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

MAY 11 2001

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: 05/09/01

ATTENTION: SCOTT SEERY

FILE: SES-2001-36

SUBJECT: REDWOOD REGIONAL PARK FUEL LEAK SITE

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

THE FOLLOWING: SITE MONITORING REPORT (MAY 2001)

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

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

BY: Bruce Rucker (BHR 5/9/01)

★ **Stellar Environmental Solutions**

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

May 4, 2001

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

MAY 11 2001

Subject: Site Monitoring Report
Redwood Regional Park Service Yard Site - Oakland, California

Dear Mr. Seery:

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

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

Sincerely,

Bruce M. Rucker

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

REGISTERED GEOLOGIST
BRUCE M. RUCKER
No. 6814
Exp. 9/02
STATE OF CALIFORNIA

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

SITE MONITORING REPORT

REDWOOD REGIONAL PARK
SERVICE YARD
OAKLAND, CALIFORNIA

Prepared For:

EAST BAY REGIONAL PARK DISTRICT
OAKLAND, CALIFORNIA

Prepared By:

STELLAR ENVIRONMENTAL SOLUTIONS
2198 SIXTH STREET
BERKELEY, CALIFORNIA 94710

May 4, 2001

Project No. 2001-36

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TABLES AND FIGURES

1.0 INTRODUCTION

PROJECT BACKGROUND

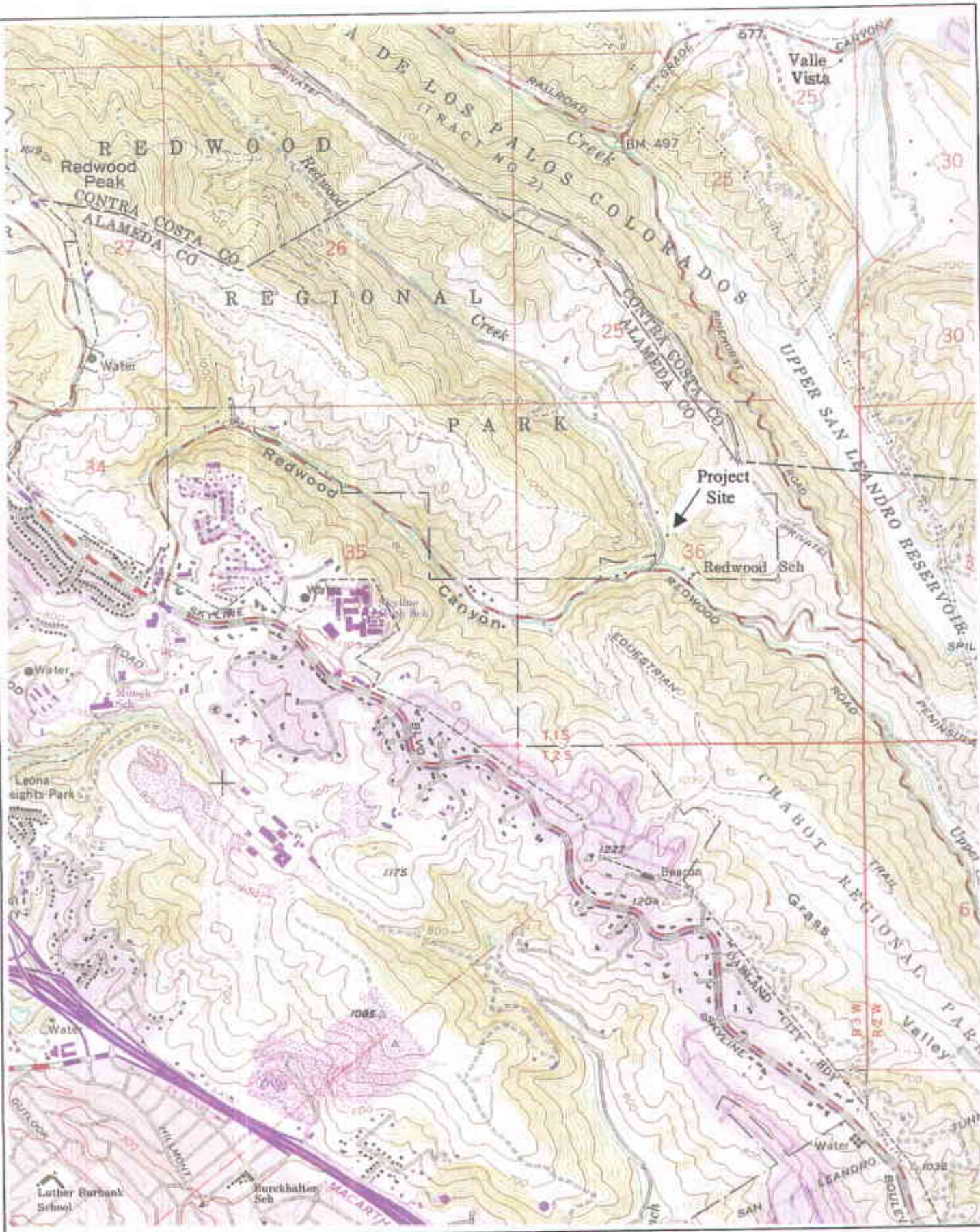
The subject property is the East Bay Regional Park District (EBRPD) Redwood Regional Park Service Yard located at 7867 Redwood Road in Oakland, Alameda County, California. The site has undergone site investigations and remediation since 1993 to address subsurface contamination caused by leakage from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

OBJECTIVES AND SCOPE OF WORK

This report discusses the results from the April 2001 surface water and groundwater monitoring event, which included determining shallow groundwater flow direction; collecting groundwater samples from site wells for contaminant analysis and natural attenuation indicators; and collecting surface water (creek) samples for contaminant analysis. Previous SES reports submitted in June 1999 and April 2000 provided a full discussion of previous site remediation and investigations; site geology and hydrogeology; residual site contamination; conceptual model for contaminant fate and transport; and evaluation of hydrochemical trends and plume stability. An October 2000 Feasibility Study report for the site, submitted to ACHCSA, provided detailed analyses of the regulatory implications of the site contamination and an assessment of viable corrective actions (SES, 2000d). The previous most recent site monitoring event was conducted in January 2001.

SITE DESCRIPTION

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



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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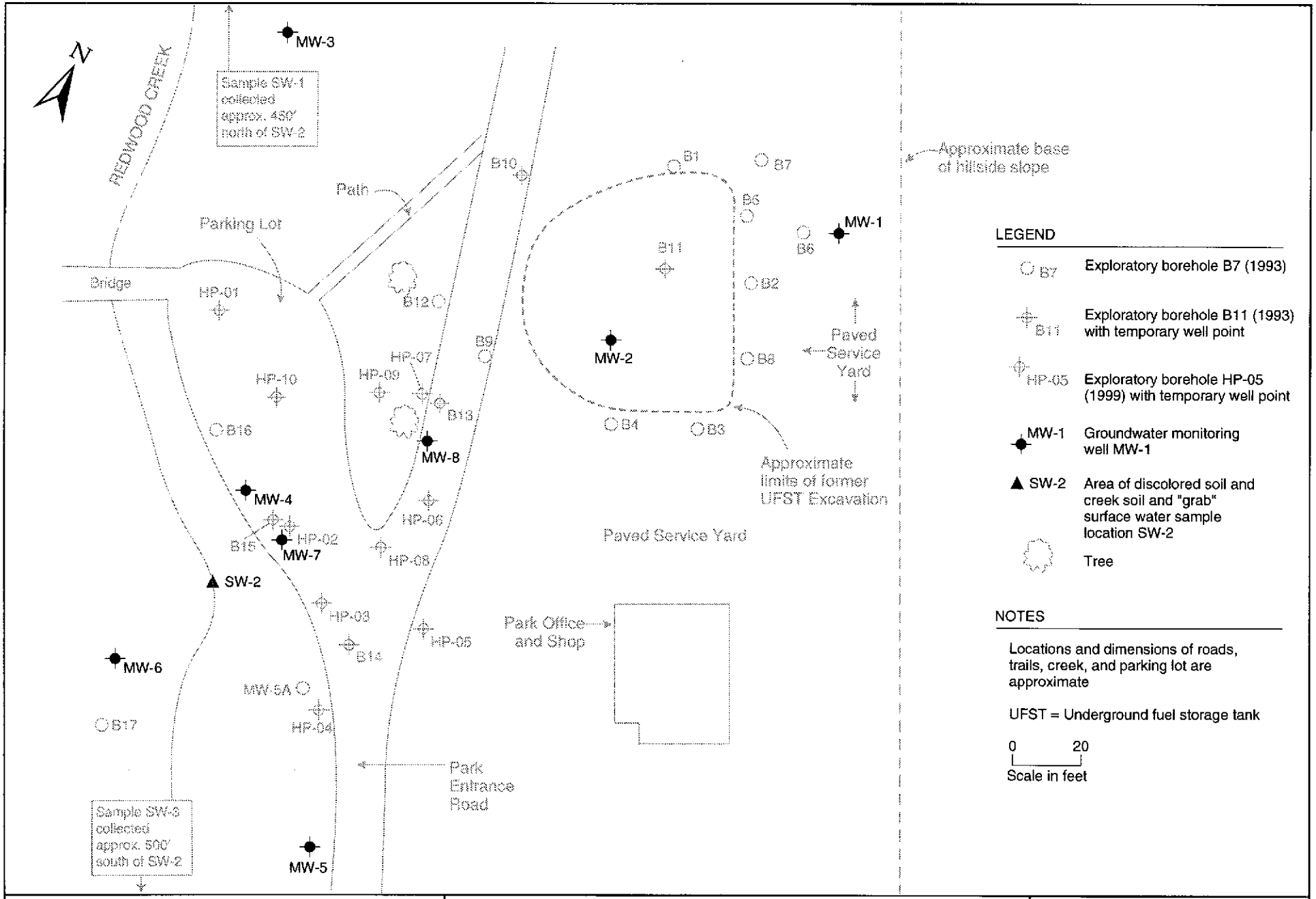


Stellar Environmental Solutions

Geoscience & Engineering Consulting

SITE PLAN AND HISTORICAL SAMPLING LOCATIONS

Redwood Regional Park Service Yard, Oakland, CA

Figure 2

by: MJC | JANUARY 2001

2000-46-04

REGULATORY OVERSIGHT

Historical ACHCSA-approved revisions to the groundwater sampling program have included: 1) discontinuing hydrochemical sampling and analysis in wells MW-1, MW-3, MW-5, and MW-6; 2) discontinuing creek surface water sampling at upstream location SW-1; and 3) reducing the frequency of creek surface water sampling from quarterly to semi-annually (ACHCSA, 1996). The latter recommendation has not yet been implemented due to continued concern over potential impacts to Redwood Creek.

2.0 PHYSICAL SETTING

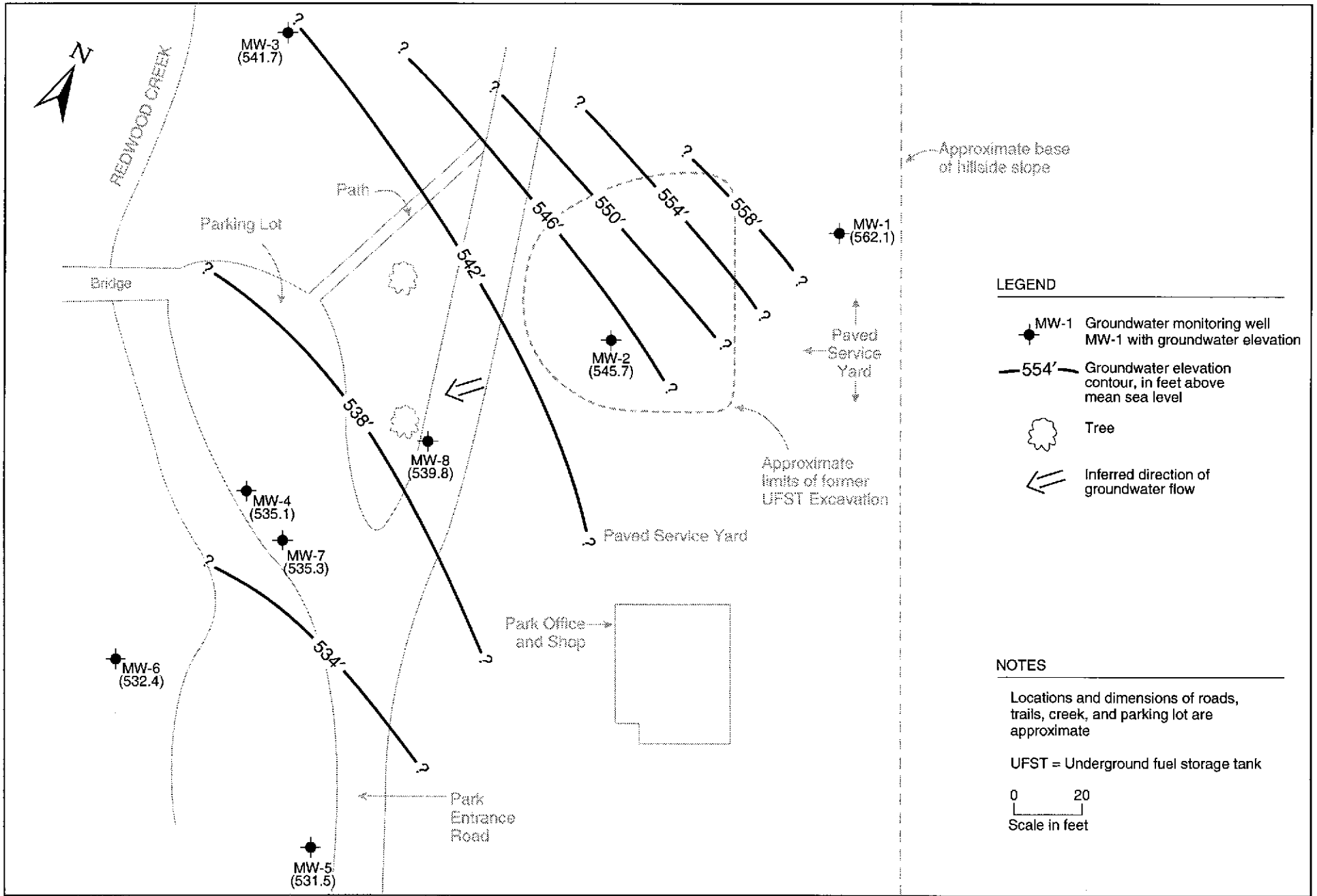
Following is a brief summary of the site hydrogeologic conditions based on geologic logging and water level measurements collected at the site since September 1993. A full discussion is presented in the SES June 1999 report.

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

Groundwater at the site occurs under unconfined and semi-confined conditions at a depth between 12.5 and 19 feet below ground surface (bgs), corresponding to the top of the clayey, silty sand-gravel zone. Local perched water zones have been observed well above the top of the capillary fringe. Local groundwater flow direction has been consistently measured as northeast to southwest. Figure 3 is a groundwater elevation map constructed from the April 2001 monitoring well static water levels, and Table 2 (in Chapter 4.0) summarizes current event groundwater elevation data. The groundwater gradient is relatively steep—approximately 2 feet per foot—between well MW-1 and the former UFST source area, resulting from the topography and the highly disturbed nature of sediments in the landslide debris. Downgradient from (west of) the UFST source area (between MW-2 and Redwood Creek), the groundwater gradient is approximately 0.1 feet per foot. The direction of shallow groundwater flow during the current event was to the west-southwest (toward Redwood Creek), which is consistent with site historical groundwater flow direction.

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

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



Stellar Environmental Solutions

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GROUNDWATER ELEVATION MAP–APRIL 13, 2001

Redwood Regional Park Service Yard, Oakland, CA

Figure 3

by: MJC | APRIL 2001

2000-46-15

3.0 APRIL 2001 CREEK AND GROUNDWATER SAMPLING

This section presents the creek surface water and groundwater sampling and analytical methods for the current event. Groundwater and surface water analytical results are summarized in Section 4.0. Monitoring and sampling protocols were in accordance with the ACHCSA-approved SES technical workplan (SES 1998a). Activities conducted 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 eight 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, and MW-8); and
- Collecting Redwood Creek surface water samples for laboratory analysis from locations SW-2 and SW-3.

The current monitoring and sampling event was conducted on April 13, 2001. The locations of all site monitoring wells and creek water sampling locations are shown on Figure 2. Well construction information and water level data are summarized in Table 1. Appendix A contains the groundwater monitoring field record.

GROUNDWATER LEVEL MONITORING AND SAMPLING

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

Table 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 (4/13/01)
MW-1	18	7 to17	565.9	562.1
MW-2	36	20 to 35	566.5	545.7
MW-3	42	7 to 41	560.9	541.7
MW-4	26	10 to 25	548.1	535.1
MW-5	26	10 to 25	547.5	531.5
MW-6	26	10 to 25	545.6	532.4
MW-7	24	9 to24	547.7	535.3
MW-8	23	8 to 23	549.2	539.8

Notes:

TOC = Top of Casing.

Wells MW-1 through MW-6 are 4-inch diameter. Wells MW-7 and MW-8 are 2-inch diameter.

All elevations are feet above USGS mean sea level. Elevations of Wells MW-1 through MW-6 were surveyed by EBRPD relative to USGS Benchmark No. JHF-49. Wells MW-7 and MW-8 were surveyed by a licensed land surveyor using existing site wells as datum.

As the first task of the monitoring event, static water levels were measured in all eight site wells using an electric water level indicator. Pre-purge groundwater samples from all wells were field analyzed for indicators of natural attenuation including ferrous iron, dissolved oxygen, and oxygen reduction potential (ORP, or redox potential). The third natural attenuation indicator that is normally measured for this site is dissolved oxygen. Dissolved oxygen was not measured in the current event because of a meter failure in the field. Pre-purge groundwater samples were collected from wells MW-3, MW-4, MW-7, and MW-8 for offsite laboratory analysis of the natural attenuation indicator sulfate. The other natural attenuation indicator normally collected for offsite laboratory analysis (nitrate) was analyzed 2 days after the method-specified 48-hour sample hold time. Thus, while the nitrate results may not be data-validatable, they are still reported to observe as part of the natural attenuation trends.

A total of approximately 60 gallons of purge water and decontamination rinseate from the current groundwater sampling event was containerized in the onsite plastic tank. The purge water will continue to be accumulated in the onsite tank until it is full, at which time it will be transported offsite for proper disposal.

CREEK SURFACE WATER SAMPLING

Surface water sampling was conducted by SES. Surface water samples were collected on April 13, 2001 from Redwood Creek locations SW-2 (immediately downgradient of the former UFST source area and within the area of documented creek bank soil contamination) and SW-3 (approximately 500 feet downstream from SW-2) (see Figure 2 for locations). In accordance with a previous ACHCSA-approved SES recommendation, upstream sample location SW-1 was not sampled.

At the time of sampling, the creek was flowing briskly and water depths at the sampling locations ranged from 6 to 12 inches. At the SW-2 location, where contaminated groundwater discharge to the creek has historically been observed, a petroleum sheen was noted, as was an orange algae growing on the saturated portion of the creek bank. It is inferred that this algae is utilizing the petroleum as a carbon source, and is therefore a good indicator of the presence of petroleum contamination.

4.0 MONITORING EVENT ANALYTICAL RESULTS

This section presents the field and laboratory analytical results of the most recent (April 2001) monitoring event, including surface water and groundwater well sampling results. Table 2 and Figure 4 summarize the contaminant analytical results of the current monitoring event samples. Table 3 summarizes natural attenuation indicator results from the current event. Appendix B contains the certified analytical laboratory report and chain-of-custody record. A detailed discussion of hydrochemical and surface water trends was included in the October 2000 Feasibility Study report, and it continues to be addressed in upcoming annual summary reports. Appendix C contains a tabular summary of historical groundwater and surface water analytical results.

GROUNDWATER SAMPLE RESULTS

The current event data indicate the following:

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

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

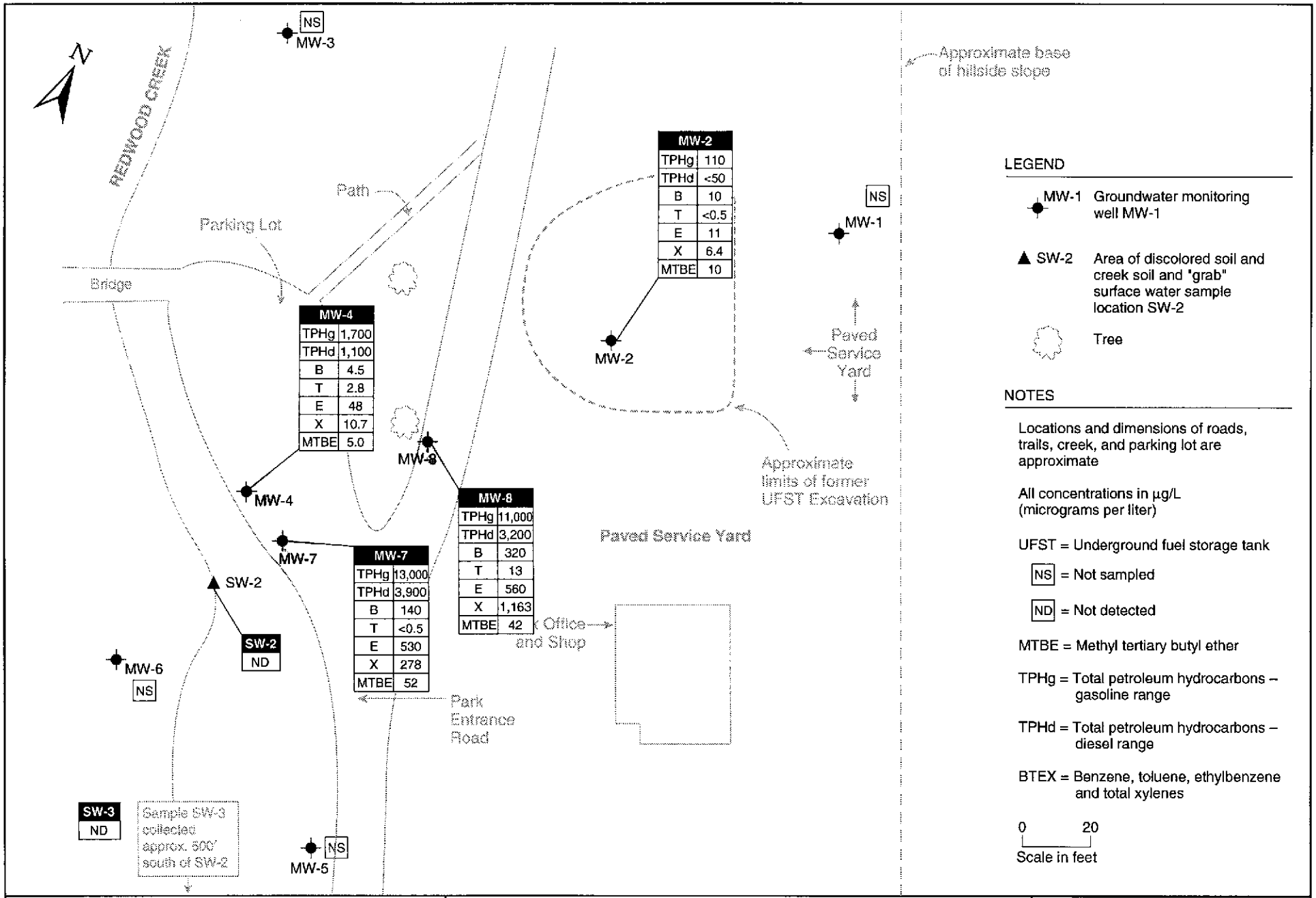
Table 2
Groundwater and Surface Water Sample
Analytical Results – April 13, 2001
Redwood Regional Park Corporation Yard, Oakland, California

Compound	Concentrations in µg/L						
	TPHg	TPHd	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE
GROUNDWATER SAMPLES							
MW-2	110	ND	10	< 0.5	11	6.4	10
MW-4	1,700	1,100	4.5	2.8	48	10.7	5.0
MW-7	13,000	3,900	140	< 0.5	530	278	52
MW-8	11,000	3,200	320	13	560	1,163	42
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

Notes:
MTBE = Methyl *tertiary*-butyl ether.
TPHg = Total petroleum hydrocarbons - gasoline range (equivalent to total volatile hydrocarbons - gasoline range).
TPHd = Total petroleum hydrocarbons - diesel range (equivalent to total extractable hydrocarbons - diesel range).
µg/L = Micrograms per liter, equivalent to parts per billion (ppb).

NATURAL ATTENUATION PARAMETERS MEASURED

Ferrous iron and redox potential were field-measured in all eight wells with electronic meters. Dissolved oxygen was field-measured in only two wells before meter failure. Sulfate and nitrate samples from well MW-3 (outside the contaminant plume) and wells MW-4, MW-7, and MW-8 (inside the contaminant plume) was analyzed in the laboratory; however, the nitrate samples were analyzed 2 days beyond the method-specified 48-hour hold time. An inverse relationship between general minerals—including Fe^{2+}, NO_3^-, and SO_4^{2-}—and hydrocarbon concentrations is indicative of the occurrence of biodegradation. Specifically, anaerobic degradation and oxidation of compounds is implied where general mineral concentrations are low and TPH concentrations are high. The natural attenuation indicators will often need to be looked at over a period of years to note sustainable trends, as seasonal effects and unique filed conditions during a given monitoring event can show misleading results.



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GROUNDWATER MONITORING WELL AND SURFACE WATER ANALYTICAL RESULTS–APRIL 13, 2001
Redwood Regional Park Service Yard, Oakland, CA

Figure 4

by: MJC | MAY 2001

2000-46-16

Table 3
Groundwater Sample Analytical Results
Natural Attenuation Indicators - April 13, 2001
Redwood Regional Park Corporation Yard, Oakland, California

Sample I.D.	Nitrogen (as Nitrate) (mg/L)	Sulfate (mg/L)	Dissolved Oxygen (mg/L)	Ferrous Iron (mg/L)	Redox Potential (milliVolts)
MW-1	NA	NA	NM	0.00	- 58
MW-2	NA	NA	NM	0.00	-29
MW-3	0.09	37	NM	0.00	- 37
MW-4	< 0.05	7.0	NM	4.2	44
MW-5	NA	NA	1.0	0.00	92
MW-6	NA	NA	NM	0.00	3.0
MW-7	< 0.05	0.55	NM	10	- 68
MW-8	< 0.05	60	1.2	0.8	133

Notes:

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

NA = Not analyzed.

NM = Not measured due to meter failure.

In the current site monitoring event, the nitrate results showed the expected inverse correlation—with hydrocarbon concentrations, ferrous iron, and sulfate concentrations having no significant correlation with the occurrence of natural attenuation.

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. Only limited DO data (two of the eight wells) were available during this event due to meter failure. These limited data provide no meaningful information, other than showing relatively low (approximately 1 mg/L) levels of DO both inside and outside the plume.

The oxidation-reduction potential (ORP) of groundwater is a measure of electron activity, and is an indicator of the relative tendency of a solute species to gain or lose electrons. The ORP of groundwater generally ranges from -400 millivolts (mV) to +800 mV. In oxidizing conditions, the ORP of groundwater is positive, while in reducing conditions the ORP is typically negative (or less positive). Reducing conditions (less positive ORP) are consistent with occurrence of anaerobic biodegradation. Therefore, ORP values of groundwater inside a hydrocarbon plume are typically less than those measured outside the plume. The current event ORP data generally show a good correlation with the expected trend, with the exception of MW-7 (inside the plume) that showed a strongly negative value, in the range similar to the wells outside the plume.

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

CREEK SURFACE WATER SAMPLE RESULTS

No surface water contaminants were detected in the current event.

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, with one exception: nitrate analyses were conducted 2 days beyond the method-specified hold time of 48 hours. All laboratory QC sample results and sample holding times (except nitrate) were within the acceptance limits of the methods (Appendix B).

5.0 SUMMARY, CONCLUSIONS AND PROPOSED ACTIONS

The following conclusions and proposed actions presented are focused on the findings of the April 2001 surface water and groundwater monitoring event report, as well as some salient historical findings.

SUMMARY AND CONCLUSIONS

- Two additional groundwater monitoring wells (MW-7 and MW-8) were installed at the site in December 2000. Well MW-7 was installed in the inferred centerline of the contaminant plume at the most downgradient available location, and well MW-8 was installed in the inferred centerline of the contaminant plume approximately halfway between the former source area and Redwood Creek (coincident with historical maximum detected groundwater concentrations).
- Soil samples collected from the capillary fringe in each of the two well boreholes had contaminant concentrations comparable to those historically detected, reflecting the continued contribution of groundwater-sourced contamination to the capillary fringe at areas downgradient of the release.
- Groundwater sampling has been conducted on an approximately quarterly basis since November 1994 (18 events). The existing monitoring well network has defined the lateral limits of groundwater contamination.
- Historical maximum monitoring well contaminant concentrations (for all analytes except diesel and ethylbenzene) have been detected in new well MW-8, located approximately halfway between the former source area and Redwood Creek, indicating that the center of mass of the groundwater plume has not reached Redwood Creek.
- Since its installation in January 2001, contaminant concentrations in well MW-7 have exceeded those in nearby well MW-4, confirming that well MW-7 (located along the centerline of the plume) is the more appropriate sampling location for precise evaluation of downgradient maximum contaminant concentrations.
- Natural attenuation is indicated to be occurring at the site, mainly at the plume margins and former source area. Natural attenuation is likely minimal in the higher concentration portion

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

- No site contaminants were detected in either surface water sampling location (either at the area of groundwater discharge to the creek, or at a location approximately 500 feet downstream).
- In accordance with an ACHCSA request, SES completed a Feasibility Study (October 2000) to determine the most appropriate and cost-effective remedial strategy. This was determined to be injection of oxygen-release compound (ORC) and post-remediation compliance monitoring. The ACHCSA approved the remedial strategy in its January 8, 2001 letter to the EBRPD.

PROPOSED ACTIONS

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

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

6.0 REFERENCES AND BIBLIOGRAPHY

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

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

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

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

7.0 LIMITATIONS

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

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

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

WELL GAUGING DATA

Project # 010413-S1 Date 4/13/01 Client Stellar Environmental Solutions

Site Redwood Regional Park Service Yard, Oakland

Well ID	Well Size (in.)	Sheen / Odor	Depth to Immiscible Liquid (ft.)	Thickness of Immiscible Liquid (ft.)	Volume of Immiscibles Removed (ml)	Depth to water (ft.)	Depth to well bottom (ft.)	Survey Point: TOB or (TOC)	D.O. / ORP Reading
MW-1	4					3.77	18.85		N/A / -58
MW-2	4					20.77	38.82		N/A / 56
MW-3	4					19.16	44.10		N/A / -37
MW-4	4					12.96	26.51		N/A / 44
MW-5	4					16.01	26.92		1.0 / 92
MW-6	4					13.21	27.39		N/A / 3
MW-7	2					12.45	25.33		N/A / -68
MW-8	2					9.42	22.21		1.2 / 133

WELL MONITORING DATA SHEET

Project #: 010413-S1	Client: Stellar Environmental Solutions
Sampler: Hoyt / Sean	Start Date: 4/13/01
Well I.D.: MW-1	Well Diameter: 2 3 (4) 6 8 ___
Total Well Depth: 18.85	Depth to Water: 3.77
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

- (Disposable Bailer)
- Extraction Port
- Dedicated Tubing
- Other: ____

NO (Gals.) X Purge = ____ Gals.
1 Case Volume | Specified Volumes | Calculated Volume

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

Time	Temp (°F)	pH	Cond.	Turbidity	Gals. Removed	Observations
1312	54.5	7.14	870	01.2	0	
D.O.	Meter	INOP			Ferrous	Iron 0.0 mg/L

Did well dewater? Yes No		Gallons actually evacuated:	
Sampling Time:		Sampling Date:	
Sample I.D.:		Laboratory:	
Analyzed for: TPH-G BTEX MTBE TPH-D		Other:	
Equipment Blank I.D.: @ Time		Duplicate I.D.:	
Analyzed for: TPH-G BTEX MTBE TPH-D		Other:	
D.O. (if req'd):	Pre-purge:	mg/L	Post-purge: mg/L
ORP (if req'd):	Pre-purge:	-58 mV	Post-purge: mV

WELL MONITORING DATA SHEET

Project #: 010413-S1	Client: Stellar Environmental Solutions
Sampler: Hoyt / Sean	Start Date: 4/13/01
Well I.D.: MW-2	Well Diameter: 2 3 (4) 6 8 ___
Total Well Depth: 38.82	Depth to Water: 20.77
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

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

11.7 (Gals.) X 3 = 35.1 Gals.
1 Case Volume | Specified Volumes | Calculated Volume

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

Time	Temp (°F)	pH	Cond.	Turbidity	Gals. Removed	Observations
1423	58.5	7.20	834	>200	12	
Well Dewatered DTW @ 37.23 @				1427	24 20	
					36	
DTW @ Sampling 34.20 Last Well For Today						
D.O. meter INop					Ferrous Iron 0.0 mg/L	

Did well dewater? (Yes) No — Gallons actually evacuated: 20

Sampling Time: 1431 — Sampling Date: 4/13/01

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

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

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

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

D.O. (if req'd):	(Pre-purge):	mg/L	Post-purge:	mg/L
ORP (if req'd):	(Pre-purge):	-29 mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: 010413-S1	Client: Stellar Environmental Solutions
Sampler: Hoyt / Sean	Start Date: 4/13/01
Well I.D.: MW-3	Well Diameter: 2 3 (4) 6 8 ___
Total Well Depth: 44.10	Depth to Water: 19.16
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

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

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

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

Time	Temp (°F)	pH	Cond.	Turbidity	Gals. Removed	Observations
1422	57.3	7.3	618	~~200~~	0	
				> 200 ↑		
D.O Meter		Inop			Ferrous Iron 0	mg/l

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

Sampling Time: 1423 Sampling Date: 4/13/01

Sample I.D.: MW-3 Laboratory: Curtis + Tompkins

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

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

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

D.O. (if req'd):	(Pre-purge):	mg/L	Post-purge:	mg/L
ORP (if req'd):	(Pre-purge):	−37 mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: 010413-S1	Client: Stellar Environmental Solutions
Sampler: Hoyt / Sean	Start Date: 4/13/01
Well I.D.: MW-4	Well Diameter: 2 3 (4) 6 8 ___
Total Well Depth: 26.51	Depth to Water: 12.96
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

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

8.8 (Gals.) X 3 = 26.4 Gals.
1 Case Volume | Specified Volumes | Calculated Volume

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

Time	Temp (°F)	pH	Cond.	Turbidity	Gals. Removed	Observations
1353	55.7	6.64	713	197.2	9	
1355	56.4	6.69	733	98.9	18	
1357	57.4	6.75	721	167.3	27	
D.O. meter	Evap				Ferrous	Iron 4.2 mg/L

Did well dewater? Yes (No)		Gallons actually evacuated: 27	
Sampling Time: 1400		Sampling Date: 4/13/01	
Sample I.D.: MW-4		Laboratory:	
Analyzed for: ~~TPH-G~~ BTEX MTBE TPH-D		Other: Nitrate & Sulfate @ 1347	
Equipment Blank I.D.:	@ Time	Duplicate I.D.:	
Analyzed for: TPH-G BTEX MTBE TPH-D		Other:	
D.O. (if req'd):	Pre-purge:	mg/L	Post-purge: mg/L
ORP (if req'd):	Pre-purge:	44 mV	Post-purge: mV

WELL MONITORING DATA SHEET

Project #: 010413-S1	Client: Stellar Environmental Solutions
Sampler: Hoyt / Sean	Start Date: 4/13/01
Well I.D.: MW-5	Well Diameter: 2 3 (4) 6 8 ___
Total Well Depth: ~~19.85~~ 26.92 ~~16.07~~	Depth to Water: ~~3.77~~ 16.01
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

(Disposable Bailer)
Extraction Port
Dedicated Tubing
Other: ___

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

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

Time	Temp (°F)	pH	Cond.	Turbidity	Gals. Removed	Observations
1230	56.9	7.01	596	10.2	0	
						Ferrous Iron 0.0 mg/L

Did well dewater? Yes No — Gallons actually evacuated:

Sampling Time: — Sampling Date:

Sample I.D.: — Laboratory:

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

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

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

D.O. (if req'd):	Pre-purge:	1.0	mg/L	Post-purge:	mg/L
ORP (if req'd):	Pre-purge:	92	mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: 010413-S1	Client: Stellar Environmental Solutions
Sampler: Hoyt / Sean	Start Date: 4/13/01
Well I.D.: MW-6	Well Diameter: 2 3 (4) 6 8 ___
Total Well Depth: 27.39	Depth to Water: 13.21
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

- (Disposable Bailer)
- Extraction Port
- Dedicated Tubing
- Other: ____

NO (Gals.) X Purge = ____ Gals.
1 Case Volume | Specified Volumes | Calculated Volume

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

Time	Temp (°F)	pH	Cond.	Turbidity	Gals. Removed	Observations
1325	54.2	6.82	564	07.4	0	
D.O. Meter		Inop			Ferrous Iron	0.0 mg/L

Did well dewater? Yes No		Gallons actually evacuated:	
Sampling Time:		Sampling Date:	
Sample I.D.:		Laboratory:	
Analyzed for: TPH-G BTEX MTBE TPH-D		Other:	
Equipment Blank I.D.:	@ Time	Duplicate I.D.:	
Analyzed for: TPH-G BTEX MTBE TPH-D		Other:	
D.O. (if req'd):	Pre-purge:	mg/L	Post-purge: mg/L
ORP (if req'd):	Pre-purge:	3 mV	Post-purge: mV

WELL MONITORING DATA SHEET

Project #: 010413-S1	Client: Stellar Environmental Solutions
Sampler: Hoyt / Sean	Start Date: 4/13/01
Well I.D.: MW-7	Well Diameter: (2) 3 4 6 8 ____
Total Well Depth: 25.33	Depth to Water: 12.45
Before: After:	Before: After:
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	D.O. Meter (if req'd): (YSI) HACH

Purge Method:

- Bailer
- Disposable Bailer
- (Middleburg)
- Electric Submersible
- Waterra
- Peristaltic
- Extraction Pump
- Other_____

Sampling Method: Bailer

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

2 (Gals.) X 3 = 6 Gals.
1 Case Volume | Specified Volumes | Calculated Volume

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

Time	Temp (°F)	pH	Cond.	Turbidity	Gals. Removed	Observations
1246	56.3	6.9	753	< 200	2	
1248	55.8	7.0	784	< 200	4	
1250	56.0	7.0	784	< 200	6.5	
					Ferrous Iron 10 mg/l	

Did well dewater? Yes (No)	Gallons actually evacuated: 6.5
Sampling Time: 1255	Sampling Date: 4/13/01
Sample I.D.: MW-7	Laboratory: Curtis + Tompkins
Analyzed for: (TPH-G) BTEX MTBE (TPH-D) @ Time	Other: Nitrate + Sulfate @ 12:35
Equipment Blank I.D.:	Duplicate I.D.:
Analyzed for: TPH-G BTEX MTBE TPH-D	Other:

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

WELL MONITORING DATA SHEET

Project #: 010413-S1	Client: Stellar Environmental Solutions
Sampler: Hoyt / Sean	Start Date: 4/13/01
Well I.D.: MW-8	Well Diameter: (2) 3 4 6 8 ___
Total Well Depth: 22.21	Depth to Water: 9.42
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
(Disposable Bailer)
Extraction Port
Dedicated Tubing
Other: _____

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

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

Time	Temp (°F)	pH	Cond.	Turbidity	Gals. Removed	Observations
1141	12.7	6.2	859	< 200	2	
1143	12.9	6.8	868	< 200	4	
1145	12.9	7.0	879	< 200	6.5	
					Ferrous Iron 0.8 mg/l	

Did well dewater? Yes (No) Gallons actually evacuated: 6.5

Sampling Time: 1148 Sampling Date: 4/13/01

Sample I.D.: MW-8 Laboratory: Curtis + Tompkins

Analyzed for: (TPH-G BTEX MTBE TPH-D) Other: Nitrate and Sulfate @1130

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

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

D.O. (if req'd):	(Pre-purge):	1.2 mg/L	Post-purge:	mg/L
ORP (if req'd):	(Pre-purge):	133 mV	Post-purge:	mV

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

ANALYTICAL REPORT

Prepared for:

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

Date: 07-MAY-01
Lab Job Number: 151444
Project ID: N/A
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

CHAIN OF CUSTODY FORM

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

C&T LOGIN # 151444

Project No:

Project Name: Redwood Regional Park

Project P.O.: 2000-46

Turnaround Time:

Sampler: Blaine Tech

Report To: Bruce Ruder

Company: Stellar Envir. Solutions

Telephone: 510/644-3123

Fax:

Laboratory Number	Sample ID.	Sampling Date Time	Matrix: Soil	Matrix: Water	Matrix: Waste	# of Containers	Preservative: HCL	Preservative: H_2SO_4	Preservative: HNO_3	Preservative: ICE	Field Notes	Analyses: TVH-gas	Analyses: TEH-diesel	Analyses: BTEX + MTBE	Analyses: Nitrate + Sulfate
-1	MW-8	4/13/01 1148		X		6	X			X	HCl in VOAs only	X	X	X	X
-2	MW-7	4/13/01 1155		X		6	X			X	" "	X	X	X	X
-3	MW-4	" 1400		X		6	X			X	" "	X	X	X	X
-4	MW-3	1403		X		1				X					X
-5	MW-2	1431		X		5	X			X	" "	X	X	X	X

For Laboratory Use

Preservation Correct? ☒ Yes ☐ No ☐ N/A

Notes:

Received ☒ On Ice ☒ Cold ☐ Ambient ☒ Intact

RELINQUISHED BY:	RECEIVED BY:
Bruce Ruder Stellar 4/13/01 1745 DATE/TIME	DATE/TIME 4/13 1745
DATE/TIME	DATE/TIME
DATE/TIME	DATE/TIME

Signature

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	151444	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 3520
Project#:	STANDARD	Analysis:	EPA 8015M
Matrix:	Water	Sampled:	04/13/01
Units:	ug/L	Received:	04/13/01
Batch#:	63095	Prepared:	04/18/01

Field ID: MW-8
Type: SAMPLE
Lab ID: 151444-001
Diln Fac: 1.000
Analyzed: 04/19/01

Analyte	Result	RL
Diesel C10-C24	3,200 L Y	50

Surrogate	%REC	Limits
Hexacosane	87	44-121

Field ID: MW-7
Type: SAMPLE
Lab ID: 151444-002
Diln Fac: 2.000
Analyzed: 04/20/01

Analyte	Result	RL
Diesel C10-C24	3,900 L Y	100

Surrogate	%REC	Limits
Hexacosane	78	44-121

Field ID: MW-4
Type: SAMPLE
Lab ID: 151444-003
Diln Fac: 1.000
Analyzed: 04/19/01

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

Surrogate	%REC	Limits
Hexacosane	85	44-121

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

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	151444	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 3520
Project#:	STANDARD	Analysis:	EPA 8015M
Matrix:	Water	Sampled:	04/13/01
Units:	ug/L	Received:	04/13/01
Batch#:	63095	Prepared:	04/18/01

Field ID:	MW-2	Diln Fac:	1.000
Type:	SAMPLE	Analyzed:	04/19/01
Lab ID:	151444-005		

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	80	44-121

Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC143408	Analyzed:	04/19/01

Analyte	Result	RL
Diesel C10-C24	ND	50

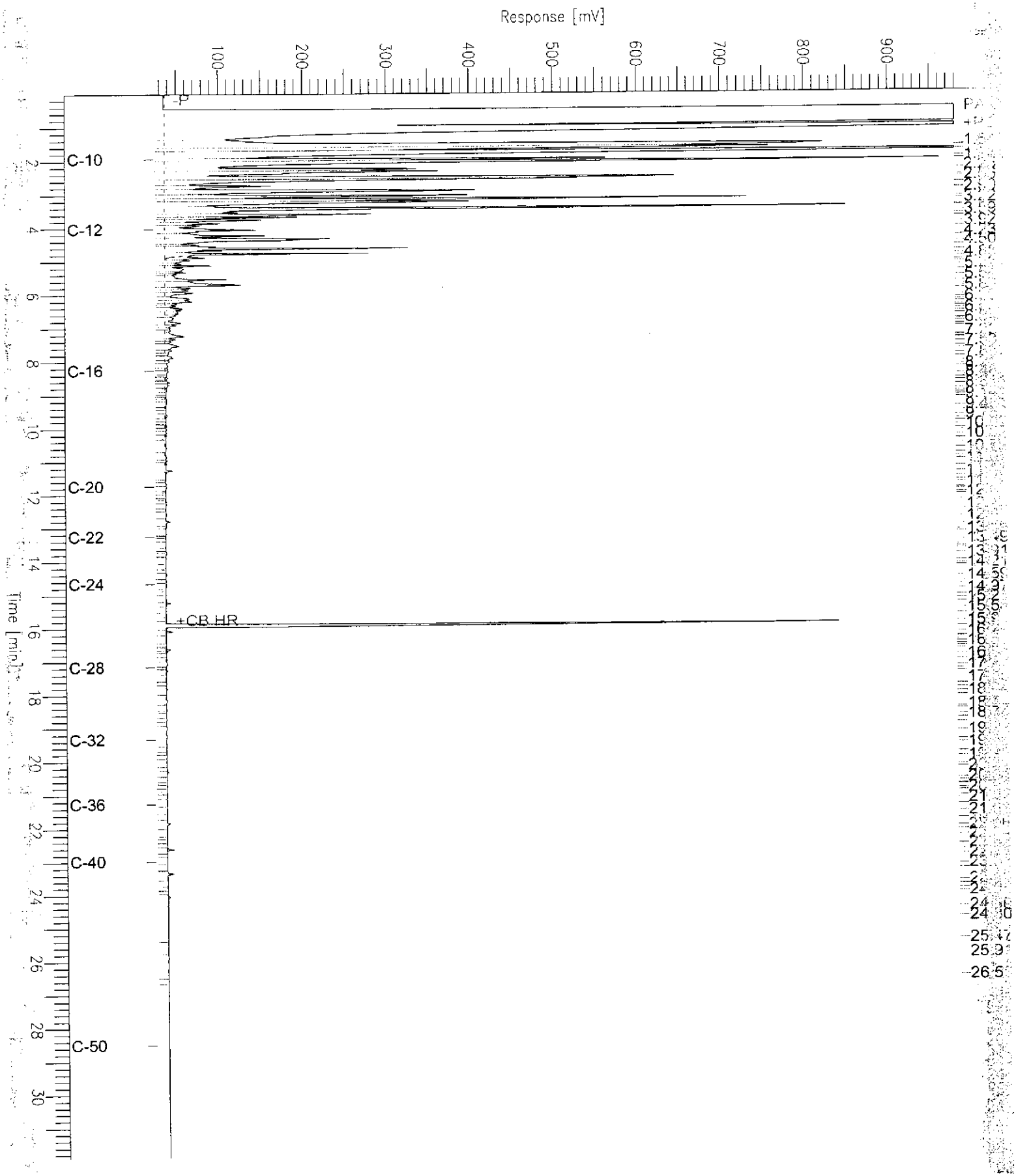
Surrogate	%REC	Limits
Hexacosane	76	44-121

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

Chromatogram

Sample Name : 151444-001,63095
FileName : G:\GC13\CHB\108B039.RAW
Method : BTEH108.MTH
Start Time : 0.01 min End Time : 31.91 min
Scale Factor: 0.0 Plot Offset: 24 mV

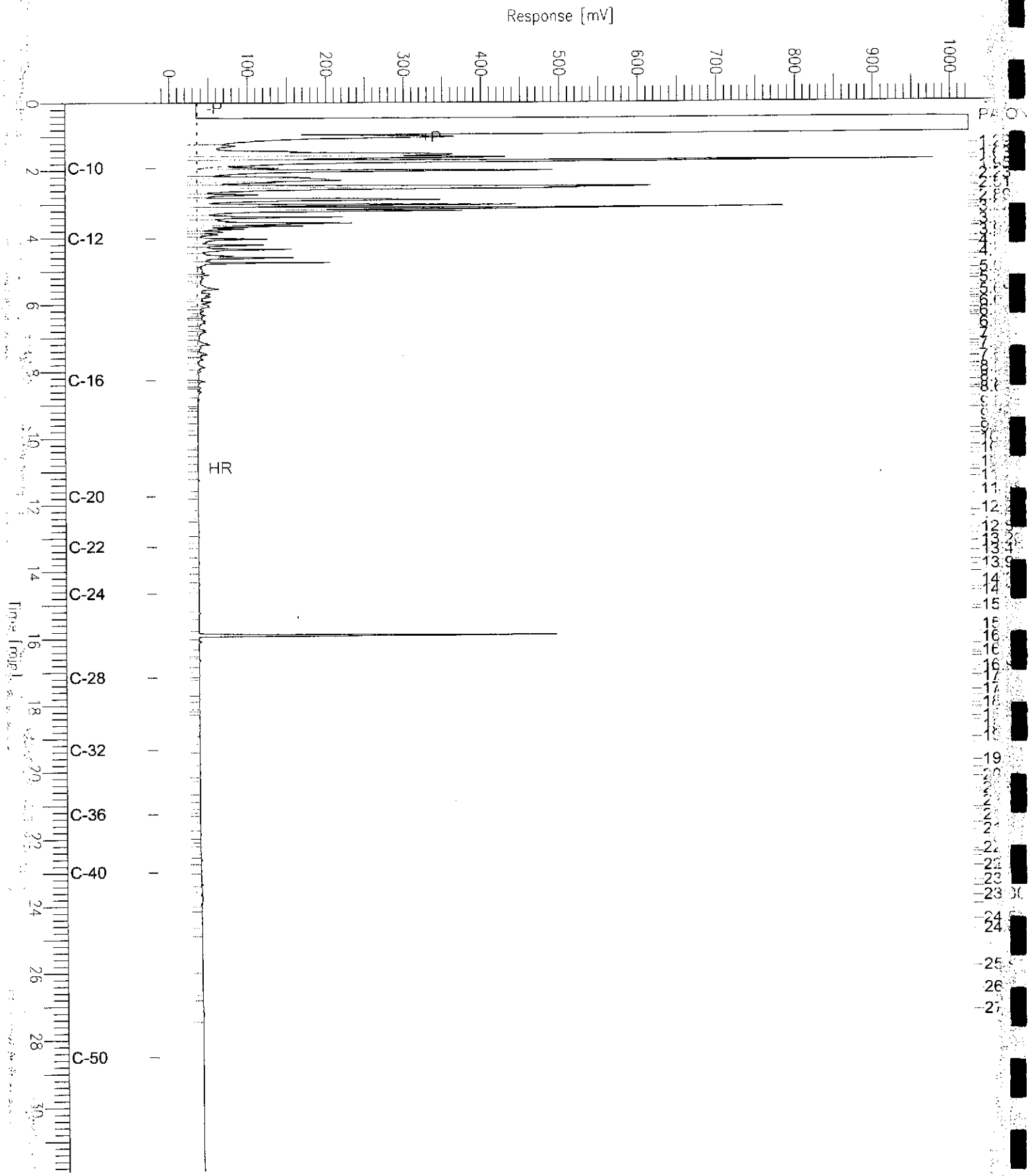
Sample #: 63095 Page 1 of 1
Date : 04/20/2001 10:03 AM
Time of Injection: 04/19/2001 07:21 PM
Low Point : 23.59 mV High Point : 980.25 mV
Plot Scale: 956.7 mV



Chromatogram

Sample Name : 151444-002,63095
FileName : G:\GC13\CHB\108B071.RAW
Method : BTEH108.MTH
Start Time : 0.00 min End Time : 31.90 min
Scale Factor: 0.0 Plot Offset: -17 mV

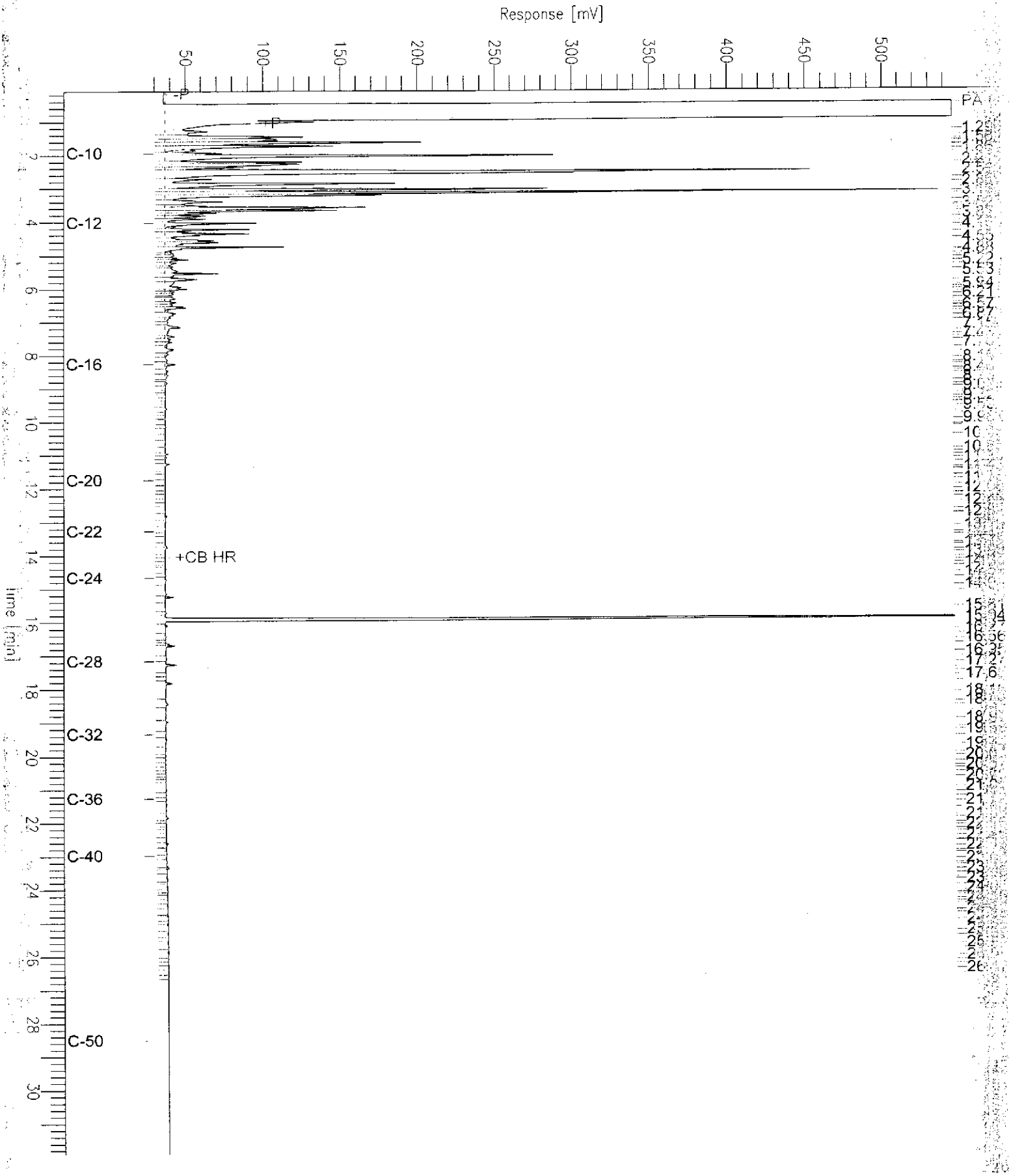
Sample #: 63095
Date : 04/22/2001 06:18 PM
Time of Injection: 04/20/2001 04:47 PM
Low Point : -17.48 mV High Point : 1024.00 mV
Plot Scale: 1041.5 mV



Chromatogram

Sample Name : 151444-003,63095
FileName : G:\GC13\CHB\108B044.RAW
Method : BTEH108.MTH
Start Time : 0.09 min End Time : 31.91 min
Scale Factor: 0.0 Plot Offset: 30 mV

Sample #: 63095 Page 1 of 1
Date : 04/20/2001 10:59 AM
Time of Injection: 04/19/2001 10:38 PM
Low Point : 29.60 mV High Point : 546.02 mV
Plot Scale: 516.4 mV

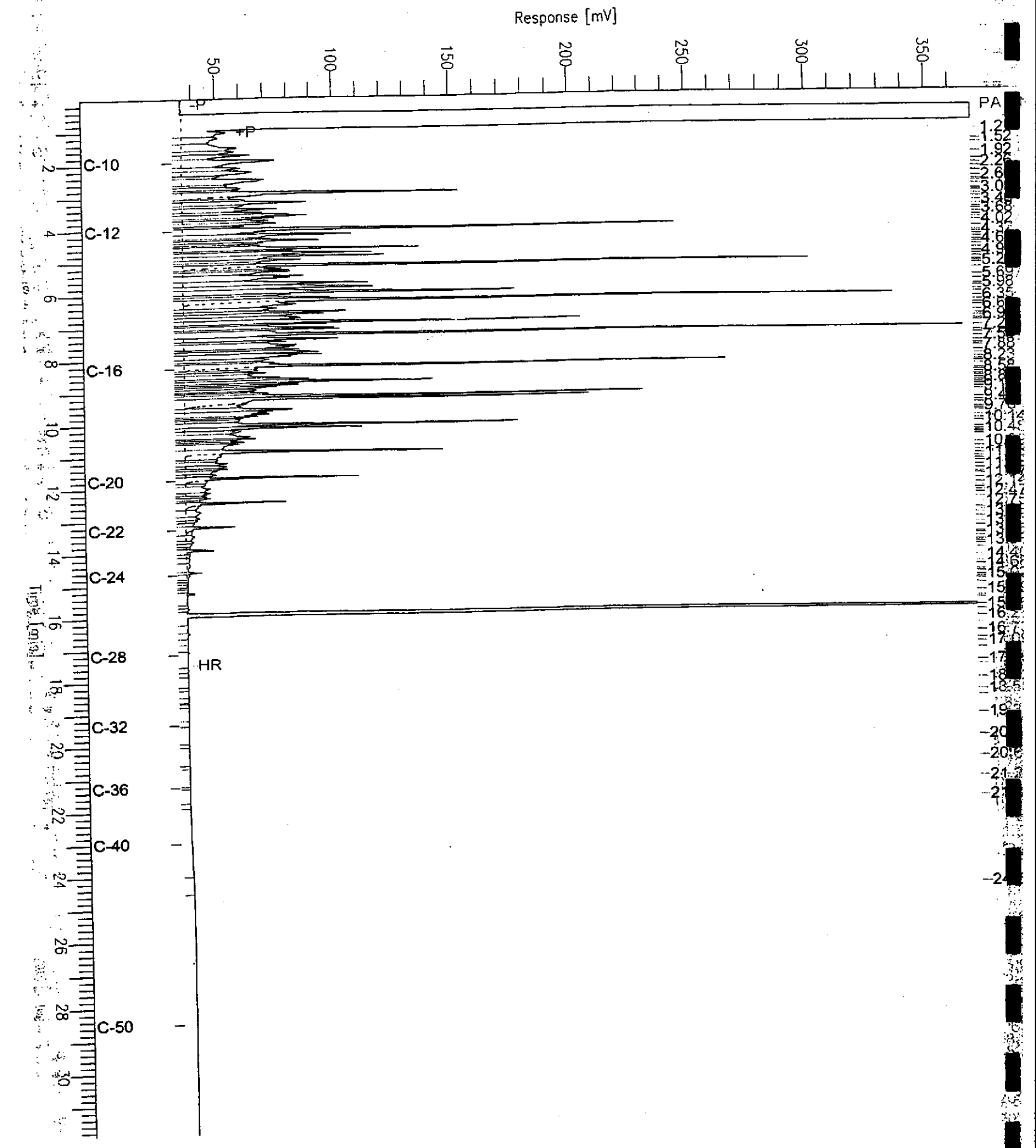


Sample Name : ccv,01ws0904,dsl
FileName : G:\GC13\CHB\108B002.RAW
Method : BTEH108.MTH
Start Time : 0.01 min
Scale Factor: 0.0

End Time : 31.91 min
Plot Offset: 32 mV

Sample #: 500mg/L
Date : 04/19/2001 08:42 AM
Time of Injection: 04/18/2001 05:07 PM
Low Point : 31.94 mV
Plot Scale: 337.9 mV

High Point : 369.81 mV

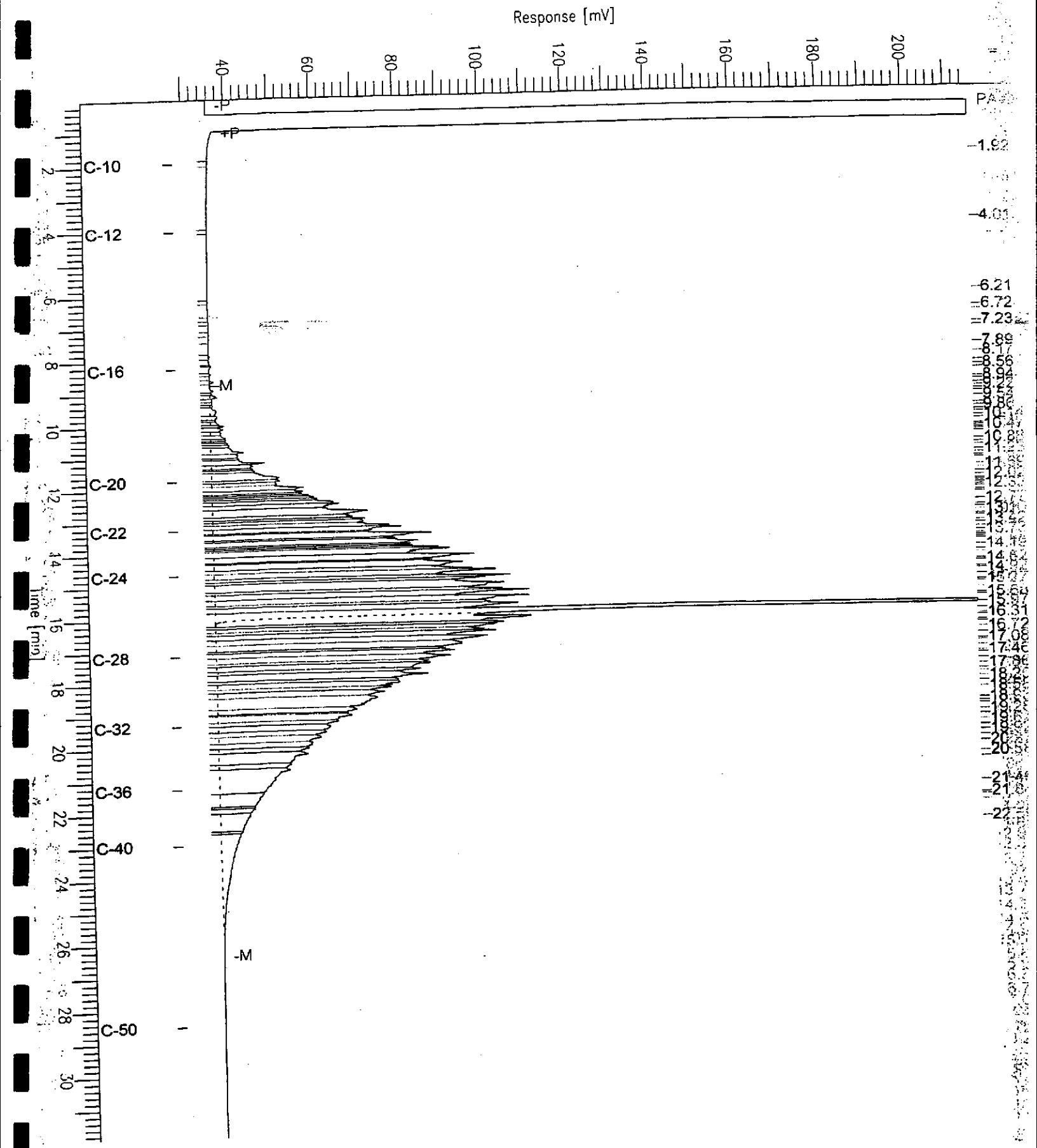


mple Name : ccv,01ws0763,mo
leName : G:\GC13\CHB\108B003.RAW
thod : BTEH108.MTH
art Time : 0.01 min
ale Factor: 0.0

End Time : 31.91 min
Plot Offset: 28 mV

Sample #: 500mg/L
Date : 04/19/2001 08:43 AM
Time of Injection: 04/18/2001 05:46 PM
Low Point : 28.05 mV
Plot Scale: 187.5 mV

High Point : 215.60 mV



Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	151444	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 3520
Project#:	STANDARD	Analysis:	EPA 8015M
Matrix:	Water	Batch#:	63095
Units:	ug/L	Prepared:	04/18/01
Diln Fac:	1.000	Analyzed:	04/19/01

Type: BS Lab ID: QC143409

Analyte	Spiked	Result	%REC	Limits
Diesel C10-C24	2,339	1,347	58	45-110

Surrogate	%REC	Limits
Hexacosane	70	44-121

Type: BSD Lab ID: QC143410

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Diesel C10-C24	2,339	1,549	66	45-110	14	22

Surrogate	%REC	Limits
Hexacosane	84	44-121

RPD= Relative Percent Difference

Gasoline by GC/FID CA LUFT

Lab #:	151444	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030
Project#:	STANDARD	Analysis:	EPA 8015M
Matrix:	Water	Sampled:	04/13/01
Units:	ug/L	Received:	04/13/01

Field ID:	MW-8	Diln Fac:	10.00
Type:	SAMPLE	Batch#:	63287
Lab ID:	151444-001	Analyzed:	04/27/01

Analyte	Result	RL
Gasoline C7-C12	11,000	500

Surrogate	%REC	Limits
Trifluorotoluene (FID)	96	59-135
Bromofluorobenzene (FID)	93	60-140

Field ID:	MW-7	Diln Fac:	10.00
Type:	SAMPLE	Batch#:	63287
Lab ID:	151444-002	Analyzed:	04/27/01

Analyte	Result	RL
Gasoline C7-C12	13,000	500

Surrogate	%REC	Limits
Trifluorotoluene (FID)	98	59-135
Bromofluorobenzene (FID)	89	60-140

Field ID:	MW-4	Diln Fac:	1.000
Type:	SAMPLE	Batch#:	63162
Lab ID:	151444-003	Analyzed:	04/22/01

Analyte	Result	RL
Gasoline C7-C12	1,700	50

Surrogate	%REC	Limits
Trifluorotoluene (FID)	124	59-135
Bromofluorobenzene (FID)	110	60-140

ND= Not Detected
RL= Reporting Limit

Gasoline by GC/FID CA LUFT

Lab #:	151444	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030
Project#:	STANDARD	Analysis:	EPA 8015M
Matrix:	Water	Sampled:	04/13/01
Units:	ug/L	Received:	04/13/01

Field ID:	MW-2	Diln Fac:	1.000
Type:	SAMPLE	Batch#:	63162
Lab ID:	151444-005	Analyzed:	04/22/01

Analyte	Result	RL
Gasoline C7-C12	110	50

Surrogate	%REC	Limits
Trifluorotoluene (FID)	106	59-135
Bromofluorobenzene (FID)	106	60-140

Type:	BLANK	Batch#:	63162
Lab ID:	QC143694	Analyzed:	04/22/01
Diln Fac:	1.000		

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Trifluorotoluene (FID)	103	59-135
Bromofluorobenzene (FID)	103	60-140

Type:	BLANK	Batch#:	63287
Lab ID:	QC144158	Analyzed:	04/26/01
Diln Fac:	1.000		

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Trifluorotoluene (FID)	80	59-135
Bromofluorobenzene (FID)	78	60-140

ND= Not Detected
RL= Reporting Limit

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	151444	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030
Project#:	STANDARD	Analysis:	EPA 8021B
Matrix:	Water	Sampled:	04/13/01
Units:	ug/L	Received:	04/13/01

Field ID:	MW-8	Diln Fac:	10.00
Type:	SAMPLE	Batch#:	63287
Lab ID:	151444-001	Analyzed:	04/27/01

Analyte	Result	RL
MTBE	42	20
Benzene	320	5.0
Toluene	13	5.0
Ethylbenzene	560	5.0
m,p-Xylenes	1,100	5.0
o-Xylene	63	5.0

Surrogate	%REC	Limits
Trifluorotoluene (PID)	85	56-142
Bromofluorobenzene (PID)	87	55-149

Field ID:	MW-7	Diln Fac:	10.00
Type:	SAMPLE	Batch#:	63287
Lab ID:	151444-002	Analyzed:	04/27/01

Analyte	Result	RL
MTBE	52	20
Benzene	140	5.0
Toluene	ND	5.0
Ethylbenzene	530	5.0
m,p-Xylenes	270	5.0
o-Xylene	8.3	5.0

Surrogate	%REC	Limits
Trifluorotoluene (PID)	87	56-142
Bromofluorobenzene (PID)	82	55-149

Field ID:	MW-4	Diln Fac:	1.000
Type:	SAMPLE	Batch#:	63162
Lab ID:	151444-003	Analyzed:	04/22/01

Analyte	Result	RL
MTBE	5.0	2.0
Benzene	4.5 C	0.50
Toluene	2.8	0.50
Ethylbenzene	48	0.50
m,p-Xylenes	10	0.50
o-Xylene	0.72	0.50

Surrogate	%REC	Limits
Trifluorotoluene (PID)	122	56-142
Bromofluorobenzene (PID)	107	55-149

C= Presence confirmed, but confirmation concentration differed by more than a factor of two
ND= Not Detected
RL= Reporting Limit

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	151444	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030
Project#:	STANDARD	Analysis:	EPA 8021B
Matrix:	Water	Sampled:	04/13/01
Units:	ug/L	Received:	04/13/01

Field ID:	MW-2	Diln Fac:	1.000
Type:	SAMPLE	Batch#:	63220
Lab ID:	151444-005	Analyzed:	04/24/01

Analyte	Result	RL
MTBE	10	2.0
Benzene	10	0.50
Toluene	ND	0.50
Ethylbenzene	11	0.50
m,p-Xylenes	6.4	0.50
o-Xylene	ND	0.50

Surrogate	%REC	Limits
Trifluorotoluene (PID)	98	56-142
Bromofluorobenzene (PID)	95	55-149

Type:	BLANK	Batch#:	63162
Lab ID:	QC143694	Analyzed:	04/22/01
Diln Fac:	1.000		

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

Surrogate	%REC	Limits
Trifluorotoluene (PID)	104	56-142
Bromofluorobenzene (PID)	101	55-149

Type:	BLANK	Batch#:	63220
Lab ID:	QC143899	Analyzed:	04/24/01
Diln Fac:	1.000		

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

Surrogate	%REC	Limits
Trifluorotoluene (PID)	98	56-142
Bromofluorobenzene (PID)	93	55-149

C= Presence confirmed, but confirmation concentration differed by more than a factor of two
ND= Not Detected
RL= Reporting Limit

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	151444	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030
Project#:	STANDARD	Analysis:	EPA 8021B
Matrix:	Water	Sampled:	04/13/01
Units:	ug/L	Received:	04/13/01

Type:	BLANK	Batch#:	63287
Lab ID:	QC144158	Analyzed:	04/26/01
Diln Fac:	1.000		

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

Surrogate	%REC	Limits
Trifluorotoluene (PID)	74	56-142
Bromofluorobenzene (PID)	76	55-149

C= Presence confirmed, but confirmation concentration differed by more than a factor of two
ND= Not Detected
RL= Reporting Limit

Gasoline by GC/FID CA LUFT

Lab #:	151444	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030
Project#:	STANDARD	Analysis:	EPA 8015M
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC143695	Batch#:	63162
Matrix:	Water	Analyzed:	04/21/01
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	2,000	1,930	97	73-121

Surrogate	%REC	Limits
Trifluorotoluene (FID)	126	59-135
Bromofluorobenzene (FID)	108	60-140

Gasoline by GC/FID CA LUFT

Lab #:	151444	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030
Project#:	STANDARD	Analysis:	EPA 8015M
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC144159	Batch#:	63287
Matrix:	Water	Analyzed:	04/26/01
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	2,000	1,977	99	73-121

Surrogate	%REC	Limits
Trifluorotoluene (FID)	101	59-135
Bromofluorobenzene (FID)	94	60-140

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	151444	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030
Project#:	STANDARD	Analysis:	EPA 8021B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC143698	Batch#:	63162
Matrix:	Water	Analyzed:	04/21/01
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
MTBE	20.00	20.64	103	51-125
Benzene	20.00	22.14	111	67-117
Toluene	20.00	21.89	109	69-117
Ethylbenzene	20.00	22.07	110	68-124
m,p-Xylenes	40.00	48.42	121	70-125
o-Xylene	20.00	23.09	115	65-129

Surrogate	%REC	Limits
Trifluorotoluene (PID)	104	56-142
Bromofluorobenzene (PID)	103	55-149

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	151444	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030
Project#:	STANDARD	Analysis:	EPA 8021B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC143898	Batch#:	63220
Matrix:	Water	Analyzed:	04/24/01
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
MTBE	20.00	19.49	97	51-125
Benzene	20.00	21.02	105	67-117
Toluene	20.00	21.68	108	69-117
Ethylbenzene	20.00	21.01	105	68-124
m,p-Xylenes	40.00	46.40	116	70-125
o-Xylene	20.00	22.09	110	65-129

Surrogate	%REC	Limits
Trifluorotoluene (PID)	98	56-142
Bromofluorobenzene (PID)	94	55-149

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	151444	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030
Project#:	STANDARD	Analysis:	EPA 8021B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC144160	Batch#:	63287
Matrix:	Water	Analyzed:	04/26/01
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
MTBE	20.00	19.41	97	51-125
Benzene	20.00	22.57	113	67-117
Toluene	20.00	21.86	109	69-117
Ethylbenzene	20.00	22.74	114	68-124
m,p-Xylenes	40.00	47.40	119	70-125
o-Xylene	20.00	23.63	118	65-129

Surrogate	%REC	Limits
Trifluorotoluene (PID)	84	56-142
Bromofluorobenzene (PID)	87	55-149

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Nitrate Nitrogen

Lab #:	151444	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	METHOD
Project#:	STANDARD	Analysis:	EPA 300.0
Analyte:	Nitrogen, Nitrate	Batch#:	63035
Matrix:	Water	Sampled:	04/13/01
Units:	mg/L	Received:	04/13/01
Diln Fac:	1.000	Analyzed:	04/17/01

Field ID	Type	Lab ID	Result	RL
MW-8	SAMPLE	151444-001	ND	0.05
MW-7	SAMPLE	151444-002	ND	0.05
MW-4	SAMPLE	151444-003	ND	0.05
MW-3	SAMPLE	151444-004	0.09	0.05
	BLANK	QC143192	ND	0.05

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Sulfate

Lab #:	151444	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	METHOD
Project#:	STANDARD	Analysis:	EPA 300.0
Analyte:	Sulfate	Sampled:	04/13/01
Matrix:	Water	Received:	04/13/01
Units:	mg/L	Analyzed:	04/17/01
Batch#:	63035		

Field ID	Type	Lab ID	Result	RL	Diln Fac
MW-8	SAMPLE	151444-001	60	2.5	5.000
MW-7	SAMPLE	151444-002	0.55	0.50	1.000
MW-4	SAMPLE	151444-003	7.0	0.50	1.000
MW-3	SAMPLE	151444-004	37	0.50	1.000
	BLANK	QC143192	ND	0.50	1.000

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Nitrate Nitrogen

Lab #:	151444	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	METHOD
Project#:	STANDARD	Analysis:	EPA 300.0
Analyte:	Nitrogen, Nitrate	Batch#:	63035
Field ID:	ZZZZZZZZZZ	Sampled:	04/12/01
MSS Lab ID:	151412-025	Received:	04/12/01
Matrix:	Water	Analyzed:	04/17/01
Units:	mg/L		

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim	Dil'n Fac
BS	QC143193		2.000	2.000	100	90-110			1.000
BSD	QC143194		2.000	2.010	100	90-110	0	20	1.000
MS	QC143195	8.502	10.00	18.50	100	80-120			10.00
MSD	QC143196		10.00	18.90	104	80-120	2	20	10.00

RPD= Relative Percent Difference

Sulfate

Lab #:	151444	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	METHOD
Project#:	STANDARD	Analysis:	EPA 300.0
Analyte:	Sulfate	Batch#:	63035
Field ID:	ZZZZZZZZZZ	Sampled:	04/12/01
MSS Lab ID:	151412-025	Received:	04/12/01
Matrix:	Water	Analyzed:	04/17/01
Units:	mg/L		

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim	Dil'n Fac
BS	QC143193		20.00	20.05	100	90-110			1.000
BSD	QC143194		20.00	20.07	100	90-110	0	20	1.000
MS	QC143195	129.1	100.0	227.2	98	80-120			10.00
MSD	QC143196		100.0	230.0	101	80-120	1	20	10.00

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

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

A N A L Y T I C A L R E P O R T

Prepared for:

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

Date: 27-APR-01
Lab Job Number: 151454
Project ID: N/A
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: **151583**
Client: **Stellar Environmental**
Location: **REDWOOD REGIONAL PARK**

Sampled Date: **04/13/01**
Received Date: **04/13/01**

CASE NARRATIVE

This hardcopy data package contains sample and QC results for two water samples, which were received from the site referenced above on March 13, 2001. The samples were received cold and intact.

TVH/BTXE:
High Trifluorotolune surrogate recovery was observed for the matrix spike duplicate of sample MW-8 (CT# 151444-001), due to hydrocarbons coeluting with the surrogate peak. No other analytical problems were encountered.

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

Chain of Custody Record

Lab job no. 15454

Date

Page ____ of ____

Laboratory Curtis + Tompkins, Ltd.
Address 2323 Fifth Street
Berkeley CA 94701
510| 486-0900

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

Project Name Redwood Regional Park
Project Number 2000-46

Method of Shipment hand delivery
Shipment No. —
Airbill No. —
Cooler No. —
Project Manager Bruce Rucker
Telephone No. (510) 644-3123
Fax No. (510) 644-3859
Samplers: *(Signature)* 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: TVH-gas	Analysis Required: TEH-diesel	Analysis Required: BTEX + MTBE	Remarks
SW-2	see	4/13/01		H_2O	1-Liter amber	✓	none		1		X		
SW-2	note				40 ml VOAs	✓	HCl		2	X		X	
	below												
SW-3					1-L amber	✓	none		1		X		
SW-3					40 ml VOAs	✓	HCl		2	X		X	

Received ☐ On Ice ☐ Cold ☐ Ambient ☑ Intact

Preservation Correct? ☐ Yes ☐ No ☑ N/A

Relinquished by:	Date	Time	Received by:	Date	Time
Signature Bruce M. Rucker			Signature		
Printed Bruce Rucker			Printed Rachaela Bunten		
Company Stellar Env. Solutions			Company		
Relinquished by:			Received by:		
Signature			Signature		
Printed			Printed		
Company			Company		
Relinquished by:			Received by:		
Signature			Signature		
Printed			Printed		
Company			Company		

Turnaround Time: ____

Comments: SW-2 = Redwood Creek at point of groundwater discharge
SW-3 = Redwood Creek ~500' downstream of SW-2

2000-00-01

Gasoline by GC/FID CA LUFT

Lab #:	151454	Location:	REDWOOD REGIONAL PARK
Client:	Stellar Environmental Solutions	Prep:	EPA 5030
Project#:	STANDARD	Analysis:	EPA 8015M
Matrix:	Water	Sampled:	04/13/01
Units:	ug/L	Received:	04/13/01
Diln Fac:	1.000	Analyzed:	04/22/01
Batch#:	63162		

Field ID: SW 2 Lab ID: 151454-001
Type: SAMPLE

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Trifluorotoluene (FID)	105	59-135
Bromofluorobenzene (FID)	108	60-140

Field ID: SW-3 Lab ID: 151454-002
Type: SAMPLE

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Trifluorotoluene (FID)	108	59-135
Bromofluorobenzene (FID)	106	60-140

Type: BLANK Lab ID: QC143694

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Trifluorotoluene (FID)	103	59-135
Bromofluorobenzene (FID)	103	60-140

ND= Not Detected
RL= Reporting Limit

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	151454	Location:	REDWOOD REGIONAL PARK
Client:	Stellar Environmental Solutions	Prep:	EPA 5030
Project#:	STANDARD	Analysis:	EPA 8021B
Matrix:	Water	Sampled:	04/13/01
Units:	ug/L	Received:	04/13/01
Diln Fac:	1.000	Analyzed:	04/23/01
Batch#:	63179		

Field ID: SW 2 Lab ID: 151454-001
Type: SAMPLE

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

Surrogate	%REC	Limits
Trifluorotoluene (PID)	105	56-142
Bromofluorobenzene (PID)	100	55-149

Field ID: SW-3 Lab ID: 151454-002
Type: SAMPLE

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

Surrogate	%REC	Limits
Trifluorotoluene (PID)	105	56-142
Bromofluorobenzene (PID)	101	55-149

Type: BLANK Lab ID: QC143751

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

Surrogate	%REC	Limits
Trifluorotoluene (PID)	102	56-142
Bromofluorobenzene (PID)	97	55-149

ND= Not Detected
RL= Reporting Limit

Gasoline by GC/FID CA LUFT

Lab #:	151454	Location:	REDWOOD REGIONAL PARK
Client:	Stellar Environmental Solutions	Prep:	EPA 5030
Project#:	STANDARD	Analysis:	EPA 8015M
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC143695	Batch#:	63162
Matrix:	Water	Analyzed:	04/21/01
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	2,000	1,930	97	73-121

Surrogate	%REC	Limits
Trifluorotoluene (FID)	126	59-135
Bromofluorobenzene (FID)	108	60-140

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	151454	Location:	REDWOOD REGIONAL PARK
Client:	Stellar Environmental Solutions	Prep:	EPA 5030
Project#:	STANDARD	Analysis:	EPA 8021B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC143750	Batch#:	63179
Matrix:	Water	Analyzed:	04/23/01
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
MTBE	20.00	19.21	96	51-125
Benzene	20.00	20.43	102	67-117
Toluene	20.00	20.88	104	69-117
Ethylbenzene	20.00	20.43	102	68-124
m,p-Xylenes	40.00	44.72	112	70-125
o-Xylene	20.00	21.37	107	65-129

Surrogate	%REC	Limits
Trifluorotoluene (PID)	105	56-142
Bromofluorobenzene (PID)	99	55-149

Gasoline by GC/FID CA LUFT

Lab #:	151454	Location:	REDWOOD REGIONAL PARK
Client:	Stellar Environmental Solutions	Prep:	EPA 5030
Project#:	STANDARD	Analysis:	EPA 8015M
Field ID:	MW-8	Batch#:	63162
MSS Lab ID:	151444-001	Sampled:	04/13/01
Matrix:	Water	Received:	04/13/01
Units:	ug/L	Analyzed:	04/22/01
Diln Fac:	1.000		

Type: MS Lab ID: QC143696

Analyte	MSS Result	Spiked	Result	%REC	Limits
Gasoline C7-C12	8,539	2,000	9,152	31 NM	65-131

Surrogate	%REC	Limits
Trifluorotoluene (FID)	132	59-135
Bromofluorobenzene (FID)	112	60-140

Type: MSD Lab ID: QC143697

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	2,000	9,007	23 NM	65-131	2	20

Surrogate	%REC	Limits
Trifluorotoluene (FID)	166 *	59-135
Bromofluorobenzene (FID)	111	60-140

*= Value outside of QC limits; see narrative
NM= Not Meaningful
RPD= Relative Percent Difference

Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	151454	Location:	REDWOOD REGIONAL PARK
Client:	Stellar Environmental Solutions	Prep:	EPA 5030
Project#:	STANDARD	Analysis:	EPA 8021B
Field ID:	ZZZZZZZZZZ	Batch#:	63179
MSS Lab ID:	151523-009	Sampled:	04/17/01
Matrix:	Water	Received:	04/17/01
Units:	ug/L	Analyzed:	04/24/01
Diln Fac:	1.000		

Type: MS Lab ID: QC143752

Analyte	MSS Result	Spiked	Result	%REC	Limits
MTBE	9.989	20.00	29.76	99	33-131
Benzene	2.384	20.00	22.68	101	65-123
Toluene	1.644	20.00	22.85	106	73-122
Ethylbenzene	2.059	20.00	22.99	105	59-137
m,p-Xylenes	6.063	40.00	50.39	111	68-132
o-Xylene	2.014	20.00	23.96	110	61-140

Surrogate	%REC	Limits
Trifluorotoluene (PID)	101	56-142
Bromofluorobenzene (PID)	98	55-149

Type: MSD Lab ID: QC143753

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	20.00	30.13	101	33-131	1	20
Benzene	20.00	23.43	105	65-123	3	20
Toluene	20.00	22.05	102	73-122	4	20
Ethylbenzene	20.00	22.40	102	59-137	3	20
m,p-Xylenes	40.00	50.22	110	68-132	0	20
o-Xylene	20.00	23.80	109	61-140	1	20

Surrogate	%REC	Limits
Trifluorotoluene (PID)	101	56-142
Bromofluorobenzene (PID)	98	55-149

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	151454	Location:	REDWOOD REGIONAL PARK
Client:	Stellar Environmental Solutions	Prep:	EPA 3520
Project#:	STANDARD	Analysis:	EPA 8015M
Matrix:	Water	Sampled:	04/13/01
Units:	ug/L	Received:	04/13/01
Diln Fac:	1.000	Prepared:	04/17/01
Batch#:	63070		

Field ID:	SW 2	Lab ID:	151454-001
Type:	SAMPLE	Analyzed:	04/18/01

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	74	44-121

Field ID:	SW-3	Lab ID:	151454-002
Type:	SAMPLE	Analyzed:	04/19/01

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	78	44-121

Type:	BLANK	Analyzed:	04/18/01
Lab ID:	QC143321		

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	87	44-121

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	151454	Location:	REDWOOD REGIONAL PARK
Client:	Stellar Environmental Solutions	Prep:	EPA 3520
Project#:	STANDARD	Analysis:	EPA 8015M
Matrix:	Water	Batch#:	63070
Units:	ug/L	Prepared:	04/17/01
Diln Fac:	1.000	Analyzed:	04/18/01

Type: BS Lab ID: QC143322

Analyte	Spiked	Result	%REC	Limits
Diesel C10-C24	2,339	1,623	69	45-110

Surrogate	%REC	Limits
Hexacosane	81	44-121

Type: BSD Lab ID: QC143323

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Diesel C10-C24	2,339	1,890	81	45-110	15	22

Surrogate	%REC	Limits
Hexacosane	87	44-121

RPD= Relative Percent Difference

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

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

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

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

Notes:

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

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

NA = Not Analyzed

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

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

TABLE A.2

HISTORICAL GROUNDWATER MONITORING WELLS ANALYTICAL RESULTS

REDWOOD REGIONAL PARK SERVICE YARD, OAKLAND, CALIFORNIA

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

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

Well MW-2									
Event	Date	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	MTBE
1	Nov-94	66	< 50	3.4	< 0.5	< 0.5	0.9	4.3	NA
2	Feb-95	89	< 50	18	2.4	1.7	7.5	29.6	NA
3	May-95	< 50	< 50	3.9	< 0.5	1.6	2.5	8	NA
4	Aug-95	< 50	< 50	5.7	< 0.5	< 0.5	< 0.5	5.7	NA
5	May-96	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
6	Aug-96	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
7	Dec-96	< 50	< 50	6.3	< 0.5	1.6	< 0.5	7.9	NA
8	Feb-97	< 50	< 50	0.69	< 0.5	0.55	< 0.5	1.24	NA
9	May-97	67	< 50	8.9	< 0.5	5.1	< 1.0	14	NA
10	Aug-97	< 50	< 50	4.5	< 0.5	1.1	< 0.5	5.6	NA
11	Dec-97	61	< 50	21	< 0.5	6.5	3.9	31.4	NA
12	Feb-98	2,000	200	270	92	150	600	1,112	NA
13	Sep-98	< 50	<50	< 0.5	< 0.5	< 0.5	< 0.5	—	7
14	Apr-99	82	710	4.2	< 0.5	3.4	4	11.6	7.5
15	Dec-99	57	<50	20	0.61	5.9	<0.5	26.5	4.5
16	Sep-00	< 50	<50	0.72	< 0.5	< 0.5	< 0.5	0.7	7.9
17	Jan-01	51	<50	8.3	< 0.5	1.5	< 0.5	9.8	8.0
18	Apr-01	110	<50	10	< 0.5	11	6.4	27.4	10.0

NA = Not Analyzed for this constituent

TABLE A.2 (continued)

Well MW-4									
Event	Date	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	MTBE
1	Nov-94	2,600	230	120	4.8	150	88	363	*NA*
2	Feb-95	11,000	330	420	17	440	460	1,337	*NA*
3	May-95	7,200	440	300	13	390	330	1,033	*NA*
4	Aug-95	1,800	240	65	6.8	89	66.5	227	*NA*
5	May-96	1,100	140	51	*< 0.5*	*< 0.5*	47	98	*NA*
6	Aug-96	3,700	120	63	2	200	144	409	*NA*
7	Dec-96	2,700	240	19	*< 0.5*	130	92.9	242	*NA*
8	Feb-97	3,300	*< 50*	120	1.0	150	102.5	374	*NA*
9	May-97	490	*< 50*	2.6	6.7	6.4	6.7	22	*NA*
10	Aug-97	1,900	150	8.6	3.5	78	52.6	143	*NA*
11	Dec-97	1,000	84	4.6	2.7	61	54.2	123	*NA*
12	Feb-98	5,300	340	110	24	320	402	856	*NA*
13	Sep-98	1,800	*<50*	8.9	*< 0.5*	68	26.9	104	23
14	Apr-99	2,900	710	61	1.2	120	80.4	263	32
15	Dec-99	1,000	430	4	2	26	13.9	45.9	*<2*
16	Sep-00	570	380	*< 0.5*	*< 0.5*	16	4.1	20.1	2.4
17	Jan-01	1,600	650	4.2	0.89	46	13.8	64.9	8.4
18	Apr-01	1,700	1,100	4.5	2.8	48	10.7	66.0	5

NA = Not Analyzed for this constituent

TABLE A.2 (continued)

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

NA = Not Analyzed for this constituent

TABLE A.2 (continued)

Well MW-7									
Event	Date	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	MTBE
1	Jan-01	13,000	3,100	95	4	500	289	888	95
2	Apr-01	13,000	3,900	140	*<0.5*	530	278	948	52

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	2037	96
2	Apr-01	11,000	3,200	320	13	560	1,163	2056	42

TABLE A.3

HISTORICAL SURFACE WATER ANALYTICAL RESULTS

REDWOOD REGIONAL PARK SERVICE YARD, OAKLAND, CALIFORNIA

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

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

NA = Not Analyzed for this constituent

TABLE A.3 (continued)

Sampling Location SW-2 (Area of Contaminated Groundwater Discharge)									
Event	Date	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	MTBE
1	Feb-94	130	< 50	1.9	< 0.5	4.4	3.2	9.5	NA
2	May-95	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
3	Aug-95	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
4	May-96	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
5	Aug-96	200	< 50	7.5	< 0.5	5.4	< 0.5	12.9	NA
6	Dec-96	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
7	Feb-97	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
8	Aug-97	350	130	13	0.89	19	10.7	43.6	NA
9	Dec-97	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
10	Feb-98	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
11	Sep-98	< 50	<50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2
11	Apr-99	81	<50	2.0	< 0.5	2.5	1.3	5.8	2.3
13	Dec-99	1,300	250	10.0	1.0	47	27	85.0	2.2
14	Sep-00	160	100	2.1	< 0.5	5.2	1.9	9.2	3.4
15	Jan-01	< 50	< 50	< 0.5	< 0.5	0.53	< 0.5	0.5	< 2

NA = Not Analyzed for this constituent

TABLE A.3 (continued)

Sampling Location SW-3 (Downstream of Contaminated Groundwater Discharge Location SW-2)									
Event	Date	TPHg	TPHd	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	MTBE
1	May-95	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
2	Aug-95	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
3	May-96	< 50	**74**	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
4	Aug-96	**69**	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
5	Dec-96	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
6	Feb-97	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
7	Aug-97	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
8	Dec-97	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
9	Feb-98	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
10	Sep-98	< 50	<50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2
11	Apr-99	< 50	<50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2
12	Dec-99	< 50	<50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2
13	Sep-00	NS	NS	NS	NS	NS	NS	—	NS
14	Jan-01	< 50	<50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2

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