CONSIDERATIONS

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

GROUNDWATER CONTAMINATION

As specified in the RWQCB's *San Francisco Bay Region Water Quality Control Plan*, all groundwaters are considered potential sources of drinking water unless otherwise approved by the RWQCB, and are also assumed to ultimately discharge to a surface water body and potentially impact aquatic organisms. While it is likely that site groundwater would satisfy geology-related criteria for exclusion as a drinking water source (excessive total dissolved solids and/or insufficient sustained yield), RWQCB approval for this exclusion has not been obtained for the site. As summarized in Table 2 (Section 5.0), site groundwater contaminant levels are compared to two sets of criteria: 1) RWQCB Tier 1 Risk-Based Screening Levels (RBSLs) for sites where groundwater is a current or potential drinking water source; and 2) RBSLs for sites where groundwater is not a current or potential drinking water source.

As stipulated in the RBSL document (August 2000, Interim Final), the RBSLs are not cleanup criteria; rather, they are conservative screening-level criteria designed to be protective of both drinking water resources and aquatic environments in general. The groundwater RBSLs are composed of multiple components, including ceiling value, human toxicity, indoor air impacts, and aquatic life protection. Exceedance of RBSLs suggests that additional investigation and/or remediation is warranted. While drinking water standards [e.g., Maximum Contaminant Levels (MCLs)] are published for the site contaminants of concern, the ACHCSA has indicated that impacts to nearby Redwood Creek are of primary importance, and that site target cleanup standards should primarily be evaluated in the context of surface water quality criteria.

SURFACE WATER CONTAMINATION

As summarized in Table 2 (Section 5.0), site surface water contaminant levels are compared to the most stringent screening level criteria published by the State of California, U.S. Environmental Protection Agency, and U.S. Department of Energy. These screening criteria address chronic and acute exposures to aquatic life. As discussed in the RWQCB's RBSL document, benthic communities at the groundwater/surface water interface (e.g., at site groundwater discharge location

SW-2) are assumed to be exposed to the full concentration of groundwater contamination prior to dilution/mixing with the surface water). This was also a fundamental assumption in the instream benthic macroinvertebrate bioassessment events, which documented no measurable impacts.

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

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

5.0 MONITORING EVENT ANALYTICAL RESULTS

This section presents the field and laboratory analytical results of the most recent monitoring event. Table 2 summarizes the contaminant analytical results of the current monitoring event, and Table 3 summarizes natural attenuation indicator results from the current event. Figure 4 shows the current event contaminant analytical results and the inferred limits of the TPH-gas groundwater plume. Appendix B contains the certified analytical laboratory report and chain-of-custody records for the current event.

CURRENT EVENT GROUNDWATER RESULTS

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

Maximum groundwater contaminant concentrations for all site contaminants except benzene and MTBE were detected in downgradient well MW-11 (approximately 70 feet downgradient of the former USTs and approximately 50 feet upgradient of Redwood Creek). The maximum concentrations of benzene and MTBE were detected in wells MW-9 (further downgradient) and MW-10, respectively. Contaminants detected in former source area well MW-2 and in downgradient wells on the edges of the plume were less than method detection limits and/or less than surface water screening criteria.

Site-sourced contaminants detected in the surface water sample from location SW-2 included gasoline (590 μg/L), benzene (10 μg/L), ethylbenzene (13 μg/L), and diesel (220 μg/L).

CURRENT EVENT NATURAL ATTENUATION PARAMETERS RESULTS

Pre-purge groundwater samples from selected wells were collected and analyzed for indicators of the natural biodegradation of the hydrocarbon contamination or "natural attenuation." Petroleum hydrocarbons require molecular oxygen to break down the ring structure of specific constituents. Accordingly, although biodegradation of hydrocarbons can occur under anaerobic conditions, hydrocarbon biodegradation is greatest under aerobic conditions. As a result of the demonstrated

Table 2
Groundwater and Surface Water Sample
Analytical Results – September 24, 2002
Redwood Regional Park Corporation Yard, Oakland, California

Compound	Concentrations in µg/L						
	TPHg	TPHd	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE
GROUNDWATER SAMPLES							
MW-2	**98**	*<50*	**5.0**	*<0.5*	*<0.5*	*<0.5*	**13**
MW-4	*<50*	*<50*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<2.0*
MW-7	**9,600**	**3,900**	**180**	*<0.5*	**380**	**160**	*<2.0*
MW-8	**1,000**	**420**	**22**	*<0.5*	**64**	**50.3**	*<2.0*
MW-9	**3,600**	**2,800**	**440**	**11**	**260**	**39.2**	*<4.0*
MW-10	**160**	**120**	**10**	*<0.5*	**6.7**	**3.6**	**26**
MW-11	**12,000**	**4,400**	**330**	**13**	**880**	**654**	*<10*
Groundwater RBSLs [(a)]	100/500	100/640	1.0/46	40/130	30/290	13/13	5/1,800
REDWOOD CREEK SURFACE WATER SAMPLES							
SW-2	**590**	**220**	**10**	*<0.5*	**13**	*<0.5*	*<2.0*
SW-3	Location not sampled (no surface water available)						
Surface Water Screening Levels [(a, b)]	500	640	46	130	290	13	8,000

Notes:

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

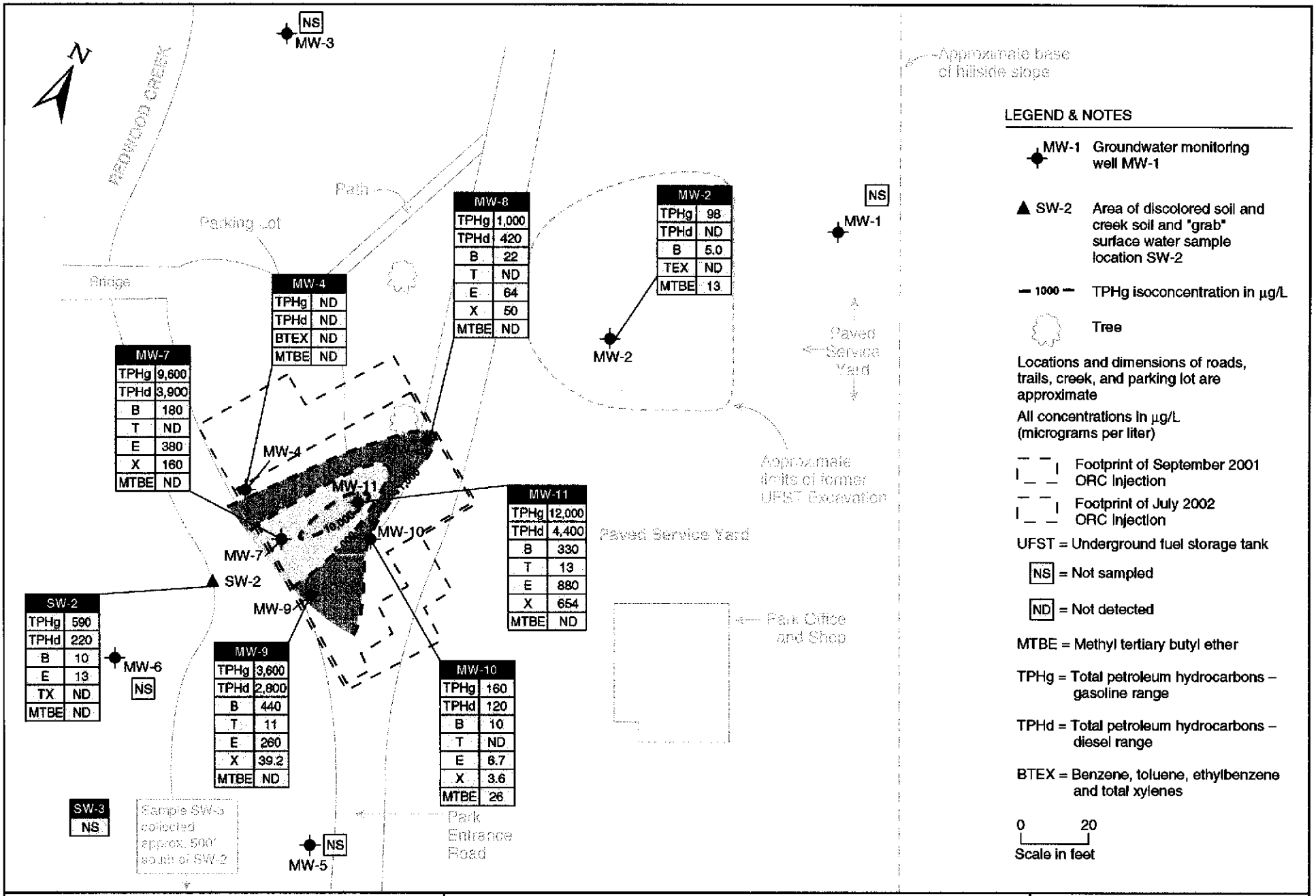
[(b)] Lowest of chronic and acute surface water criteria published by the State of California, U.S. Environmental Protection Agency, or U.S. Department of Energy.

MTBE = Methyl *tertiary*-butyl ether

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

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

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



LEGEND & NOTES

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

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

All concentrations in µg/L (micrograms per liter)

- Footprint of September 2001 ORC Injection
- Footprint of July 2002 ORC Injection

UFST = Underground fuel storage tank

NS = Not sampled

ND = Not detected

MTBE = Methyl tertiary butyl ether

TPHg = Total petroleum hydrocarbons – gasoline range

TPHd = Total petroleum hydrocarbons – diesel range

BTEX = Benzene, toluene, ethylbenzene and total xylenes

0 20
Scale in feet

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

Figure 4

by: MJC | OCTOBER 2002

2001-53-25

Table 3
Groundwater Sample Analytical Results
Natural Attenuation Indicators – September 24, 2002
Redwood Regional Park Corporation Yard, Oakland, California

Sample I.D.	Nitrogen (as Nitrate) (mg/L)	Sulfate (mg/L)	Dissolved Oxygen (mg/L)	Ferrous Iron (mg/L)	Redox Potential (milliVolts)
MW-1	NA	NA	1.0	0.0	198
MW-2	NA	NA	2.0	0.0	198
MW-3	<0.05	37	0.5	0.0	130
MW-4	0.57	55	15.9	0.0	228
MW-5	NA	NA	1.1	0.0	216
MW-6	NA	NA	0.4	0.0	243
MW-7	<0.05	1.9	0.2	2.4	-117
MW-8	<0.05	86	0.3	0.8	138
MW-9	0.32	72	2.9	1.6	236
MW-10	0.21	64	14.5	0.0	213
MW-11	<0.05	3.7	2.4	4.4	-103

Notes:

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

NA = Not analyzed

degradability of petroleum hydrocarbons, remediation by natural attenuation has been found to be a viable option for addressing many hydrocarbon plumes, replacing the need for active remediation. However, such natural attenuation only occurs if the concentration of hydrocarbons is low enough to facilitate the infiltration of natural oxygen through the interstitial space around the contamination, supporting the microorganisms for which the contamination is a food source (thus "attenuating" it). The concentration in soil or groundwater above which natural attenuation is unlikely to take place is still the subject of various research studies. In general, biodegradation of petroleum hydrocarbons in groundwater has a significant role in creating a stable plume and minimizing groundwater plume configuration and concentrations over time. Evidence of the historical occurrence and potential for future occurrence of biodegradation can be obtained from analysis of groundwater for specific biodegradation-indicator parameters, including dissolved oxygen, oxidation-reduction potential, and general mineral analyses.

Dissolved Oxygen

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

Current monitoring event DO concentrations ranged from 0.2 mg/L to 15.9 mg/L. The highest concentrations of total hydrocarbons in the current quarter were in wells MW-7, MW-8, MW-9, and MW-11. Dissolved oxygen in these wells ranged from 0.2 to 2.9 mg/L. In wells with little or no hydrocarbon contamination (e.g., MW-1, MW-2, MW-3, MW-5, and MW-6), similar DO concentrations were observed. Only wells MW-4 and MW-10 showed elevated DO concentrations of 15.9 and 14.5 mg/L, respectively, which may be a function of localized supersaturation at these wells resulting from the ORC™ injection.

Oxidation-Reduction Potential

The oxidation-reduction potential (ORP — a.k.a. redox potential) of groundwater is a measure of electron activity, and is an indicator of the relative tendency of a solute species to gain or lose electrons. The ORP of groundwater generally ranges from -400 millivolts (mV) to +800 mV. In oxidizing (aerobic) conditions, the ORP of groundwater is positive while in reducing (anaerobic) conditions, the ORP is typically negative (or less positive). Therefore, ORP values of groundwater inside a hydrocarbon plume are typically less than those measured outside the plume. Of the four wells with pronounced hydrocarbon contamination (MW-7, MW-8, MW-9, and MW-11), the ORP values ranged from –117 mV to +236 mV. Other wells with little or no contamination showed positive ORP values ranging from +130 mV to +243 mV. Thus, the ORP values in this field event showed a general inverse correlation with hydrocarbon concentrations, although similar ORP values for some contaminated vs. non-contaminated wells are inconsistent with the expected trend.

General Mineral Analyses

An inverse relationship between general minerals—including ferrous iron (Fe_2^+), nitrate (NO_3^-), and sulfate (SO_4^{2-})—and hydrocarbon concentrations is also indicative of the occurrence of biodegradation. Specifically, anaerobic degradation and oxidation of compounds is implied where general mineral concentrations are low and hydrocarbon concentrations are high. In the current site monitoring event, neither the Fe_2^+ nor the SO_4^{2-} results showed the expected inverse correlation with hydrocarbon concentrations. Nitrate concentrations showed a viable correlation.

QUALITY CONTROL SAMPLE ANALYTICAL RESULTS

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

6.0 SUMMARY, CONCLUSIONS, AND PROPOSED ACTIONS

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

SUMMARY AND CONCLUSIONS

- Groundwater sampling has been conducted approximately on a quarterly basis since November 1994 (23 events in the original wells).
- Current site groundwater contaminant concentrations exceed their respective groundwater RBSLs (both for cases in which the drinking water resource is and is not threatened)—with the exception of toluene, which does not exceed either set of criteria. Site groundwater contaminant concentrations also exceed all surface water screening levels, with the exception of toluene and MTBE.
- The groundwater contaminant plume has become disconnected from the former source, and has migrated well beyond the former source area (represented by well MW-2) toward Redwood Creek. The zone of greatest groundwater contamination (TPHg greater than 3,500 μg/L) is centered around wells MW-7, MW-9, and MW-11 in the downgradient portion of the site (immediately upgradient of the creek). The area of groundwater contamination in excess of screening level criteria appears to be no greater than 70 feet long by 50 feet wide, which is significantly reduced relative to pre-ORC™ injection conditions. Maximum groundwater concentrations for the majority of the contaminants have reached the most downgradient wells (just upgradient of the creek). Continued discharge of elevated concentrations could continue for at least several years if unabated.
- Hydrochemical (contaminant and dissolved oxygen) trends indicate that the first phase of the ORC™ injection (September 2001) was generally successful in increasing DO levels and reducing groundwater contaminant concentrations, although the active life of the ORC™ appears to have been exceeded between the second and third post-injection events in some of the wells. A second phase of the ORC™ injection, conducted in July 2002, appears to have been effective in controlling the lateral limits of the plume, although it has not been wholly effective in reducing the magnitude of contamination within the centerline of the plume.
- The only contaminant detected in site surface water (creek samples) above screening-level criteria was gasoline (at 590 μg/L—the RBSL is 500 μg/L). Other contaminants detected in

the creek surface water sample (below screening-level criteria) included diesel, benzene, and ethylbenzene.

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

PROPOSED ACTIONS

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

- Continue the quarterly program of creek and groundwater sampling and reporting, including evaluating future groundwater and surface water analytical results in the context of the need for additional corrective action.

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8.0 LIMITATIONS

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

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

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

WELL GAUGING DATA

Project # 020724-DW-2 Date 9-24-12 Client Stellar Environmental

Site Redwood Regional Park Service Yard Oakland

Well ID	Well Size (in.)	Sheen / Odor	Depth to Immiscible Liquid (ft.)	Thickness of Immiscible Liquid (ft.)	Volume of Immiscibles Removed (ml)	Depth to water (ft.)	Depth to well bottom (ft.)	Survey Point: TOB or TOC	DO/ORP/Fe	GW AMSL
MW-1	4					4.47	18.85		1.0/198/0	561.43
MW-2	4					24.34	38.82		2.0/235/0	542.16
MW-3	4					23.61	44.10		0.5/130/0	537.29
MW-4	4					14.65	26.51		1.5/228/0	537.45
MW-5	4					16.94	26.92		1.1/216/0	530.56
MW-6	4					13.82	27.93		0.4/243/0	531.78
MW-7	2					14.24	25.33		0.2/-117/2.4	533.46
MW-8	2	odor				13.75	22.21		0.3/138/0.8	535.45
MW-9	2					14.15	26.00		2.9/286/1.6	535.25
MW-10	2					13.55	28.75		14.5/213/0	537.75
MW-11	2	odor				16.19	26.00		2.4/-103/4.4	531.71

WELL MONITORING DATA SHEET

Project #: 020924-DW-1	Client: Stellar Environmental @ Redwood Regional Park
Sampler: Dave Walker	Start Date: 9-24-02
Well I.D.: MW-1	Well Diameter: 2 3 (4) 6 8 ___
Total Well Depth: 18.85	Depth to Water: 4.47
Before: After:	Before: After:
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	D.O. Meter (if req'd): (YSI) HACH

Purge Method:

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

Sampling Method: Bailer

X Disposable Bailer
Extraction Port
Dedicated Tubing
Other: ____

____ (Gals.) X 3 = ____ Gals.

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

Time	Temp. (°F or °C)	pH	Conductivity (mS or µS)	Turbidity (NTU)	Gals. Removed	Observations
					Ferrous Iron =	0

Did well dewater? Yes No

Gallons actually evacuated:

Sampling Time:

Sampling Date: 9-24-02

Sample I.D.:

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):	1.0 mg/L	Post-purge:		mg/L
ORP (if req'd):	(Pre-purge):	198 mV	Post-purge:		mV

WELL MONITORING DATA SHEET

Project #: 020924-DW-1	Client: Stellar Environmental @ Redwood Regional Park
Sampler: Dave Walter	Start Date: 9-24-02
Well I.D.: MW-2	Well Diameter: 2 3 (4) 6 8 ___
Total Well Depth: 38.82	Depth to Water: 24.34
Before: After:	Before: After:
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	D.O. Meter (if req'd): (YSI) HACH

Purge Method:

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

Sampling Method: Bailer

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

9.4 (Gals.) X 3 = 28.2 Gals.

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

Time	Temp. (°F or °C)	pH	Conductivity (mS or µS)	Turbidity (NTU)	Gals. Removed	Observations
12:56	71.0	7.1	773	25	10	
12:58	65.1	7.1	820	>200	20	cloudy
13:00	64.9	7.1	833	>200	30	
					Ferrous Iron=	0

Did well dewater? Yes (No) Gallons actually evacuated: 30

Sampling Time: 13:06 Sampling Date: 9-24-02

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

Analyzed for: (TPH-G) (BTEX) (MTBE) (TPH-D) Other: ~~Volatile Halocarbons~~

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

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

D.O. (if req'd):	(Pre-purge):	2.0 mg/L	Post-purge:		mg/L
ORP (if req'd):	(Pre-purge):	198 mV	Post-purge:		mV

WELL MONITORING DATA SHEET

Project #: 020924-DW-1	Client: Stellar Environmental @ Redwood Regional Park
Sampler: Dave Walter	Start Date: 9-24-02
Well I.D.: MW-3	Well Diameter: 2 3 (4) 6 8 ___
Total Well Depth: 44.10	Depth to Water: 23.61
Before: After:	Before: After:
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	D.O. Meter (if req'd): (YSI) HACH

Purge Method:

- Bailer
- X Disposable Bailer
- Middleburg
- Electric Submersible
- Waterra
- Peristaltic
- Extraction Pump
- Other ____

Sampling Method:

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

____ (Gals.) X 3 no purge = ____ Gals.

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

Time	Temp. (°F or °C)	pH	Conductivity (mS or µS)	Turbidity (NTU)	Gals. Removed	Observations
10:23	69.8	7.5	980	85	—	
					Ferrous Iron = 0	

Did well dewater? Yes No — Gallons actually evacuated: —

Sampling Time: 10:23 — Sampling Date: 9-24-02

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):	0.5 mg/L	Post-purge:		mg/L
ORP (if req'd):	(Pre-purge):	130 mV	Post-purge:		mV

WELL MONITORING DATA SHEET

Project #: 020924-DW-1	Client: Stellar Environmental @ Redwood Regional Park
Sampler: Dave Walter	Start Date: 9-24-02
Well I.D.: mw-4	Well Diameter: 2 3 (4) 6 8 ___
Total Well Depth: 26.51	Depth to Water: 14.65
Before: After:	Before: After:
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	D.O. Meter (if req'd): (YSI) HACH

Purge Method:

- Bailer
- Disposable Bailer
- Middleburg
- X Electric Submersible
- Waterra
- Peristaltic
- Extraction Pump
- Other ____

Sampling Method: Bailer

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

7.7 (Gals.) X 3 = 23.11 Gals.

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

Time	Temp. (°F or °C)	pH	Conductivity (mS or (µS))	Turbidity (NTU)	Gals. Removed	Observations
13:20	70.9	8.8	797	7200	8	Cloudy
13:21	64.3	8.9	676	7200	16	
13:23	62.3	9.0	665	7200	24	
					Ferrous Iron = 0	

Did well dewater? Yes (No) Gallons actually evacuated: 24

Sampling Time: 13:28 Sampling Date: 9-24-02

Sample I.D.: mw-4 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):	15.9 mg/L	Post-purge:	mg/L
ORP (if req'd):	(Pre-purge):	228 mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: 020924-DW-1	Client: Stellar Environmental @ Redwood Regional Park
Sampler: Dave Walter	Start Date: 9-24-02
Well I.D.: mw-5	Well Diameter: 2 3 (4) 6 8 ___
Total Well Depth: 26.92	Depth to Water: 16.94
Before: After:	Before: After:
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	D.O. Meter (if req'd): (YSI) HACH

Purge Method:
- Bailer
- Disposable Bailer
- Middleburg
- Electric Submersible
- Waterra
- Peristaltic
- Extraction Pump
- Other

Sampling Method:
- Bailer
- X Disposable Bailer
- Extraction Port
- Dedicated Tubing
- Other:

_____ (Gals.) X 3 = _____ Gals.

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

Time	Temp. (°F or °C)	pH	Conductivity (mS or µS)	Turbidity (NTU)	Gals. Removed	Observations
						Ferrous Iron = 0

Did well dewater? Yes No		Gallons actually evacuated:	
Sampling Time:		Sampling Date: 9-24-02	
Sample I.D.:		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: 1.1 mg/L	Post-purge:	mg/L
ORP (if req'd):	Pre-purge: 216 mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: 020924-DW-1	Client: Stellar Environmental @ Redwood Regional Park
Sampler: Dave Walter	Start Date: 9-24-02
Well I.D.: MW-6	Well Diameter: 2 3 (4) 6 8 ____
Total Well Depth: 27.93	Depth to Water: 13.82
Before: After:	Before: After:
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	D.O. Meter (if req'd): (YSI) HACH

Purge Method:
- Bailer
- Disposable Bailer
- Middleburg
- Electric Submersible
- Waterra
- Peristaltic
- Extraction Pump
- Other ____

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

____ (Gals.) X 3 = ____ Gals.

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

Time	Temp. (°F or °C)	pH	Conductivity (mS or µS)	Turbidity (NTU)	Gals. Removed	Observations
						Ferrous Iron = 0

Did well dewater? Yes No — Gallons actually evacuated:

Sampling Time: — Sampling Date: 9-24-02

Sample I.D.: — 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):	0.4	mg/L	Post-purge:	mg/L
ORP (if req'd):	(Pre-purge):	243	mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: 020924-DW-1	Client: Stellar Environmental @ Redwood Regional Park
Sampler: Dave Walter	Start Date: 9-24-02
Well I.D.: MW-7	Well Diameter: (2) 3 4 6 8 ___
Total Well Depth: 25.33	Depth to Water: 14.24
Before: After:	Before: After:
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	D.O. Meter (if req'd): (YSI) HACH

Purge Method:

- Bailer
- Disposable Bailer
- X Middleburg
- Electric Submersible
- Waterra
- Peristaltic
- Extraction Pump
- Other ____

Sampling Method: Bailer

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

1.8 (Gals.) X 3 = 5.4 Gals.

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

Time	Temp. (°F or °C)	pH	Conductivity (mS or µS)	Turbidity (NTU)	Gals. Removed	Observations
14:34	66.3	7.2	680	7200	2	odor / Brown
14:36	63.2	7.1	690	7200	4	gray
14:38	61.5	7.0	692	7200	6	
					Ferrous Iron = 2.4	

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

Sampling Time: 14:44 Sampling Date: 9-24-02

Sample I.D.: MW-7 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):	0.2 mg/L	Post-purge:		mg/L
ORP (if req'd):	(Pre-purge):	-117 mV	Post-purge:		mV

WELL MONITORING DATA SHEET

Project #: 020924-DW-1	Client: Stellar Environmental @ Redwood Regional Park
Sampler: Dave Walter	Start Date: 9-24-02
Well I.D.: mw-8	Well Diameter: (2) 3 4 6 8 ___
Total Well Depth: 22.21	Depth to Water: 13.75
Before: After:	Before: After:
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	D.O. Meter (if req'd): (YSI) HACH

Purge Method:
- Bailer
- Disposable Bailer
- X Middleburg
- Electric Submersible
- Waterra
- Peristaltic
- Extraction Pump
- Other ____

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

1.4 (Gals.) X 3 = 4.2 Gals.

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

Time	Temp. (°F or °C)	pH	Conductivity (mS or µS)	Turbidity (NTU)	Gals. Removed	Observations
14:10	65.6	7.4	744	>200	1.5	Brown
14:11	63.6	7.4	758	>200	3.0	
14:13	62.1	7.3	765	>200	4.5	
						Ferrous Iron = 0.8

Did well dewater? Yes (No) Gallons actually evacuated: 4.5

Sampling Time: 14:19 Sampling Date: 9-24-02

Sample I.D.: mw-8 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):	0.3 mg/L	Post-purge:	mg/L
ORP (if req'd):	(Pre-purge):	138 mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: 020924-DW-1	Client: Stellar Environmental @ Redwood Regional Park
Sampler: Dave Walter	Start Date: 9-24-02
Well I.D.: MW-9	Well Diameter: (2) 3 4 6 8 ___
Total Well Depth: 26.00	Depth to Water: 14.15
Before: After:	Before: After:
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	D.O. Meter (if req'd): (YSI) HACH

Purge Method:
- Bailer
- Disposable Bailer
- X Middleburg
- Electric Submersible
- Waterra
- Peristaltic
- Extraction Pump
- Other ____

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

1.9 (Gals.) X 3 = 5.7 Gals.

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

Time	Temp. (°F or °C)	pH	Conductivity (mS or µS)	Turbidity (NTU)	Gals. Removed	Observations
12:32	64.0	9.4	652	>200	2	Brown/oder
12:34	62.0	8.3	769	>200	4	
12:36	61.3	7.3	835	>200	6	
12:39	60.6	7.2	846	>200	8	
					Ferrous Iron = 1.6	

Did well dewater? Yes (No)		Gallons actually evacuated: 8	
Sampling Time: 12:40		Sampling Date: 9-24-02	
Sample I.D.: MW-9		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):	2.9 mg/L	Post-purge:	mg/L
ORP (if req'd): (Pre-purge):	236 mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: 020924-DW-1	Client: Stellar Environmental @ Redwood Regional Park
Sampler: Dave Walter	Start Date: 9-24-02
Well I.D.: MW-10	Well Diameter: (2) 3 4 6 8 ___
Total Well Depth: 28.75	Depth to Water: 13.55
Before: After:	Before: After:
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	D.O. Meter (if req'd): (YSI) HACH

Purge Method:
- Bailer
- Disposable Bailer
- X Middleburg
- Electric Submersible
- Waterra
- Peristaltic
- Extraction Pump
- Other ____

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

2.4 (Gals.) X 3 = 7.2 Gals.

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

Time	Temp. (°F or °C)	pH	Conductivity (mS or (µS))	Turbidity (NTU)	Gals. Removed	Observations
13:46	69.7	8.8	771	>200	2.5	Brown
13:49	65.2	8.7	756	7200	5.0	
13:51	63.6	8.8	736	7200	7.5	
					Ferrous Iron=0	

Did well dewater? Yes (No) Gallons actually evacuated: 7.5

Sampling Time: 13:57 Sampling Date: 9-24-02

Sample I.D.: MW-10 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):	14.5 mg/L	Post-purge:	mg/L
ORP (if req'd):	(Pre-purge):	213 mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: 020924-DW-1	Client: Stellar Environmental @ Redwood Regional Park
Sampler: Dave Walter	Start Date: 9-24-02
Well I.D.: MW-11	Well Diameter: (2) 3 4 6 8 ___
Total Well Depth: 26.00	Depth to Water: 16.19
Before: After:	Before: After:
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	D.O. Meter (if req'd): (YSI) HACH

Purge Method:

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

Sampling Method: Bailer

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

1.6 (Gals.) X 3 = 4.8 Gals.

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

Time	Temp. (°F or °C)	pH	Conductivity (mS or µS)	Turbidity (NTU)	Gals. Removed	Observations
14:56	67.0	6.9	931	>200	1.6	odor/grey
14:58	63.2	7.0	964	>200	3.2	
15:00	61.1	7.1	969	>200	4.8	
					Ferrous Iron-4.4	

Did well dewater? Yes (No) Gallons actually evacuated: 4.8

Sampling Time: 15:05 Sampling Date: 9-24-02

Sample I.D.: MW-11 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):	2.4 mg/L	Post-purge:		mg/L
ORP (if req'd):	(Pre-purge):	-103 mV	Post-purge:		mV

WELLHEAD INSPECTION CHECKLIST AND REPAIR ORDER

Client Stellar Environmental Solutions Inspection Date 9-24-02

Site Address Redwood Regional Park Service Yard Oakland Inspected By Dave Walter

1. Lid on box?	6. Casing secure?	12. Water standing in wellbox?	15. Well cap functional?
2. Lid broken?	7. Casing cut level?	12a. Standing above the top of casing?	16. Can cap be pulled loose?
3. Lid bolts missing?	8. Debris in wellbox?	12b. Standing below the top of casing?	17. Can cap seal out water?
4. Lid bolts stripped?	9. Wellbox is too far above grade?	12c. Water even with the top of casing?	18. Padlock present?
5. Lid seal intact?	10. Wellbox is too far below grade?	13. Well cap present?	19. Padlock functional?
	11. Wellbox is crushed/damaged?	14. Well cap found secure?	

☑ Check box if no deficiencies were found. Note below deficiencies you were able to correct.

Well I.D.	Deficiency	Corrective Action Taken

Note below all defiencies that could not be corrected and still need to be corrected.

Well I.D.	Persisting Deficiency	BTS Office assigns or defers Correction to:	Date assigned	Date corrected

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900, Fax (510) 486-0532

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: 09-OCT-02
Lab Job Number: 160913
Project ID: 020924-DW-1
Location: Redwood Regional Park

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

Reviewed by: _____
Project Manager

Reviewed by: _____
Operations Manager

Curtis & Tompkins, Ltd.

Laboratory Numbers: **160913**
Client: **Stellar Environmental Solutions**
Location: **Redwood Regional Park**
Project#: **020924-DW-1**

Sampled Date: **09/24/02**
Received Date: **09/24/02**

CASE NARRATIVE

This hardcopy data package contains samples and QC results for eight water samples, which were received from the site referenced above on September 24, 2002. The samples were received cold and intact.

TVH/BTXE: High Trifluorotoluene surrogate recoveries were observed for samples MW-7 (CT# 160913-004), MW-8 (CT# 160913-005) and MW-9 (CT# 160913-006) due to coelution of the hydrocarbons with the surrogate. No other analytical problems were encountered.

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

General Chemistry: No analytical problems were encountered.

STELLAR ENVIRONMENTAL SOLUTIONS

Chain of Custody Record

76915

Lab Job No.: [redacted]-24

Page 1 of 1

Laboratory CAT
Address Berkeley, CA
Client Stellar Env. Sol.
Address 2198 Sixth St.
Berkeley, CA
Project Name Redwood Regional Park
Project Number 00CF124-DW-1

Method of Shipment
Shipment No.
Airbill No.
Cooler No.
Project Manager Bruce Rucker
Telephone No. 510-644-3123
Fax No.
Sampler: (Signature) DW

Field Sample Number	Location/ Depth	Date	Time	Sample Type	Type/Size of Container	Preservation: Temp.	Preservation: Chemical	Filtered?	No. of Containers	TPH-G/BTEX/MTBE	TPH-D	NITRATE/SULFATE	Remarks
-1 MW-2		9-24	13:06	W	VOA's Ambers		VOA's=HCl		5	X	X		
-2 MW-3			10:33		Poly		none		1			X	
-3 MW-4			13:58		poly, VOA's, Ambers		VOA's=HCl		6	X	X	X	
-4 MW-7			14:44							X	X	X	
-5 MW-8			14:19							X	X	X	
-6 MW-9			12:40							X	X	X	
-7 MW-10			13:57							X	X	X	
-8 MW-11			15:05							X	X	X	

Analysis Required

Received: On Ice / Cold / Ambient / Intact

Preservation Correct? Yes / No / N/A

Relinquished by:	Date	Received by:	Date
Signature: David C. Walter	9-24	Signature: [signature]	9/24/02
Printed: David C. Walter	Time	Printed: [illegible]	Time
Company: Blaine Tech	18:41	Company: CAT	4:4
Reason:			

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

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

Comments:

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	160913	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	020924-DW-1		
Matrix:	Water	Sampled:	09/24/02
Units:	ug/L	Received:	09/24/02

Field ID:	MW-2	Diln Fac:	1.000
Type:	SAMPLE	Batch#:	75546
Lab ID:	160913-001	Analyzed:	09/26/02

Analyte	Result	RL	Analysis
Gasoline C7-C12	98	50	8015B(M)
MTBE	13	2.0	EPA 8021B
Benzene	5.0	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)	110	68-145	8015B(M)
Bromofluorobenzene (FID)	118	66-143	8015B(M)
Trifluorotoluene (PID)	90	53-143	EPA 8021B
Bromofluorobenzene (PID)	100	52-142	EPA 8021B

Field ID:	MW-4	Diln Fac:	1.000
Type:	SAMPLE	Batch#:	75546
Lab ID:	160913-003	Analyzed:	09/26/02

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

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	93	68-145	8015B(M)
Bromofluorobenzene (FID)	112	66-143	8015B(M)
Trifluorotoluene (PID)	86	53-143	EPA 8021B
Bromofluorobenzene (PID)	98	52-142	EPA 8021B

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

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	160913	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	020924-DW-1		
Matrix:	Water	Sampled:	09/24/02
Units:	ug/L	Received:	09/24/02

Field ID:	MW-7	Diln Fac:	1.000
Type:	SAMPLE	Batch#:	75546
Lab ID:	160913-004	Analyzed:	09/26/02

Analyte	Result	RL	Analysis
Gasoline C7-C12	9,600	50	8015B(M)
MTBE	ND	2.0	EPA 8021B
Benzene	180	0.50	EPA 8021B
Toluene	ND	0.50	EPA 8021B
Ethylbenzene	380	0.50	EPA 8021B
m,p-Xylenes	160	0.50	EPA 8021B
o-Xylene	5.2	0.50	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	177 *	68-145	8015B(M)
Bromofluorobenzene (FID)	117	66-143	8015B(M)
Trifluorotoluene (PID)	85	53-143	EPA 8021B
Bromofluorobenzene (PID)	111	52-142	EPA 8021B

Field ID:	MW-8	Diln Fac:	1.000
Type:	SAMPLE	Batch#:	75546
Lab ID:	160913-005	Analyzed:	09/26/02

Analyte	Result	RL	Analysis
Gasoline C7-C12	1,000	50	8015B(M)
MTBE	ND	2.0	EPA 8021B
Benzene	22	0.50	EPA 8021B
Toluene	ND	0.50	EPA 8021B
Ethylbenzene	64	0.50	EPA 8021B
m,p-Xylenes	48	0.50	EPA 8021B
o-Xylene	2.3	0.50	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	118	68-145	8015B(M)
Bromofluorobenzene (FID)	111	66-143	8015B(M)
Trifluorotoluene (PID)	86	53-143	EPA 8021B
Bromofluorobenzene (PID)	97	52-142	EPA 8021B

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

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	160913	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	020924-DW-1		
Matrix:	Water	Sampled:	09/24/02
Units:	ug/L	Received:	09/24/02

Field ID: MW-9
Type: SAMPLE
Lab ID: 160913-006

Analyte	Result	RL	Diln Fac	Batch#	Analyzed	Analysis
Gasoline C7-C12	3,600	50	1.000	75546	09/26/02	8015B(M)
MTBE	ND	4.0	2.000	75599	09/27/02	EPA 8021B
Benzene	440	1.0	2.000	75599	09/27/02	EPA 8021B
Toluene	11 C	1.0	2.000	75599	09/27/02	EPA 8021B
Ethylbenzene	260	1.0	2.000	75599	09/27/02	EPA 8021B
m,p-Xylenes	32	1.0	2.000	75599	09/27/02	EPA 8021B
o-Xylene	7.2 C	1.0	2.000	75599	09/27/02	EPA 8021B

Surrogate	%REC	Limits	Diln Fac	Batch#	Analyzed	Analysis
Trifluorotoluene (FID)	170 *	68-145	1.000	75546	09/26/02	8015B(M)
Bromofluorobenzene (FID)	122	66-143	1.000	75546	09/26/02	8015B(M)
Trifluorotoluene (PID)	103	53-143	2.000	75599	09/27/02	EPA 8021B
Bromofluorobenzene (PID)	100	52-142	2.000	75599	09/27/02	EPA 8021B

Field ID: MW-10
Type: SAMPLE
Lab ID: 160913-007
Diln Fac: 1.000
Batch#: 75546
Analyzed: 09/26/02

Analyte	Result	RL	Analysis
Gasoline C7-C12	160	50	8015B(M)
MTBE	26	2.0	EPA 8021B
Benzene	10	0.50	EPA 8021B
Toluene	ND	0.50	EPA 8021B
Ethylbenzene	6.7	0.50	EPA 8021B
m,p-Xylenes	3.6	0.50	EPA 8021B
o-Xylene	ND	0.50	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	98	68-145	8015B(M)
Bromofluorobenzene (FID)	108	66-143	8015B(M)
Trifluorotoluene (PID)	84	53-143	EPA 8021B
Bromofluorobenzene (PID)	95	52-142	EPA 8021B

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

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	160913	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	020924-DW-1		
Matrix:	Water	Sampled:	09/24/02
Units:	ug/L	Received:	09/24/02

Field ID:	MW-11	Lab ID:	160913-008
Type:	SAMPLE	Diln Fac:	5.000

Analyte	Result	RL	Batch#	Analyzed	Analysis
Gasoline C7-C12	12,000	250	75611	09/28/02	8015B(M)
MTBE	ND	10	75599	09/27/02	EPA 8021B
Benzene	330	2.5	75599	09/27/02	EPA 8021B
Toluene	13	2.5	75599	09/27/02	EPA 8021B
Ethylbenzene	880	2.5	75599	09/27/02	EPA 8021B
m,p-Xylenes	630	2.5	75599	09/27/02	EPA 8021B
o-Xylene	24	2.5	75599	09/27/02	EPA 8021B

Surrogate	%REC	Limits	Batch#	Analyzed	Analysis
Trifluorotoluene (FID)	181 *	68-145	75611	09/28/02	8015B(M)
Bromofluorobenzene (FID)	109	66-143	75611	09/28/02	8015B(M)
Trifluorotoluene (PID)	118	53-143	75599	09/27/02	EPA 8021B
Bromofluorobenzene (PID)	99	52-142	75599	09/27/02	EPA 8021B

Type:	BLANK	Batch#:	75546
Lab ID:	QC190969	Analyzed:	09/25/02
Diln Fac:	1.000		

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

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	89	68-145	8015B(M)
Bromofluorobenzene (FID)	104	66-143	8015B(M)
Trifluorotoluene (PID)	83	53-143	EPA 8021B
Bromofluorobenzene (PID)	92	52-142	EPA 8021B

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

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	160913	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	020924-DW-1		
Matrix:	Water	Sampled:	09/24/02
Units:	ug/L	Received:	09/24/02

Type:	BLANK	Batch#:	75599
Lab ID:	QC191190	Analyzed:	09/27/02
Diln Fac:	1.000	Analysis:	EPA 8021B

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

Surrogate	%REC	Limits
Trifluorotoluene (PID)	100	53-143
Bromofluorobenzene (PID)	101	52-142

Type:	BLANK	Batch#:	75611
Lab ID:	QC191226	Analyzed:	09/27/02
Diln Fac:	1.000	Analysis:	8015B(M)

Analyte	Result	RL
Gasoline C7-C12	ND	50

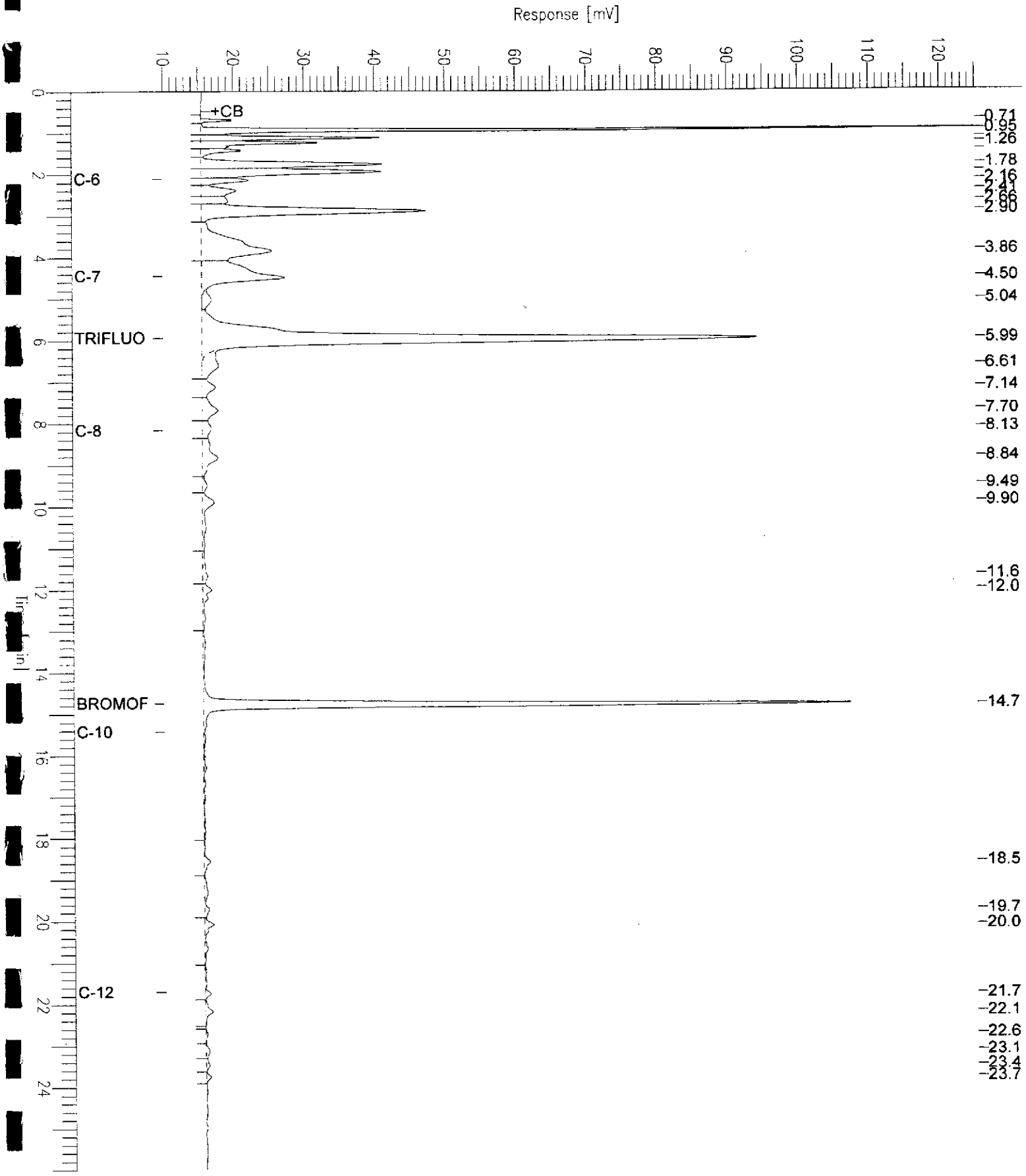
Surrogate	%REC	Limits
Trifluorotoluene (FID)	103	68-145
Bromofluorobenzene (FID)	108	66-143

*= 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

GC07 TVH 'A' Data File RTX 502

mple Name : 160913-001,75546
leName : G:\GC07\DATA\268A020.raw
ethod : TVHBTXE
Start Time : 0.00 min End Time : 26.00 min
cale Factor: 1.0 Plot Offset: 10 mV

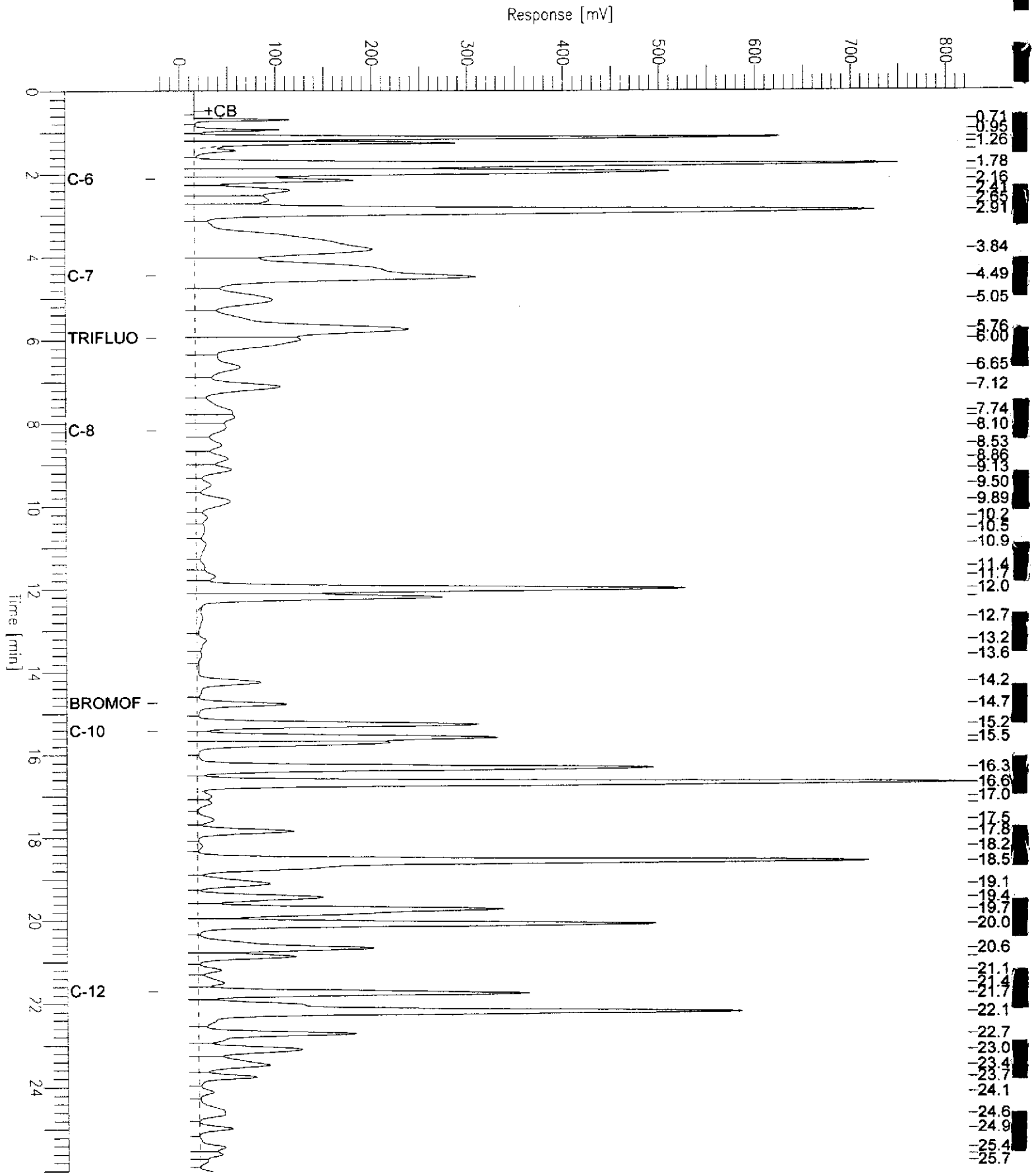
Sample #: a1 Page 1 of 1
Date : 9/26/02 02:34 AM
Time of Injection: 9/26/02 02:08 AM
Low Point : 9.91 mV High Point : 125.10 mV
Plot Scale: 115.2 mV



GC07 TVH 'A' Data File RTX 502

Sample Name : 160913-004,75546
FileName : G:\GC07\DATA\268A022.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 26.00 min
Scale Factor: 1.0 Plot Offset: -25 mV

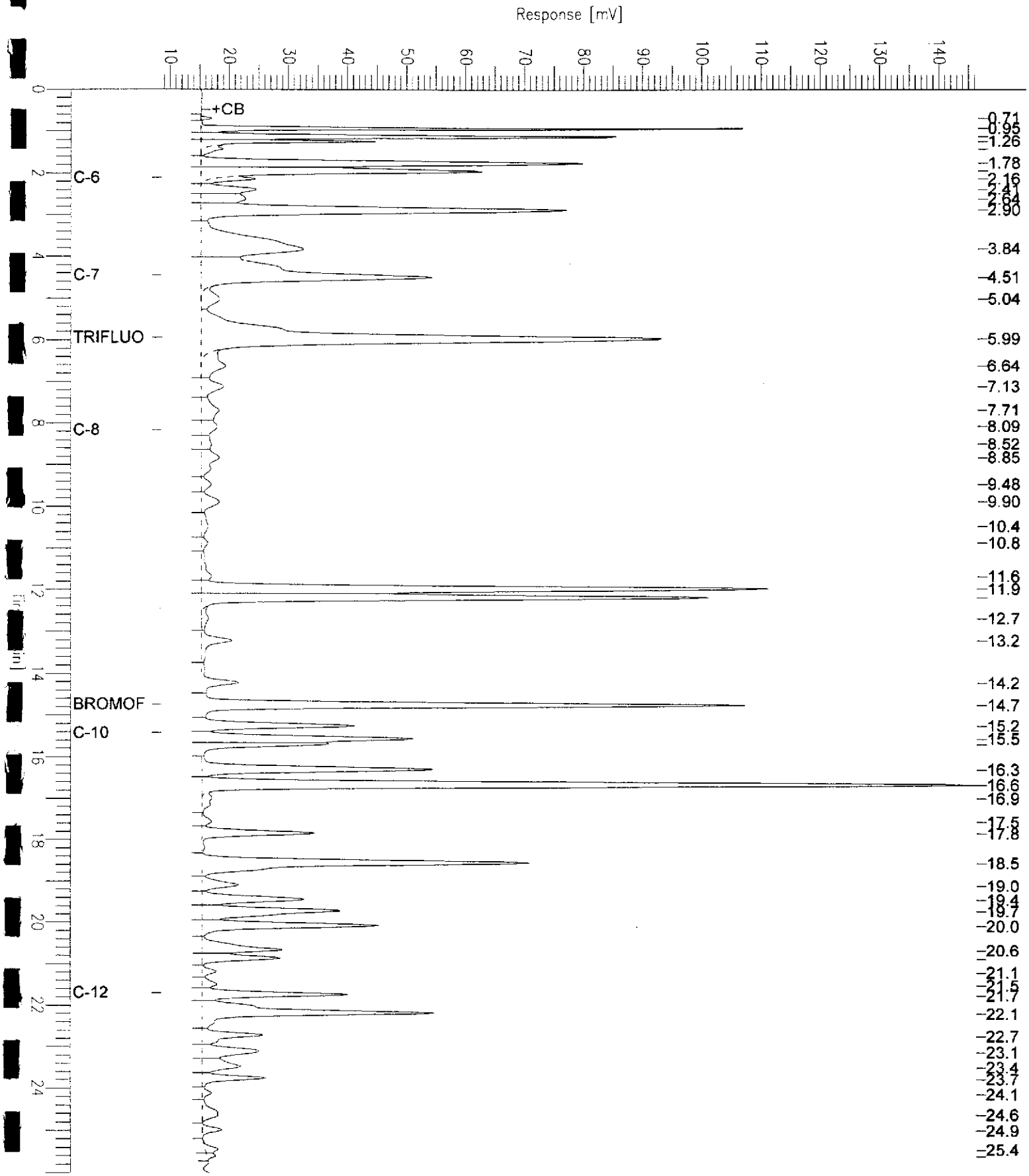
Sample #: a1
Date : 9/26/02 03:42 AM
Time of Injection: 9/26/02 03:16 AM
Low Point : -25.00 mV High Point : 821.46 mV
Plot Scale: 846.5 mV



GC07 TVH 'A' Data File RTX 502

[redacted]mple Name : 160913-005,75546
[redacted]leName : G:\GC07\DATA\268A023.raw
[redacted]ethod : TVHBTXE
Start Time : 0.00 min End Time : 26.00 min
[redacted]cale Factor: 1.0 Plot Offset: 9 mV

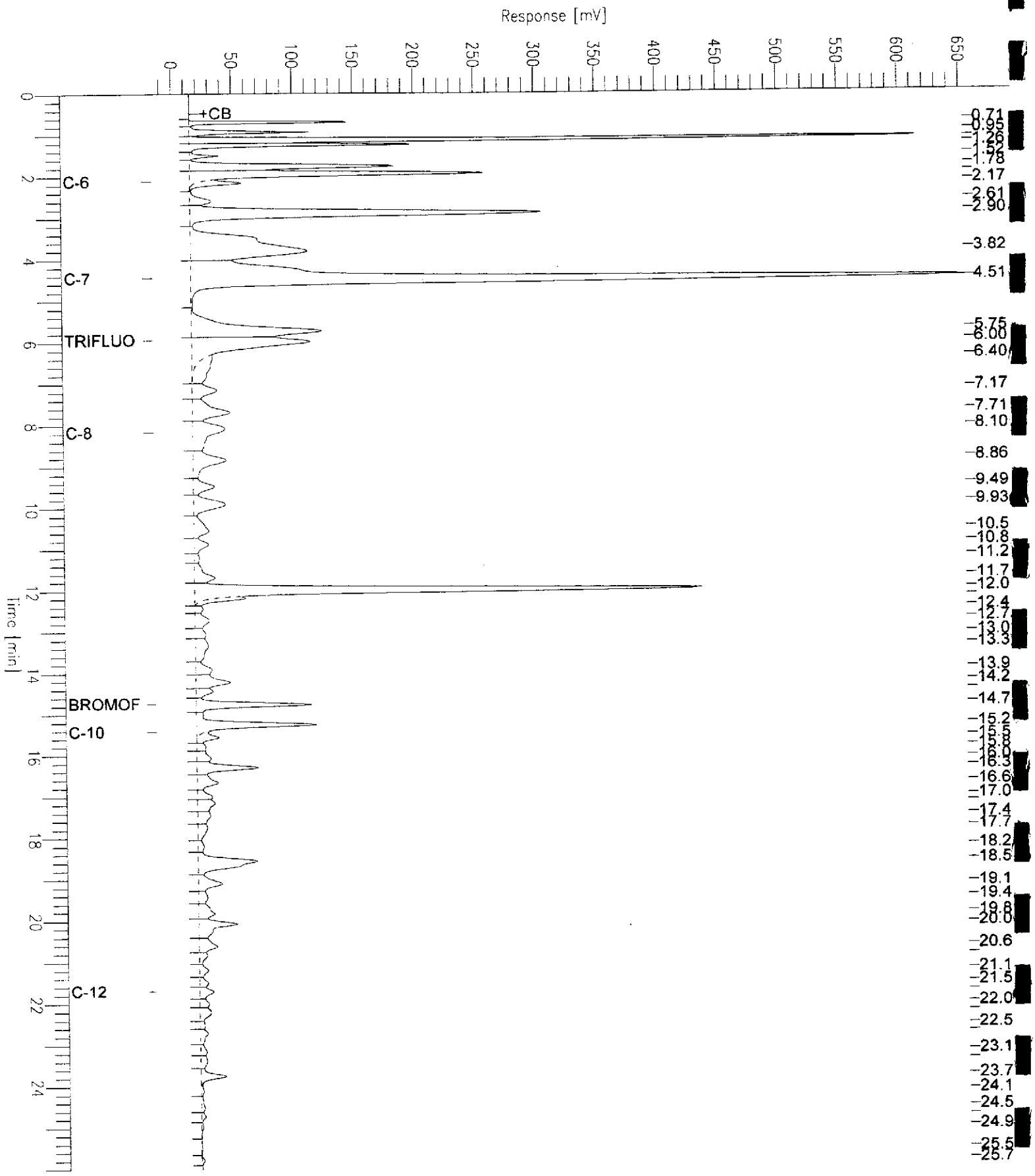
Sample #: a1 Page 1 of 1
Date : 9/26/02 04:16 AM
Time of Injection: 9/26/02 03:50 AM
Low Point : 8.61 mV High Point : 146.60 mV
Plot Scale: 138.0 mV



GC07 TVH 'A' Data File RTX 502

Sample Name : 160913-006,75546
FileName : G:\GC07\DATA\268A024.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 26.00 min
Scale Factor: 1.0 Plot Offset: -17 mV

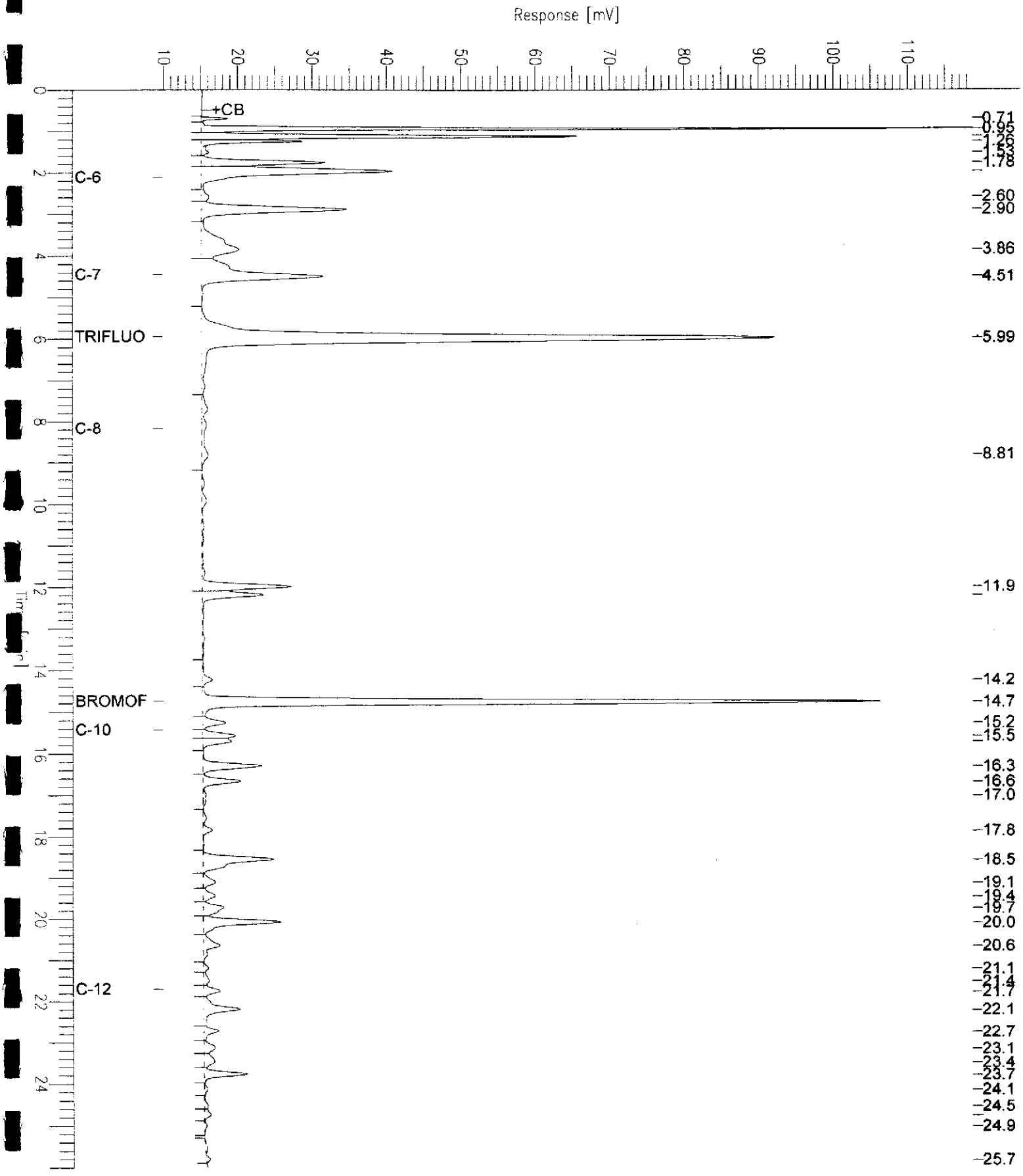
Sample #: a1 Page 1 of 1
Date : 9/26/02 04:50 AM
Time of Injection: 9/26/02 04:24 AM
Low Point : -16.73 mV High Point : 653.32 mV
Plot Scale: 670.0 mV



GC07 TVH 'A' Data File RTX 502

mple Name : 160913-007,75546
leName : G:\GC07\DATA\268A025.raw
thod : TVHBTXE
tart Time : 0.00 min End Time : 26.00 min
cale Factor: 1.0 Plot Offset: 10 mV

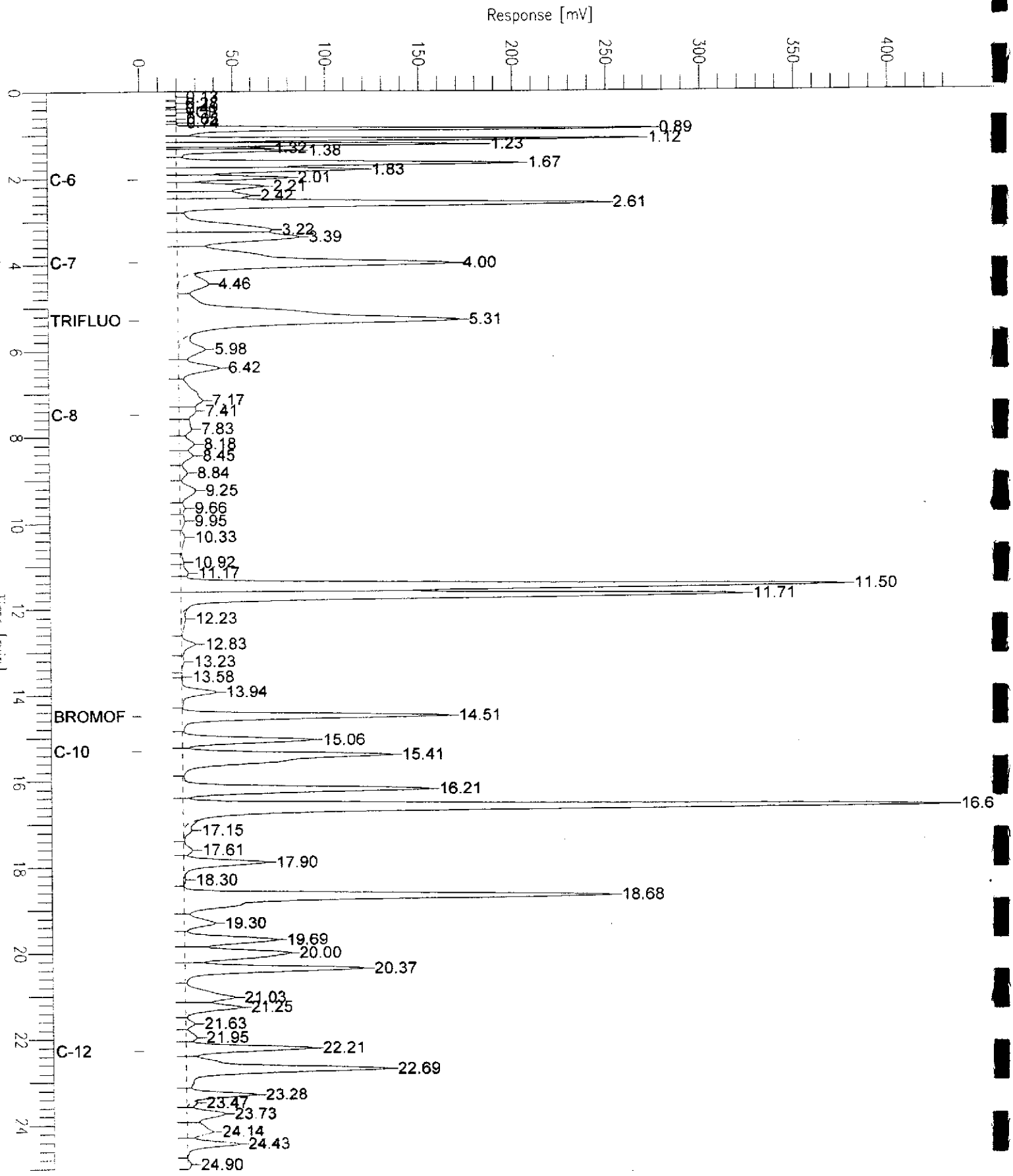
Sample #: a1 Page 1 of 1
Date : 9/26/02 05:25 AM
Time of Injection: 9/26/02 04:59 AM
Low Point : 9.92 mV High Point : 118.72 mV
Plot Scale: 108.8 mV



Chromatogram

Sample Name : 160913-008,75611
FileName : G:\GC05\DATA\270G028.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 25.00 min
Scale Factor: 1.0 Plot Offset: -1 mV

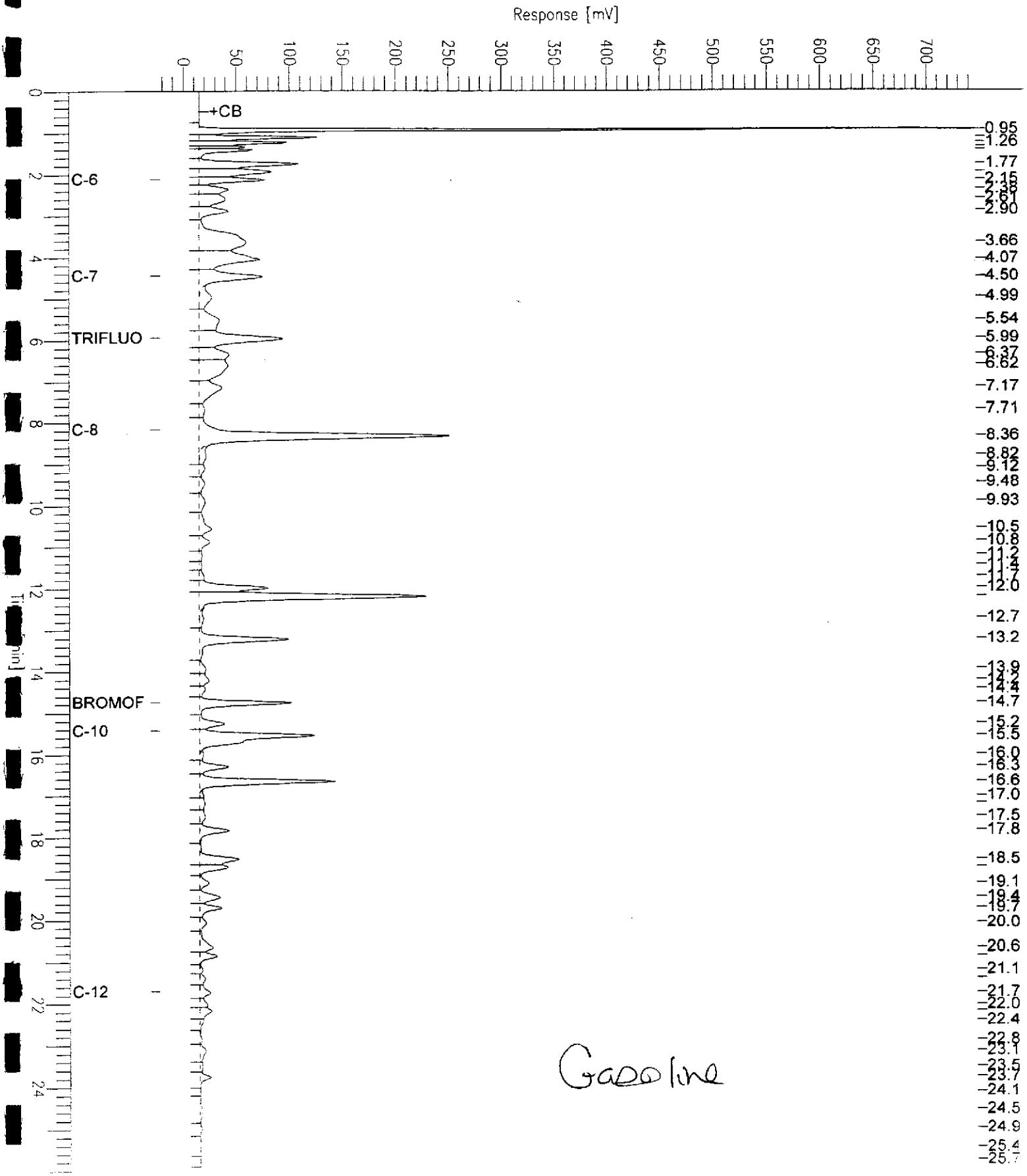
Sample #: B1
Date : 9/28/02 03:44 PM
Time of Injection: 9/28/02 02:10 AM
Low Point : -0.93 mV High Point : 432.08 mV
Plot Scale: 433.0 mV



GC07 TVH 'A' Data File RTX 502

mple Name : ccv/lcs,qc190970,75546,02ws1468,5/5000
leName : G:\GC07\DATA\268A001.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 26.00 min
ale Factor: 1.0 Plot Offset: -22 mV

Sample #: Page 1 of 1
Date : 9/25/02 03:33 PM
Time of Injection: 9/25/02 03:07 PM
Low Point : -21.58 mV High Point : 746.20 mV
Plot Scale: 767.8 mV



Gasoline

Curtis & Tompkins, Ltd.

Total Volatile Hydrocarbons

Lab #:	160913	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	020924-DW-1	Analysis:	8015B(M)
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC190970	Batch#:	75546
Matrix:	Water	Analyzed:	09/25/02
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	2,000	2,211	111	79-120

Surrogate	%REC	Limits
Trifluorotoluene (FID)	102	68-145
Bromofluorobenzene (FID)	107	66-143

Curtis & Tompkins, Ltd.

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	160913	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	020924-DW-1	Analysis:	EPA 8021B
Matrix:	Water	Batch#:	75546
Units:	ug/L	Analyzed:	09/25/02
Diln Fac:	1.000		

Type: BS Lab ID: QC190971

Analyte	Spiked	Result	%REC	Limits
MTBE	20.00	19.72	99	51-125
Benzene	20.00	20.42	102	65-122
Toluene	20.00	20.82	104	67-121
Ethylbenzene	20.00	21.19	106	70-121
m,p-Xylenes	40.00	40.02	100	72-125
o-Xylene	20.00	20.79	104	73-122

Surrogate	%REC	Limits
Trifluorotoluene (PID)	87	53-143
Bromofluorobenzene (PID)	96	52-142

Type: BSD Lab ID: QC191004

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	20.00	19.60	98	51-125	1	20
Benzene	20.00	19.91	100	65-122	3	20
Toluene	20.00	20.20	101	67-121	3	20
Ethylbenzene	20.00	20.69	103	70-121	2	20
m,p-Xylenes	40.00	38.95	97	72-125	3	20
o-Xylene	20.00	20.43	102	73-122	2	20

Surrogate	%REC	Limits
Trifluorotoluene (PID)	86	53-143
Bromofluorobenzene (PID)	96	52-142

RPD= Relative Percent Difference

22.0

Curtis & Tompkins, Ltd.

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	160913	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	020924-DW-1	Analysis:	EPA 8021B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC191191	Batch#:	75599
Matrix:	Water	Analyzed:	09/27/02
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
MTBE	20.00	20.05	100	51-125
Benzene	20.00	21.13	106	65-122
Toluene	20.00	20.33	102	67-121
Ethylbenzene	20.00	20.58	103	70-121
m,p-Xylenes	40.00	35.73	89	72-125
o-Xylene	20.00	20.30	101	73-122

Surrogate	%REC	Limits
Trifluorotoluene (PID)	99	53-143
Bromofluorobenzene (PID)	99	52-142

Curtis & Tompkins, Ltd.

Total Volatile Hydrocarbons

Lab #:	160913	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	020924-DW-1	Analysis:	8015B(M)
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC191227	Batch#:	75611
Matrix:	Water	Analyzed:	09/27/02
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	2,000	1,795	90	79-120

Surrogate	%REC	Limits
Trifluorotoluene (FID)	125	68-145
Bromofluorobenzene (FID)	110	66-143

Curtis & Tompkins, Ltd.

Total Volatile Hydrocarbons

Lab #:	160913	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	020924-DW-1	Analysis:	8015B(M)
Field ID:	ZZZZZZZZZZ	Batch#:	75546
MSS Lab ID:	160919-001	Sampled:	09/23/02
Matrix:	Water	Received:	09/25/02
Units:	ug/L	Analyzed:	09/26/02
Diln Fac:	1.000		

Type: MS Lab ID: QC191005

Analyte	MSS Result	Spiked	Result	%REC	Limits
Gasoline C7-C12	49.23	2,000	2,031	99	67-120

Surrogate	%REC	Limits
Trifluorotoluene (FID)	107	68-145
Bromofluorobenzene (FID)	116	66-143

Type: MSD Lab ID: QC191006

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	2,000	2,026	99	67-120	0	20

Surrogate	%REC	Limits
Trifluorotoluene (FID)	107	68-145
Bromofluorobenzene (FID)	118	66-143

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	160913	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	020924-DW-1	Analysis:	EPA 8021B
Field ID:	ZZZZZZZZZZ	Batch#:	75599
MSS Lab ID:	160872-005	Sampled:	09/19/02
Matrix:	Water	Received:	09/20/02
Units:	ug/L	Analyzed:	09/27/02
Diln Fac:	1.000		

Type: MS Lab ID: QC191192

Analyte	MSS Result	Spiked	Result	%REC	Limits
MTBE	ND	20.00	21.71	109	33-131
Benzene	2.139	20.00	23.10	105	52-149
Toluene	<0.05100	20.00	20.32	102	69-130
Ethylbenzene	1.675	20.00	21.65	100	70-131
m,p-Xylenes	4.500	40.00	38.79	86	68-137
o-Xylene	1.529	20.00	22.29	104	73-133

Surrogate	%REC	Limits
Trifluorotoluene (PID)	100	53-143
Bromofluorobenzene (PID)	103	52-142

Type: MSD Lab ID: QC191193

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	20.00	21.73	109	33-131	0	20
Benzene	20.00	23.02	104	52-149	0	30
Toluene	20.00	20.41	102	69-130	0	30
Ethylbenzene	20.00	21.71	100	70-131	0	30
m,p-Xylenes	40.00	38.91	86	68-137	0	30
o-Xylene	20.00	22.06	103	73-133	1	30

Surrogate	%REC	Limits
Trifluorotoluene (PID)	100	53-143
Bromofluorobenzene (PID)	101	52-142

ND= Not Detected
RPD= Relative Percent Difference

25.0

Curtis & Tompkins, Ltd.

Total Volatile Hydrocarbons

Lab #:	160913	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	020924-DW-1	Analysis:	8015B(M)
Field ID:	ZZZZZZZZZZ	Batch#:	75611
MSS Lab ID:	160863-010	Sampled:	09/19/02
Matrix:	Water	Received:	09/20/02
Units:	ug/L	Analyzed:	09/27/02
Diln Fac:	1.000		

Type: MS Lab ID: QC191228

Analyte	MSS Result	Spiked	Result	%REC	Limits
Gasoline C7-C12	14.41	2,000	1,912	95	67-120

Surrogate	%REC	Limits
Trifluorotoluene (FID)	126	68-145
Bromofluorobenzene (FID)	114	66-143

Type: MSD Lab ID: QC191229

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	2,000	1,853	92	67-120	3	20

Surrogate	%REC	Limits
Trifluorotoluene (FID)	125	68-145
Bromofluorobenzene (FID)	112	66-143

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	160913	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 3520C
Project#:	020924-DW-1	Analysis:	EPA 8015B(M)
Matrix:	Water	Sampled:	09/24/02
Units:	ug/L	Received:	09/24/02
Batch#:	75619	Prepared:	09/27/02

Field ID: MW-2 | Diln Fac: 1.000
Type: SAMPLE | Analyzed: 09/29/02
Lab ID: 160913-001

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	87	39-137

Field ID: MW-4 | Diln Fac: 1.000
Type: SAMPLE | Analyzed: 09/29/02
Lab ID: 160913-003

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	87	39-137

Field ID: MW-7 | Diln Fac: 1.000
Type: SAMPLE | Analyzed: 09/29/02
Lab ID: 160913-004

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

Surrogate	%REC	Limits
Hexacosane	87	39-137

Field ID: MW-8 | Diln Fac: 1.000
Type: SAMPLE | Analyzed: 09/29/02
Lab ID: 160913-005

Analyte	Result	RL
Diesel C10-C24	420 L Y	50

Surrogate	%REC	Limits
Hexacosane	89	39-137

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

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	160913	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 3520C
Project#:	020924-DW-1	Analysis:	EPA 8015B(M)
Matrix:	Water	Sampled:	09/24/02
Units:	ug/L	Received:	09/24/02
Batch#:	75619	Prepared:	09/27/02

Field ID:	MW-9	Diln Fac:	1.000
Type:	SAMPLE	Analyzed:	09/29/02
Lab ID:	160913-006		

Analyte	Result	RL
Diesel C10-C24	2,800 L Y	50

Surrogate	%REC	Limits
Hexacosane	83	39-137

Field ID:	MW-10	Diln Fac:	1.000
Type:	SAMPLE	Analyzed:	09/29/02
Lab ID:	160913-007		

Analyte	Result	RL
Diesel C10-C24	120 L Y	50

Surrogate	%REC	Limits
Hexacosane	90	39-137

Field ID:	MW-11	Diln Fac:	2.000
Type:	SAMPLE	Analyzed:	09/30/02
Lab ID:	160913-008		

Analyte	Result	RL
Diesel C10-C24	4,400 L Y	100

Surrogate	%REC	Limits
Hexacosane	88	39-137

Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC191257	Analyzed:	09/29/02

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	94	39-137

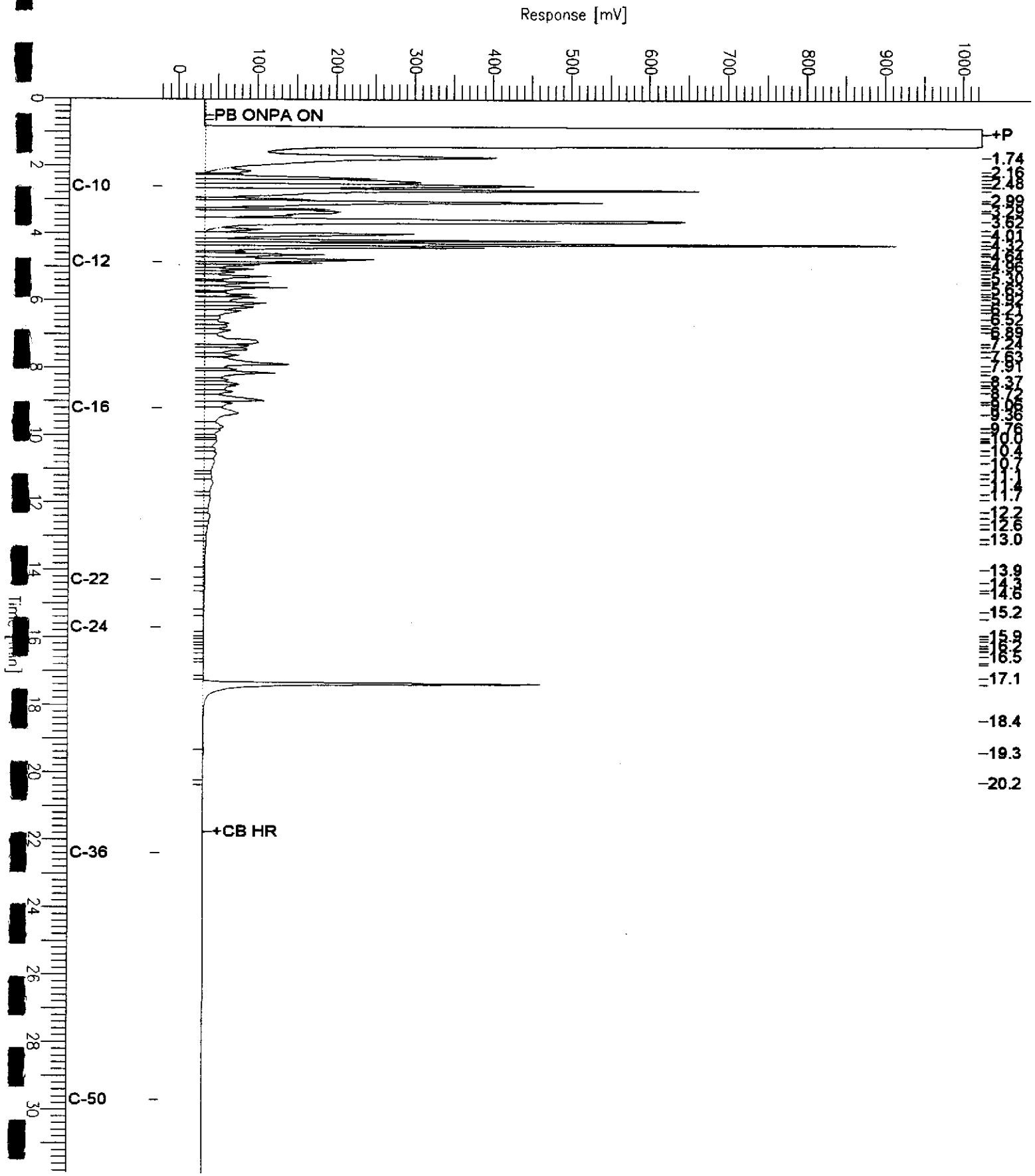
L= Lighter hydrocarbons contributed to the quantitation
Y= Sample exhibits fuel pattern which does not resemble standard
ND= Not Detected
RL= Reporting Limit

5.0

Chromatogram

Sample Name : 160913-004,75619
FileName : G:\GC15\CHB\272B006.RAW
Method : BTEH230.MTH
Start Time : 0.00 min End Time : 31.90 min
Scale Factor: 0.0 Plot Offset: -20 mV

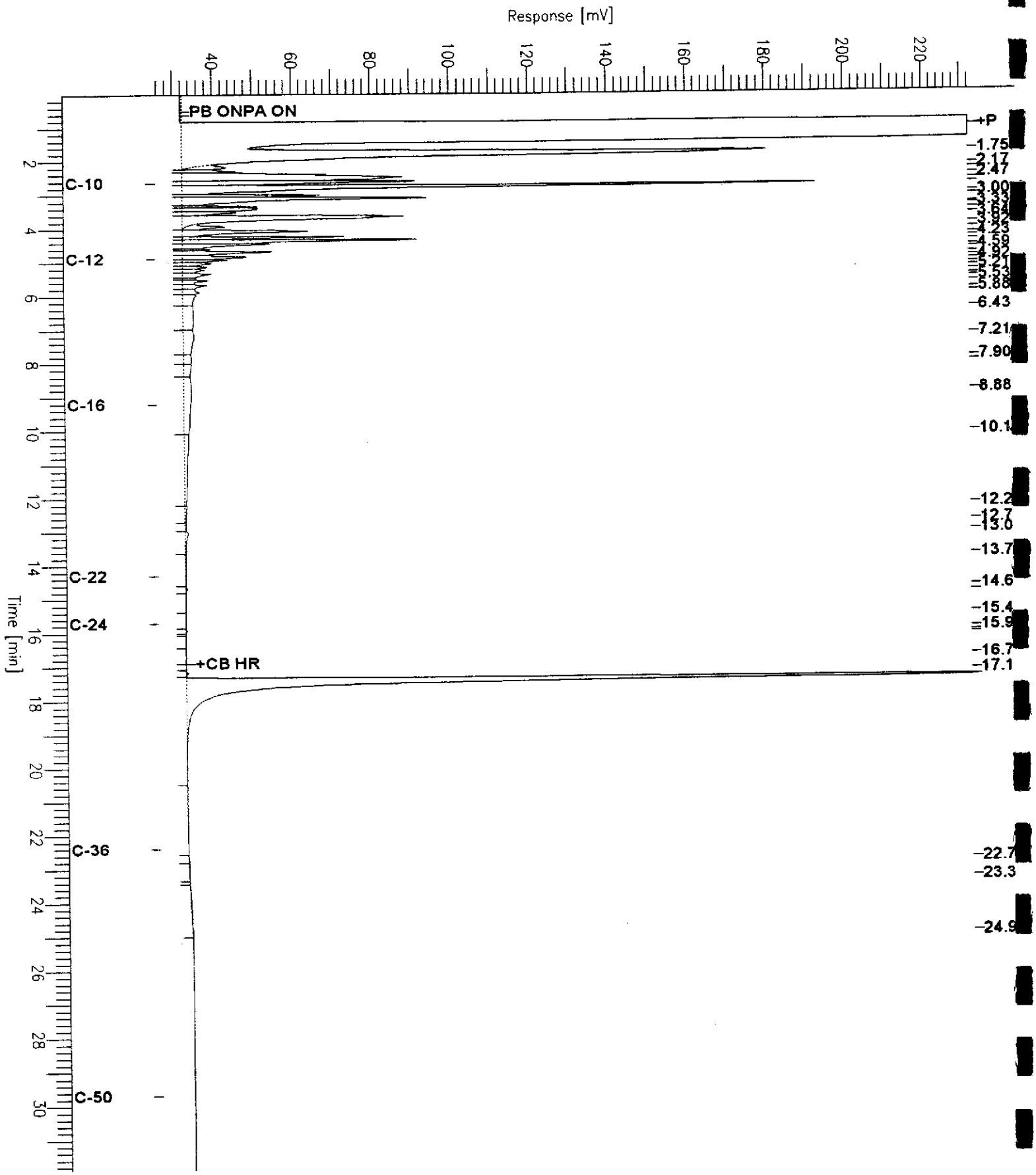
Sample #: 75619 Page 1 of 1
Date : 09/30/2002 11:50 AM
Time of Injection: 09/29/2002 03:07 PM
Low Point : -20.25 mV High Point : 1024.00 mV
Plot Scale: 1044.3 mV



Chromatogram

Sample Name : 160913-005,75619
FileName : G:\GC15\CHB\272B007.RAW
Method : BTEH230.MTH
Start Time : 0.01 min End Time : 31.91 min
Scale Factor: 0.0 Plot Offset: 26 mV

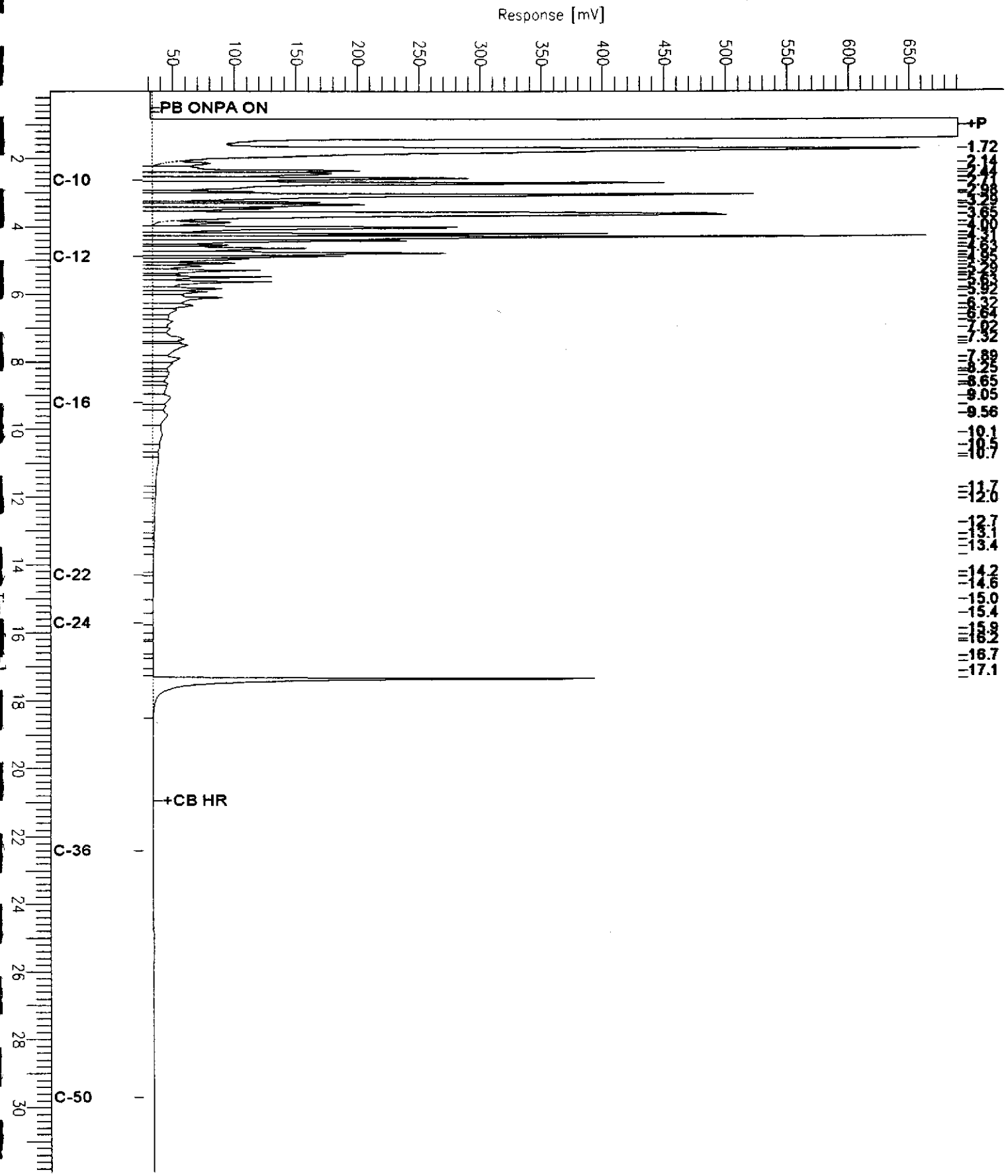
Sample #: 75619
Date : 09/30/2002 11:51 AM
Time of Injection: 09/29/2002 03:48 PM
Low Point : 25.64 mV High Point : 232.17 mV
Plot Scale: 206.5 mV



Chromatogram

[redacted]mple Name : 160913-006,75619
[redacted]leName : G:\GC15\CHB\272B008.RAW
[redacted]thod : BTEH230.MTH
Start Time : 0.01 min End Time : 31.91 min
Scale Factor: 0.0 Plot Offset: 26 mV

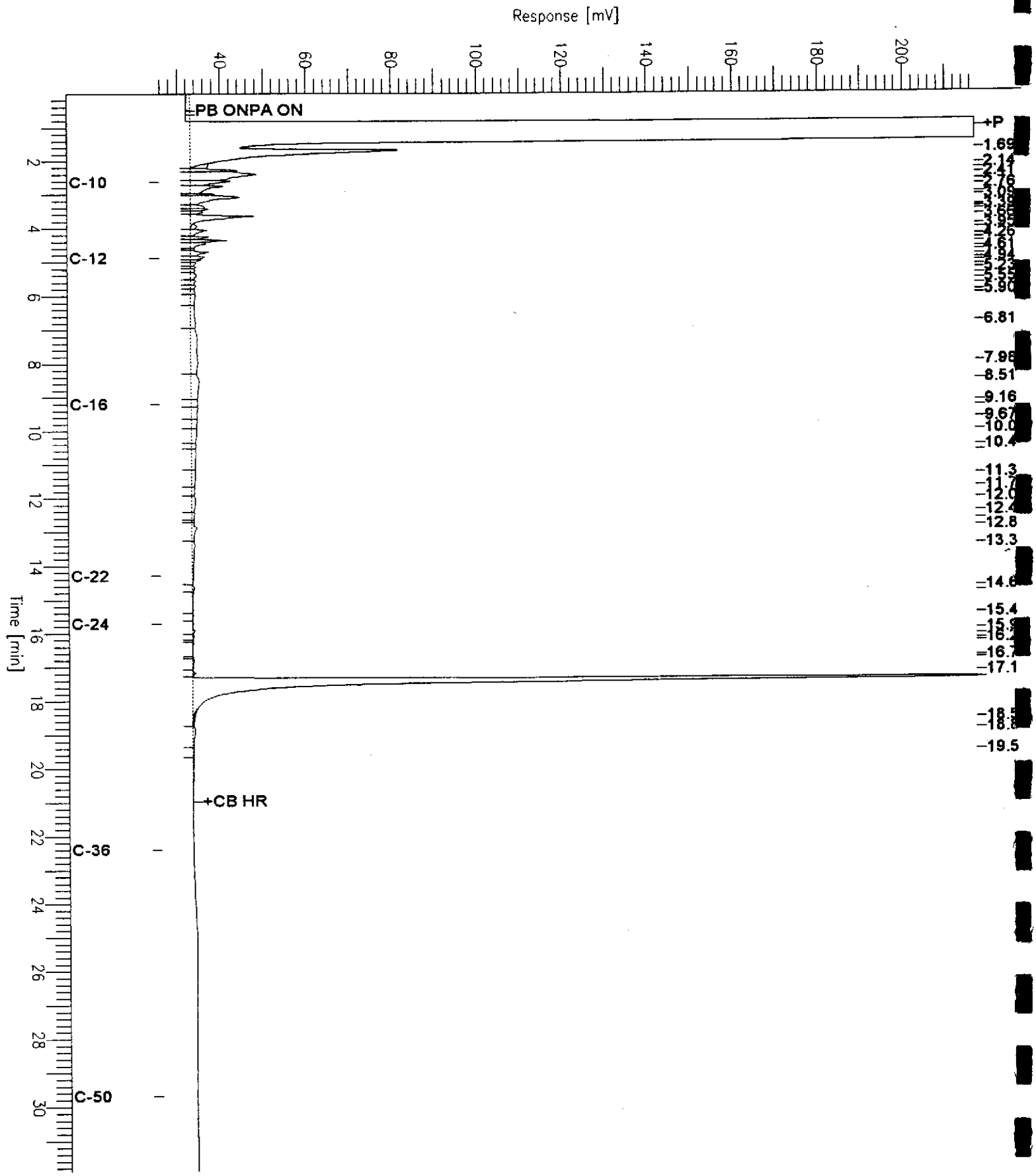
Sample #: 75619 Page 1 of 1
Date : 09/30/2002 11:51 AM
Time of Injection: 09/29/2002 04:29 PM
Low Point : 25.51 mV High Point : 691.11 mV
Plot Scale: 665.6 mV



Chromatogram

Sample Name : 160913-007,75619
FileName : G:\GC15\CHB\272B009.RAW
Method : BTEH230.MTH
Start Time : 0.01 min End Time : 31.91 min
Scale Factor: 0.0 Plot Offset: 26 mV

Sample #: 75619 Page 1 of 1
Date : 09/30/2002 11:52 AM
Time of Injection: 09/29/2002 05:09 PM
Low Point : 25.77 mV High Point : 217.09 mV
Plot Scale: 191.3 mV

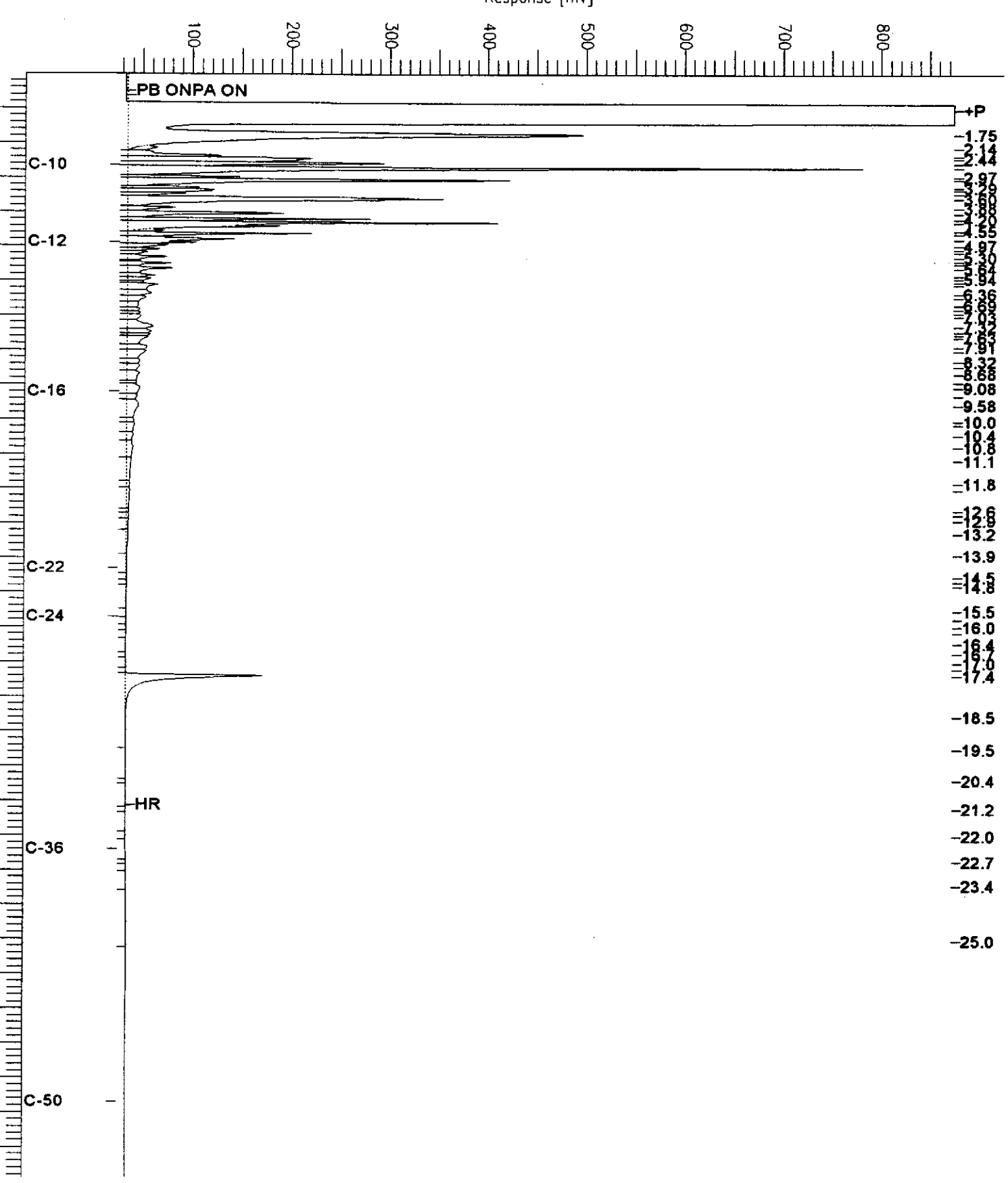


Chromatogram

MH 10/1/02

Sample Name : 160913-008sg, 75619
FileName : G:\GC15\CHB\272B032.RAW
Method : BTEH230.MTH
Start Time : 0.01 min End Time : 31.91 min
Scale Factor: 0.0 Plot Offset: 26 mV

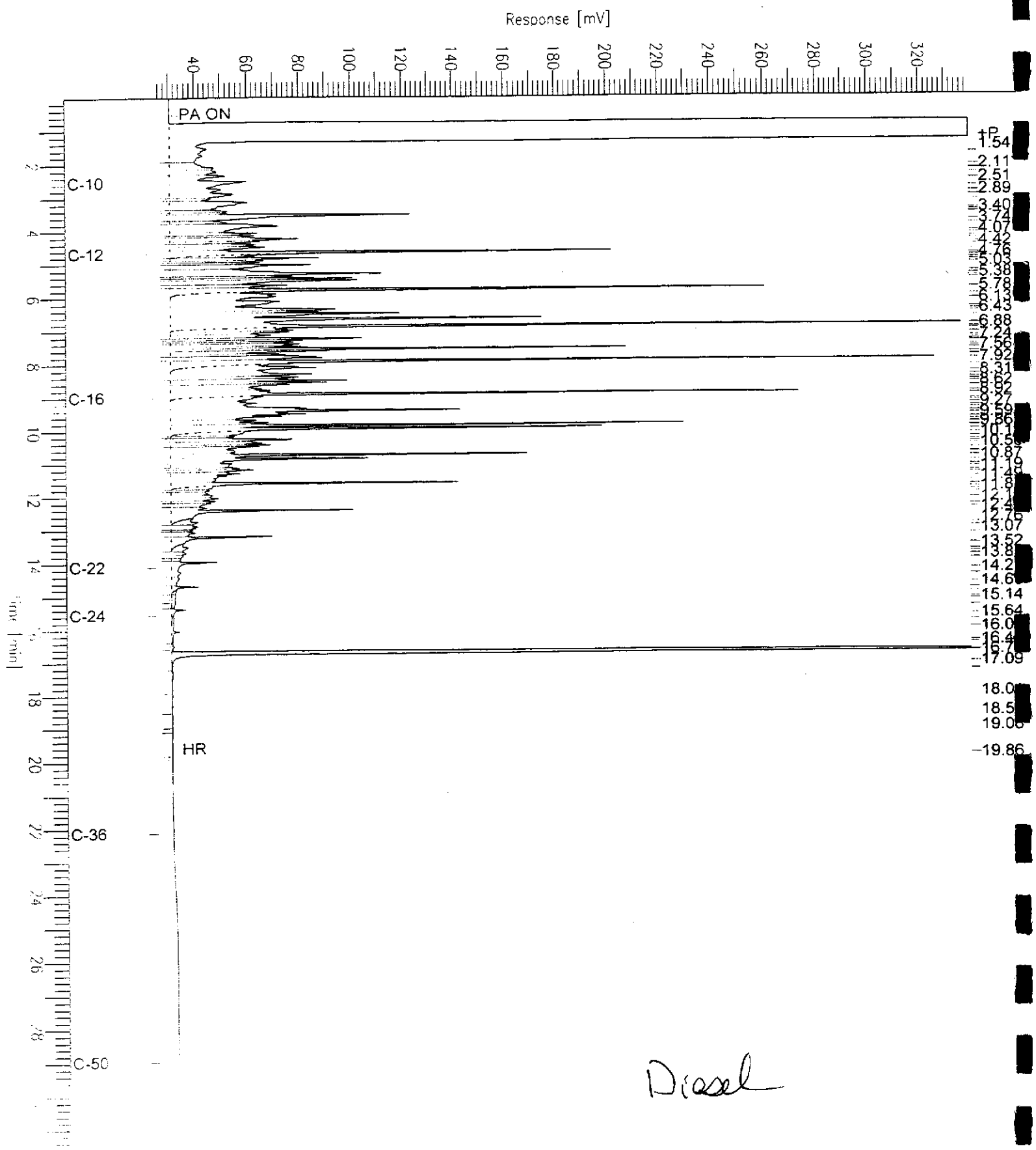
Sample #: 75619 Page 1 of 1
Date : 09/30/2002 05:09 PM
Time of Injection: 09/30/2002 02:13 PM
Low Point : 26.38 mV High Point : 874.95 mV
Plot Scale: 848.6 mV



Chromatogram

ample Name : ccv,02wsl485,dsl
ileName : G:\GC11\CHA\272A002.RAW
ethod : ATEH262.MTH
tart Time : 0.01 min End Time : 31.91 min
cale Factor: 0.0 Plot Offset: 25 mV

Sample #: 500mg/L Page 1 of 1
Date : 9/29/02 11:49 AM
Time of Injection: 9/29/02 11:05 AM
Low Point : 24.97 mV High Point : 339.51 mV
Plot Scale: 314.5 mV



Diesel

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	160913	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 3520C
Project#:	020924-DW-1	Analysis:	EPA 8015B(M)
Matrix:	Water	Batch#:	75619
Units:	ug/L	Prepared:	09/27/02
Diln Fac:	1.000	Analyzed:	09/30/02

Type: BS Lab ID: QC191258

Analyte	Spiked	Result	%REC	Limits
Diesel C10-C24	2,500	2,183	87	37-120

Surrogate	%REC	Limits
Hexacosane	103	39-137

Type: BSD Lab ID: QC191259

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Diesel C10-C24	2,500	1,943	78	37-120	12	26

Surrogate	%REC	Limits
Hexacosane	96	39-137

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Nitrate Nitrogen

Lab #:	160913	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Analysis:	EPA 300.0
Project#:	020924-DW-1		
Analyte:	Nitrogen, Nitrate	Batch#:	75529
Matrix:	Water	Sampled:	09/24/02
Units:	mg/L	Received:	09/24/02
Diln Fac:	1.000	Analyzed:	09/25/02

Field ID	Type	Lab ID	Result	RL
MW-3	SAMPLE	160913-002	ND	0.05
MW-4	SAMPLE	160913-003	0.57	0.05
MW-7	SAMPLE	160913-004	ND	0.05
MW-8	SAMPLE	160913-005	ND	0.05
MW-9	SAMPLE	160913-006	0.32	0.05
MW-10	SAMPLE	160913-007	0.21	0.05
MW-11	SAMPLE	160913-008	ND	0.05
	BLANK	QC190917	ND	0.05

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Sulfate

Lab #:	160913	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Analysis:	EPA 300.0
Project#:	020924-DW-1		
Analyte:	Sulfate	Sampled:	09/24/02
Matrix:	Water	Received:	09/24/02
Units:	mg/L	Analyzed:	09/25/02
Batch#:	75529		

Field ID	Type	Lab ID	Result	RL	Diln Fac
MW-3	SAMPLE	160913-002	37	0.50	1.000
MW-4	SAMPLE	160913-003	55	1.0	2.000
MW-7	SAMPLE	160913-004	1.9	0.50	1.000
MW-8	SAMPLE	160913-005	86	1.0	2.000
MW-9	SAMPLE	160913-006	72	1.0	2.000
MW-10	SAMPLE	160913-007	64	1.0	2.000
MW-11	SAMPLE	160913-008	3.7	0.50	1.000
	BLANK	QC190917	ND	0.50	1.000

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Nitrate Nitrogen

Lab #:	160913	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Analysis:	EPA 300.0
Project#:	020924-DW-1		
Analyte:	Nitrogen, Nitrate	Batch#:	75529
Field ID:	MW-3	Sampled:	09/24/02
MSS Lab ID:	160913-002	Received:	09/24/02
Matrix:	Water	Analyzed:	09/25/02
Units:	mg/L		

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim	Dil'n Fac
BS	QC190918		1.000	1.052	105	90-110			1.000
BSD	QC190919		1.000	1.025	102	90-110	3	20	1.000
MS	QC190920	<0.07000	2.500	2.368	95	80-120			5.000
MSD	QC190921		2.500	2.532	101	80-120	7	20	5.000

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Sulfate

Lab #:	160913	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Analysis:	EPA 300.0
Project#:	020924-DW-1		
Analyte:	Sulfate	Batch#:	75529
Field ID:	MW-3	Sampled:	09/24/02
MSS Lab ID:	160913-002	Received:	09/24/02
Matrix:	Water	Analyzed:	09/25/02
Units:	mg/L		

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim	Dil'n Fac
BS	QC190918		10.00	10.13	101	90-110			1.000
BSD	QC190919		10.00	10.06	101	90-110	1	20	1.000
MS	QC190920	34.63	25.00	59.42	99	72-125			5.000
MSD	QC190921		25.00	59.70	100	72-125	0	20	5.000

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900, Fax (510) 486-0532

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: 08-OCT-02
Lab Job Number: 160898
Project ID: 2001-53
Location: Redwood Park Service Yard

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

Reviewed by: _____
Project Manager

Reviewed by: _____
Operations Manager

[redacted] 160898 [redacted] Chain of Custody Record [redacted]

Lab job no. _____
Date _____
Page _____ of _____

Laboratory: Curtis & Tompkins Ltd.
Address: 2323 Fifth Street
Berkeley CA
510-486-0900

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

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

Analysis Required

Field Sample Number	Location/ Depth	Date	Time	Sample Type	Type/Size of Container	Preservation: Cooler	Preservation: Chemical	Filtered	No. of Containers	TVH + BTEX + MTBE	TEH-diesel	Remarks
SW-2	—	9/24/02	810	H_2O	40 ml VOAs	✓	HCl		2	X		
"		"	"		1-L amber	✓	none		1		X	
~~SW-3~~ (BR)					40 ml VOAs (BR)	~~X~~	~~HCl~~		~~2~~	~~X~~		
"					1-L ~~amber~~	~~X~~	~~none~~		~~1~~	~~X~~		

Preservation Correct? ☑ Yes ☐ No ☐ N/A

Received ☑ On Ice ☑ Cold ☐ Ambient ☑ Intact

Relinquished by:	Date	Received by:	Date	Relinquished by:	Date	Received by:	Date
Signature: B.M. Rueter	9/24/02	Signature: [signature]	9/24/02	Signature:		Signature:	
Printed: Bruce Rueter	Time: 900	Printed: [illegible]	Time: 9:00	Printed:	Time:	Printed:	Time:
Company: Stellar Env. Solutions		Company: C&T		Company:		Company:	

Turnaround Time: 5 DAY

Comments:

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

25008-00-01

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	160898	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2001-53		
Field ID:	SW-2	Batch#:	75546
Matrix:	Water	Sampled:	09/24/02
Units:	ug/L	Received:	09/24/02
Diln Fac:	1.000		

Type: SAMPLE
Lab ID: 160898-001

Analyzed: 09/26/02

Analyte	Result	RL	Analysis
Gasoline C7-C12	590	50	8015B(M)
MTBE	ND	2.0	EPA 8021B
Benzene	10	0.50	EPA 8021B
Toluene	ND	0.50	EPA 8021B
Ethylbenzene	13	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)	141	68-145	8015B(M)
Bromofluorobenzene (FID)	112	66-143	8015B(M)
Trifluorotoluene (PID)	96	53-143	EPA 8021B
Bromofluorobenzene (PID)	99	52-142	EPA 8021B

Type: BLANK
Lab ID: QC190969

Analyzed: 09/25/02

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

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	89	68-145	8015B(M)
Bromofluorobenzene (FID)	104	66-143	8015B(M)
Trifluorotoluene (PID)	83	53-143	EPA 8021B
Bromofluorobenzene (PID)	92	52-142	EPA 8021B

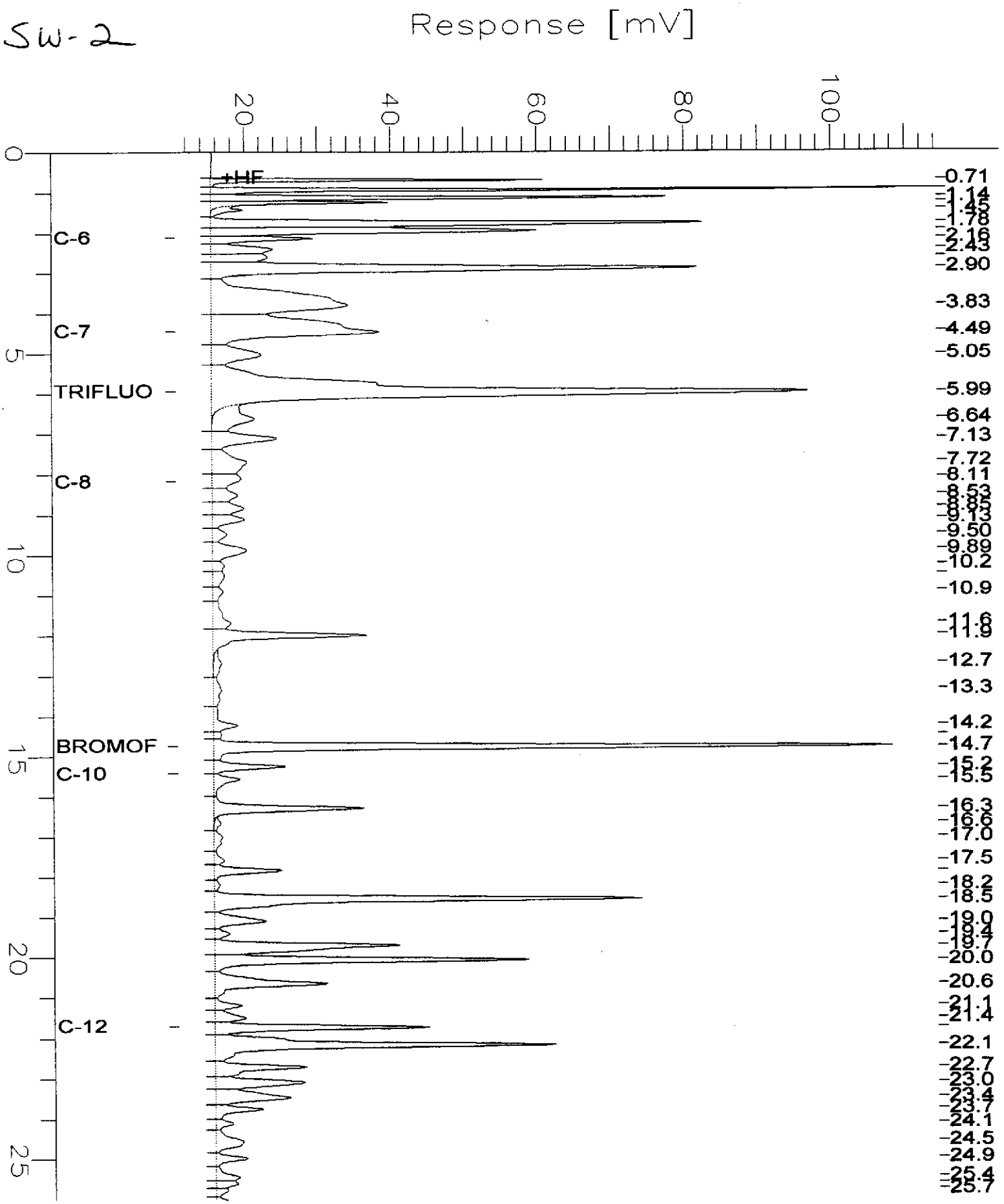
ND= Not Detected
RL= Reporting Limit

GC07 TVH 'A' Data File RTX 502

Sample Name : 160898-001,75546
FileName : G:\GC07\DATA\268A019.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 26.00 min
Scale Factor: 1.0 Plot Offset: 10 mV

Sample #: a1
Date : 9/26/02 08:39 AM
Time of Injection: 9/26/02 01:34 AM
Low Point : 10.49 mV High Point : 114.34 mV
Plot Scale: 103.8 mV

SW-2

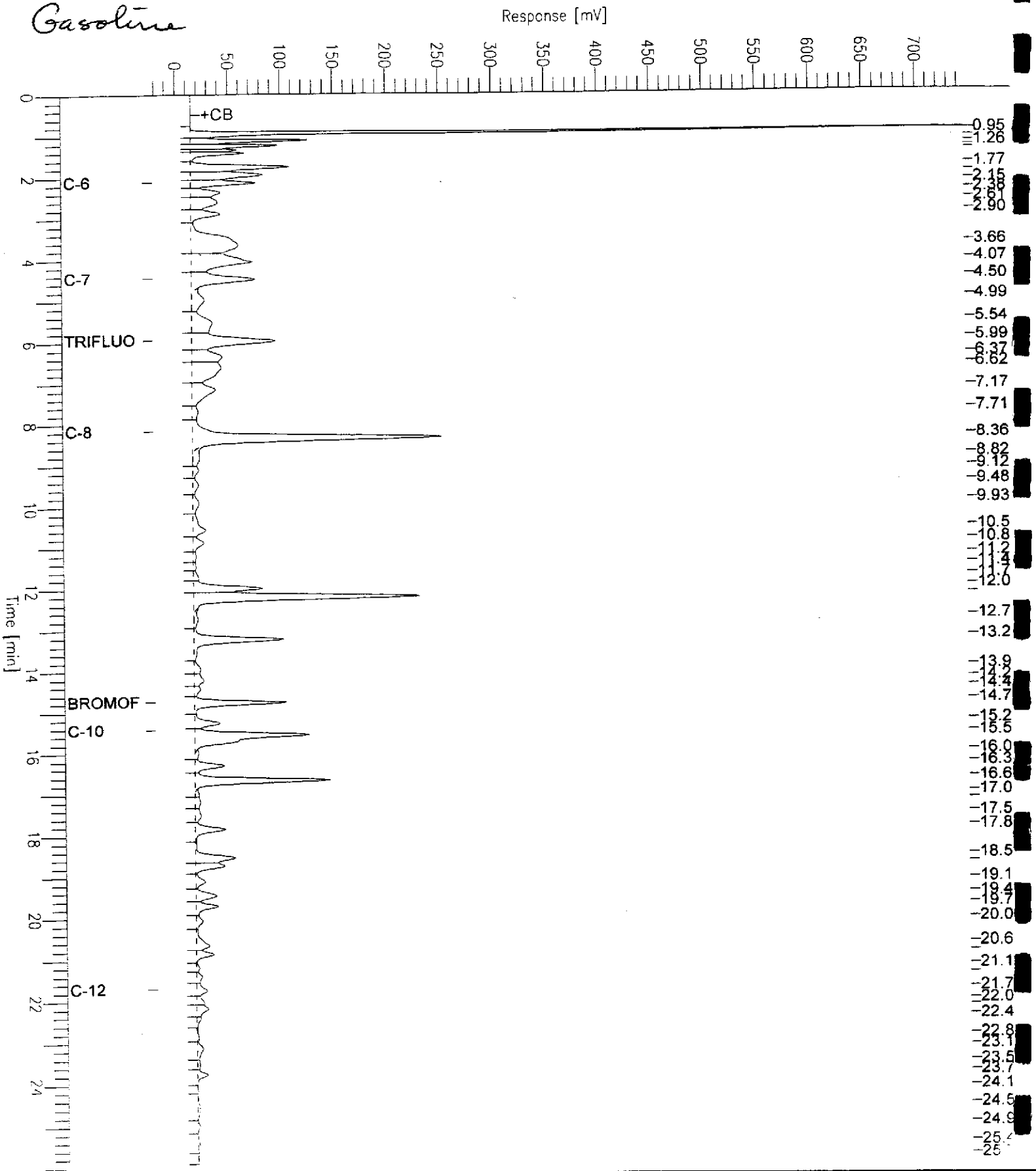


GC07 TVH 'A' Data File RTX 502

Sample Name : ccv/lcs,qc190970,75546,02wsl468,5/5000
FileName : G:\GC07\DATA\268A001.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 26.00 min
Scale Factor: 1.0 Plot Offset: -22 mV

Sample #:
Date : 9/25/02 03:33 PM
Time of Injection: 9/25/02 03:07 PM
Low Point : -21.58 mV High Point : 746.20 mV
Plot Scale: 767.8 mV

Gasoline



Curtis & Tompkins, Ltd.

Total Volatile Hydrocarbons

Lab #:	160898	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2001-53	Analysis:	8015B(M)
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC190970	Batch#:	75546
Matrix:	Water	Analyzed:	09/25/02
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	2,000	2,211	111	79-120

Surrogate	%REC	Limits
Trifluorotoluene (FID)	102	68-145
Bromofluorobenzene (FID)	107	66-143

Curtis & Tompkins, Ltd.

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	160898	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2001-53	Analysis:	EPA 8021B
Matrix:	Water	Batch#:	75546
Units:	ug/L	Analyzed:	09/25/02
Diln Fac:	1.000		

Type: BS Lab ID: QC190971

Analyte	Spiked	Result	%REC	Limits
MTBE	20.00	19.72	99	51-125
Benzene	20.00	20.42	102	65-122
Toluene	20.00	20.82	104	67-121
Ethylbenzene	20.00	21.19	106	70-121
m,p-Xylenes	40.00	40.02	100	72-125
o-Xylene	20.00	20.79	104	73-122

Surrogate	%REC	Limits
Trifluorotoluene (PID)	87	53-143
Bromofluorobenzene (PID)	96	52-142

Type: BSD Lab ID: QC191004

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	20.00	19.60	98	51-125	1	20
Benzene	20.00	19.91	100	65-122	3	20
Toluene	20.00	20.20	101	67-121	3	20
Ethylbenzene	20.00	20.69	103	70-121	2	20
m,p-Xylenes	40.00	38.95	97	72-125	3	20
o-Xylene	20.00	20.43	102	73-122	2	20

Surrogate	%REC	Limits
Trifluorotoluene (PID)	86	53-143
Bromofluorobenzene (PID)	96	52-142

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Total Volatile Hydrocarbons

Lab #:	160898	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2001-53	Analysis:	8015B(M)
Field ID:	ZZZZZZZZZZ	Batch#:	75546
MSS Lab ID:	160919-001	Sampled:	09/23/02
Matrix:	Water	Received:	09/25/02
Units:	ug/L	Analyzed:	09/26/02
Diln Fac:	1.000		

Type: MS Lab ID: QC191005

Analyte	MSS Result	Spiked	Result	%REC	Limits
Gasoline C7-C12	49.23	2,000	2,031	99	67-120

Surrogate	%REC	Limits
Trifluorotoluene (FID)	107	68-145
Bromofluorobenzene (FID)	116	66-143

Type: MSD Lab ID: QC191006

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	2,000	2,026	99	67-120	0	20

Surrogate	%REC	Limits
Trifluorotoluene (FID)	107	68-145
Bromofluorobenzene (FID)	118	66-143

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	160898	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 3520C
Project#:	2001-53	Analysis:	EPA 8015B(M)
Field ID:	SW-2	Batch#:	75621
Matrix:	Water	Sampled:	09/24/02
Units:	ug/L	Received:	09/24/02
Diln Fac:	1.000	Prepared:	09/27/02

Type: SAMPLE
Lab ID: 160898-001
Analyzed: 09/30/02

Analyte	Result	RL
Diesel C10-C24	220 L Y	50

Surrogate	%REC	Limits
Hexacosane	78	39-137

Type: BLANK
Lab ID: QC191264
Analyzed: 09/29/02
Cleanup Method: EPA 3630C

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	87	39-137

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

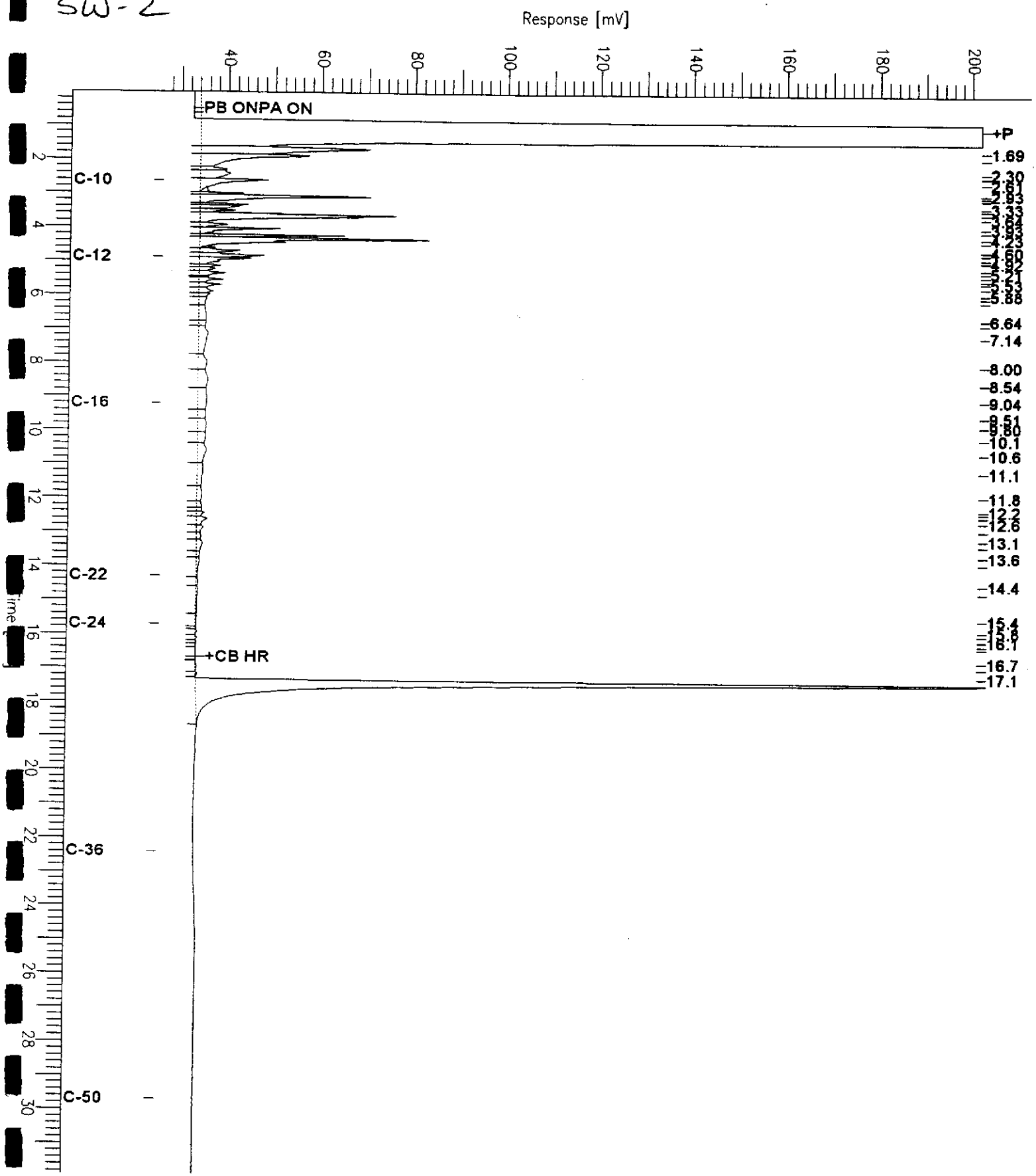
5.0

Chromatogram

Sample Name : 160898-001,75621
leName : G:\GC15\CHB\272B023.RAW
thod : BTEH230.MTH
art Time : 0.01 min End Time : 31.91 min
Scale Factor: 0.0 Plot Offset: 26 mV

Sample #: 75621 Page 1 of 1
Date : 09/30/2002 12:02 PM
Time of Injection: 09/30/2002 02:40 AM
Low Point : 26.15 mV High Point : 201.98 mV
Plot Scale: 175.8 mV

SW-2



Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	160898	Location:	Redwood Park Service Yard
Client:	Stellar Environmental Solutions	Prep:	EPA 3520C
Project#:	2001-53	Analysis:	EPA 8015B(M)
Matrix:	Water	Batch#:	75621
Units:	ug/L	Prepared:	09/27/02
Diln Fac:	1.000	Analyzed:	09/30/02

Type: BS
Lab ID: QC191265

Cleanup Method: EPA 3630C

Analyte	Spiked	Result	%REC	Limits
Diesel C10-C24	2,500	1,823	73	37-120

Surrogate	%REC	Limits
Hexacosane	86	39-137

Type: BSD
Lab ID: QC191266

Cleanup Method: EPA 3630C

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Diesel C10-C24	2,500	1,804	72	37-120	1	26

Surrogate	%REC	Limits
Hexacosane	84	39-137

RPD= Relative Percent Difference

Chromatogram

Sample Name : ccv,02ws1485,dsl
File Name : G:\GC11\CHA\272A002.RAW
Method : ATEH262.MTH
Start Time : 0.01 min End Time : 31.91 min
Scale Factor: 0.0 Plot Offset: 25 mV

Sample #: 500mg/L Page 1 of 1
Date : 9/29/02 11:49 AM
Time of Injection: 9/29/02 11:05 AM
Low Point : 24.97 mV High Point : 339.51 mV
Plot Scale: 314.5 mV

Diesel