STELLAR ENVIRONMENTAL SOLUTIONS
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TRANSMITTAL MEMORANDUM

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

DATE: 7/30/2003

ATTENTION: MR. SCOTT SEERY

FILE: SES-2003-02

SUBJECT: REDWOOD REGIONAL PARK FUEL LEAK SITE

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

THE FOLLOWING: SECOND QUARTER 2003 SITE MONITORING REPORT FOR REDWOOD REGIONAL PARK SERVICE YARD SITE – OAKLAND, CALIFORNIA (JULY 2003)

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

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

BY: Bruce Rucker

★ **Stellar Environmental Solutions**

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

July 29, 2003

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

Subject: Second Quarter 2003 Site Monitoring Report
Redwood Regional Park Service Yard Site – Oakland, California

Dear Mr. Seery:

Attached is the referenced Stellar Environmental Solutions, Inc. (SES) 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.

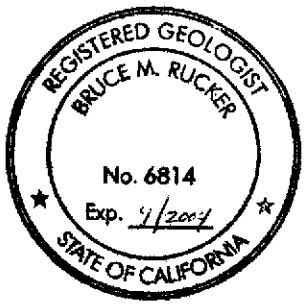
This report summarizes groundwater and surface monitoring and sampling activities conducted in March 2003 (Second Quarter 2003), evaluates the efficacy of the previous ORC™ injection corrective action program implemented to address groundwater contamination, and makes recommendations for future corrective action measures. 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

SECOND QUARTER 2003
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

July 29, 2003

Project No. 2003-02

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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, Inc. (SES) in March 2003:

- Collecting water levels in site wells to determine shallow groundwater flow direction;
- Sampling site wells for contaminant analysis and natural attenuation indicators;
- Collecting surface water samples for contaminant analysis; and
- Evaluating the efficacy of the previous ORC™ injection corrective action program implemented at the site and recommending further corrective action measures.

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 25 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.

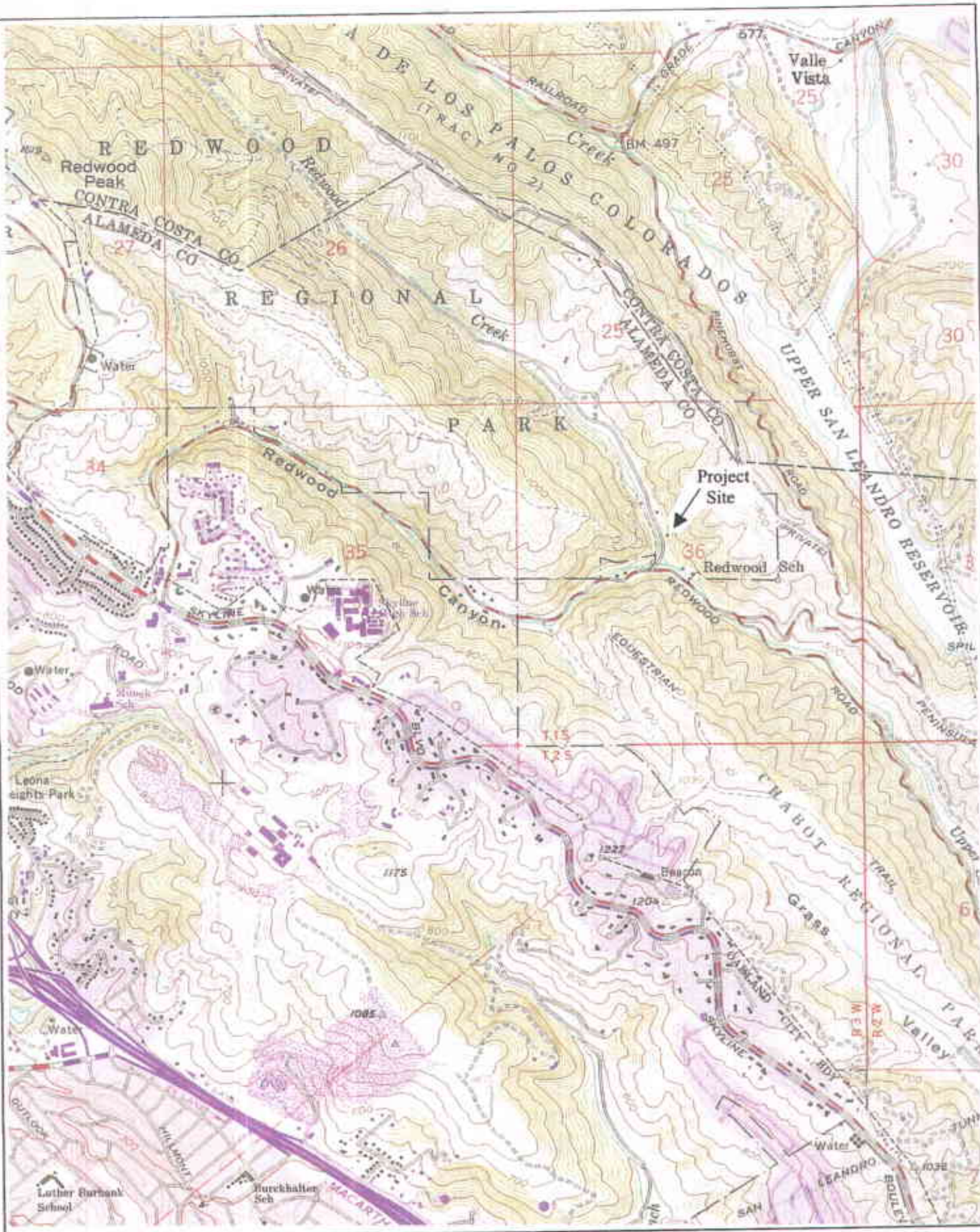
SITE DESCRIPTION

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. Historical site groundwater and surface water analytical results are presented in Appendix C.



N

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

Redwood Regional Park Service Yard
Oakland, Alameda County, California

By: MJC | NOVEMBER 1997

Figure 1

Stellar Environmental Solutions
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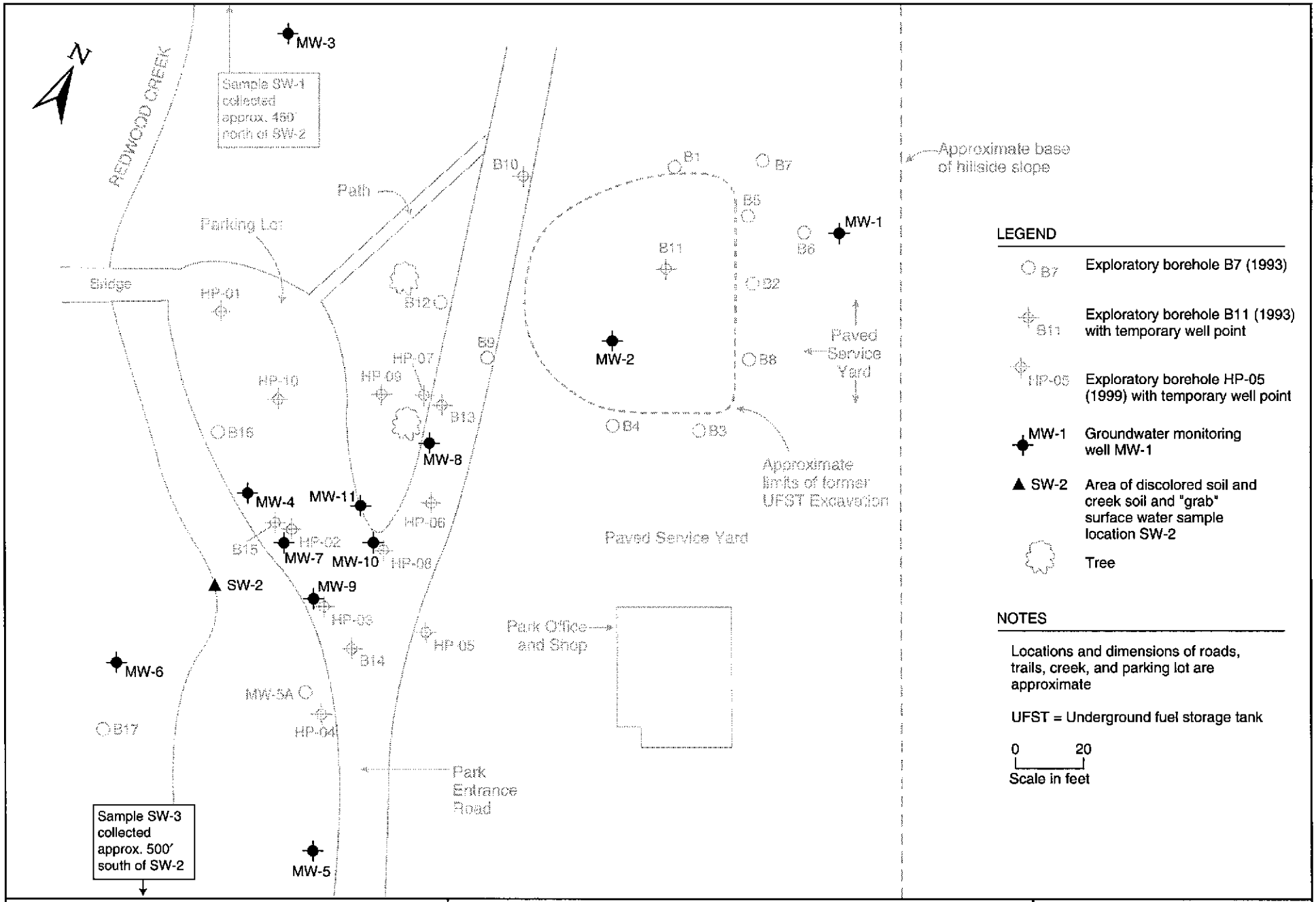


Stellar Environmental Solutions

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

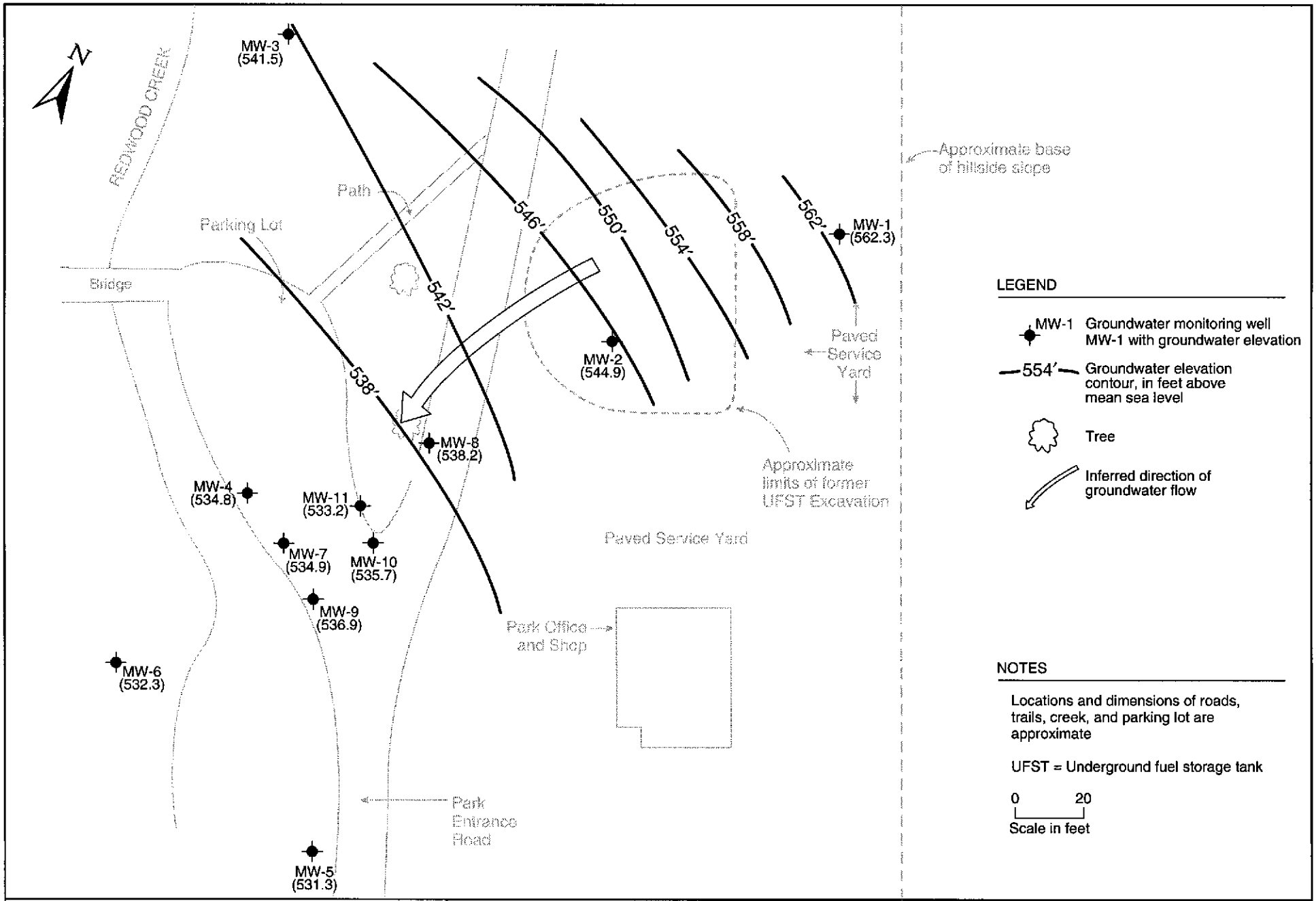
Following is a brief summary of the site hydrogeologic conditions based on geologic logging and water level measurements collected at the site since September 1993. A full discussion is presented in the SES June 1999 report.

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–JUNE 19, 2003
Redwood Regional Park Service Yard, Oakland, CA

Figure 3

by: MJC | JULY 2003

2003-02-09

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 June 19, 2003. The locations of all site monitoring wells and creek water sampling locations are shown on Figure 2. Well construction information and water level data are summarized in Table 1. Appendix A contains the groundwater monitoring field records.

GROUNDWATER LEVEL MONITORING AND SAMPLING

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

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

Well	Well Depth	Screened Interval	TOC Elevation	Groundwater Elevation (6/19/03)
MW-1	18	7 to17	565.9	562.3
MW-2	36	20 to 35	566.5	544.9
MW-3	42	7 to 41	560.9	541.5
MW-4	26	10 to 25	548.1	534.8
MW-5	26	10 to 25	547.5	531.3
MW-6	26	10 to 25	545.6	532.3
MW-7	24	9 to24	547.7	534.9
MW-8	23	8 to 23	549.2	538.2
MW-9	26	11 to 26	549.4	536.9
MW-10	26	11 to 26	547.3	535.7
MW-11	26	11 to 26	547.9	533.2

Notes:
TOC = Top of casing.
Wells MW-1 through MW-6 are 4-inch diameter; all other wells are 2inch diameter.
All elevations are feet above USGS mean sea level. Elevations of wells MW through MW-6 were surveyed by EBRPD relative to USGS Benchmark No. JHF-49. Wells MW-7 through MW-11 were surveyed by a licensed land surveyor using existing site wells as datum.

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

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

CREEK SURFACE WATER SAMPLING

Surface water sampling was conducted by SES on June 19, 2003. Surface water samples were collected from Redwood Creek location SW-2 (immediately downgradient of the former UFST source area and within the area of documented creek bank soil contamination) and from location

SW-3 (approximately 500 feet downstream from SW-2). In accordance with a previous ACHCSA-approved SES recommendation, upstream sample location SW-1 was not sampled.

At the time of sampling, the creek was flowing upstream and downstream of the sampling locations. Water depths ranged from approximately 6 to 12 inches. **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. There are no ACHCSA or RWQCB cleanup orders for the site, although all site work has been conducted under oversight of these agencies.

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. Excedance 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 AND HYDROCHEMICAL TRENDS

This section presents the field and laboratory analytical results of the most recent monitoring event, followed by a summary of hydrochemical trends. 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 total petroleum hydrocarbons as gasoline (TPHg) groundwater plume. Appendix B contains the certified analytical laboratory report and chain-of-custody records for the current event.

CURRENT EVENT GROUNDWATER AND SURFACE WATER 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 or near maximum groundwater contaminant concentrations were detected in well MW-11 (approximately 2/3 of the distance between the former source area and the creek). Somewhat lower concentrations were detected in further downgradient wells MW-7 and MW-9, and in well MW-8 upgradient of MW-11. The northern and southern edges of the plume in the downgradient area of the plume appear to be well defined by wells MW-4 and MW-10.

No contaminants were detected in either creek water sample.

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 efficiently break down the ring structure of specific constituents. Although biodegradation of hydrocarbons can occur under anaerobic conditions, hydrocarbon biodegradation is greatest under aerobic conditions. As a result of the demonstrated degradability of petroleum hydrocarbons, remediation by natural attenuation has been found to be a viable option for addressing many hydrocarbon plumes, replacing the need for active remediation.

Table 2
Groundwater and Surface Water Sample
Analytical Results – June 19, 2003
Redwood Regional Park Corporation Yard, Oakland, California

Compound	Concentrations in µg/L						
	TPHg	TPHd	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE
GROUNDWATER SAMPLES							
MW-2	*< 50*	*< 50*	**1.9**	*< 0.5*	*< 0.5*	*< 0.5*	**8.7**
MW-4	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 2.0*
MW-7	**9,300**	**4,200**	**190**	*< 10*	**250**	**130**	**200**
MW-8	**7,900**	**2,200**	**370**	**7.4**	**620**	**562**	*< 4.0*
MW-9	**7,600**	**1,600**	**490**	**10**	**620**	**167**	*<4.0*
MW-10	**110**	*< 50*	**9.6**	*< 0.5*	**6.8**	*< 0.5*	**9.0**
MW-11	**14,000**	**3,800**	**250**	*< 2.5*	**870**	**693**	*< 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	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 2.0*
SW-3	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 2.0*
Surface Water Screening Levels [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, equivalento parts per billion (ppb).

Table 3
Groundwater Sample Analytical Results
Natural Attenuation Indicators – June 19, 2003
Redwood Regional Park Corporation Yard, Oakland, California

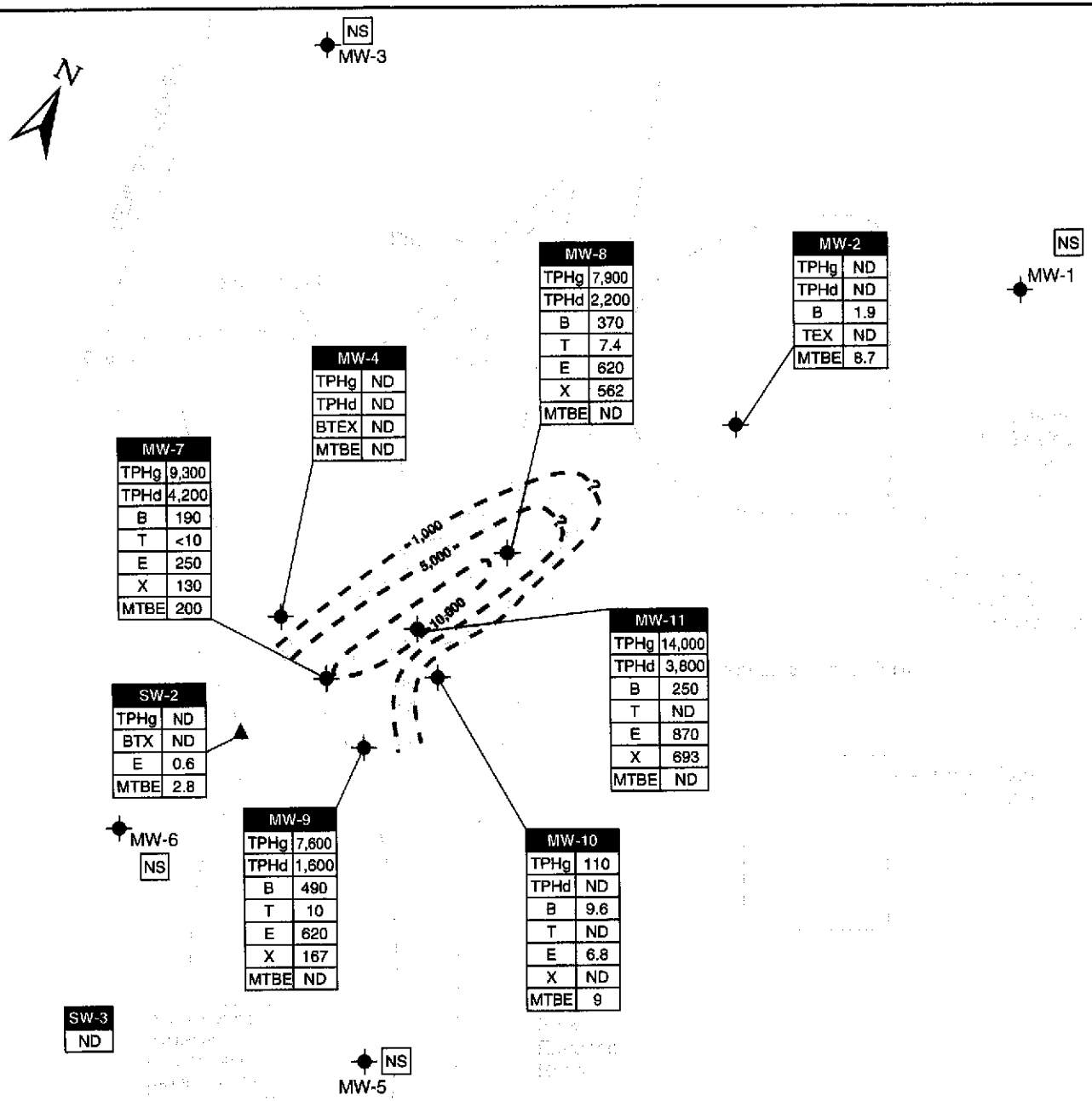
Sample I.D.	Nitrate (as Nitrogen) (mg/L)	Sulfate (mg/L)	Dissolved Oxygen (mg/L)	Ferrous Iron (mg/L)	Redox Potential (milliVolts)
MW-1	NA	NA	3.0	0.0	108
MW-2	NA	NA	1.0	0.4	84
MW-3	< 0.05	38	0.8	0.0	98
MW-4	0.25	53	11.9	0.2	25
MW-5	NA	NA	0.8	0.2	82
MW-6	NA	NA	1.6	0.3	98
MW-7	< 0.05	1.7	1.1	2.4	-91
MW-8	< 0.05	48	0.9	2.2	-104
MW-9	< 0.05	69	1.2	0.0	-91
MW-10	0.23	75	3.7	0.2	26
MW-11	< 0.05	6.3	1.3	2.0	-103

Notes:

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

NA = Not analyzed.

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



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

Stellar Environmental Solutions

Geoscience & Engineering Consulting

ANALYTICAL RESULTS AND TPH-GAS PLUME—JUNE 19, 2003
Redwood Regional Park Service Yard, Oakland, CA

Figure 4

by: MJC | JULY 2003

2003-02-10

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 0.8 mg/L to 3.7 mg/L, with one well (MW-4) at 11.9 mg/L. The elevated DO concentration in that well may be a function of localized supersaturation at this well resulting from the previous ORC™ injection. **There was no clear correlation between DO and hydrocarbon concentrations in the current event;** however, in general, monitoring wells upgradient and crossgradient of the plume had higher DO concentrations than monitoring wells within and downgradient of the plume. This trend is to be expected when oxygen is currently limiting hydrocarbon biodegradation. .

Oxidation-Reduction Potential

The oxidation-reduction potential (ORP or 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 typically positive; in reducing (anaerobic) conditions, the ORP is typically negative (or less positive). Therefore, groundwater ORP values inside a hydrocarbon plume are typically less than those measured outside the plume.

For this monitoring event, for the four monitoring wells within the 1,000-µg/L TPHg contour (MW-7, MW-8, MW-9, and MW-11) (see Figure 4), ORP values ranged from –91 mV to -104 mV. Other monitoring wells showed positive ORP values ranging from +25 mV to +108 mV. **Thus, the ORP values showed the expected general inverse correlation with hydrocarbon concentrations.**

General Mineral Analyses

An inverse relationship between general minerals—including ferrous iron, nitrate, and sulfate—and hydrocarbon concentrations is indicative of the occurrence of anaerobic biodegradation. Specifically, anaerobic degradation of hydrocarbon compounds is indicated when DO concentrations are low (less than 1.0 mg/L), ORP is low (less than 50 mV), and general mineral concentrations are below background.

In the current site monitoring event, for the four wells within the 1,000-µg/L TPHg contour, nitrate concentrations were generally lower and ferrous iron concentrations were generally higher than for other monitoring wells. **These results indicate that some degree of anaerobic degradation is likely occurring within the plume.** The results are also consistent with the DO and ORP data, supporting the conclusion that oxygen is currently limiting the more efficient aerobic biodegradation process. Sulfate concentration showed no discernable trend, indicating that anaerobic biodegradation is probably within the iron-reducing redox environment rather than the sulfate-reducing environment.

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).

GENERAL HYDROCHEMICAL TRENDS

Appendix C contains a summary of historical groundwater analytical results. A detailed discussion of hydrochemical trends (focused on the efficacy of the ORC injection corrective action program) was provided in the SES Year 2002 Annual Summary report (SES, 2003a) and will be addressed again in the Year 2003 Annual Summary report. **The following summary is presented because the active life of the previously-injected ORC product has been exceeded and is not expected to provide any significant further benefit.**

Following both ORC injection events (September 2001 and July 2002), contaminant concentrations in all wells showed contaminant reductions. Some wells on the plume fringes (northern and southern limits) were brought to trace or non-detectable concentrations. Natural attenuation indicators (especially dissolved oxygen) have also demonstrated some positive effects from the injection program. However, for wells along the centerline of the plume concentrations generally rebounded following initial reductions. Overall, the groundwater plume appears to have stabilized in that maximum groundwater concentrations have not increased in recent events.

The ORC model output for each ORC injection anticipated full and permanent reduction of groundwater contamination, which was predicated on numerous variables, the most important being the absence of a continued source of contaminant mass input to the system. The rebound in concentrations along the centerline of the plume and in the most upgradient well (MW-8) suggest the presence of a continued mass input from two sources: 1) the capillary fringe soils within the plume; and 2) capillary fringe soils and groundwater upgradient of the ORC treatment grid (i.e., upgradient of MW-8).

CORRECTIVE ACTION EVALUATION

The corrective action program has shown an overall reduction in contaminant mass in groundwater, and the downgradient ORC injection barrier (just upgradient of Redwood Creek) has likely significantly reduced contaminant discharge into Redwood Creek. However, residual groundwater concentrations still exceed groundwater and surface water screening-level criteria. Since the active life of the previously-injected ORC product has been exceeded, continued contaminant input to the system and migration toward Redwood Creek is likely. **Additional investigation and corrective action are needed to address the issue of continuing contaminant mass input.**

While further injection of ORC may be appropriate for additional corrective action, limited additional site characterization is needed to identify specific areas and depths of residual contaminant mass upgradient of MW-8 and in the unsaturated zone overlying the contaminant plume. If additional ORC injection is warranted, any future injection design (and location) would need to be altered from the previous design in order to optimize the remedy and focus on the remaining sources of contaminant mass input. Some of the potential residual contamination may be located in drilling-inaccessible areas (steep topography immediately downgradient of the former source area and upgradient of the ORC injection area).

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 (26 events in the original wells). The existing well layout fully constrains the lateral extent of groundwater contamination, and the vertical (lowest) limit is very likely the top of the siltstone bedrock. The saturated interval extends approximately 12 to 15 feet from top of bedrock upward through the capillary fringe.
- 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.
- Historical monitoring data indicate that 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 area of groundwater contamination in excess of screening level criteria appears to be no greater than 100 feet long by 40 feet wide, significantly less than the area of contamination that existed prior to the ORC™ injections. Maximum groundwater concentrations for the majority of the contaminants have reached the most downgradient wells (just upgradient of the creek), and the plume appears to have stabilized (maximum site contaminant concentrations have not increased in recent sampling events).
- No contaminants were detected in the current event site surface water (creek samples). There continues to be visual evidence of contaminated groundwater discharge at the downgradient creek bank.
- Hydrochemical (contaminant and natural attenuation parameter) trends indicate that the two ORC™ injection phases (in September 2001 and July 2002) were generally successful in increasing DO levels and reducing groundwater contaminant concentrations, but have not been wholly effective in permanently reducing the contaminant concentrations within the centerline of

the plume. Residual groundwater concentrations exceed groundwater and surface water screening-level criteria, and the active life of the ORC™ product has likely been exceeded.

- The available data indicate that continued contaminant mass input is occurring within the centerline portions of the plume and potentially from sources upgradient of MW-8, possibly from residual light non-aqueous phase liquid [LNAPL] in the capillary fringe/unsaturated zone. Any additional corrective action to prevent contaminated groundwater discharge to Redwood Creek would need to address the potential sources of continuing mass input to the plume.

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, and
- Complete the Year 2003 Annual Summary Report following the Q4 2003 monitoring event.
- Limited additional site characterization will be conducted to identify specific areas and depths of residual contaminant mass upgradient of MW-8 and in the unsaturated zone overlying the contaminant plume. If the investigation findings indicate that additional ORC injection is warranted, any future injection design (and location) would be altered from the previous design in order to optimize the remedy and focus on the remaining sources of contaminant mass input. The results of the additional site characterization, and any recommendations for further corrective action, will be presented in the Year 2003 Annual Summary Report.

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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.

WELLHEAD INSPECTION CHECKLIST

Client ~~030619-SW1~~ Stellar Environmental Date 6-18-03

Site Address Redwood Regional Park

Job Number 030619-DW Technician Dave Walter

Well ID	Well Inspected - No Corrective Action Required	Water Bailed From Wellbox	Wellbox Components Cleaned	Cap Replaced	Lock Replaced	Other Action Taken (explain below)	Well Not Inspected (explain below)	Repair Order Submitted
mw-1	X							
mw-2	X							
mw-3	X							
mw-4	X							
mw-5	X							
mw-6	X							
mw-7	X							
mw-8	X							
mw-9				X				
mw-10	X							
mw-11	X							

NOTES: 2" @ mw-9

WELL GAUGING DATA

Project # 030619-DW-1 Date 6-19-03 Client Stellar Environmental

Site Redwood Regional Park Oakland

Well ID	Well Size (in.)	Sheen / Odor	Depth to Immiscible Liquid (ft.)	Thickness of Immiscible Liquid (ft.)	Volume of Immiscibles Removed (ml)	Depth to water (ft.)	Depth to well bottom (ft.)	Survey Point: TOB or TOC	
MW-1	4					3.59	19.25		GO
MW-2	4				21.66 ✓	21.65	33.88		
MW-3	4					19.40	45.10		Nitrate Sulfate NO
MW-4	4				13.32 ✓	13.32	26.41		
MW-5	4					16.19	26.97		GO
MW-6	4					13.30	27.57		GO
MW-7	2				12.81 ✓	12.82	25.44		
MW-8	2				10.95 ✓	10.97	22.15		
MW-9	2				12.62 ✓	12.54	26.33		
MW-10	2				11.61 ✓	11.63	28.32		
MW-11	2				14.62 ✓	14.67	30.21	↓	
					water ✓	level before purging			

WELL MONITORING DATA SHEET

Project #: 030619-DW-1	Client: Stellar Environmental
Sampler: Dave Walter	Start Date: 6-19-03
Well I.D.: MW-1	Well Diameter: 2 3 (4) 6 8 ___
Total Well Depth: 19.25	Depth to Water: 3.59
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 B gauge = enb _____
Gals.

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

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

Did well dewater? Yes No	Gallons actually evacuated:		
Sampling Time:	Sampling Date: 6-19-03		
Sample I.D.:	Laboratory: C&T		
Analyzed for: TPH-G BTEX MTBE TPH-D	Other:		
Equipment Blank I.D.: @ Time	Duplicate I.D.:		
Analyzed for: TPH-G BTEX MTBE TPH-D	Other:		
D.O. (if req'd): FE+2 = 0 (Pre-purge)	3.0 mg/L	Post-purge:	mg/L
ORP (if req'd): (Pre-purge)	108 mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: 030619-DW-1	Client: Stellar Environmental
Sampler: Dave Walter	Start Date: 6-19-03
Well I.D.: MW-2	Well Diameter: 2 3 (4) 6 8 ____
Total Well Depth: 38.88	Depth to Water: 21.65
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: _____

11.2 (Gals.) X 3 = 33.6 Gals.

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

Time	Temp. (°F or °C)	pH	Conductivity (mS or µS)	Turbidity (NTU)	Gals. Removed	Observations
10:40	59.9	7.3	836	47	12	clear
10:42	59.7	7.3	845	59	24	
10:44	59.7	7.2	846	210	36	cloudy

Did well dewater? Yes (No) Gallons actually evacuated: 36

Sampling Time: 10:49 Sampling Date: 6-19-03

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

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

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

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

D.O. (if req'd): FE^{+2} = 0.4	(Pre-purge):	1.0 mg/L	Post-purge:	mg/L
ORP (if req'd):	(Pre-purge):	84 mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: 030619-DW-1	Client: Stellar Environmental
Sampler: Dave Walter	Start Date: 6-19-03
Well I.D.: MW-3	Well Diameter: 2 3 4 6 8 ___
Total Well Depth:	Depth to Water:
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 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	radius^2 * 0.163

Time	Temp. (°F or °C)	pH	Conductivity (mS or µS)	Turbidity (NTU)	Gals. Removed	Observations
9:23	58.1	6.9	1982	20	—	

Did well dewater? Yes No		Gallons actually evacuated: —	
Sampling Time: 9:23		Sampling Date: 6-19-03	
Sample I.D.: MW-3		Laboratory: C.T	
Analyzed for: TPH-G BTEX MTBE TPH-D		Other: Nitrate / Sulfate	
Equipment Blank I.D.: @ Time		Duplicate I.D.:	
Analyzed for: TPH-G BTEX MTBE TPH-D		Other:	
D.O. (if req'd): FE+2 = 0	Pre-purge: 0.8 mg/L	Post-purge:	mg/L
ORP (if req'd):	Pre-purge: 98 mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: 030619-DW-1	Client: Stellar Environmental
Sampler: Dave Walter	Start Date: 6-19-03
Well I.D.: MW-4	Well Diameter: 2 3 (4) 6 8 ___
Total Well Depth: 26.41	Depth to Water: 13.32
Before: After:	Before: After:
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	D.O. Meter (if req'd): (YSI) HACH

Purge Method:

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

Sampling Method: Bailer

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

9.5 (Gals.) X 3 = 25.5 Gals.

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

Time	Temp. (°F or °C)	pH	Conductivity (mS or µS)	Turbidity (NTU)	Gals. Removed	Observations
11:08	59.2	7.9	753	63	9	clear
11:10	58.0	8.1	743	60	18	
	well dewatered @ 18 gl. DTW = 25.02					
13:45	57.4	8.6	784	21	21 -	DTW = 21.18

Did well dewater? (Yes) No — Gallons actually evacuated: 18

Sampling Time: 13:45 — Sampling Date: 6-19-03

Sample I.D.: MW-4 — Laboratory: C&T

Analyzed for: (TPH-G) (BTEX) (MTBE) (TPH-D) Other: Nitrate/Sulfate @ 11:02

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

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

D.O. (if req'd): FE+2 = 0.2	(Pre-purge):	11.9 mg/L	Post-purge:	mg/L
ORP (if req'd):	(Pre-purge):	25 mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: 030619-DW-1	Client: Stellar Environmental
Sampler: Dave Walker	Start Date: 6-19-03
Well I.D.: MW-5	Well Diameter: 2 3 (4) 6 8 ___
Total Well Depth: 26.97	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
Middleburg
Electric Submersible
Waterra
Peristaltic
Extraction Pump
Other_____

Sampling Method: Bailer

X Disposable Bailer
Extraction Port
Dedicated Tubing
Other: _____

_____(Gals.) X _____ = _____
Gals.

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

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

Did well dewater? Yes No Gallons actually evacuated:

Sampling Time: Sampling Date: 6-19-03

Sample I.D.: Laboratory: C&T

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

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

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

D.O. (if req'd): $FE^{+2} = 0.2$ (Pre-purge)	0.8 mg/L	Post-purge:		mg/L
ORP (if req'd): (Pre-purge)	82 mV	Post-purge:		mV

WELL MONITORING DATA SHEET

Project #: 030619-DW-1	Client: Stellar Environmental
Sampler: Dave Walter	Start Date: 6-19-03
Well I.D.: MW-6	Well Diameter: 2 3 (4) 6 8 ___
Total Well Depth: 27.57	Depth to Water: 13.30
Before: After:	Before: After:
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	D.O. Meter (if req'd): (YSI) HACH

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

Sampling Method: Bailer, X Disposable Bailer, Extraction Port, Dedicated Tubing, Other: ___

___ (Gals.) X 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	$radius^2 * 0.163$

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

Did well dewater? Yes No	Gallons actually evacuated:
Sampling Time:	Sampling Date: 6-19-03
Sample I.D.:	Laboratory: C&T
Analyzed for: TPH-G BTEX MTBE TPH-D	Other:
Equipment Blank I.D.: @ Time	Duplicate I.D.:
Analyzed for: TPH-G BTEX MTBE TPH-D	Other:
D.O. (if req'd): FE^{+2} = 0.3 (Pre-purge): 1.6 mg/L	Post-purge: mg/L
ORP (if req'd): (Pre-purge): 98 mV	Post-purge: mV

WELL MONITORING DATA SHEET

Project #: 030619-DW-1	Client: Stellar Environmental
Sampler: Dave Walter	Start Date: 6-19-03
Well I.D.: MW-7	Well Diameter: (2) 3 ~~4~~ 6 8 ___
Total Well Depth: 25.44	Depth to Water: 12.82
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
- X Middleburg
- Electric Submersible
- Waterra
- Peristaltic
- Extraction Pump
- Other ___

Sampling Method: Bailer

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

2.0 (Gals.) X 3 = 6 Gals.

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

Time	Temp. (°F or °C)	pH	Conductivity (mS or µS)	Turbidity (NTU)	Gals. Removed	Observations
12:25	59.6	7.0	879	>200	2	cloudy/odor
12:28	57.6	6.9	867	184	4	
12:34	57.3	6.9	864	113	6	

Did well dewater? Yes No		Gallons actually evacuated:	
Sampling Time: 12:36		Sampling Date: 6-19-03	
Sample I.D.: MW-7		Laboratory: C&T	
Analyzed for: TPH-G BTEX MTBE TPH-D		Other: Nitrate/Sulfate @ 12:20	
Equipment Blank I.D.:	@ Time	Duplicate I.D.:	
Analyzed for: TPH-G BTEX MTBE TPH-D		Other:	
D.O. (if req'd): FE^{+2} 2.4	Pre-purge:	1.1 mg/L	Post-purge: mg/L
ORP (if req'd):	Pre-purge:	−91 mV	Post-purge: mV

WELL MONITORING DATA SHEET

Project #: 030619-DW-1	Client: Stellar Environmental
Sampler: Dave Walter	Start Date: 6-19-03
Well I.D.: MW-8	Well Diameter: (2) 3 4 6 8 ___
Total Well Depth: 22.15	Depth to Water: 10.97
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	radius^2 * 0.163

Time	Temp. (°F or °C)	pH	Conductivity (mS or µS)	Turbidity (NTU)	Gals. Removed	Observations
11:59	57.8	7.3	862	>200	1.8	Brown/odor
12:01	57.4	7.2	876	>200	3.6	
12:04	57.0	7.2	892	>200	5.4	

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

Sampling Time: 12:09 Sampling Date: 6-19-03

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

Analyzed for: (TPH-G BTEX MTBE TPH-D) Other: Nitrate/Sulfate @ 11:53

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

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

D.O. (if req'd): Fe^{+2} = 2.2 (Pre-purge):	0.9 mg/L	Post-purge:	mg/L
ORP (if req'd): (Pre-purge):	-104 mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: 030619-DW-1	Client: Stellar Environmental
Sampler: Dave Walter	Start Date: 6-19-03
Well I.D.: MW-9	Well Diameter: (2) 3 4 6 8 ___
Total Well Depth: 26.33	Depth to Water: 12.54
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: ____

2.2 (Gals.) X 3 = 6.6 Gals.

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

Time	Temp. (°F or °C)	pH	Conductivity (mS or (µS))	Turbidity (NTU)	Gals. Removed	Observations
13:17	59.4	7.6	685	>200	2.2	Brown
13:20	58.2	7.4	733	>200	4.4	
13:22	57.8	7.2	803	>200	6.6	

Did well dewater? Yes (No)		Gallons actually evacuated: 6.6	
Sampling Time: 13:27		Sampling Date: 6-19-03	
Sample I.D.: MW-9		Laboratory: C&T	
Analyzed for: (TPH-G BTEX MTBE TPH-D)		Other: Nitrate / Sulfate @ 13:13	
Equipment Blank I.D.:	@ Time	Duplicate I.D.:	
Analyzed for: TPH-G BTEX MTBE TPH-D		Other:	
D.O. (if req'd): $Fe^{+2} = 0$ (Pre-purge)	1.2 mg/L	Post-purge:	mg/L
ORP (if req'd): (Pre-purge)	-91 mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: 030619-DW-1	Client: Stellar Environmental
Sampler: Dave Walter	Start Date: 6-19-03
Well I.D.: MW-10	Well Diameter: (2) 3 4 6 8 ____
Total Well Depth: 28.37	Depth to Water: ~~28.55~~ 11.63
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: _____

2.7 (Gals.) X 3 = 8.1 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
11:31	60.4	8.1	625	105	2.7	
11:34	59.7	8.1	631	88	5.4	
11:37	58.7	8.3	642	65	8.1	

Did well dewater? Yes (No) Gallons actually evacuated: 8.1

Sampling Time: 11:42 Sampling Date: 6-19-03

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

Analyzed for: (TPH-G BTEX MTBE TPH-D) Other: Nitrate/Sulfate @ 11:23

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

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

D.O. (if req'd): Fe^{+2} = 0.2	(Pre-purge):	3.7 mg/L	Post-purge:	mg/L
ORP (if req'd):	(Pre-purge):	26 mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: 030619-DW-1	Client: Stellar Environmental
Sampler: Dave Walter	Start Date: 6-19-03
Well I.D.: MW-11	Well Diameter: (2) 3 4 6 8 ___
Total Well Depth: 30.21	Depth to Water: 14.67
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: ____

2.5 (Gals.) X 3 = 7.5 Gals.

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

Time	Temp. (°F or °C)	pH	Conductivity (mS or (µS))	Turbidity (NTU)	Gals. Removed	Observations
12:50	59.8	6.9	1014	222	2.5	cloudy
12:53	58.9	6.9	1017	144	5.0	
12:55	58.5	6.9	1018	80	7.5	

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

Sampling Time: 13:00 Sampling Date: 6-19-03

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

Analyzed for: (TPH-G BTEX MTBE TPH-D) Other: Nitrate/Sulfate @ 12:47

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

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

D.O. (if req'd): FE+2 2.0 (Pre-purge): 1.3 mg/L Post-purge: mg/L

ORP (if req'd): (Pre-purge): -103 mV Post-purge: mV

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

ANALYTICAL REPORT

Prepared for:

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

Date: 30-JUN-03
Lab Job Number: 165932
Project ID: STANDARD
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

165450

Chain of Custody Record

Lab job no. _____
Date 6/19/03
Page 1 of 1

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

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

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

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

Project Name Redwood Regional Park
Project Number

Samplers: (Signature) B.M. Rucker

Field Sample Number	Location/ Depth	Date	Time	Sample Type	Type/Size of Container	Preservation: Cooler	Preservation: Chemical	Filtered	No. of Containers	Analysis Required: TPHg + BTEX + MTBE	Analysis Required: TEH-diesel	Remarks
SW-2		6/19/03	805	H_2O	40 ml VOA	✓	HCl	No	2	X		
			"		1-L amber glass	✓			1		X	
SW-3			815		40 ml VOA	✓	HCl		2	X		
			"		1-L amber glass	✓			1		X	

Preservation Correct? ☑ Yes ☐ No ☐ N/A

Received ☐ On Ice ☑ Cold ☐ Ambient ☐ Intact

Relinquished by:	Date	Received by:	Date
Signature B.M. Rucker	6/19/03	Signature	6/19/03
Printed Bruce Rucker	Time 905	Printed Allwine	Time 9:05
Company Stellar Env. Solutions		Company C&T	

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

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

Turnaround Time: 1 week

Comments:

2000-UU-01

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	165932	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	STANDARD		
Matrix:	Water	Sampled:	06/19/03
Units:	ug/L	Received:	06/19/03
Diln Fac:	1.000	Analyzed:	06/19/03
Batch#:	82350		

Field ID: SW-2 Lab ID: 165932-001
Type: SAMPLE

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

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	95	57-150	8015B
Bromofluorobenzene (FID)	104	65-144	8015B
Trifluorotoluene (PID)	80	54-149	EPA 8021B
Bromofluorobenzene (PID)	91	58-143	EPA 8021B

Field ID: SW-3 Lab ID: 165932-002
Type: SAMPLE

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

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	92	57-150	8015B
Bromofluorobenzene (FID)	104	65-144	8015B
Trifluorotoluene (PID)	80	54-149	EPA 8021B
Bromofluorobenzene (PID)	90	58-143	EPA 8021B

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	165932	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	STANDARD		
Matrix:	Water	Sampled:	06/19/03
Units:	ug/L	Received:	06/19/03
Diln Fac:	1.000	Analyzed:	06/19/03
Batch#:	82350		

Type: BLANK Lab ID: QC217174

Analyte	Result	RL	Analysis
Gasoline C7-C12	ND	50	8015B
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	57-150	8015B
Bromofluorobenzene (FID)	95	65-144	8015B
Trifluorotoluene (PID)	78	54-149	EPA 8021B
Bromofluorobenzene (PID)	83	58-143	EPA 8021B

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	165932	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	STANDARD	Analysis:	EPA 8021B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC217175	Batch#:	82350
Matrix:	Water	Analyzed:	06/19/03
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12		NA		
MTBE	20.00	21.76	109	51-125
Benzene	20.00	19.58	98	78-123
Toluene	20.00	19.26	96	79-120
Ethylbenzene	20.00	18.82	94	80-120
m,p-Xylenes	40.00	39.12	98	76-120
o-Xylene	20.00	19.38	97	80-121

Surrogate	Result	%REC	Limits
Trifluorotoluene (FID)	NA		
Bromofluorobenzene (FID)	NA		
Trifluorotoluene (PID)		78	54-149
Bromofluorobenzene (PID)		86	58-143

NA= Not Analyzed

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Curtis & Tompkins Laboratories Analytical Report

Lab #:	165932	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	STANDARD	Analysis:	8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC217176	Batch#:	82350
Matrix:	Water	Analyzed:	06/19/03
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	2,000	1,893	95	80-120
MTBE		NA		
Benzene		NA		
Toluene		NA		
Ethylbenzene		NA		
m,p-Xylenes		NA		
o-Xylene		NA		

Surrogate	Result	%REC	Limits
Trifluorotoluene (FID)		106	57-150
Bromofluorobenzene (FID)		100	65-144
Trifluorotoluene (PID)	NA		
Bromofluorobenzene (PID)	NA		

NA= Not Analyzed

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	165932	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	STANDARD	Analysis:	8015B
Field ID:	ZZZZZZZZZZ	Diln Fac:	1.000
Type:	MS	Batch#:	82350
MSS Lab ID:	165927-010	Sampled:	06/18/03
Lab ID:	QC217192	Received:	06/18/03
Matrix:	Water	Analyzed:	06/19/03
Units:	ug/L		

Analyte	MSS Result	Spiked	Result	%REC	Limits
Gasoline C7-C12	<18.00	2,000	1,851	93	76-120
MTBE			NA		
Benzene			NA		
Toluene			NA		
Ethylbenzene			NA		
m,p-Xylenes			NA		
o-Xylene			NA		

Surrogate	Result	%REC	Limits
Trifluorotoluene (FID)		110	57-150
Bromofluorobenzene (FID)		109	65-144
Trifluorotoluene (PID)	NA		
Bromofluorobenzene (PID)	NA		

NA= Not Analyzed

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	165932	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	STANDARD	Analysis:	8015B
Field ID:	ZZZZZZZZZZ	Diln Fac:	1.000
Type:	MSD	Batch#:	82350
MSS Lab ID:	165927-010	Sampled:	06/18/03
Lab ID:	QC217191	Received:	06/18/03
Matrix:	Water	Analyzed:	06/19/03
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	2,000	1,858	93	76-120	0	20
MTBE		NA				
Benzene		NA				
Toluene		NA				
Ethylbenzene		NA				
m,p-Xylenes		NA				
o-Xylene		NA				

Surrogate	Result	%REC	Limits
Trifluorotoluene (FID)		108	57-150
Bromofluorobenzene (FID)		109	65-144
Trifluorotoluene (PID)	NA		
Bromofluorobenzene (PID)	NA		

NA= Not Analyzed
RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	165932	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 3520C
Project#:	STANDARD	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	06/19/03
Units:	ug/L	Received:	06/19/03
Diln Fac:	1.000	Prepared:	06/23/03
Batch#:	82433	Analyzed:	06/26/03

Field ID: SW-2 Lab ID: 165932-001
Type: SAMPLE

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	95	44-146

Field ID: SW-3 Lab ID: 165932-002
Type: SAMPLE

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	110	44-146

Type: BLANK Cleanup Method: EPA 3630C
Lab ID: QC217504

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	104	44-146

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	165932	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 3520C
Project#:	STANDARD	Analysis:	EPA 8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC217505	Batch#:	82433
Matrix:	Water	Prepared:	06/23/03
Units:	ug/L	Analyzed:	06/25/03

Cleanup Method: EPA 3630C

Analyte	Spiked	Result	%REC	Limits
Diesel C10-C24	2,500	2,468	99	38-137

Surrogate	%REC	Limits
Hexacosane	120	44-146

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	165932	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 3520C
Project#:	STANDARD	Analysis:	EPA 8015B
Field ID:	ZZZZZZZZZZ	Batch#:	82433
MSS Lab ID:	165941-002	Sampled:	06/18/03
Matrix:	Water	Received:	06/19/03
Units:	ug/L	Prepared:	06/23/03
Diln Fac:	1.000	Analyzed:	06/25/03

Type: MS Lab ID: QC217506

Analyte	MSS Result	Spiked	Result	%REC	Limits
Diesel C10-C24	457.0	2,500	2,896	98	35-138

Surrogate	%REC	Limits
Hexacosane	102	44-146

Type: MSD Lab ID: QC217507

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Diesel C10-C24	2,500	3,482	121	35-138	18	33

Surrogate	%REC	Limits
Hexacosane	122	44-146

RPD= Relative Percent Difference

8.0

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: 30-JUN-03
Lab Job Number: 165947
Project ID: 030619-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: **165947**
Client: **Stellar Environmental Solutions**
Project #: **030619-DW-1**
Location: **Redwood Regional Park**

Sampled Date: **06/**
Received Date: **06/19/03**

CASE NARRATIVE

This hardcopy data package contains sample and QC results for fourteen water samples, which were received from the site referenced above on June 19, 2003. The samples were received cold and intact.

TVH/BTXE:
High Trifluorotoluene surrogate recovery was observed for sample MW-9 (CT# 165947-010) as a result of hydrocarbons coeluting with the surrogate. No other analytical problems were encountered.

TEH by EPA 8015M:
High hexacosane surrogate recovery was observed for sample MW-4 (CT# 165947-003). This high bias should not affect the quality of the result because the sample was not detected for hydrocarbons. No other analytical problems were encountered.

General Chemistry:
No analytical problems were encountered.

STELLAR ENVIRONMENTAL SOLUTIONS

Chain of Custody Record

Lab job no.:
Date 6-19-03
Page 1 of 2

Laboratory: Curtis & Tompkins
Address: 2323 Fifth St.
Berkeley, CA

Client: STELLAR
Address: 2198 SIXTH ST.
Berkeley, CA

Project Name: Redwood Regional Park
Project Number: 030619-DW-1

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

Analysis Required: Filtered / No. of Containers / TPH-G, BTEX, MTBE / TPH-D / Nitrate, Sulfate / Remarks

	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		6-19	10:49	W	1L Amber / Voa's		HCL			X	X		
-2	mw-3		↓	9:23	↓	500ml poly							X	
-3	mw-4			13:45		A, Voa's		HCL			X	X		
-4	mw-4			11:02		poly							X	
-5	mw-7			12:30		poly							X	
-6	mw-7			12:36		A, Voa's		HCL			X	X		
-7	mw-8			11:53		poly							X	
-8	mw-8			12:09		A, Voa's		HCL			X	X		
-9	mw-9			13:13		poly							X	
-10	mw-9			13:27		A, Voa's		HCL			X	X		
-11	mw-10			11:23		poly							X	
-12	mw-10		↓	11:42	↓	A, Voa's		HCL			X	X		

Received: ☒ On Ice ☒ Cold ☐ Ambient ☒ Intact

Preservation Correct? ☒ Yes ☐ No ☐ N/A

Relinquished by:	Date	Received by:	Date
Signature: David C. Walt	6/19	Signature: [signature]	6/19/03
Printed: David C. Walter	Time	Printed: G. Alvarez	Time
Company: BTS	15:00	Company: C&T	3:00
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:

Chain of Custody Record

Date 6-19-03

Page 2 of 2

Laboratory C+T
Address 2323 Fifth St.
Berkeley, CA

Method of Shipment
Shipment No.
Airbill No.
Cooler No.

Client Stellar
Address 2198 Sixth St.
Berkeley, CA

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

Project Name Redwood Regional Pk
Project Number 030619-Rin-1

Samplers: (Signature)

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
13 MW-11		6-19	12:14	W	poly						X		
14 MW-11		6-19	13:00	W	Amber, Voa's		HCL			X	X		

Received: ☐ On Ice ☐ Intact
☒ Cold ☐ Ambient

Preservation Correct?
☒ Yes ☐ No ☐ N/A

Relinquished by:	Date	Received by:	Date
Signature David C. Walter	6-19	Signature	6/19/03
Printed David C. Walter	Time 15:00	Printed	Time 3:00
Company BTS		Company Alvarez	
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 #:	165947	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	030619-DW-1		
Matrix:	Water	Sampled:	06/19/03
Units:	ug/L	Received:	06/19/03

Field ID:	MW-2	Diln Fac:	1.000
Type:	SAMPLE	Batch#:	82381
Lab ID:	165947-001	Analyzed:	06/20/03

Analyte	Result	RL	Analysis
Gasoline C7-C12	ND	50	8015B
MTBE	8.7	2.0	EPA 8021B
Benzene	1.9	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	57-150	8015B
Bromofluorobenzene (FID)	106	65-144	8015B
Trifluorotoluene (PID)	81	54-149	EPA 8021B
Bromofluorobenzene (PID)	92	58-143	EPA 8021B

Field ID:	MW-4	Diln Fac:	1.000
Type:	SAMPLE	Batch#:	82381
Lab ID:	165947-003	Analyzed:	06/20/03

Analyte	Result	RL	Analysis
Gasoline C7-C12	ND	50	8015B
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)	94	57-150	8015B
Bromofluorobenzene (FID)	105	65-144	8015B
Trifluorotoluene (PID)	81	54-149	EPA 8021B
Bromofluorobenzene (PID)	90	58-143	EPA 8021B

*= Value outside of QC limits; see narrative
H= Heavier hydrocarbons contributed to the quantitation
Y= Sample exhibits chromatographic pattern which does not resemble standard
ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	165947	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	030619-DW-1		
Matrix:	Water	Sampled:	06/19/03
Units:	ug/L	Received:	06/19/03

Field ID:	MW-7	Diln Fac:	20.00
Type:	SAMPLE	Batch#:	82381
Lab ID:	165947-006	Analyzed:	06/20/03

Analyte	Result	RL	Analysis
Gasoline C7-C12	9,300 H	1,000	8015B
MTBE	200	40	EPA 8021B
Benzene	190	10	EPA 8021B
Toluene	ND	10	EPA 8021B
Ethylbenzene	250	10	EPA 8021B
m,p-Xylenes	130	10	EPA 8021B
o-Xylene	ND	10	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	102	57-150	8015B
Bromofluorobenzene (FID)	100	65-144	8015B
Trifluorotoluene (PID)	82	54-149	EPA 8021B
Bromofluorobenzene (PID)	84	58-143	EPA 8021B

Field ID:	MW-8	Diln Fac:	2.000
Type:	SAMPLE	Batch#:	82398
Lab ID:	165947-008	Analyzed:	06/23/03

Analyte	Result	RL	Analysis
Gasoline C7-C12	7,900 H	100	8015B
MTBE	ND	4.0	EPA 8021B
Benzene	370	1.0	EPA 8021B
Toluene	7.4	1.0	EPA 8021B
Ethylbenzene	620	1.0	EPA 8021B
m,p-Xylenes	530	1.0	EPA 8021B
o-Xylene	32	1.0	EPA 8021B

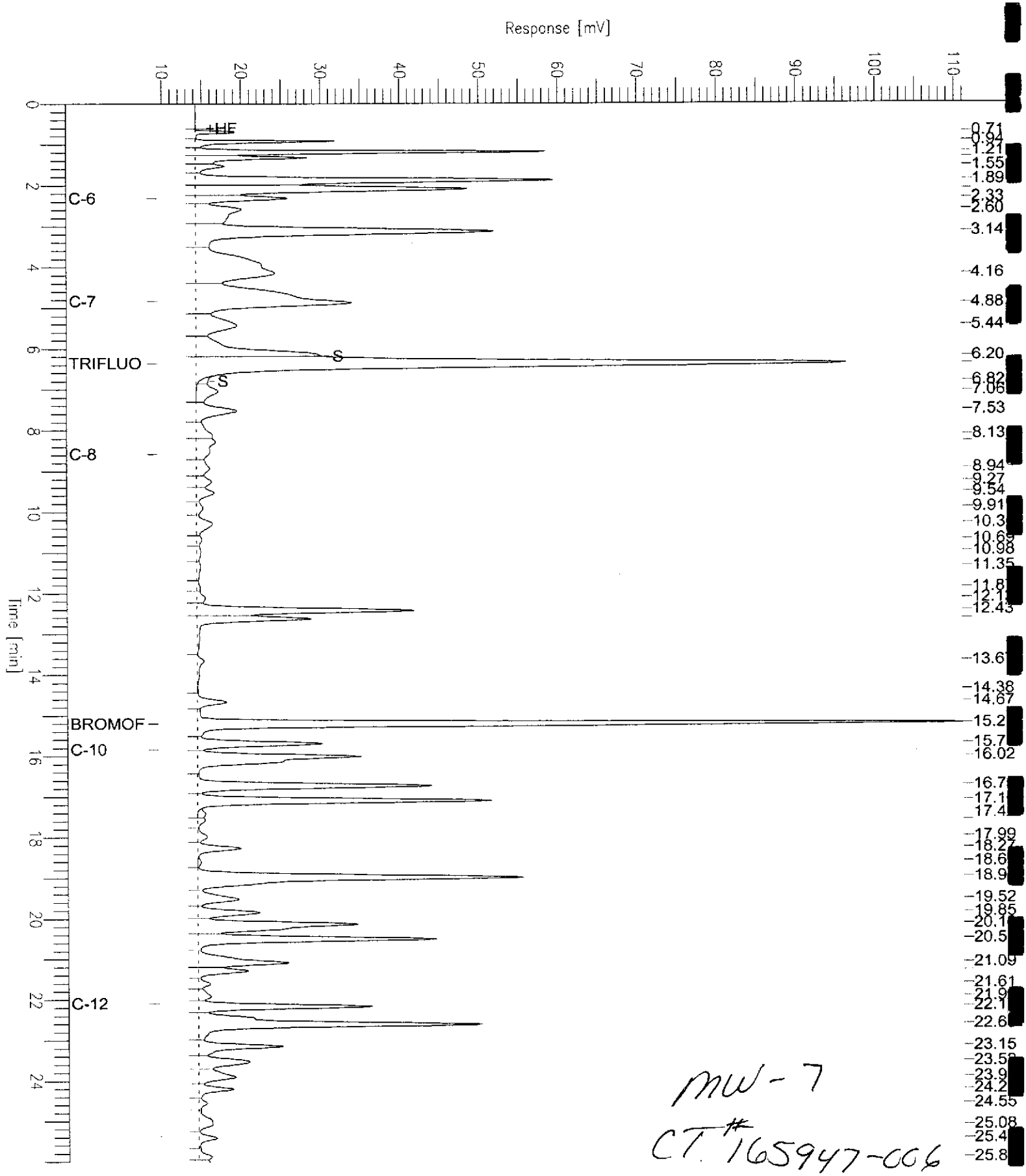
Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	122	57-150	8015B
Bromofluorobenzene (FID)	103	65-144	8015B
Trifluorotoluene (PID)	83	54-149	EPA 8021B
Bromofluorobenzene (PID)	87	58-143	EPA 8021B

*= Value outside of QC limits; see narrative
H= Heavier hydrocarbons contributed to the quantitation
Y= Sample exhibits chromatographic pattern which does not resemble standard
ND= Not Detected
RL= Reporting Limit

GC07 TVH 'A' Data File RTX 502

Sample Name : 165947-006,82381
FileName : G:\GC07\DATA\171A020.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 26.00 min
Scale Factor: 1.0 Plot Offset: 9 mV

Sample #: a1 Page 1 of 1
Date : 6/23/03 07:54 AM
Time of Injection: 6/20/03 11:41 PM
Low Point : 9.37 mV High Point : 111.03 mV
Plot Scale: 101.7 mV

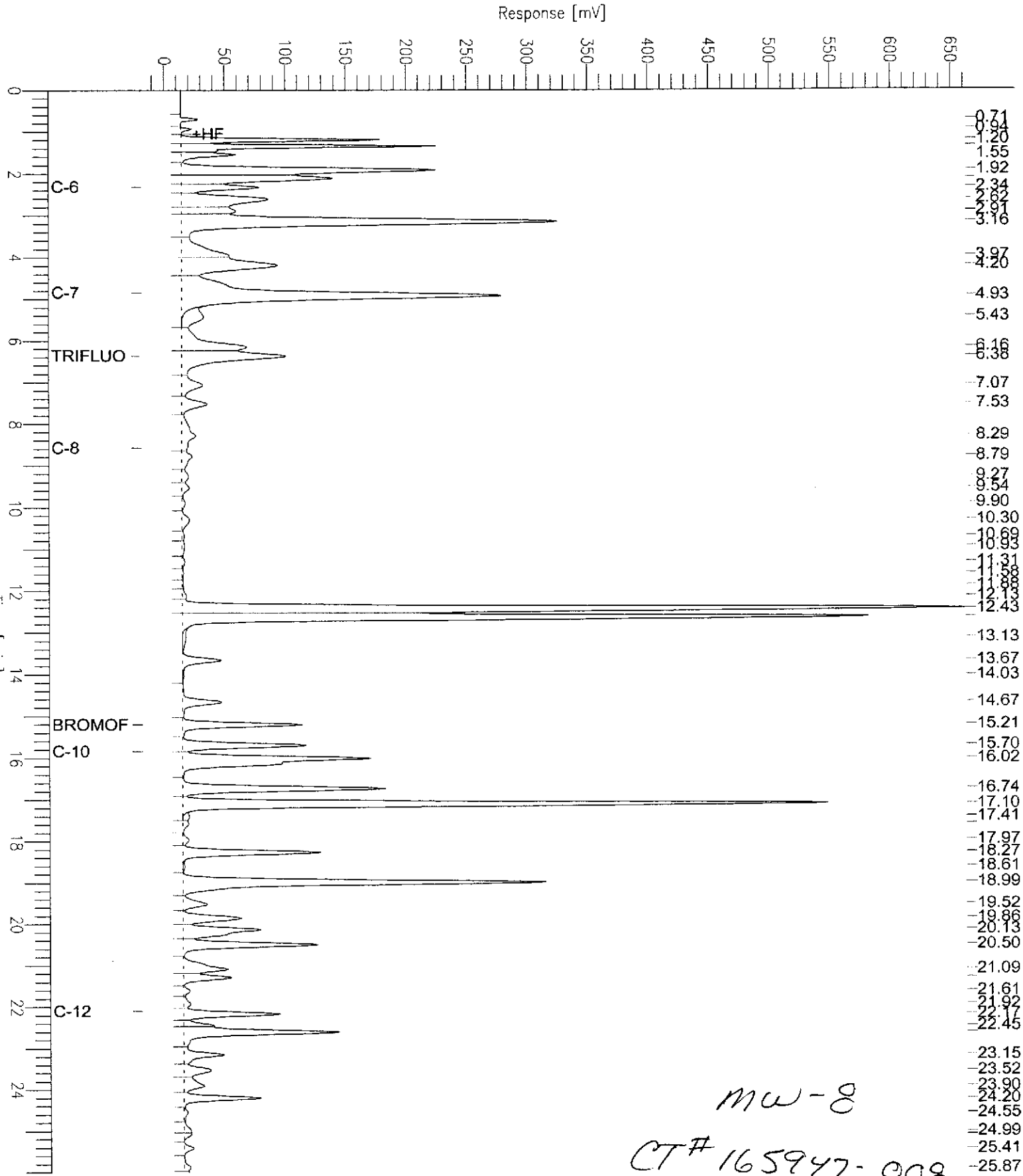


MW-7
CT# 165947-006

GC07 TVH 'A' Data File RTX 502

Sample Name : 165947-008,82398
FileName : G:\GC07\DATA\174A012.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 26.00 min
Scale Factor: 1.0 Plot Offset: -19 mV

Sample #: b1 Page 1 of 1
Date : 6/24/03 08:13 AM
Time of Injection: 6/23/03 03:54 PM
Low Point : -18.52 mV High Point : 662.63 mV
Plot Scale: 681.1 mV



MW-8

CT# 165947-008

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	165947	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	030619-DW-1		
Matrix:	Water	Sampled:	06/19/03
Units:	ug/L	Received:	06/19/03

Field ID:	MW-9	Diln Fac:	2.000
Type:	SAMPLE	Batch#:	82398
Lab ID:	165947-010	Analyzed:	06/23/03

Analyte	Result	RL	Analysis
Gasoline C7-C12	7,600 H	100	8015B
MTBE	ND	4.0	EPA 8021B
Benzene	490	1.0	EPA 8021B
Toluene	10	1.0	EPA 8021B
Ethylbenzene	620	1.0	EPA 8021B
m,p-Xylenes	160	1.0	EPA 8021B
o-Xylene	6.9	1.0	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	152 *	57-150	8015B
Bromofluorobenzene (FID)	106	65-144	8015B
Trifluorotoluene (PID)	82	54-149	EPA 8021B
Bromofluorobenzene (PID)	88	58-143	EPA 8021B

Field ID:	MW-10	Diln Fac:	1.000
Type:	SAMPLE	Batch#:	82381
Lab ID:	165947-012	Analyzed:	06/20/03

Analyte	Result	RL	Analysis
Gasoline C7-C12	110 H Y	50	8015B
MTBE	9.0	2.0	EPA 8021B
Benzene	9.6	0.50	EPA 8021B
Toluene	ND	0.50	EPA 8021B
Ethylbenzene	6.8	0.50	EPA 8021B
m,p-Xylenes	ND	0.50	EPA 8021B
o-Xylene	ND	0.50	EPA 8021B

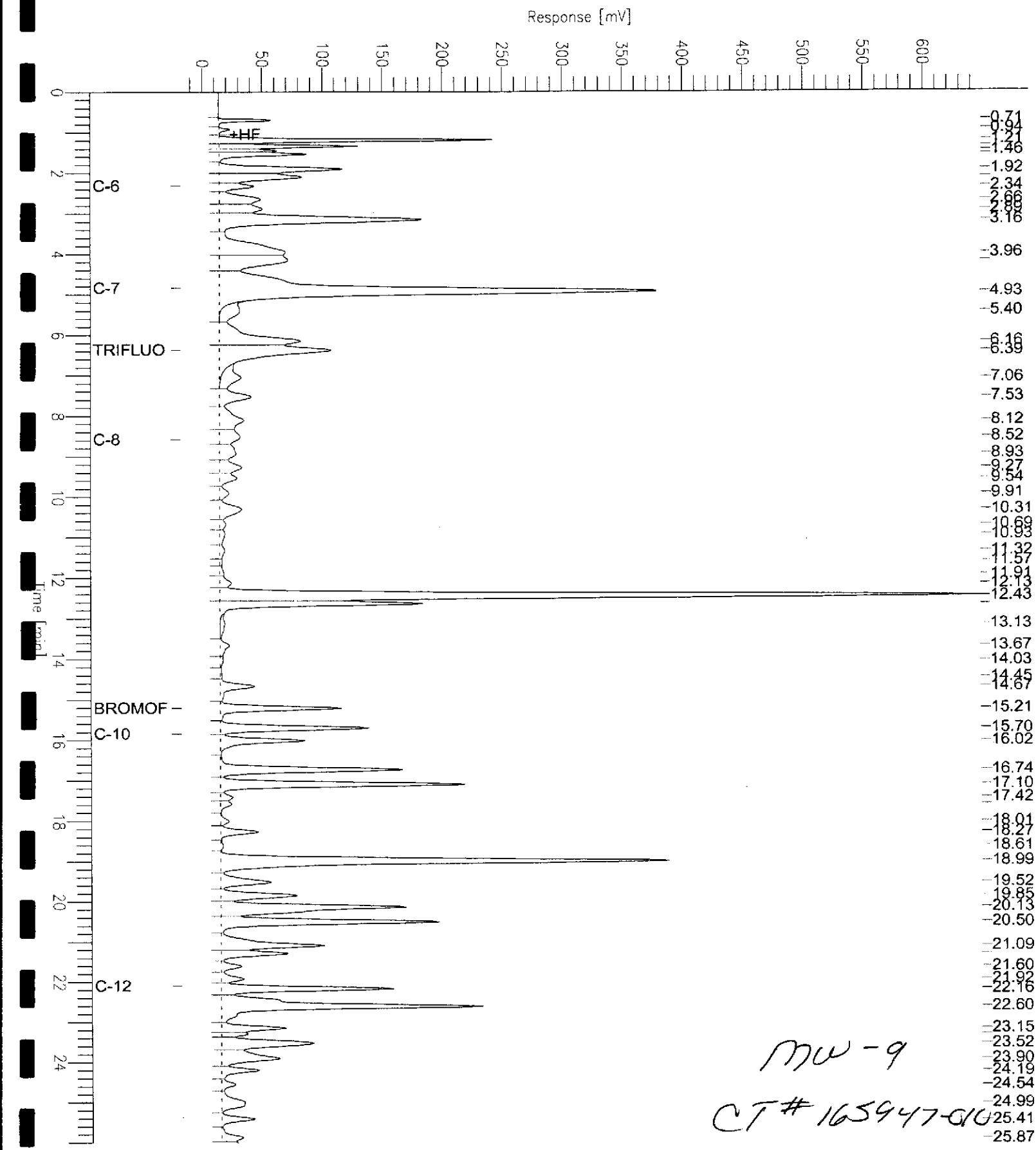
Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	98	57-150	8015B
Bromofluorobenzene (FID)	101	65-144	8015B
Trifluorotoluene (PID)	80	54-149	EPA 8021B
Bromofluorobenzene (PID)	91	58-143	EPA 8021B

*= Value outside of QC limits; see narrative
H= Heavier hydrocarbons contributed to the quantitation
Y= Sample exhibits chromatographic pattern which does not resemble standard
ND= Not Detected
RL= Reporting Limit

GC07 TVH 'A' Data File RTX 502

Sample Name : 165947-010,82398
FileName : G:\GC07\DATA\174A013.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 26.00 min
Scale Factor: 1.0 Plot Offset: -18 mV

Sample #: c1 Page 1 of 1
Date : 6/24/03 08:13 AM
Time of Injection: 6/23/03 04:29 PM
Low Point : -17.83 mV High Point : 648.72 mV
Plot Scale: 666.6 mV



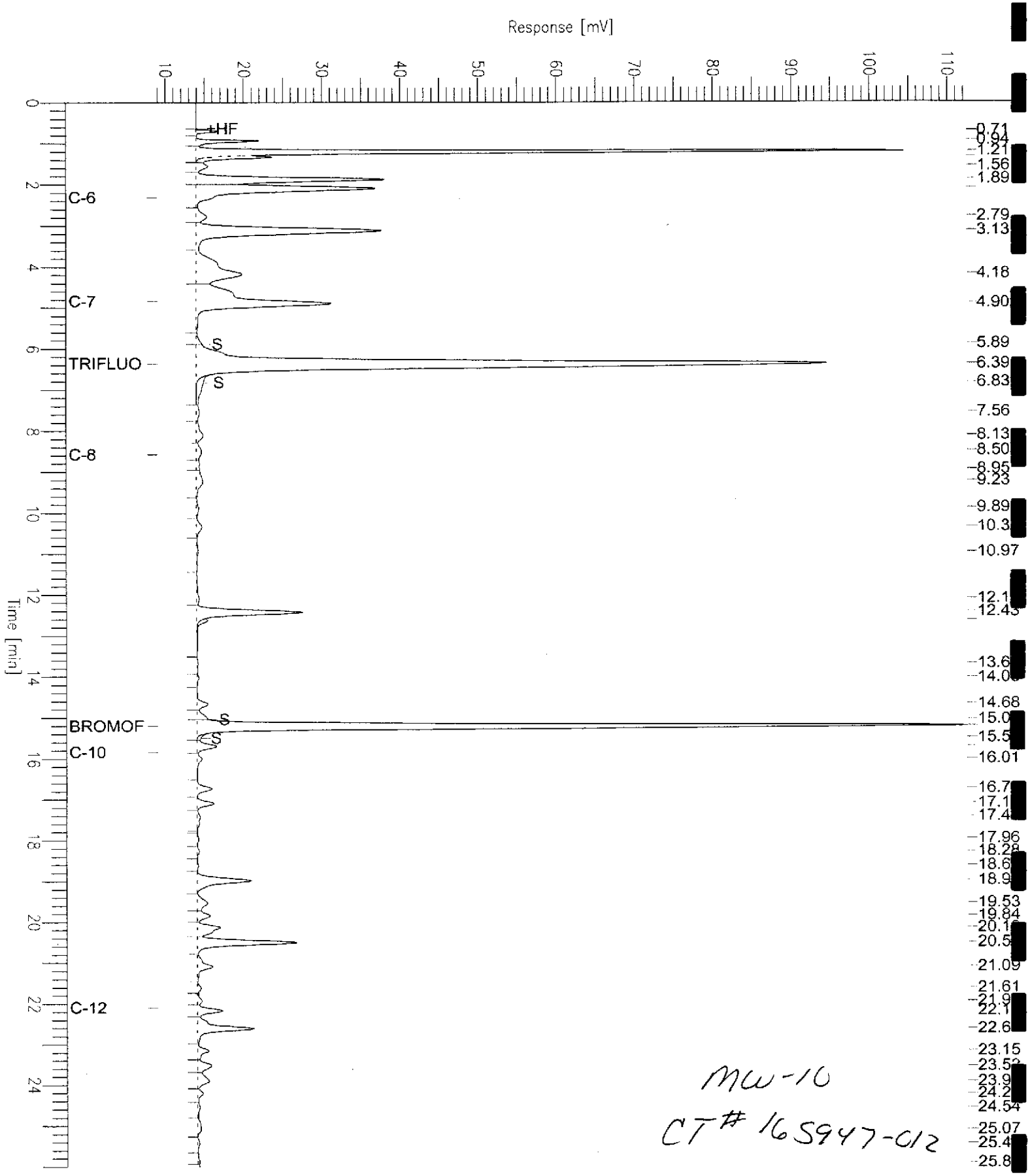
MW-9

CT# 165947-010

GC07 TVH 'A' Data File RTX 502

Sample Name : 165947-012,82381
FileName : G:\GC07\DATA\171A007.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 26.00 min
Scale Factor: 1.0 Plot Offset: 9 mV

Sample #: a1 Page 1 of 1
Date : 6/23/03 07:54 AM
Time of Injection: 6/20/03 04:05 PM
Low Point : 8.95 mV High Point : 112.48 mV
Plot Scale: 103.5 mV



MW-10
CT# 165947-012

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	165947	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	030619-DW-1		
Matrix:	Water	Sampled:	06/19/03
Units:	ug/L	Received:	06/19/03

Field ID:	MW-11	Diln Fac:	5.000
Type:	SAMPLE	Batch#:	82398
Lab ID:	165947-014	Analyzed:	06/23/03

Analyte	Result	RL	Analysis
Gasoline C7-C12	14,000 H	250	8015B
MTBE	ND	10	EPA 8021B
Benzene	250	2.5	EPA 8021B
Toluene	ND	2.5	EPA 8021B
Ethylbenzene	870	2.5	EPA 8021B
m,p-Xylenes	680	2.5	EPA 8021B
o-Xylene	13	2.5	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	131	57-150	8015B
Bromofluorobenzene (FID)	101	65-144	8015B
Trifluorotoluene (PID)	87	54-149	EPA 8021B
Bromofluorobenzene (PID)	85	58-143	EPA 8021B

Type:	BLANK	Batch#:	82381
Lab ID:	QC217288	Analyzed:	06/20/03
Diln Fac:	1.000		

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

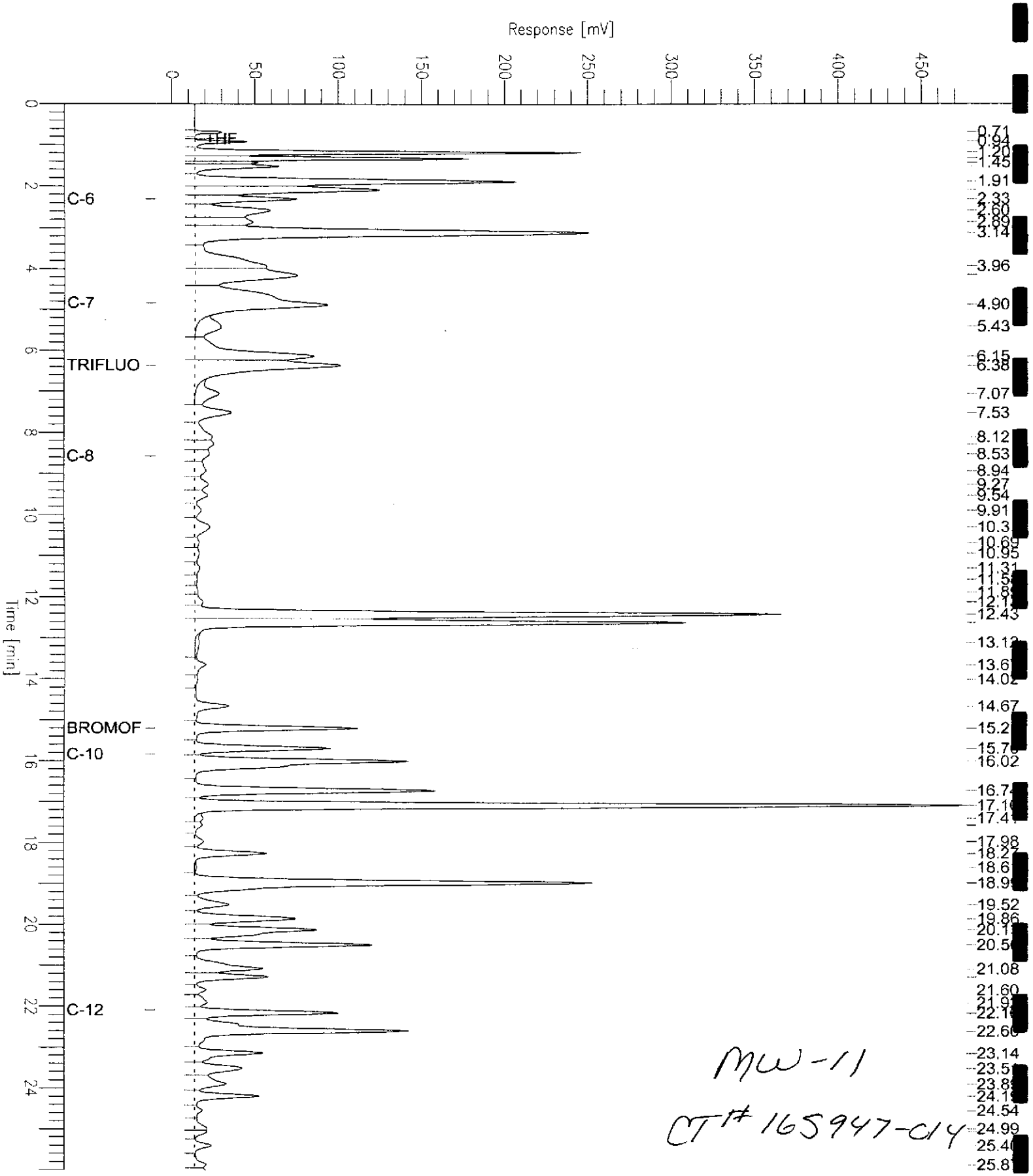
Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	90	57-150	8015B
Bromofluorobenzene (FID)	95	65-144	8015B
Trifluorotoluene (PID)	78	54-149	EPA 8021B
Bromofluorobenzene (PID)	83	58-143	EPA 8021B

*= Value outside of QC limits; see narrative
H= Heavier hydrocarbons contributed to the quantitation
Y= Sample exhibits chromatographic pattern which does not resemble standard
ND= Not Detected
RL= Reporting Limit

GC07 TVH 'A' Data File RTX 502

Sample Name : 165947-014,82398
FileName : G:\GC07\DATA\174A016.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 26.00 min
Scale Factor: 1.0 Plot Offset: -9 mV

Sample #: c1 Page 1 of 1
Date : 6/24/03 08:13 AM
Time of Injection: 6/23/03 06:15 PM
Low Point : -9.30 mV High Point : 477.60 mV
Plot Scale: 486.9 mV

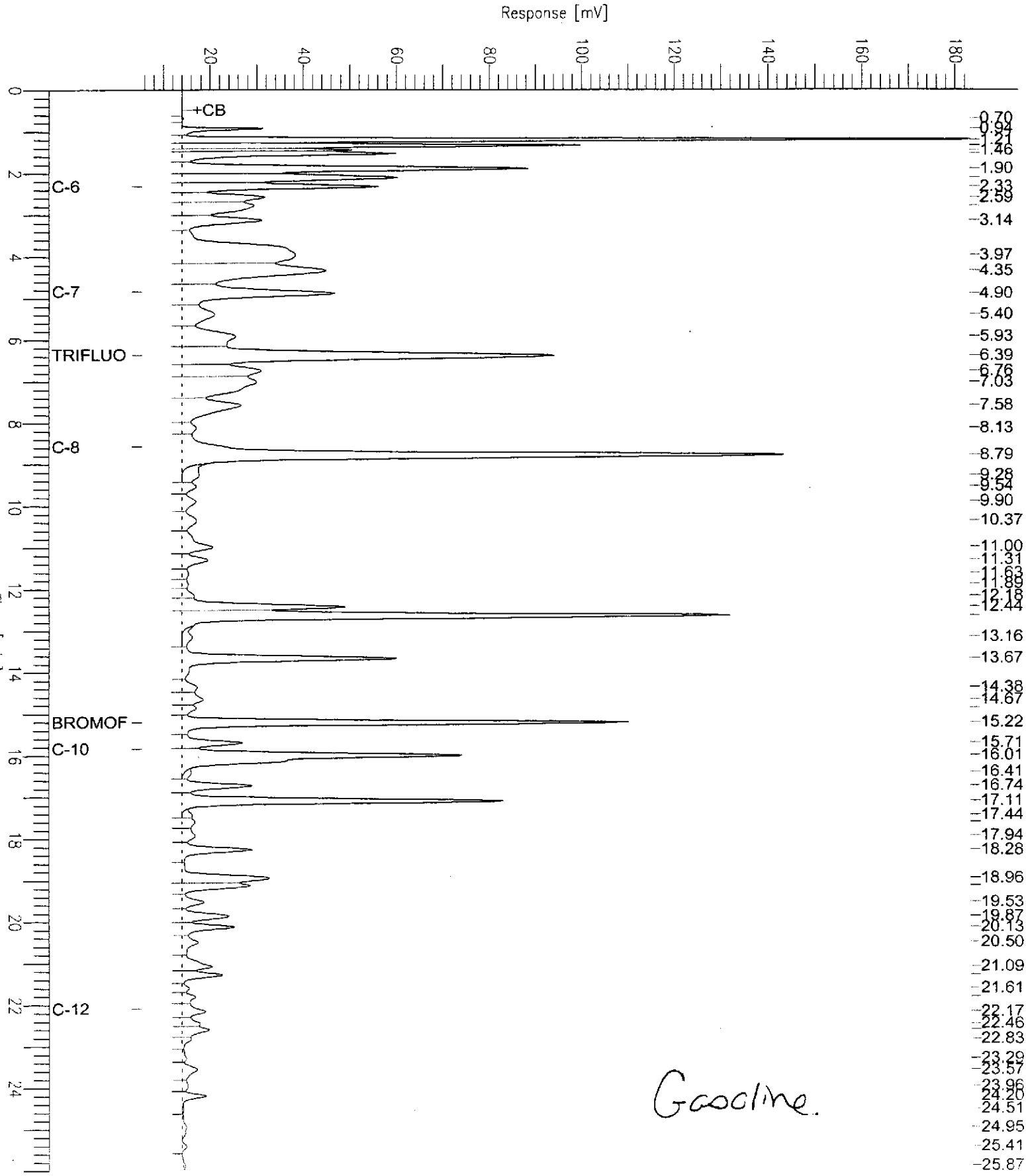


MW-11
CT# 165947-014

GC07 TVH 'A' Data File RTX 502

Sample Name : ccv/lcs,qc217290,82381,03ws0989,2.5/5000
FileName : G:\GC07\DATA\171A003.raw
Method : TVHBTXE
Start Time : 0.00 min End Time : 26.00 min
Scale Factor: 1.0 Plot Offset: 5 mV

Sample #: Page 1 of 1
Date : 6/20/03 02:10 PM
Time of Injection: 6/20/03 01:44 PM
Low Point : 5.48 mV High Point : 182.97 mV
Plot Scale: 177.5 mV



Gasoline.

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Curtis & Tompkins Laboratories Analytical Report

Lab #:	165947	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	030619-DW-1		
Matrix:	Water	Sampled:	06/19/03
Units:	ug/L	Received:	06/19/03

Type:	BLANK	Batch#:	82398
Lab ID:	QC217364	Analyzed:	06/23/03
Diln Fac:	1.000		

Analyte	Result	RL	Analysis
Gasoline C7-C12	ND	50	8015B
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)	91	57-150	8015B
Bromofluorobenzene (FID)	99	65-144	8015B
Trifluorotoluene (PID)	76	54-149	EPA 8021B
Bromofluorobenzene (PID)	85	58-143	EPA 8021B

*= Value outside of QC limits; see narrative
H= Heavier hydrocarbons contributed to the quantitation
Y= Sample exhibits chromatographic pattern which does not resemble standard
ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Total Volatile Hydrocarbons

Lab #:	165947	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	030619-DW-1	Analysis:	8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC217290	Batch#:	82381
Matrix:	Water	Analyzed:	06/20/03
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	1,000	997.7	100	80-120

Surrogate	%REC	Limits
Trifluorotoluene (FID)	100	57-150
Bromofluorobenzene (FID)	100	65-144

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Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	165947	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	030619-DW-1	Analysis:	EPA 8021B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC217289	Batch#:	82381
Matrix:	Water	Analyzed:	06/20/03
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
MTBE	10.00	9.390	94	51-125
Benzene	10.00	9.560	96	78-123
Toluene	10.00	9.351	94	79-120
Ethylbenzene	10.00	8.981	90	80-120
m,p-Xylenes	20.00	19.34	97	76-120
o-Xylene	10.00	9.356	94	80-121

Surrogate	%REC	Limits
Trifluorotoluene (PID)	74	54-149
Bromofluorobenzene (PID)	80	58-143

Curtis & Tompkins, Ltd.

Total Volatile Hydrocarbons

Lab #:	165947	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	030619-DW-1	Analysis:	8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC217366	Batch#:	82398
Matrix:	Water	Analyzed:	06/23/03
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	1,000	995.8	100	80-120

Surrogate	%REC	Limits
Trifluorotoluene (FID)	100	57-150
Bromofluorobenzene (FID)	103	65-144

Curtis & Tompkins, Ltd.

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	165947	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	030619-DW-1	Analysis:	EPA 8021B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC217365	Batch#:	82398
Matrix:	Water	Analyzed:	06/23/03
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
MTBE	10.00	10.04	100	51-125
Benzene	10.00	9.609	96	78-123
Toluene	10.00	9.361	94	79-120
Ethylbenzene	10.00	8.965	90	80-120
m,p-Xylenes	20.00	19.55	98	76-120
o-Xylene	10.00	9.481	95	80-121

Surrogate	%REC	Limits
Trifluorotoluene (PID)	78	54-149
Bromofluorobenzene (PID)	87	58-143

Curtis & Tompkins, Ltd.

Total Volatile Hydrocarbons

Lab #:	165947	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	030619-DW-1	Analysis:	8015B
Field ID:	MW-2	Batch#:	82381
MSS Lab ID:	165947-001	Sampled:	06/19/03
Matrix:	Water	Received:	06/19/03
Units:	ug/L	Analyzed:	06/20/03
Diln Fac:	1.000		

Type: MS Lab ID: QC217301

Analyte	MSS Result	Spiked	Result	%REC	Limits
Gasoline C7-C12	<18.00	2,000	1,853	93	76-120

Surrogate	%REC	Limits
Trifluorotoluene (FID)	107	57-150
Bromofluorobenzene (FID)	108	65-144

Type: MSD Lab ID: QC217302

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	2,000	1,889	94	76-120	2	20

Surrogate	%REC	Limits
Trifluorotoluene (FID)	108	57-150
Bromofluorobenzene (FID)	109	65-144

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	165947	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	030619-DW-1	Analysis:	EPA 8021B
Field ID:	ZZZZZZZZZZ	Batch#:	82398
MSS Lab ID:	165972-003	Sampled:	06/20/03
Matrix:	Water	Received:	06/20/03
Units:	ug/L	Analyzed:	06/23/03
Diln Fac:	1.000		

Type: MS Lab ID: QC217428

Analyte	MSS Result	Spiked	Result	%REC	Limits
MTBE	<0.3700	20.00	21.02	105	33-131
Benzene	<0.06500	20.00	19.54	98	75-128
Toluene	<0.06000	20.00	19.11	96	79-127
Ethylbenzene	<0.03800	20.00	18.12	91	78-124
m,p-Xylenes	<0.03400	40.00	38.60	97	67-121
o-Xylene	<0.03600	20.00	19.23	96	77-131

Surrogate	%REC	Limits
Trifluorotoluene (PID)	80	54-149
Bromofluorobenzene (PID)	89	58-143

Type: MSD Lab ID: QC217429

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	20.00	19.87	99	33-131	6	20
Benzene	20.00	18.88	94	75-128	3	20
Toluene	20.00	18.44	92	79-127	4	20
Ethylbenzene	20.00	17.55	88	78-124	3	20
m,p-Xylenes	40.00	37.35	93	67-121	3	20
o-Xylene	20.00	18.44	92	77-131	4	20

Surrogate	%REC	Limits
Trifluorotoluene (PID)	80	54-149
Bromofluorobenzene (PID)	87	58-143

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	165947	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 3520C
Project#:	030619-DW-1	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	06/19/03
Units:	ug/L	Received:	06/19/03
Diln Fac:	1.000	Prepared:	06/23/03
Batch#:	82433	Analyzed:	06/26/03

Field ID: MW-2 Lab ID: 165947-001
Type: SAMPLE

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	103	44-146

Field ID: MW-4 Lab ID: 165947-003
Type: SAMPLE

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	147 *	44-146

Field ID: MW-7 Lab ID: 165947-006
Type: SAMPLE

Analyte	Result	RL
Diesel C10-C24	4,200 L Y	50

Surrogate	%REC	Limits
Hexacosane	119	44-146

Field ID: MW-8 Lab ID: 165947-008
Type: SAMPLE

Analyte	Result	RL
Diesel C10-C24	2,200 L Y	50

Surrogate	%REC	Limits
Hexacosane	132	44-146

Field ID: MW-9 Lab ID: 165947-010
Type: SAMPLE

Analyte	Result	RL
Diesel C10-C24	1,600 L Y	50

Surrogate	%REC	Limits
Hexacosane	99	44-146

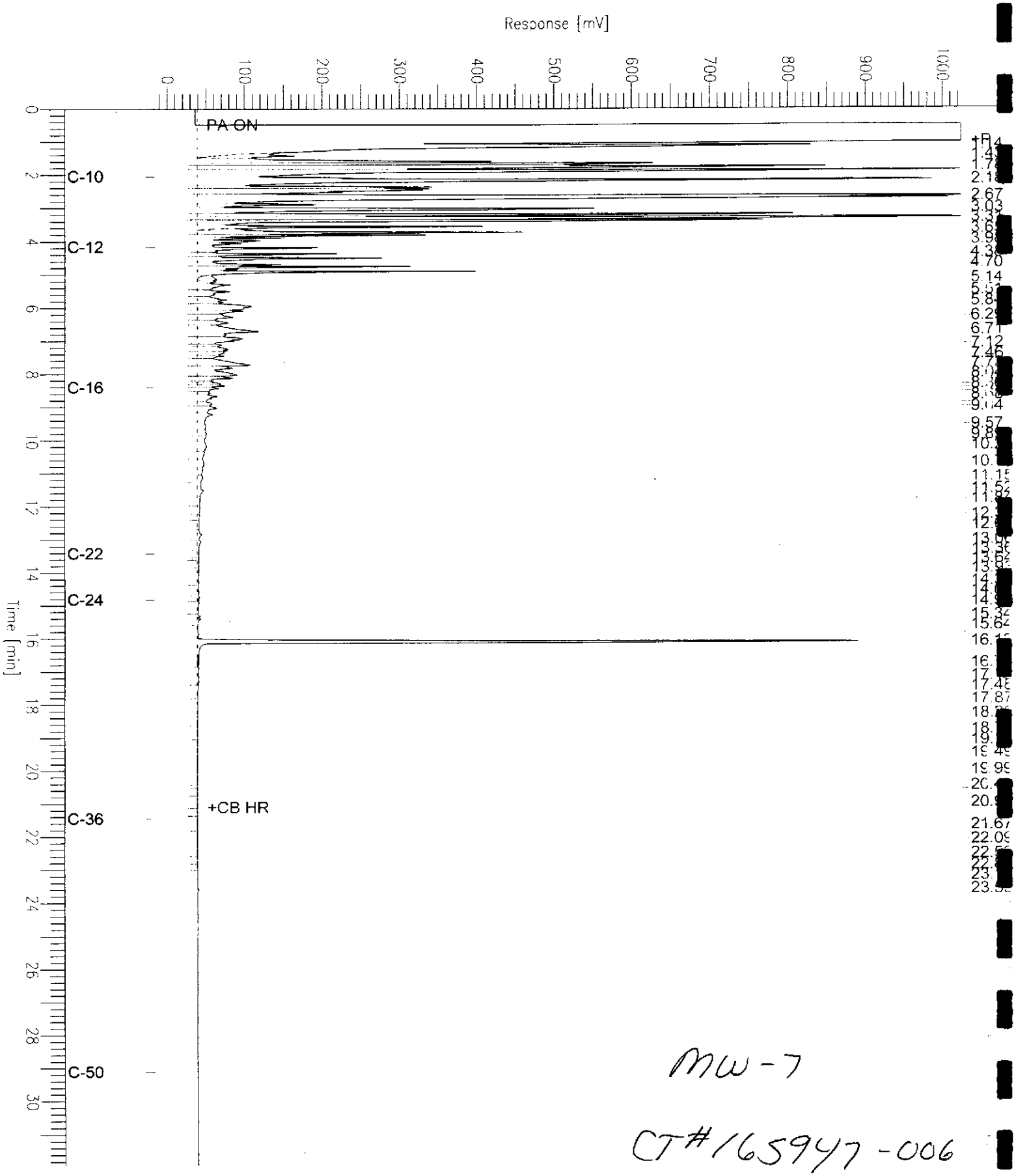
*= Value outside of QC limits; see narrative
L= Lighter hydrocarbons contributed to the quantitation
Y= Sample exhibits chromatographic pattern which does not resemble standard
ND= Not Detected
RL= Reporting Limit

16.0

Chromatogram

Sample Name : 165947-006,82433
FileName : G:\GC17\CHA\173A091.RAW
Method :
Start Time : 0.00 min End Time : 31.90 min
Scale Factor: 0.0 Plot Offset: -16 mV

Sample #: 82433 Page 1 of 1
Date : 6/26/03 11:19 AM
Time of Injection: 6/26/03 06:01 AM
Low Point : -15.53 mV High Point : 1024.00 mV
Plot Scale: 1039.5 mV



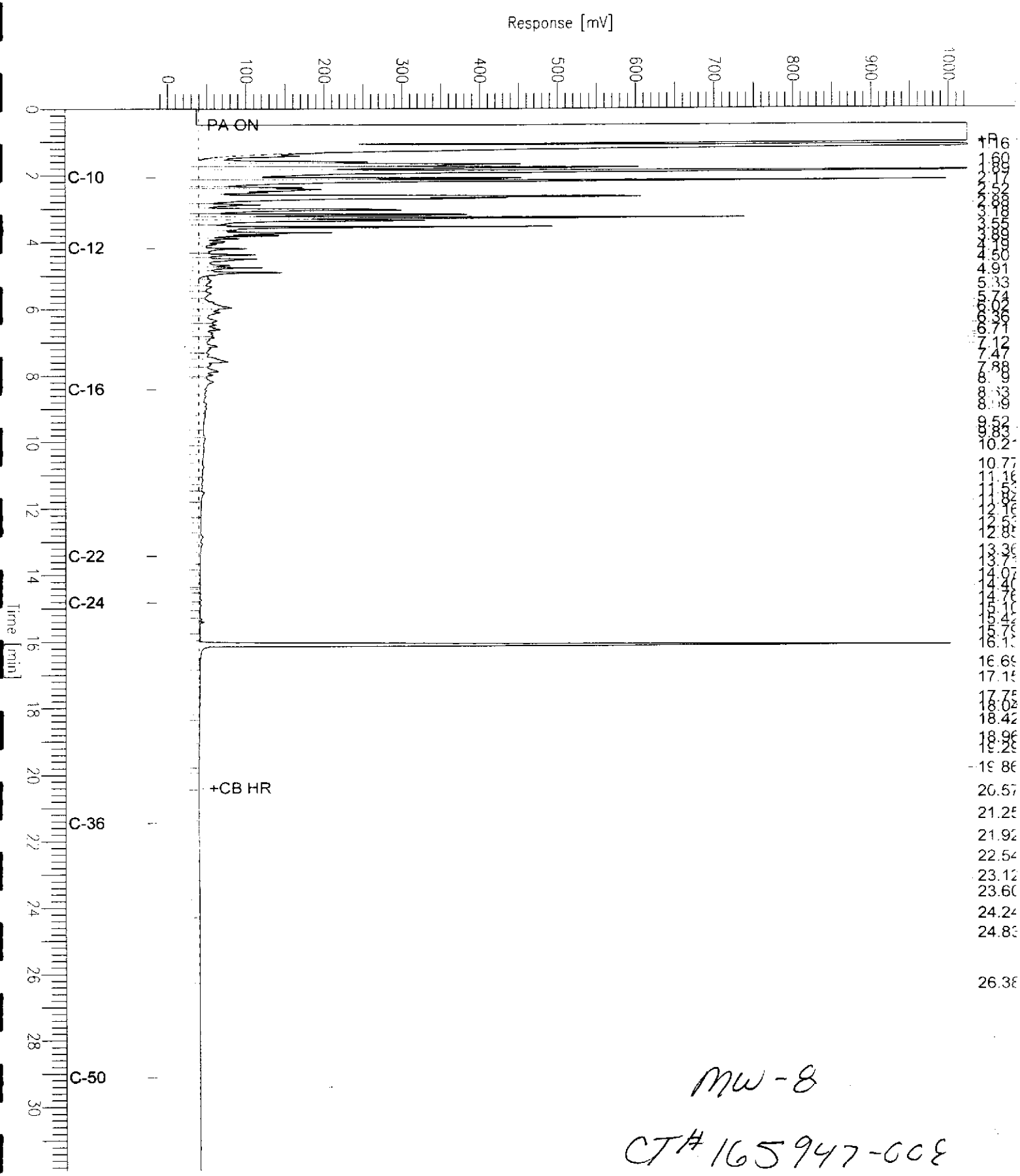
MW-7

CT#165947-006

Chromatogram

Sample Name : 165947-008,82433
FileName : G:\GC17\CHA\173A092.RAW
Method :
Start Time : 0.00 min End Time : 31.90 min
Scale Factor: 0.0 Plot Offset: -15 mV

Sample #: 82433
Date : 6/26/03 11:19 AM
Time of Injection: 6/26/03 06:41 AM
Low Point : -15.07 mV High Point : 1024.00 mV
Plot Scale: 1039.1 mV



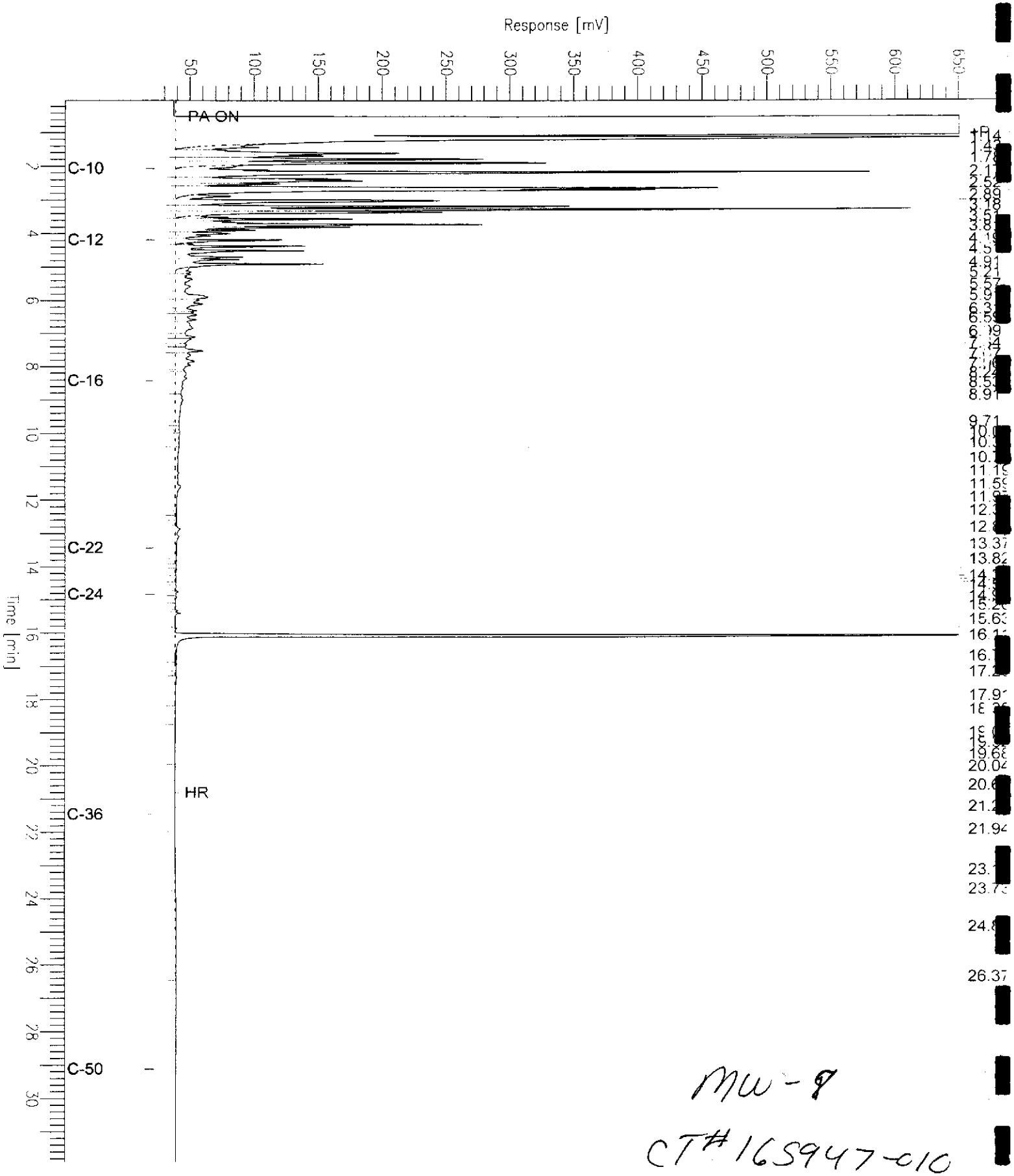
MW-8

CT# 165947-008

Chromatogram

Sample Name : 165947-010,82433
FileName : G:\GC17\CHA\173A093.RAW
Method :
Start Time : 0.01 min End Time : 31.91 min
Scale Factor: 0.0 Plot Offset: 23 mV

Sample #: 82433 Page 1 of 1
Date : 6/26/03 11:19 AM
Time of Injection: 6/26/03 07:22 AM
Low Point : 22.79 mV High Point : 650.49 mV
Plot Scale: 627.7 mV



MW-8

CT# 165947-010

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	165947	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 3520C
Project#:	030619-DW-1	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	06/19/03
Units:	ug/L	Received:	06/19/03
Diln Fac:	1.000	Prepared:	06/23/03
Batch#:	82433	Analyzed:	06/26/03

Field ID: MW-10 Lab ID: 165947-012
Type: SAMPLE

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	111	44-146

Field ID: MW-11 Lab ID: 165947-014
Type: SAMPLE

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

Surrogate	%REC	Limits
Hexacosane	115	44-146

Type: BLANK Cleanup Method: EPA 3630C
Lab ID: QC217504

Analyte	Result	RL
Diesel C10-C24	ND	50

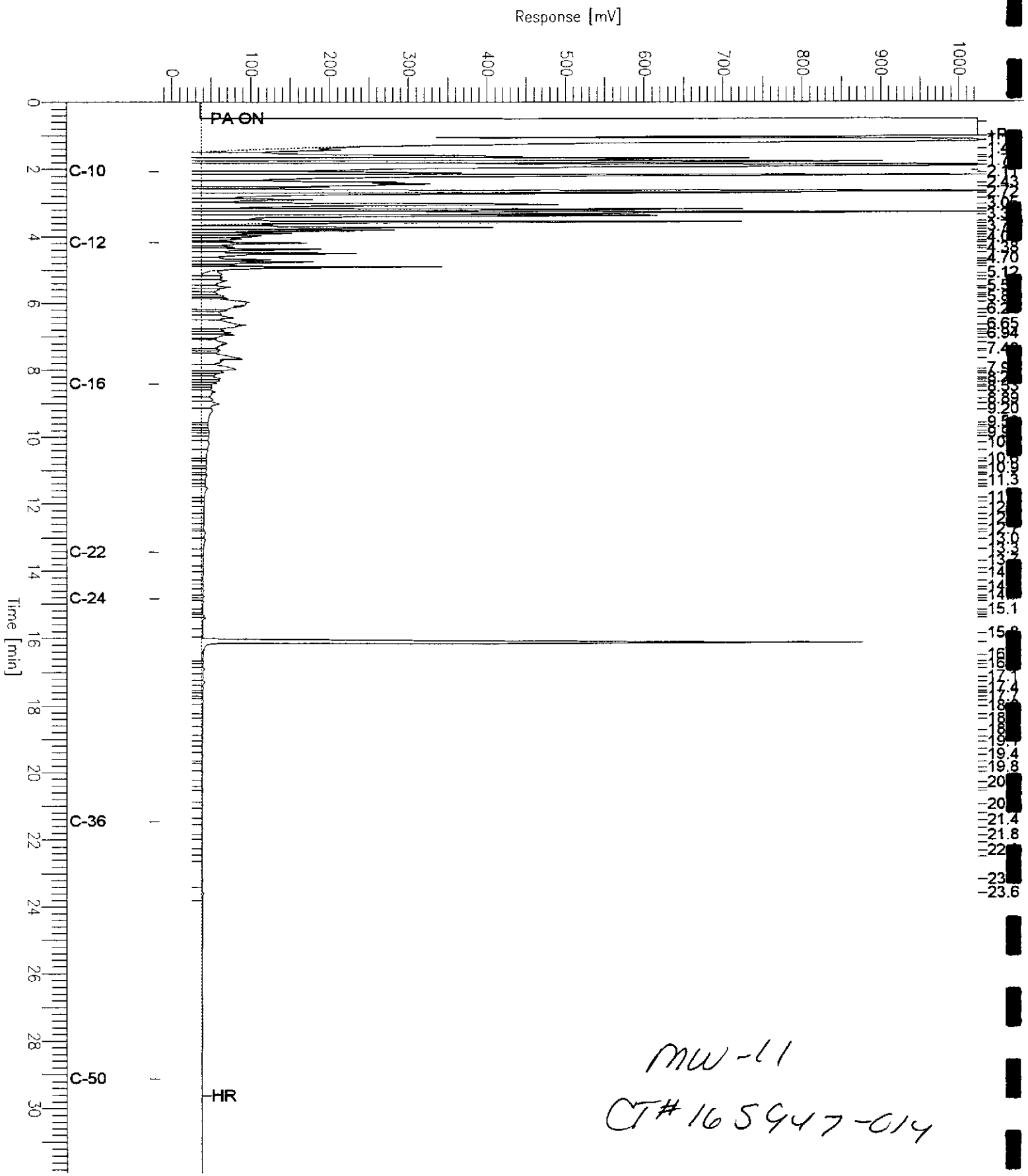
Surrogate	%REC	Limits
Hexacosane	104	44-146

*= Value outside of QC limits; see narrative
L= Lighter hydrocarbons contributed to the quantitation
Y= Sample exhibits chromatographic pattern which does not resemble standard
ND= Not Detected
RL= Reporting Limit

Chromatogram

Sample Name : 165947-014,82433
FileName : G:\GC17\CHA\173A095.RAW
Method : ATEH171.MTH
Start Time : 0.00 min End Time : 31.90 min
Scale Factor: 0.0 Plot Offset: -16 mV

Sample #: 82433 Page 1 of 1
Date : 6/26/03 11:26 AM
Time of Injection: 6/26/03 08:43 AM
Low Point : -16.40 mV High Point : 1024.00 mV
Plot Scale: 1040.4 mV

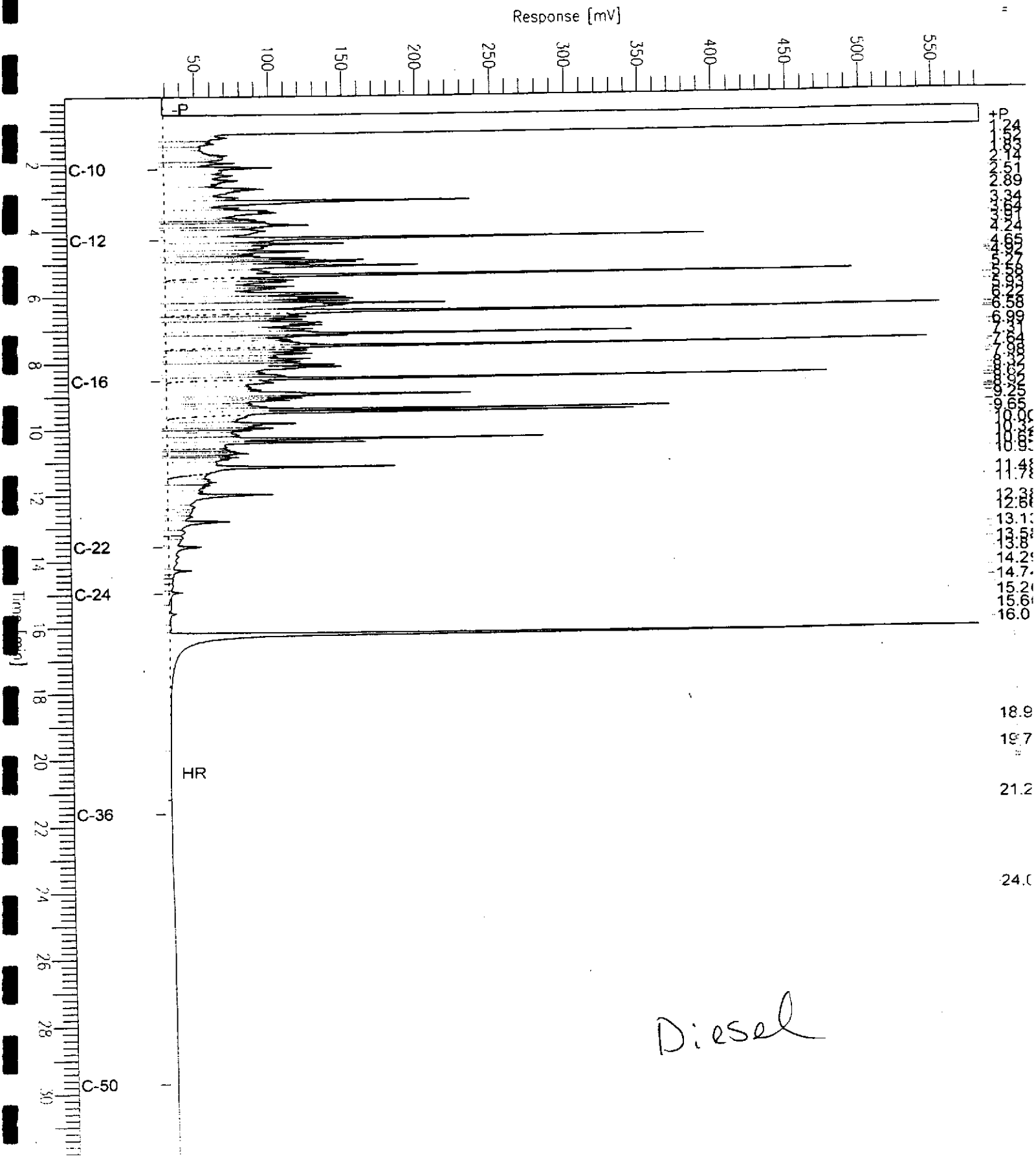


MW-11
CT# 165947-014

Chromatogram

ample Name : ccv,03ws0739,dsl
leName : G:\GC11\CHA\173A001.RAW
thod : ATEH167.MTH
tart Time : 0.01 min End Time : 31.91 min
cale Factor: 0.0 Plot Offset: 25 mV

Sample #: 1000mg/L
Date : 6/22/03 02:20 PM
Time of Injection: 6/22/03 01:46 PM
Low Point : 24.87 mV High Point : 582.88 mV
Plot Scale: 558.0 mV



Diesel

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	165947	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 3520C
Project#:	030619-DW-1	Analysis:	EPA 8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC217505	Batch#:	82433
Matrix:	Water	Prepared:	06/23/03
Units:	ug/L	Analyzed:	06/25/03

Cleanup Method: EPA 3630C

Analyte	Spiked	Result	%REC	Limits
Diesel C10-C24	2,500	2,468	99	38-137

Surrogate	%REC	Limits
Hexacosane	120	44-146

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	165947	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 3520C
Project#:	030619-DW-1	Analysis:	EPA 8015B
Field ID:	ZZZZZZZZZZ	Batch#:	82433
MSS Lab ID:	165941-002	Sampled:	06/18/03
Matrix:	Water	Received:	06/19/03
Units:	ug/L	Prepared:	06/23/03
Diln Fac:	1.000	Analyzed:	06/25/03

Type: MS Lab ID: QC217506

Analyte	MSS Result	Spiked	Result	%REC	Limits
Diesel C10-C24	457.0	2,500	2,896	98	35-138

Surrogate	%REC	Limits
Hexacosane	102	44-146

Type: MSD Lab ID: QC217507

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Diesel C10-C24	2,500	3,482	121	35-138	18	33

Surrogate	%REC	Limits
Hexacosane	122	44-146

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Nitrate Nitrogen

Lab #:	165947	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Analysis:	EPA 300.0
Project#:	030619-DW-1		
Analyte:	Nitrogen, Nitrate	Sampled:	06/19/03
Matrix:	Water	Received:	06/19/03
Units:	mg/L	Analyzed:	06/19/03
Batch#:	82380		

Field ID	Type	Lab ID	Result	RL	Diln Fac
MW-3	SAMPLE	165947-002	ND	0.05	1.000
MW-4	SAMPLE	165947-004	0.25	0.10	2.000
MW-7	SAMPLE	165947-005	ND	0.05	1.000
MW-8	SAMPLE	165947-007	ND	0.05	1.000
MW-9	SAMPLE	165947-009	ND	0.05	1.000
MW-10	SAMPLE	165947-011	0.23	0.05	1.000
MW-11	SAMPLE	165947-013	ND	0.05	1.000
	BLANK	QC217283	ND	0.05	1.000

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Nitrate Nitrogen

Lab #:	165947	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Analysis:	EPA 300.0
Project#:	030619-DW-1		
Analyte:	Nitrogen, Nitrate	Batch#:	82380
Field ID:	ZZZZZZZZZZ	Sampled:	06/10/03
MSS Lab ID:	165880-004	Received:	06/16/03
Matrix:	Water	Analyzed:	06/19/03
Units:	mg/L		

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim	Diln Fac
BS	QC217284		0.9960	0.9760	98	90-110			1.000
BSD	QC217285		0.9960	1.006	101	90-110	3	20	1.000
MS	QC217286	0.03994	0.5080	0.5306	97	80-120			1.020
MSD	QC217287		0.5080	0.5230	95	80-120	1	20	1.020

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Sulfate

Lab #:	165947	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Analysis:	EPA 300.0
Project#:	030619-DW-1		
Analyte:	Sulfate	Sampled:	06/19/03
Matrix:	Water	Received:	06/19/03
Units:	mg/L	Analyzed:	06/19/03
Batch#:	82380		

Field ID	Type	Lab ID	Result	RL	Dilu Fac
MW-3	SAMPLE	165947-002	38	0.50	1.000
MW-4	SAMPLE	165947-004	53	1.0	2.000
MW-7	SAMPLE	165947-005	1.7	0.50	1.000
MW-8	SAMPLE	165947-007	48	0.50	1.000
MW-9	SAMPLE	165947-009	69	1.0	2.000
MW-10	SAMPLE	165947-011	75	1.0	2.000
MW-11	SAMPLE	165947-013	6.3	0.50	1.000
	BLANK	QC217283	ND	0.50	1.000

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Sulfate

Lab #:	165947	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Analysis:	EPA 300.0
Project#:	030619-DW-1		
Analyte:	Sulfate	Batch#:	82380
Field ID:	ZZZZZZZZZZ	Sampled:	06/10/03
MSS Lab ID:	165880-004	Received:	06/16/03
Matrix:	Water	Analyzed:	06/19/03
Units:	mg/L		

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim	Dil'n Fac
BS	QC217284		9.960	9.930	100	90-110			1.000
BSD	QC217285		9.960	10.10	101	90-110	2	20	1.000
MS	QC217286	0.6009	5.080	5.509	97	80-120			1.020
MSD	QC217287		5.080	5.450	95	80-120	1	20	1.020

RPD= Relative Percent Difference

HISTORICAL GROUNDWATER MONITORING WELLS ANALYTICAL RESULTS

REDWOOD REGIONAL PARK SERVICE YARD, OAKLAND, CALIFORNIA

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

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

NA = Not Analyzed for this constituent

Well MW-2 (continued)									
Event	Date	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	MTBE
21	Mar-02	< 50	< 50	2.3	0.51	1.9	1.3	8.3	8.2
22	Jun-02	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	7.7
23	Sep-02	98	< 50	5.0	< 0.5	< 0.5	< 0.5	—	13
24	Dec-02	< 50	< 50	4.3	< 0.5	< 0.5	< 0.5	—	< 2.0
25	Mar-03	130	82	39	< 0.5	20	4.1	63	16
26	Jun-03	< 50	< 50	1.9	< 0.5	< 0.5	< 0.5	1.9	8.7

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

NA = Not Analyzed for this constituent

Well MW-4 (continued)									
Event	Date	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	MTBE
19	Aug-01	1,300	810	3.2	4.0	29	9.7	46	< 2.0
20	Dec-01	< 50	110	< 0.5	< 0.5	< 0.5	1.2	1.2	< 2.0
21	Mar-02	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 2.0
22	Jun-02	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 2.0
23	Sep-02	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 2.0
24	Dec-02	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 2.0
25	Mar-03	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 2.0
26	Jun-03	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 2.0

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

NA = Not Analyzed for this constituent

Well MW-7									
Event	Date	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	MTBE
1	Jan-01	13,000	3,100	95	4	500	289	888	95
2	Apr-01	13,000	3,900	140	< 0.5	530	278	948	52
3	Aug-01	12,000	5,000	55	25	440	198	718	19
4	Dec-01	9,100	4,600	89	< 2.5	460	228	777	< 10
5	Mar-02	8,700	3,900	220	6.2	450	191	867	200
6	Jun-02	9,300	3,500	210	6.3	380	155	751	18
7	Sep-02	9,600	3,900	180	< 0.5	380	160	720	< 2.0
8	Dec-02	9,600	3,700	110	< 0.5	400	188.9	699	< 2.0
9	Mar-03	10,000	3,600	210	12	360	143	725	45
10	Jun-03	9,300	4,200	190	< 10	250	130	570	200

Well MW-8									
Event	Date	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	MTBE
1	Jan-01	14,000	1,800	430	17	360	1230	2,037	96
2	Apr-01	11,000	3,200	320	13	560	1,163	2,056	42
3	Aug-01	9,600	3,200	130	14	470	463	1,077	14
4	Dec-01	3,500	950	69	2.4	310	431	812	< 4.0
5	Mar-02	14,000	3,800	650	17	1,200	1,510	3,377	240
6	Jun-02	2,900	1,100	70	2.0	170	148	390	19
7	Sep-02	1,000	420	22	< 0.5	64	50	136	< 2.0
8	Dec-02	3,300	290	67	< 0.5	190	203	460	< 2.0
9	Mar-03	13,000	3,500	610	12	1,100	958	2,680	< 10
10	Jun-03	7,900	2,200	370	7.4	620	562	1,559	< 4.0

NA = Not Analyzed for this constituent

Well MW-9									
Event	Date	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	MTBE
1	Aug-01	11,000	170	340	13	720	616	1,689	48
2	Dec-01	9,400	2,700	250	5.1	520	317	1,092	*< 10*
3	Mar-02	1,700	300	53	4.2	120	67	244	20
4	Jun-02	11,000	2,500	200	16	600	509	1,325	85
5	Sep-02	3,600	2,800	440	11	260	39	750	*< 4.0*
6	Dec-02	7,000	3,500	380	9.5	730	147	1,266	*< 10*
7	Mar-03	4,400	1,400	320	6.9	400	93	820	*< 2.0*
8	Jun-03	7,600	1,600	490	10	620	167	1,287	*< 4.0*

Well MW-10									
Event	Date	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	MTBE
1	Aug-01	550	2,100	17	*< 0.5*	31	44	92	40
2	Dec-01	*< 50*	81	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	—	25
3	Mar-02	*< 50*	*< 50*	0.61	*< 0.5*	*< 0.5*	*< 0.5*	0.61	6.0
4	Jun-02	*< 50*	*< 50*	0.59	*< 0.5*	0.58	*< 0.5*	1.2	9.0
5	Sep-02	160	120	10	*< 0.5*	6.7	3.6	20	26
6	Dec-02	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	—	16
7	Mar-03	110	*< 50*	11	*< 0.5*	12	1.3	24	15
8	Jun-03	110	*< 50*	9.6	*< 0.5*	6.8	*< 0.5*	16	9.0

NA = Not Analyzed for this constituent

Well MW-11									
Event	Date	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	MTBE
1	Aug-01	17,000	7,800	390	17	820	344	1,571	< 10
2	Dec-01	5,800	2,800	280	7.8	500	213	1,001	< 10
3	Mar-02	100	94	< 0.5	< 0.5	0.64	< 0.5	0.64	2.4
4	Jun-02	8,200	2,600	570	13	560	170	1,313	< 4
5	Sep-02	12,000	4,400	330	13	880	654	1,877	< 10
6	Dec-02	18,000	4,500	420	< 2.5	1100	912	2,432	< 10
7	Mar-03	7,800	2,600	170	4.7	530	337	1,042	53
8	Jun-03	14,000	3,800	250	< 2.5	870	693	1,813	< 10

NA = Not Analyzed for this constituent

HISTORICAL SURFACE WATER ANALYTICAL RESULTS

REDWOOD REGIONAL PARK SERVICE YARD, OAKLAND, CALIFORNIA

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

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

NA = Not Analyzed for this constituent

Sampling Location SW-2 (Area of Historical Contaminated Groundwater Discharge)									
Event	Date	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	MTBE
1	Feb-94	130	< 50	1.9	< 0.5	4.4	3.2	9.5	NA
2	May-95	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
3	Aug-95	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
4	May-96	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
5	Aug-96	200	< 50	7.5	< 0.5	5.4	< 0.5	13	NA
6	Dec-96	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
7	Feb-97	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
8	Aug-97	350	130	13	0.89	19	11	44	NA
9	Dec-97	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
10	Feb-98	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
11	Sep-98	< 50	<50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2.0
12	Apr-99	81	<50	2.0	< 0.5	2.5	1.3	5.8	2.3
13	Dec-99	1,300	250	10	1.0	47	27	85	2.2
14	Sep-00	160	100	2.1	< 0.5	5.2	1.9	9.2	3.4
15	Jan-01	< 50	< 50	< 0.5	< 0.5	0.53	< 0.5	0.5	< 2.0
16	Apr-01	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2.0
17	Sep-01	440	200	2.1	< 0.5	17	1.3	20	10
18	Dec-01	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	-	< 2.0
19	Mar-02	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	-	< 2.0
20	Jun-02	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	-	< 2.0
21	Sep-02	220	590	10	< 0.5	13	< 0.5	23	< 2.0
22	Dec-02	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	-	< 2.0
23	Mar-03	< 50	< 50	< 0.5	< 0.5	0.56	< 0.5	0.56	2.8
24	Jun-03	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	-	< 2.0

NA = Not Analyzed for this constituent

Sampling Location SW-3 (Downstream of Contaminated Groundwater Discharge Location SW-2)									
Event	**Date**	**TPHg**	**TPHd**	**Benzene**	**Toluene**	**Ethylbenzene**	**Total Xylenes**	**Total BTEX**	**MTBE**
1	May-95	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
2	Aug-95	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
3	May-96	< 50	**74**	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
4	Aug-96	**69**	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
5	Dec-96	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
6	Feb-97	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
7	Aug-97	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
8	Dec-97	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
9	Feb-98	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
10	Sep-98	< 50	<50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2.0
11	Apr-99	< 50	<50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2.0
12	Dec-99	< 50	<50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2.0
13	Sep-00	NS	NS	NS	NS	NS	NS	—	NS
14	Jan-01	< 50	<50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2.0
15	Apr-01	< 50	<50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2.0
16	Sep-01	NS	NS	NS	NS	NS	NS	—	NS
17	Dec-01	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2.0
18	Mar-02	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2.0
19	Jun-02	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	**2.4**
20	Sep-02	NS	NS	NS	NS	NS	NS	—	NS
21	Dec-02	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	-	< 2.0
22	Mar-03	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	-	< 2.0
23	Jun-03	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	-	< 2.0

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

NA = Not Analyzed for this constituent