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# **THIRD QUARTER 2007 SITE MONITORING REPORT**

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

*Prepared for:*

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

**October 2007**

**THIRD QUARTER 2007  
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, INC.  
2198 SIXTH STREET  
BERKELEY, CALIFORNIA 94710**

**October 9, 2007**

Project No. 2006-17

October 9, 2007

Mr. Jerry Wickham, P.G.  
Hazardous Materials Specialist  
Local Oversight Program  
Alameda County Department of Environmental Health  
1131 Harbor Bay Parkway, Suite 250  
Alameda, California 94502

Subject: Third Quarter 2007 Site Monitoring Report  
Redwood Regional Park Service Yard Site – Oakland, California  
Alameda County Environmental Health Fuel Leak Case No. RO0000246

Dear Mr. Wickham:

Attached is the referenced Stellar Environmental Solutions, Inc. 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 (EBRPD), and follows previous site investigation and remediation activities (conducted since 1993) associated with former leaking UFSTs. The key regulatory agencies for this investigation are the Alameda County Environmental Health Care Services Agency, Department of Environmental Health; the Regional Water Quality Control Board; and the California Department of Fish and Game.

This report summarizes groundwater and surface monitoring and sampling activities conducted on September 14, 2007 (Third Quarter 2007). Ongoing bioventing activities are reported in technical submittals separate from the ongoing groundwater and surface water monitoring quarterly reports; salient summary discussions will be included in the quarterly groundwater monitoring reports.

I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge. If you have any questions regarding this report, please contact Mr. Neal Fujita of the EBRPD, or contact me directly at (510) 644-3123.

Sincerely,



Richard S. Makdisi, R.G., R.E.A.  
Principal and Project Manager



cc: Carl Wilcox, California Department of Fish and Game  
Neal Fujita, East Bay Regional Park District  
State of California GeoTracker  
Alameda County Environmental Health ftp System

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# **1.0 INTRODUCTION**

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## **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 Environmental Health Care Services Agency, Department of Environmental Health (Alameda County Environmental Health) has provided regulatory oversight of the investigation since its inception (Alameda County Environmental Health Fuel Leak Case No. RO0000246). Other regulatory agencies with historical involvement in site review include the Regional Water Quality Control Board (Water Board) 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) on September 14, 2007 (Third Quarter 2007):

- 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

## **HISTORICAL CORRECTIVE ACTIONS AND INVESTIGATIONS**

Previous SES reports 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. Section 7.0 (References and Bibliography) of this report provides a listing of all technical reports for the site. The following is a summary of the general phases of site work:

- In 2000, a Feasibility Study report for the site was submitted to Alameda County Environmental Health. The study provided detailed analyses of the regulatory implications of site contamination and an assessment of viable corrective actions (SES, 2000d).

- Two instream bioassessment events were conducted in April 1999 and January 2000 to evaluate potential impacts to stream biota associated with the site contamination (no impacts were documented).
- Additional monitoring well installations and corrective action by ORC™ injection proposed by SES were approved by Alameda County Environmental Health in its January 8, 2001 letter to the EBRPD. Two phases of ORC™ injection were conducted—in September 2001 and July 2002.
- A total of 43 groundwater monitoring events have been conducted on a quarterly basis since project inception (November 1994), and a total of 11 groundwater monitoring wells are currently available for monitoring.
- A bioventing pilot test was conducted in September and October 2004 to evaluate the feasibility of this corrective action strategy, and the full-scale bioventing system was installed in November and December 2005. Bioventing activities conducted to date have been, and will continue to be, discussed in bioventing-specific technical reports, and updates will be provided in groundwater monitoring progress reports as they relate to this ongoing program.

## **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 530 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 Alameda County Environmental Health (Case No. RO0000246), with oversight provided by the Water Board (State of California GeoTracker Global ID T0600100489). The CDFG is also involved with regard to water quality impacts to Redwood Creek. All workplans and reports have been submitted to these agencies. Historical Alameda County Environmental Health-approved revisions to the groundwater sampling program have included:

- Discontinuing hydrochemical sampling and analysis in wells MW-1, MW-3, MW-5, and MW-6;
- Discontinuing creek surface water sampling at upstream location SW-1;





3-D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 Source Data: USGS 750 ft Scale: 1 : 25,000 Detail: 13-0 Datum: WGS84



### SITE LOCATION ON U.S.G.S. TOPOGRAPHIC MAP

Redwood Reg. Park Service Yard  
Oakland, CA

By: MJC

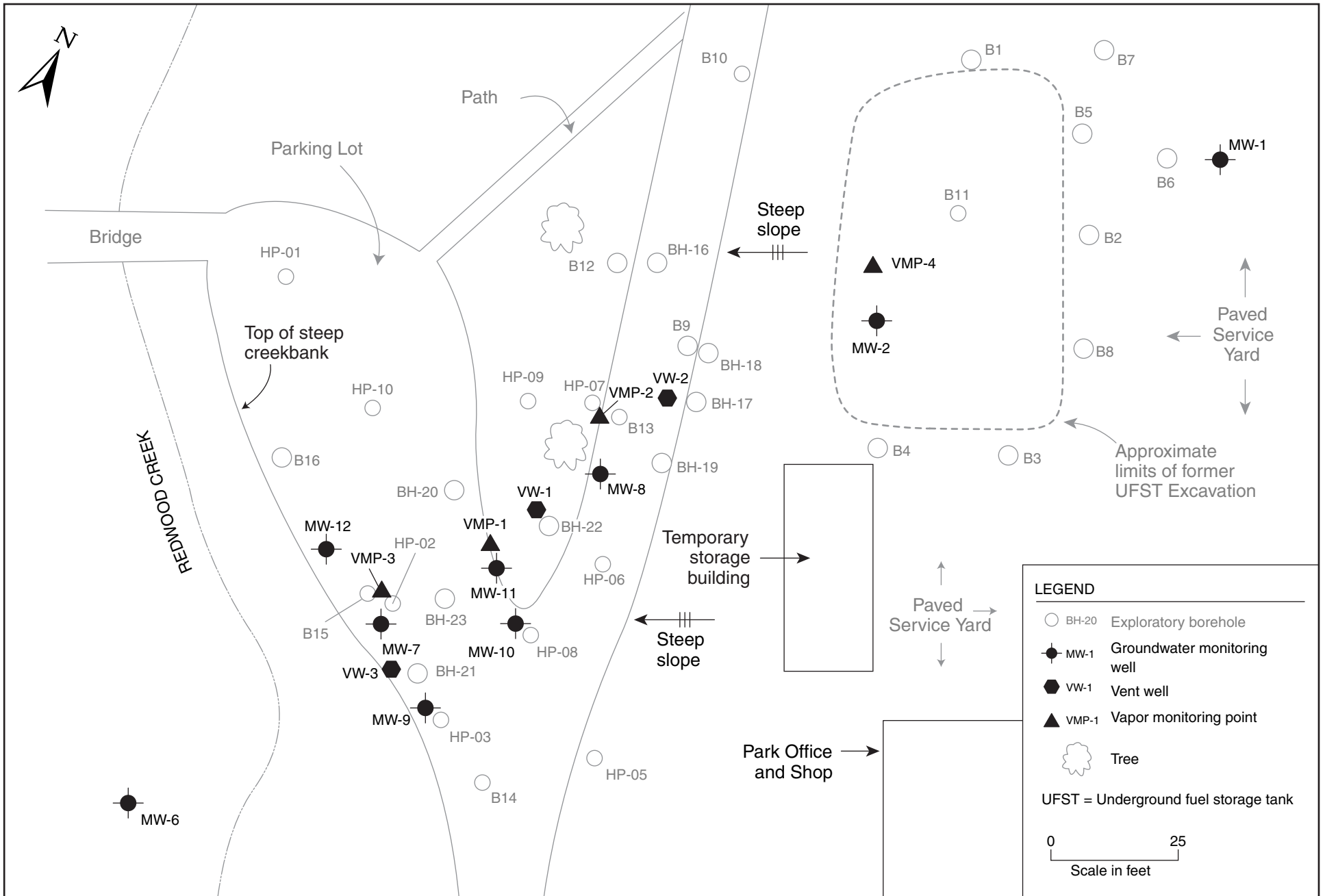
MARCH 2006

Figure 1



2006-17-01





**LEGEND**

- BH-20 Exploratory borehole
- MW-1 Groundwater monitoring well
- VW-1 Vent well
- ▲ VMP-1 Vapor monitoring point
- 🌳 Tree

UFST = Underground fuel storage tank

0 25  
Scale in feet

**SITE PLAN AND WELL LOCATIONS**  
**Redwood Regional Park Service Yard, Oakland, CA**

**Figure 2**

by: MJC

JANUARY 2006

- Discontinuing field measurement and laboratory analyses for natural attenuation indicators; and
- Reducing the frequency of creek surface water sampling from quarterly to semi-annually. The latter recommendation has not yet been implemented due to the EBRPD's continued concern over potential impacts to Redwood Creek.

The site is in compliance with the State Water Resources Control Board's GeoTracker requirements for uploading electronic data and reports. In addition, electronic copies of technical documentation reports published since Q2 2005 have been uploaded to Alameda County Environmental Health's file transfer protocol (ftp) system. Per Alameda County Environmental Health's October 31, 2005 directive entitled "Miscellaneous Administrative Topics and Procedures," effective January 31, 2006, paper copies of reports will no longer be provided to Alameda County Environmental Health.

## **2.0 PHYSICAL SETTING**

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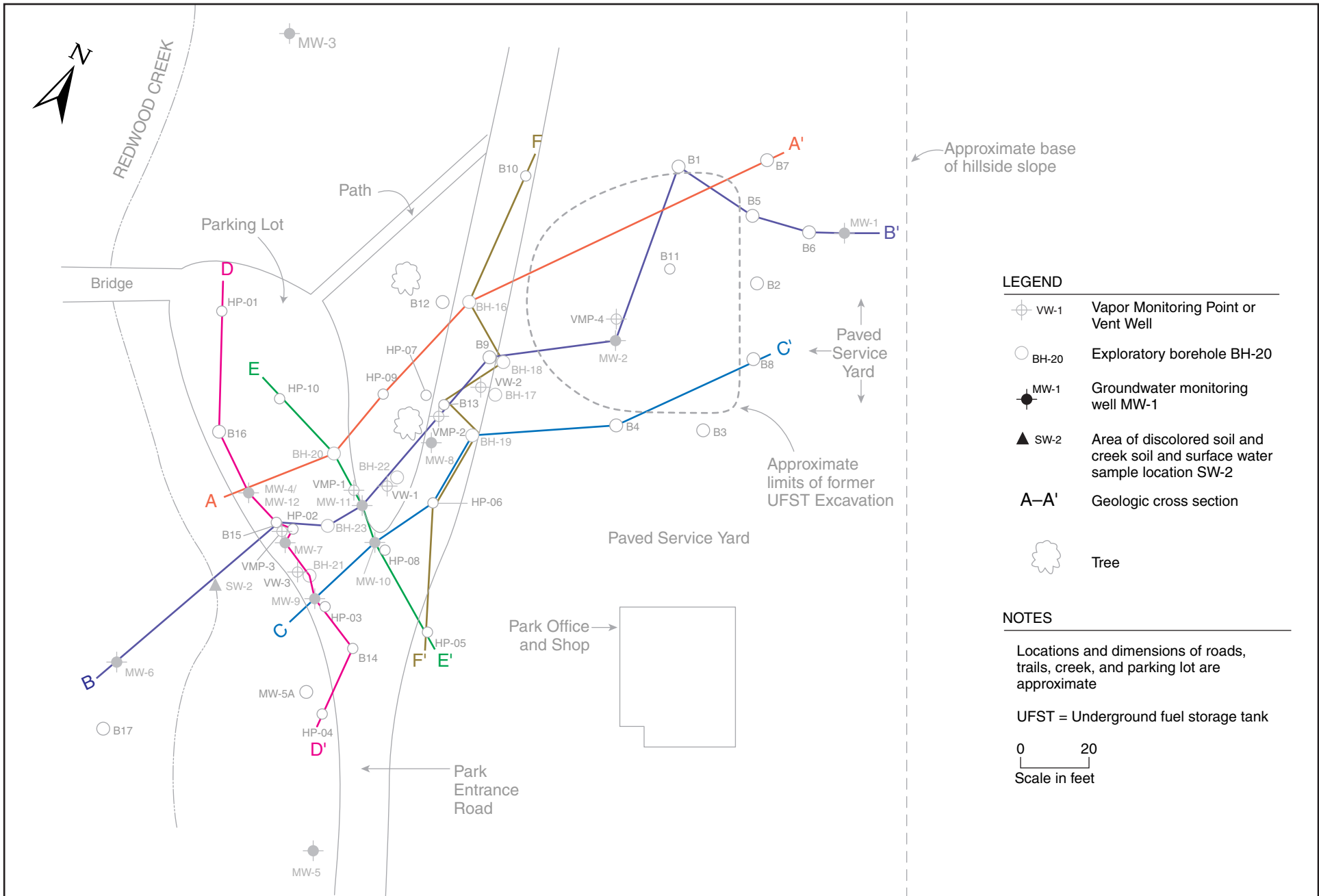
This section discusses the site hydrogeologic conditions based on geologic logging and water level measurements collected at the site since September 1993. Previous SES reports have included detailed discussions of site lithologic and hydrogeologic conditions. In May 2004, Alameda County Environmental Health requested, via email, additional evaluation of site lithology—specifically, the preparation of multiple geologic cross-sections parallel to and perpendicular to the contaminant plume’s long axis.

### **SITE LITHOLOGY**

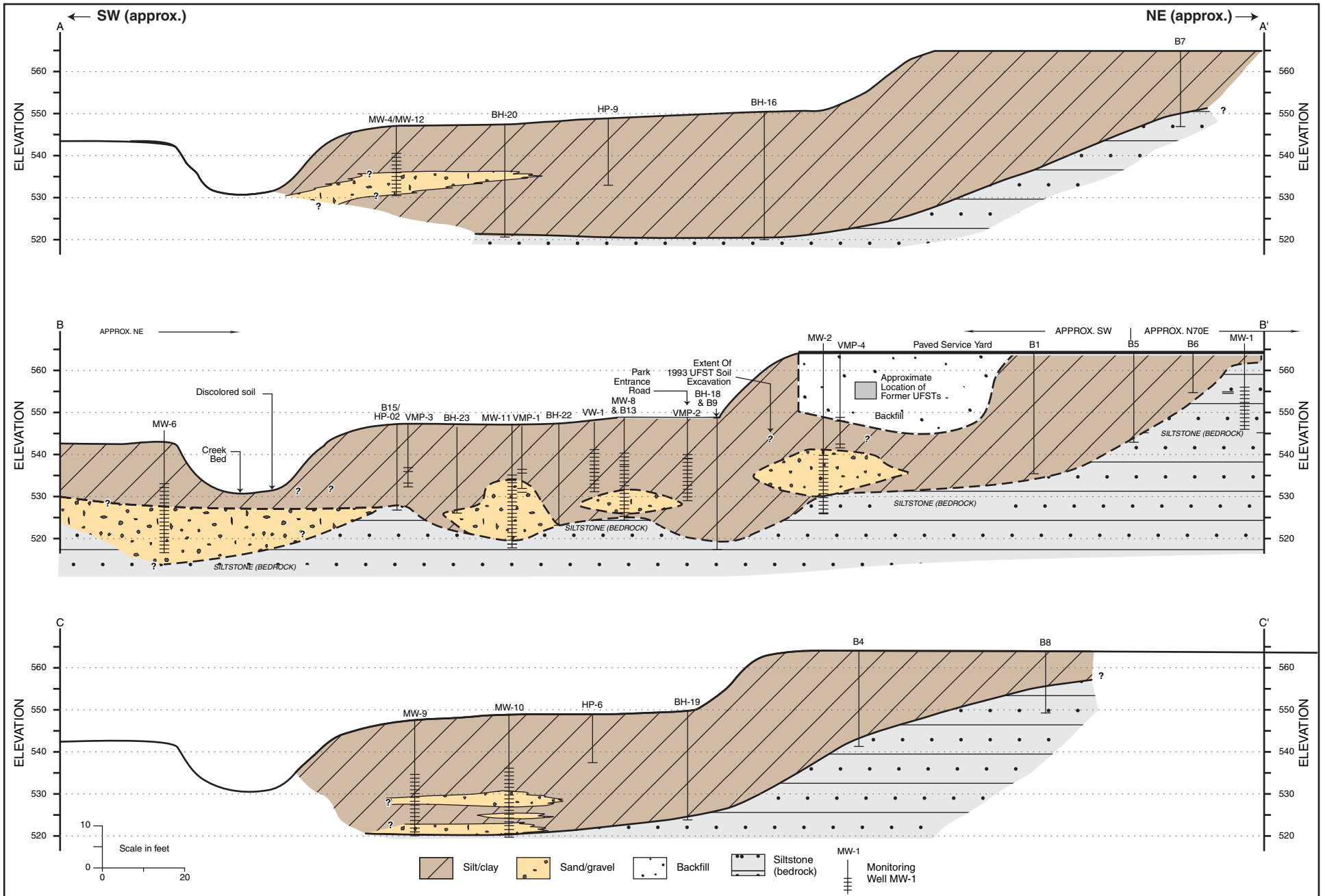
Figure 3 shows the location of geologic cross-sections. Figure 4 shows three sub-parallel geologic cross-sections (A-A’ through C-C’) along the long axis of the groundwater contaminant plume (i.e., along local groundwater flow direction). Figure 5 shows three sub-parallel geologic cross-sections (D-D’ through F-F’) roughly perpendicular to groundwater direction. In each figure, the three sub-parallel sections are presented together for ease of comparison. Due to the small scale, these sections show only lithologic conditions (i.e., soil type and bedrock depth). Additional information on water level depths, historical range of water levels, and inferred thickness of soil contamination were presented in a previous report (SES, 2004c) for cross-section B-B’.

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.

A previous SES report (SES, 2004c) presented a bedrock surface isopleth map (elevation contours for the top of the bedrock surface) in the contaminant plume area. That isopleth map and Figures 4 and 5 indicate the following: The bedrock surface slopes steeply, approximately 0.3 feet/foot from east to west (toward Redwood Creek) in the upgradient portion of the site (from the service yard to under the entrance road), then shows a gentle east-to-west slope in the downgradient portion of the site (under the gravel parking area) toward Redwood Creek. This



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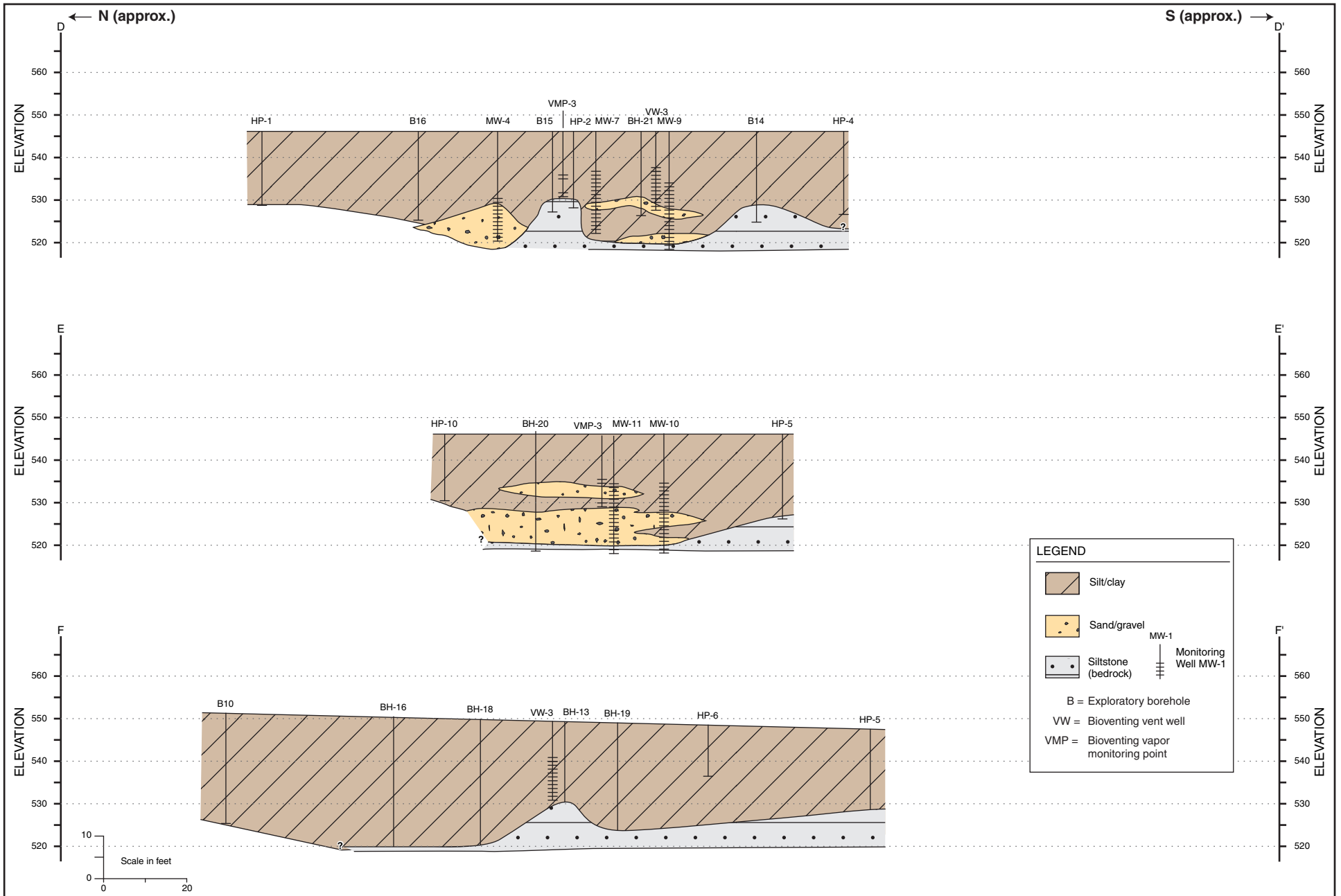


**GEOLOGIC CROSS SECTIONS — A-A' through C-C'**  
**Redwood Regional Park Service Yard, Oakland, CA**

**Figure 4**

by: MJC

DECEMBER 2005



**GEOLOGIC CROSS SECTIONS — D-D' through F-F'**  
**Redwood Regional Park Service Yard, Oakland, CA**

**Figure 5**

by: MJC

DECEMBER 2005

general gradient corresponds to the local groundwater flow direction. On the southern side of the plume area, bedrock slopes gently from south to north (the opposite of the general topographic gradient). Bedrock topography on the northern side of the plume cannot be determined from the available data.

In the central and downgradient portions of the groundwater contaminant plume (under the entrance road and the parking area), the bedrock surface has local, fairly steep elevation highs and lows, expressing a hummocky surface. Bedrock elevations vary by up to 10 feet over distances of less than 20 feet in this area. Local bedrock elevation highs are observed at upgradient location BH-13 (see cross-section F-F') and at downgradient location B15/HP-02 (see cross-section B-B'). Intervening elevation lows create troughs that trend north-south in the central portion of the plume and east-west in the downgradient portion of the plume.

The bedrock surface (and overlying unconsolidated sediment lithology) suggest that the bedrock surface may have at one time undergone channel erosion from a paleostream(s) flowing sub-parallel to present-day Redwood Creek. Because groundwater flows in the unconsolidated sediments that directly overlie the bedrock surface, it is likely that the hummocky bedrock surface affects local groundwater depth and flow direction. This is an important hydrogeologic control that should be considered if groundwater-specific corrective action is contemplated.

## **HYDROGEOLOGY**

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); 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 that 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. Consistent with the bedrock isopleth map showing an elevation depression in the vicinity of MW-11, historical groundwater elevations in MW-11 are sporadically lower than in the surrounding area. As discussed in the previous sub-section, local groundwater flow direction likely is more variable than expressed by groundwater monitoring well data, due to local variations in bedrock surface topography.

Groundwater elevations in Q3 2007 lowered an average of 1.6 feet compared to last quarter, which reflects the dry summer season. Figure 6 is a groundwater elevation map constructed from the current event monitoring well equilibrated water levels. Table 1 (in Section 3.0)

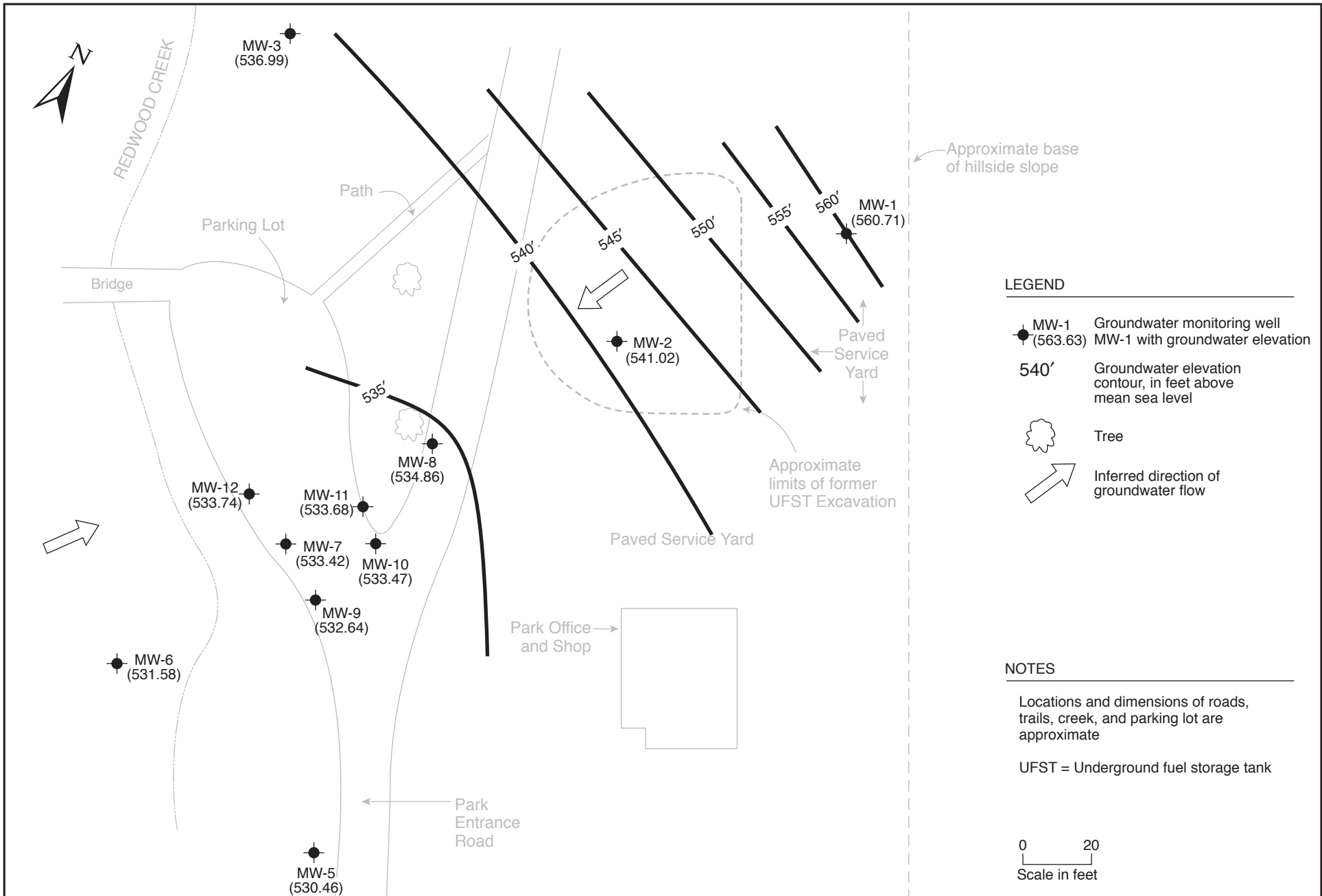


summarizes current event groundwater elevation data. Appendix A contains historical groundwater elevation data.

In the upgradient portion of the site (between well MW-1 and MW-2, in landslide debris and the former UFST excavation backfill), the groundwater gradient is approximately 0.26 feet per foot. Downgradient from (west of) the UFST source area (between MW-2 and Redwood Creek), the groundwater gradient is approximately 0.09 feet per foot. The average groundwater elevation was 0.01 feet lower than the previous (June 2007) event, with the greatest lowering of 3.81 feet measured in MW-3. The smallest changes in groundwater elevations was seen in wells nearest to Redwood Creek, with the groundwater elevation in MW-9 measured at 1.54 feet higher than in June 2007. 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 assume a site groundwater velocity of 7 to 10 feet per year using general look-up tables for permeability characteristics for the site-specific lithologic data obtained from site investigations. This velocity estimate is conservatively low, but does meet minimum-distance-traveled criteria from the date when contamination was first observed in Redwood Creek (1993) relative to the time of the UST installations (late 1970s). Locally, however, the groundwater velocity could vary significantly. Calculating the specific hydraulic conductivity critical to accurately estimating site-specific groundwater velocity would require direct testing of the water-bearing zone through a slug or pumping test.

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 seeps and springs) in the vicinity of the site, and discharges into Upper San Leandro Reservoir located approximately 1 mile southeast of the site. During low-flow conditions, the groundwater table is below the creek bed in most locations (including the area of historical contaminated groundwater discharge); consequently, there is little to no observable creek flow at these times.



2006-17-14

### **3.0 THIRD QUARTER 2007 ACTIVITIES**

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This section presents the creek surface water and groundwater sampling and analytical methods for the most recent groundwater monitoring event (Q3 2007), conducted in September 2007. A summary of bioventing-related activities is also provided.

#### **GROUNDWATER AND SURFACE WATER MONITORING ACTIVITIES**

Groundwater and surface water analytical results are summarized in Section 5.0. Monitoring and sampling protocols were in accordance with the Alameda County Environmental Health-approved SES technical workplan (SES, 1998a). Current event activities included:

- Measuring static water levels in all 11 of the site wells.
- Collecting post-purge groundwater samples for laboratory analysis of site contaminants from wells located within (or potentially within) the groundwater plume (MW-2, MW-7, MW-8, MW-9, MW-10, MW-11, and MW-12).
- Collecting Redwood Creek surface water samples for laboratory analysis from locations SW-2 and SW-3.

The Q3-2007 water level monitoring was notable for low water levels resulting from the significantly lower than normal rainfall in the winter of 2006-2007.

Groundwater monitoring/sampling and creek sampling were conducted on September 14, 2007. The locations of all site monitoring wells and creek water sampling locations are shown on Figure 2 (in Section 1.0). Well construction information and water level data are summarized in Table 1. Appendix B contains the groundwater monitoring field records for the current event.

**Table 1**  
**Groundwater Monitoring Well Construction and Groundwater Elevation Data –**  
**September 14, 2007 Monitoring Event**  
**Redwood Regional Park Corporation Yard, Oakland, California**

Well	Well Depth	Screened Interval	TOC Elevation	Groundwater Elevation (9/14/07)
MW-1	18	7 to 17	565.83	560.71
MW-2	36	20 to 35	566.42	541.02
MW-3	42	7 to 41	560.81	536.99
MW-5	26	10 to 25	547.41	530.46
MW-6	26	10 to 25	545.43	531.58
MW-7	24	9 to 24	547.56	533.42
MW-8	23	8 to 23	549.13	534.86
MW-9	26	11 to 26	549.28	532.64
MW-10	26	11 to 26	547.22	533.47
MW-11	26	11 to 26	547.75	533.68
MW-12	25	10 to 25	544.67	533.74

**Notes:**

TOC = Top of casing.

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

All elevations are feet above U.S. Geological Survey mean sea level.

**Groundwater Level Monitoring and Sampling**

Groundwater monitoring well water level measurements, purging, sampling, and field analyses were conducted by Blaine Tech Services under the 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 (State Water Resources Control Board, 1989), and followed the methods and protocols approved by Alameda County Environmental Health in the SES 1998 workplan (SES, 1998a).

As the first task of the monitoring event, static water levels were measured using an electric water level indicator. Water levels were lower than normal, reflecting the past year of drought conditions.

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, electrical conductivity, and turbidity) were measured after each purged casing volume to ensure that

representative formation water would be sampled. To minimize the potential for cross-contamination, wells were purged and sampled in order of increasing contamination (based on the analytical results of the previous quarter).

The sampling-derived purge water and decontamination rinseate (approximately 50 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 the water will be transported offsite for proper disposal.

### **Creek Surface Water Sampling**

Surface water sampling was conducted by SES on September 14, 2007. 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 SW-3 (approximately 500 feet downstream of the SW-2 location). In accordance with a previous SES recommendation approved by the Alameda County Environmental Health, upstream sample location SW-1 is no longer part of the surface water sampling program.

At the time of sampling, the creek was at a historically low stage—intermittent pools of water along the creek reach to be sampled were observed with water depths ranged from approximately 0.0 to 0.5 feet, and no continuous surface no flow. The SW-3 sampling location was completely dry and was not sampled during this quarter. At the SW-2 location, where contaminated groundwater discharge to the creek historically has been observed, an orange algae was seen growing on the saturated portion of the creek bank. This algae likely is utilizing the petroleum as a carbon source, and therefore is a good indicator of the presence of petroleum contamination. A slight sheen was evident on/at the water surface.

### **BIOVENTING-RELATED ACTIVITIES**

The bioventing system was installed and started up in December 2005/January 2006. One month's worth of weekly system monitoring and air flow optimization events were conducted in January and February 2006. Monthly bioventing system operations and maintenance (O&M) events have been conducted since February 2006. Bioventing activities are discussed in detail in separate technical documents.

## **4.0 REGULATORY CONSIDERATIONS**

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This chapter summarizes the regulatory considerations regarding surface water and groundwater contamination. There are no Alameda County Environmental Health or Water Board cleanup orders for the site, although all site work has been conducted under oversight of these agencies.

### **GROUNDWATER CONTAMINATION**

As specified in the Water Board's San Francisco Bay Region Water Quality Control Plan (Regional Water Quality Control Board, 1986), all groundwater are considered potential sources of drinking water unless otherwise approved by the Water Board, 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), Water Board approval for this exclusion has not been obtained for the site. As summarized in Table 2 (in Section 5.0), site groundwater contaminant levels are compared to two sets of criteria: 1) Water Board Tier 1 Environmental Screening Levels (ESLs) for sites where groundwater is a current or potential drinking water source; and 2) ESLs for sites where groundwater is not a current or potential drinking water source.

As stipulated in the ESL document (Water Board, 2005), the ESLs 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 ESLs are composed of multiple components, including ceiling value, human toxicity, indoor air impacts, and aquatic life protection. Exceedance of ESLs 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, Alameda County Environmental Health has indicated that impacts to nearby Redwood Creek are of primary importance, and that site target cleanup standards should be evaluated primarily in the context of surface water quality criteria.

### **SURFACE WATER CONTAMINATION**

As summarized in Table 2 (in 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 ESL document (Water

Board, 2005), 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-7, MW-9, and MW-12).

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**

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This section presents the field and laboratory analytical results of the most recent monitoring event. Table 2 summarizes the contaminant analytical results of the current monitoring event. Figure 7 shows the current event contaminant analytical results and the inferred limits of the gasoline groundwater plume. Appendix C contains the certified analytical laboratory report and chain-of-custody record for the current event. Appendix D contains a summary of historical groundwater and surface analytical results.

### **CURRENT EVENT GROUNDWATER AND SURFACE WATER RESULTS**

Current quarter site groundwater contaminant concentrations in wells MW-2, MW-7, MW-8, MW-9, MW-11, and MW-12 exceeded their respective groundwater ESLs for TVHg and TEHd. Contaminant concentrations in wells MW-2, MW-8, MW-9, MW-10, and MW-11 exceeded their groundwater ESLs for benzene. Concentrations at MW-2 exceeded the ESL for toluene and MTBE. Monitoring wells MW-2, MW-7, MW-8, MW-9, and MW-11 exceeded the ESLs for ethylbenzene and total xylenes. All of the concentrations were above the ESLs both under the drinking water resource *is* threatened criterion and under the drinking water resource *is not* threatened criterion.

The maximum groundwater contaminant concentrations were detected in well MW-8 (located directly down from the previous source area adjacent to the steep slope). Elevated contaminant concentrations were also detected in downgradient wells MW-2, MW-7, MW-9, and MW-11. The northern edge of the plume in the downgradient area of the plume is defined by well MW-12. The southern edge of the plume in the downgradient area is not strictly defined; however, based on historical groundwater data, it appears to be located between well MW-9 and well MW-5. The current event contaminant plume geometry is consistent with recent historical contaminant distribution, showing the center of contaminant mass in groundwater located downgradient of the former source area.



**Table 2**  
**Groundwater and Surface Water Sample**  
**Analytical Results, September 14, 2007**  
**Redwood Regional Park Corporation Yard, Oakland, California**

Location	Contaminant						
	TVHg	TEHd	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE
<b>GROUNDWATER SAMPLES</b>							
MW-2	<b>2,600</b>	<b>260</b>	<b>160</b>	<b>44</b>	<b>86</b>	<b>431</b>	<b>15</b>
MW-7	<b>6,400</b>	<b>3,000</b>	<0.5	<0.5	<b>170</b>	<b>43</b>	<2.0
MW-8	<b>9,400</b>	<b>3,400</b>	<b>200</b>	6.9	<b>1,000</b>	<b>773</b>	<8.0
MW-9	<b>4,500</b>	<b>2,100</b>	<b>60</b>	3.8	<b>420</b>	<b>226.5</b>	<4.0
MW-10	84	<50	<b>3.6</b>	<0.5	2.3	0.52	3.6
MW-11	<b>5,500</b>	<b>2,700</b>	<b>86</b>	<0.5	<b>180</b>	<b>16.1</b>	<2.0
MW-12	<b>390</b>	<b>180</b>	<0.5	<0.5	2.4	2.44	<2.0
<b>Groundwater ESLs</b> <sup>(a)</sup>	100 / 500	100 / 640	1.0 / 46	40 / 130	30 / 290	13 / 13	5.0 / 1,800
<b>REDWOOD CREEK SURFACE WATER SAMPLES</b>							
SW-2	<50	77	<0.5	<0.5	<0.5	<0.5	<2.0
SW-3	NS	NS	NS	NS	NS	NS	NS
<b>Surface Water Screening Levels</b> <sup>(a, b)</sup>	500	100	46	130	290	13	8,000

**Notes:**

<sup>(a)</sup> Water Board Environmental Screening Levels (drinking water resource threatened/not threatened) (Water Board, 2005).

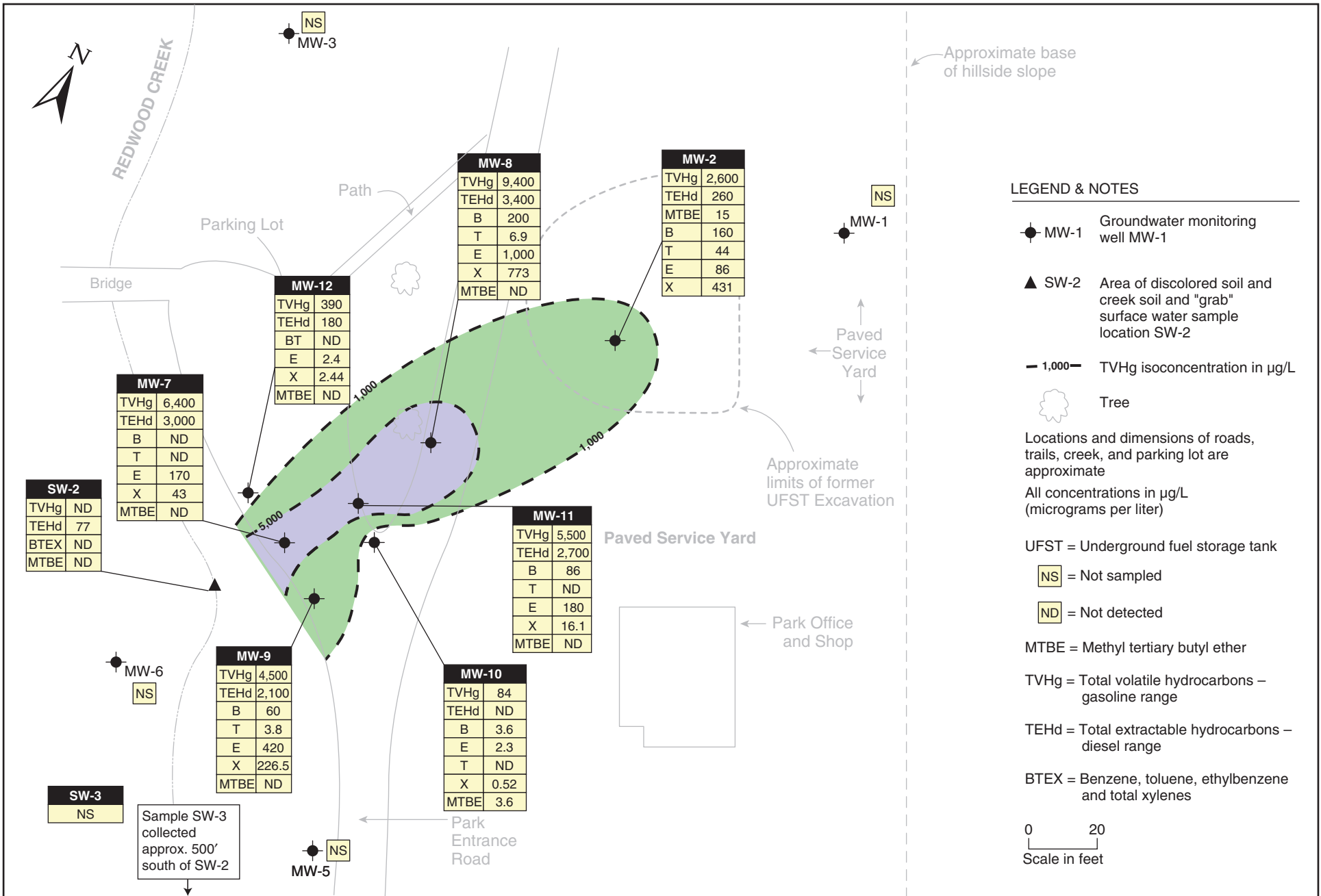
<sup>(b)</sup> Lowest of chronic and acute surface water criteria published by the State of California, U.S. Environmental Protection Agency, or U.S. Department of Energy.

MTBE = methyl *tertiary*-butyl ether; TVHg = total volatile hydrocarbons - gasoline range; TEHd = total extractable hydrocarbons - diesel range  
 All concentrations expressed in µg/L (equivalent to parts per billion).  
 Samples in **bold-face type** exceed the ESL and/or surface water screening levels.  
 NS = Not sampled. SW-3 location was completely dry during the sampling event.

Diesel was detected in the surface water sample collected at SW-2 (77 µg/L). The concentration was just slightly below the 100-µg/L surface water screening level criterion. The surface water at SW-3 was not sampled as there was no surface water at the sampling location during this sampling event.

**QUALITY CONTROL SAMPLE ANALYTICAL RESULTS**

Laboratory QC samples (e.g., method blanks, matrix spikes, surrogate spikes) 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 C).



**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
  - 1,000 - TVHg 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)
  - UFST = Underground fuel storage tank
  - NS = Not sampled
  - ND = Not detected
  - MTBE = Methyl tertiary butyl ether
  - TVHg = Total volatile hydrocarbons – gasoline range
  - TEHd = Total extractable hydrocarbons – diesel range
  - BTEX = Benzene, toluene, ethylbenzene and total xylenes
- 0 20  
Scale in feet

2006-17-15

## **6.0 SUMMARY, CONCLUSIONS AND PROPOSED ACTIONS**

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

### **SUMMARY AND CONCLUSIONS**

- Groundwater elevations in Q3-2007 were lower than seasonal normal due to lower than average rainfall in 2007. This has had the ancillary positive effect of exposing much of the bioventing screened zone to oxygen.
- Groundwater contaminant concentrations in Q3-2007 were on average lower than the previous quarter and Q3-2006 analytical data. Well MW-9, near Redwood Creek, showed the largest decrease with 4,500 µg/L TVH-gas in Q3-2007 compared to 12,000 µg/L TVH-gas in Q3-2006.
- Groundwater sampling has been conducted on an approximately quarterly basis since November 1994 (43 events in the initial site wells). A total of 11 site wells are available for monitoring; 7 of the available wells are currently monitored for contamination.
- Site contaminants of concern include gasoline, diesel, BTEX, and MTBE. Current groundwater concentrations exceed regulatory screening levels for groundwater.
- The primary environmental risk is discharge of contaminated groundwater to the adjacent Redwood Creek. A stream bioassessment concluded that there were no direct impacts to the surface water benthic community; however, groundwater contamination is sporadically detected in surface water samples, and there is historical visual evidence of plume discharge at the creek/groundwater interface. Surface water samples have sporadically exceeded surface water ESL criteria for gasoline, diesel, and benzene, and generally only under low creek flow conditions. An in-stream bioassessment evaluation conducted in 1999 to 2000 determined that there were no impacts to the benthic macroinvertebrate community.
- The existing well layout adequately defines the lateral extent of groundwater contamination, and the vertical limit is very likely the top of the near-surface (25 to 28 feet) siltstone bedrock. The saturated interval extends approximately 12 to 15 feet from top of bedrock through the capillary fringe. Groundwater elevations fluctuate seasonally, creating a capillary fringe that varies seasonally in thickness.

- The groundwater contaminant plume has become disconnected from its original source, but continues to be fed from the residual hydrocarbon concentrations in the soil. The groundwater plume has migrated well beyond the former source area (represented by well MW-2) toward Redwood Creek. The plume of groundwater contamination above screening levels appears to be approximately 100 feet long and approximately 40 feet wide. The zone of greatest contamination (greater than 9,000- $\mu\text{g/L}$  TVHg) is currently an approximately 20-foot-wide by 30-foot-long area centered around well MW-8.
- The contaminant plume is neither stable nor reducing, as groundwater contaminant concentrations fluctuate seasonally, and the center of mass of the contaminant plume (represented by maximum concentrations) has alternated between mid-plume and downgradient wells in recent history. Recent groundwater contaminant concentrations are below sitewide historical maxima, and there is no indication that maximum site groundwater concentrations are increasing, which suggests that “worst case” contaminant concentrations may have been reached.
- A two-phase ORC™ injection corrective action program was implemented at the site. In September 2001, approximately 3,000 pounds of ORC™ was injected into 44 boreholes over a 4,400-square foot area of the maximum groundwater contamination. In June 2002, approximately 1,000 pounds of ORC™ was injected in 30 boreholes over a smaller area that showed residual high contaminant concentrations following the initial injection phase. The ORC™ was injected over the full saturated interval (including the capillary fringe). The findings indicate that the corrective action was partially effective in reducing the lateral extent of the groundwater contaminant plume; however, initial contaminant reductions were followed by rebounding to pre-injection concentrations. The data suggest that site conditions support aerobic biodegradation when not limited by oxygen concentrations, notably on the plume margins and upgradient former source area, but not along the centerline of the contaminant plume.
- A September 2003 exploratory borehole program confirmed that sorbed-phase contamination in the seasonally-unsaturated zone is a primary source of long-term contaminant contribution to the groundwater plume. Reduction/removal of this contamination will be necessary to eliminate continued discharge of contaminated groundwater to Redwood Creek and ultimately obtain site closure.
- Soil bioventing appears to be the best remedy for contaminant mass removal in the unsaturated zone, under the restrictive conditions at the site, and appears to be the most appropriate corrective action strategy giving consideration to technical, cost, safety, and aesthetic issues. A 2- to 3-year program of bioventing may reduce unsaturated zone contamination such that it will no longer be a long-term source of contamination to groundwater. A full-scale bioventing system was installed in November/December 2005, and began operating in December 2005.

## **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.
- Continue to inform regulators of site progress and seek their concurrence with proposed actions.
- Operate the bioventing system as a corrective action to try and reduce the residual contaminated soil in the area of the former source area excavation, and report those results in bioventing-specific technical reports.
- Continue to evaluate analytical results (and bioventing contaminant removal data) in the context of hydrochemical trends, impacts of groundwater contamination on Redwood Creek, and effectiveness of the corrective action.
- Conduct a microbial respiration test to evaluate the second year effectiveness of the bioventing system.
- Continue to make required Electronic Data Format uploads to the State of California GeoTracker database, and upload an electronic copy of technical reports to Alameda County Environmental Health's ftp system.

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## 8.0 LIMITATIONS

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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 has been prepared in accordance with generally accepted methodologies and standards of practice. The SES personnel who performed this work 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 site characterization and corrective actions completed.

## **APPENDIX A**

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### **Historical Groundwater Monitoring Well Water Level Data**

**HISTORICAL GROUNDWATER ELEVATIONS IN MONITORING WELLS  
REDWOOD REGIONAL PARK SERVICE YARD  
7867 REDWOOD ROAD, OAKLAND, CALIFORNIA**

Well I.D.	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-9	MW-10	MW-11	MW-12
TOC Elevation (a)	565.83	566.42	560.81	548.10	547.41	545.43	547.56	549.13	549.28	547.22	547.75	544.67
Date Monitored	Groundwater Elevations (feet above mean sea level)											
09/18/98	563.7	544.2	540.8	534.5	531.1	545.6						
04/06/99	565.2	546.9	542.3	535.6	532.3	532.9						
12/20/99	562.9	544.7	541.5	534.9	531.2	532.2						
09/28/00	562.8	542.7	538.3	532.2	530.9	532.0						
01/11/01	562.9	545.1	541.7	535.0	531.2	532.3	534.9	538.1				
04/13/01	562.1	545.7	541.7	535.1	531.5	532.4	535.3	539.8				
09/01/01	560.9	542.0	537.7	533.9	530.7	531.8	534.0	535.6				
12/17/01	562.2	545.2	542.2	534.8	531.4	532.4	534.8	538.4	534.6	535.7	535.2	
03/14/02	563.0	547.1	542.2	535.5	532.4	533.3	535.7	541.8	535.0	537.6	536.6	
06/18/02	562.1	544.7	541.1	534.6	531.2	532.2	534.8	537.9	534.7	535.6	535.3	
09/24/02	561.4	542.2	537.3	533.5	530.6	531.8	533.5	535.5	535.3	533.8	531.7	
12/18/02	562.4	545.0	542.0	534.8	531.5	532.5	534.6	537.1	536.5	535.2	532.8	
03/27/03	562.6	545.7	541.7	534.8	531.6	532.4	535.1	539.9	537.2	536.2	533.6	
06/19/03	562.3	544.9	541.5	534.8	531.3	532.3	534.9	538.2	536.9	535.7	533.2	
09/10/03	561.6	542.1	537.9	533.8	530.8	531.9	533.7	535.6	535.6	534.1	531.9	
12/10/03	562.4	542.7	537.6	533.7	530.9	531.9	533.7	535.2	535.5	533.8	531.7	
03/18/04	563.1	546.6	541.9	535.0	531.7	532.4	535.2	540.9	537.4	536.6	533.8	
06/17/04	562.1	544.3	540.7	534.3	531.0	532.1	534.6	537.4	536.5	535.1	532.7	
09/21/04	561.5	541.1	536.5	533.1	530.5	531.6	533.1	534.7	532.7	533.2	533.2	
12/14/04	562.2	545.3	541.7	534.7	531.4	532.2	534.6	540.4	536.7	535.5	532.9	
03/16/05	563.8	547.3	541.7	535.3	532.4	532.8	535.6	541.8	538.0	537.1	534.2	
06/15/05	562.9	545.9	541.6	535.0	531.7	532.5	535.0	540.0	535.0	536.1	535.6	
09/13/05	562.3	543.5	539.7	534.4	530.9	532.2	534.3	536.7	536.1	534.7	532.4	
12/15/05	562.2	544.3	541.4	(b)	531.0	532.2	534.5	537.3	534.1	534.7	534.9	535.1
03/30/06	565.8	548.6	542.7	(b)	533.9	534.4	536.2	542.3	536.4	537.3	537.6	535.7
06/20/06	563.6	545.4	541.6	(b)	531.5	532.5	534.9	538.6	534.6	536.2	535.5	535.0
09/29/06	561.9	542.8	539.0	(b)	530.7	532.1	535.1	536.1	533.7	534.6	534.7	534.7
12/14/06	562.9	544.2	541.5	(b)	531.1	532.3	534.7	536.7	534.0	534.8	535.2	535.0
03/21/07	562.5	545.2	541.7	(b)	531.4	532.4	534.9	539.3	534.6	535.6	535.6	535.1
06/20/07	561.5	543.5	540.8	(b)	531.0	532.4	534.6	537.1	531.1	535.2	535.3	534.9
9/14/2007	560.71	541.02	536.99	(b)	530.46	531.58	533.42	534.86	532.64	533.47	533.68	533.74

TOC = Top of well Casing

(a) TOC Elevations resurveyed on December 15, 2005 in accordance GeoTracker requirements.

(b) Well decommissioned and replaced by MW-12 in December 2005.

## **APPENDIX B**

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### **Groundwater Monitoring Field Documentation**

# WELL GAUGING DATA

Project # 070914-DW-1 Date 9-14-07 Client Stellar

Site Redwood Regional Park, Oakland

Well ID	Time	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 <u>TOC</u>	Notes
MW-1	0905	4					5.12	19.10		
MW-2	0908	4	odor				25.40	38.90		
MW-3	0917	4					23.82	45.02		
MW-5	0913	4					16.95	26.95		
MW-6	0923	4					13.85	27.45		
MW-7	0930	2					14.14	25.33		
MW-8	0937	2					14.27	22.23		
MW-9	0934	2					16.64	30.25		
MW-10	0927	2					13.75	28.34		
MW-11	0940	2					14.07	28.72		
MW-12	0932	2					10.93	23.86		

# WELLHEAD INSPECTION CHECKLIST

Date 9-14-07 Client Stellar

Site Address Redwood Regional Park Oakland

Job Number ~~09090~~ 090914-DW-1 Technician DL

Well ID	Well Inspected - No Corrective Action Required	Water Bailed From Wellbox	Wellbox Components Cleaned	Cap Replaced	Debris Removed From Wellbox	Lock Replaced	Other Action Taken (explain below)	Well Not Inspected (explain below)
MW-1		Lock + cap rusty						
MW-2	X							
MW-3	X							
MW-5		Lock + cap rusty						
MW-6		Lock + cap rusty						
MW-7	X							
MW-8	<del>X</del>	Bolts/tabs stripped						
MW-9	X							
MW-10		Annular seal down ≈ 1'						
MW-11	X							
MW-12	X							

NOTES: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_





WELL MONITORING DATA SHEET

Project #: 070914-0W-1	Client: Stellar
Sampler: DW	Date: 9-14-07
Well I.D.: MW-2	Well Diameter: 2 3 4 6 8
Total Well Depth (TD): 38.90	Depth to Water (DTW): 25.40
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: PVC Grade	D.O. Meter (if req'd): YSI HACH
DTW with 80% Recharge [(Height of Water Column x 0.20) + DTW]: 28.10	

Purge Method: Bailer      Waterra      Sampling Method: Bailer  
 Disposable Bailer      Peristaltic       Disposable Bailer  
 Positive Air Displacement      Extraction Pump      Extraction Port  
 Electric Submersible      Other \_\_\_\_\_      Dedicated Tubing  
 Other: \_\_\_\_\_

8.8 (Gals.) X 3 = 26.4 Gals.	Well Diameter Multiplier	Well Diameter Multiplier
1 Case Volume Specified Volumes Calculated Volume	1" 0.04	4" 0.65
	2" 0.16	6" 1.47
	3" 0.37	Other radius <sup>2</sup> * 0.163

Time	Temp (°F or °C)	pH	Cond. (mS or µS)	Turbidity (NTUs)	Gals. Removed	Observations
0952	61.3	6.8	842	33	8.8	
0954	60.8	6.8	844	157	17.6	
	well dewatered @ 18 g/s.					
1221	60.3	7.5	801	286	-	

Did well dewater?  Yes No Gallons actually evacuated: 18

Sampling Date: 9-14-07 Sampling Time: 1221 Depth to Water: 26.80

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

Analyzed for: TPH-G BTEX MTBE TPH-D Oxygenates (5) Other:

EB I.D. (if applicable): @ Time Duplicate I.D. (if applicable):

Analyzed for: TPH-G BTEX MTBE TPH-D Oxygenates (5) Other:

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

WELL MONITORING DATA SHEET

Project #: 070914-DW-1	Client: Stellar
Sampler: DW	Date: 9-14-07
Well I.D.: MW-7	Well Diameter: (2) 3 4 6 8
Total Well Depth (TD): 25.33	Depth to Water (DTW): 14.14
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: (PVC) Grade	D.O. Meter (if req'd): YSI HACH
DTW with 80% Recharge [(Height of Water Column x 0.20) + DTW]:	

Purge Method: Bailer      Waterra      Sampling Method: Bailer  
 Disposable Bailer      Peristaltic       Disposable Bailer  
 Positive Air Displacement      Extraction Pump      Extraction Port  
 Electric Submersible      Other \_\_\_\_\_      Dedicated Tubing  
 Other: \_\_\_\_\_

1.8 (Gals.) X 3 = 5.4 Gals.  
 I Case Volume      Specified Volumes      Calculated Volume

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

Time	Temp (°F or °C)	pH	Cond. (mS or µS)	Turbidity (NTUs)	Gals. Removed	Observations
1036	58.7	7.0	798	71000	1.8	gray
1038	57.7	7.0	819	71000	3.6	"
1041	57.3	7.0	809	71000	5.4	"

Did well dewater? Yes  No      Gallons actually evacuated: 5.4

Sampling Date: 9-14-07      Sampling Time: 1045      Depth to Water:

Sample I.D.: MW-7      Laboratory: Kiff CalScience Other C&T

Analyzed for: (TPH-G) (BTEX) (MTBE) (TPH-D)      Oxygenates (5)      Other:

EB I.D. (if applicable): @ Time      Duplicate I.D. (if applicable):

Analyzed for: TPH-G BTEX MTBE TPH-D Oxygenates (5) Other:

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

O.R.P. (if req'd): Pre-purge: mV      Post-purge: mV

WELL MONITORING DATA SHEET

Project #: 070914-DW-1	Client: Stellar
Sampler: DW	Date: 9-14-07
Well I.D.: MW-8	Well Diameter: (2) 3 4 6 8
Total Well Depth (TD): 22.23	Depth to Water (DTW): 14.27
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: PVO Grade	D.O. Meter (if req'd): YSI HACH
DTW with 80% Recharge [(Height of Water Column x 0.20) + DTW]:	

Purge Method: Bailer  
 Disposable Bailer  
 Positive Air Displacement  
 Electric Submersible

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

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

1.3 (Gals.) X 3 = 3.9 Gals.  
 I Case Volume Specified Volumes Calculated Volume

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

Time	Temp (°F or °C)	pH	Cond. (mS or µS)	Turbidity (NTUs)	Gals. Removed	Observations
1136	63.1	7.2	848	>1000	1.3	gray/odor
1138	62.4	7.0	867	560	2.6	" "
1141	62.5	7.0	872	664	3.9	" "

Did well dewater? Yes  No Gallons actually evacuated: 3.9

Sampling Date: 9-14-07 Sampling Time: 1146 Depth to Water:

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

Analyzed for:  TPH-G  BTEX  MTBE  TPH-D Oxygenates (5) Other:

EB I.D. (if applicable): @ Time Duplicate I.D. (if applicable):

Analyzed for: TPH-G BTEX MTBE TPH-D Oxygenates (5) Other:

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

## WELL MONITORING DATA SHEET

Project #: <b>070914-0W-1</b>	Client: <b>Stellar</b>
Sampler: <b>OW</b>	Date: <b>9-14-07</b>
Well I.D.: <b>MW-9</b>	Well Diameter: <b>(2)</b> 3 4 6 8 _____
Total Well Depth (TD): <b>30.25</b>	Depth to Water (DTW): <b>16.64</b>
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: <b>(PVC)</b> Grade	D.O. Meter (if req'd): YSI HACH
DTW with 80% Recharge [(Height of Water Column x 0.20) + DTW]:	

Purge Method: Bailer  
 Disposable Bailer  
 Positive Air Displacement  
 Electric Submersible

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

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

<b>2.2</b>	(Gals.) X	<b>3</b>	=	<b>6.6</b>	Gals.
1 Case Volume		Specified Volumes		Calculated Volume	

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

Time	Temp (°F or °C)	pH	Cond. (mS or $\mu$ S)	Turbidity (NTUs)	Gals. Removed	Observations
1116	60.3	7.0	860	71000	2.2	gray/odor
1120	59.1	7.0	869	71000	4.4	" "
1123	58.0	7.0	838	71000	6.6	" "

Did well dewater? Yes  No  Gallons actually evacuated: **6.6**

Sampling Date: **9-14-07** Sampling Time: **1128** Depth to Water:

Sample I.D.: **MW-9** Laboratory: Kiff CalScience Other **CH**

Analyzed for: **(TPH-G)** **(BTEX)** **(MTBE)** **(TPH-D)** Oxygenates (5) Other:

EB I.D. (if applicable): \_\_\_\_\_ @ \_\_\_\_\_ Time Duplicate I.D. (if applicable):

Analyzed for: TPH-G BTEX MTBE TPH-D Oxygenates (5) Other:

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

O.R.P. (if req'd): Pre-purge: \_\_\_\_\_ mV Post-purge: \_\_\_\_\_ mV

WELL MONITORING DATA SHEET

Project #: <u>070914-DW-1</u>	Client: <u>Stellar</u>
Sampler: <u>DW</u>	Date: <u>9-14-07</u>
Well I.D.: <u>MW-10</u>	Well Diameter: <u>2</u> 3 4 6 8 _____
Total Well Depth (TD): <u>28.34</u>	Depth to Water (DTW): <u>13.75</u>
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: <u>PVC</u> Grade	D.O. Meter (if req'd): YSI HACH
DTW with 80% Recharge [(Height of Water Column x 0.20) + DTW]:	

Purge Method: Bailer  Disposable Bailer  Positive Air Displacement  Electric Submersible  Waterra Peristaltic Extraction Pump  Other \_\_\_\_\_

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

2.3 (Gals.) X 3 = 6.9 Gals.  
 1 Case Volume Specified Volumes Calculated Volume

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

Time	Temp (°F or °C)	pH	Cond. (mS or µS)	Turbidity (NTUs)	Gals. Removed	Observations
1011	60.1	7.8	785	113	2.3	
1014	58.9	7.3	812	196	4.6	
1018	58.9	7.3	774	310	6.9	

Did well dewater? Yes  No  Gallons actually evacuated: 6.9

Sampling Date: 9-14-07 Sampling Time: 1023 Depth to Water:

Sample I.D.: MW-10 Laboratory: Kiff CalScience Other CST

Analyzed for: TPH-G BTEX MTBE TPH-D Oxygenates (5) Other:

EB I.D. (if applicable): @ Time Duplicate I.D. (if applicable):

Analyzed for: TPH-G BTEX MTBE TPH-D Oxygenates (5) Other:

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

WELL MONITORING DATA SHEET

Project #: 070914-DW-1	Client: Stellar
Sampler: DW	Date: 9-14-07
Well I.D.: MW-11	Well Diameter: (2) 3 4 6 8
Total Well Depth (TD): 28.72	Depth to Water (DTW): 14.07
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: PVC Grade	D.O. Meter (if req'd): YSI HACH
DTW with 80% Recharge [(Height of Water Column x 0.20) + DTW]:	

Purge Method: Bailer	Waterra	Sampling Method: Bailer
<input checked="" type="checkbox"/> Disposable Bailer	Peristaltic	<input checked="" type="checkbox"/> Disposable Bailer
Positive Air Displacement	Extraction Pump	Extraction Port
Electric Submersible	Other _____	Dedicated Tubing
		Other: _____

2.3 (Gals.) X 3 = 6.9 Gals.	Well Diameter Multiplier	Well Diameter Multiplier
1 Case Volume Specified Volumes Calculated Volume	1" 0.04	4" 0.65
	2" 0.16	6" 1.47
	3" 0.37	Other radius <sup>2</sup> * 0.163

Time	Temp (°F or °C)	pH	Cond. (mS or µS)	Turbidity (NTUs)	Gals. Removed	Observations
1158	60.3	7.0	835	>1000	2.3	gray/odor
1202	59.1	6.9	831	>1000	4.6	" "
1205	58.8	6.9	831	>1000	6.9	" "

Did well dewater? Yes <input checked="" type="checkbox"/> No	Gallons actually evacuated: 6.9		
Sampling Date: 9-14-07	Sampling Time: 1210	Depth to Water:	
Sample I.D.: MW-11	Laboratory: Kiff CalScience	Other: C+T	
Analyzed for: TPH-G BTEX MTBE TPH-D	Oxygenates (5)	Other:	
EB I.D. (if applicable):	Time	Duplicate I.D. (if applicable):	
Analyzed for: TPH-G BTEX MTBE TPH-D	Oxygenates (5)	Other:	
D.O. (if req'd): Pre-purge:	mg/L	Post-purge:	mg/L
O.R.P. (if req'd): Pre-purge:	mV	Post-purge:	mV

WELL MONITORING DATA SHEET

Project #: <u>070914-0w-1</u>	Client: <u>Stellar</u>
Sampler: <u>DW</u>	Date: <u>9-14-07</u>
Well I.D.: <u>MW-12</u>	Well Diameter: <u>(2)</u> 3 4 6 8 _____
Total Well Depth (TD): <u>23.86</u>	Depth to Water (DTW): <u>10.93</u>
Depth to Free Product:	Thickness of Free Product (feet):
Referenced to: <u>(PVO)</u> Grade	D.O. Meter (if req'd): YSI HACH
DTW with 80% Recharge [(Height of Water Column x 0.20) + DTW]:	

Purge Method: Bailer  Disposable Bailer  Positive Air Displacement  Electric Submersible  Waterra  Peristaltic  Extraction Pump  Other \_\_\_\_\_

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

<u>2.1</u> (Gals.) X <u>3</u> = <u>6.3</u> Gals.	Well Diameter	Multiplier	Well Diameter	Multiplier
1 Case Volume	Specified Volumes	Calculated Volume		
	1"	0.04	4"	0.65
	2"	0.16	6"	1.47
	3"	0.37	Other	radius <sup>2</sup> * 0.163

Time	Temp (°F or °C)	pH	Cond. (mS or µS)	Turbidity (NTUs)	Gals. Removed	Observations
1054	57.7	6.8	739	>1000	2.1	Brown
1057	57.0	6.8	725	>1000	4.2	"
1059	57.0	6.8	713	>1000	6.3	"

Did well dewater? Yes  No  Gallons actually evacuated: 6.3

Sampling Date: 9-14-07 Sampling Time: 1104 Depth to Water:

Sample I.D.: MW-12 Laboratory: Kiff CalScience Other C++

Analyzed for: TPH-G BTEX MTBE TPH-D Oxygenates (5) Other:

EB I.D. (if applicable): @ Time Duplicate I.D. (if applicable):

Analyzed for: TPH-G BTEX MTBE TPH-D Oxygenates (5) Other:

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

O.R.P. (if req'd): Pre-purge: \_\_\_\_\_ mV Post-purge: \_\_\_\_\_ mV



## **APPENDIX C**

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### **Analytical Laboratory Report and Chain-of-Custody Record**

# Chain of Custody Record

# 197632

Lab job no. \_\_\_\_\_  
 Date 9-14-07  
 Page 1 of 1

Laboratory Curtis and Tompkins, Ltd. Method of Shipment Hand Delivery  
 Address 2323 Fifth Street Shipment No. \_\_\_\_\_  
Berkeley, California 94710 Airbill No. \_\_\_\_\_  
510-486-0900 Cooler No. \_\_\_\_\_  
 Project Owner East Bay Regional Park District Project Manager Bruce Rucker Rohn  
 Site Address 7867 Redwood Road Telephone No. (510) 644-3123  
Oakland, California Fax No. (510) 644-3859  
 Project Name Redwood Regional Park Samplers: (Signature) David C. Walt  
 Project Number 2006-16

Field Sample Number	Location/Depth	Date	Time	Sample Type	Type/Size of Container	Preservation		Filtered	No. of Containers	Analysis Required				Remarks
						Cooler	Chemical							
-1 MW-2		9-14	1221	W	Amber 1L Voas 40ml		NP HCL	4	X	X	X			
-2 MW-7			1045					4	X	X	X			
-3 MW-8			1146					4	X	X	X			
-4 MW-9			1128					4	X	X	X			
-5 MW-10			1023					4	X	X	X			
-6 MW-11			1210					4	X	X	X			
-7 MW-12			1104					4	X	X	X			

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

IVH-6 (Bois)  
 BTRP/MBE (Bois)  
 TTH-D (Bois)

Relinquished by: <u>David C. Walt</u> Signature: _____ Printed: <u>Dave Walter</u> Company: <u>Blaine Tech</u>	Date: <u>9-14</u> Time: <u>1340</u>	Received by: <u>[Signature]</u> Signature: _____ Printed: <u>Loranna Cortis</u> Company: <u>Curtis &amp; Tompkins</u>	Date: <u>9-14-07</u> Time: <u>1140</u>	Relinquished by: _____ Signature: _____ Printed: _____ Company: _____	Date: _____ Time: _____	Received by: _____ Signature: _____ Printed: _____ Company: _____	Date: _____ Time: _____		
Turnaround Time: <u>5 Day TAT</u> Comments: <u>Please provide a GeoTracker EDD as well as hard copy of report.</u> <u>Surface water samples collected by Stellar Environmental Solutions.</u> <u>Groundwater samples collected by Blaine Tech Services.</u>				Relinquished by: _____ Signature: _____ Printed: _____ Company: _____				Date: _____ Time: _____	

2000-00-01

1200 P intact, on ice



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

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

Laboratory Job Number 197632
ANALYTICAL REPORT

Stellar Environmental Solutions
2198 6th Street
Berkeley, CA 94710

Project : 2006-16
Location : Redwood Regional Park
Level : II

Table with 2 columns: Sample ID, Lab ID. Rows include MW-2 through MW-12 with corresponding Lab IDs from 197632-001 to 197632-007.

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. This report may be reproduced only in its entirety.

Signature: [Handwritten Signature]
Project Manager

Date: 09/21/2007

Signature: [Handwritten Signature]
Operations Manager

Date: 09/21/2007

### CASE NARRATIVE

Laboratory number: 197632  
Client: Stellar Environmental Solutions  
Project: 2006-16  
Location: Redwood Regional Park  
Request Date: 09/14/07  
Samples Received: 09/14/07

This hardcopy data package contains sample and QC results for seven water samples, requested for the above referenced project on 09/14/07. The samples were received cold and intact.

**TPH-Purgeables and/or BTXE by GC (EPA 8015B and EPA 8021B):**

High surrogate recovery was observed for trifluorotoluene (PID) in MW-7 (lab # 197632-002), due to interference from coeluting hydrocarbon peaks; the corresponding bromofluorobenzene (PID) surrogate recovery was within limits. Low surrogate recovery was observed for trifluorotoluene (FID) in MW-7 (lab # 197632-002), due to matrix interference; the corresponding bromofluorobenzene (FID) surrogate recovery was within limits. High surrogate recovery was also observed for trifluorotoluene (FID) in MW-9 (lab # 197632-004), due to interference from coeluting hydrocarbon peaks; the corresponding bromofluorobenzene (FID) surrogate recovery was within limits. High surrogate recovery was observed for bromofluorobenzene (PID) in MW-11 (lab # 197632-006), due to interference from coeluting hydrocarbon peaks; the corresponding trifluorotoluene (PID) surrogate recovery was within limits. No other analytical problems were encountered.

**TPH-Extractables by GC (EPA 8015B):**

No analytical problems were encountered.

**Curtis & Tompkins Laboratories Analytical Report**

Lab #: 197632	Location: Redwood Regional Park
Client: Stellar Environmental Solutions	Prep: EPA 5030B
Project#: 2006-16	
Matrix: Water	Sampled: 09/14/07
Units: ug/L	Received: 09/14/07
Batch#: 129518	

Field ID: MW-2 Diln Fac: 1.000  
 Type: SAMPLE Analyzed: 09/17/07  
 Lab ID: 197632-001

Analyte	Result	RL	Analysis
Gasoline C7-C12	2,600	50	EPA 8015B
MTBE	15	2.0	EPA 8021B
Benzene	160	0.50	EPA 8021B
Toluene	44	0.50	EPA 8021B
Ethylbenzene	86	0.50	EPA 8021B
m,p-Xylenes	340	0.50	EPA 8021B
o-Xylene	91	0.50	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	130	73-134	EPA 8015B
Bromofluorobenzene (FID)	100	77-140	EPA 8015B
Trifluorotoluene (PID)	118	65-142	EPA 8021B
Bromofluorobenzene (PID)	106	74-135	EPA 8021B

Field ID: MW-7 Diln Fac: 1.000  
 Type: SAMPLE Analyzed: 09/17/07  
 Lab ID: 197632-002

Analyte	Result	RL	Analysis
Gasoline C7-C12	6,400 H	50	EPA 8015B
MTBE	ND	2.0	EPA 8021B
Benzene	ND	0.50	EPA 8021B
Toluene	ND	0.50	EPA 8021B
Ethylbenzene	170	0.50	EPA 8021B
m,p-Xylenes	36	0.50	EPA 8021B
o-Xylene	7.0 C	0.50	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	0 *	73-134	EPA 8015B
Bromofluorobenzene (FID)	114	77-140	EPA 8015B
Trifluorotoluene (PID)	166 *	65-142	EPA 8021B
Bromofluorobenzene (PID)	128	74-135	EPA 8021B

\*= Value outside of QC limits; see narrative  
 C= Presence confirmed, but RPD between columns exceeds 40%  
 H= Heavier hydrocarbons contributed to the quantitation  
 L= Lighter hydrocarbons contributed to the quantitation  
 ND= Not Detected  
 RL= Reporting Limit

**Curtis & Tompkins Laboratories Analytical Report**

Lab #: 197632	Location: Redwood Regional Park
Client: Stellar Environmental Solutions	Prep: EPA 5030B
Project#: 2006-16	
Matrix: Water	Sampled: 09/14/07
Units: ug/L	Received: 09/14/07
Batch#: 129518	

Field ID: MW-8 Diln Fac: 4.000  
 Type: SAMPLE Analyzed: 09/18/07  
 Lab ID: 197632-003

Analyte	Result	RL	Analysis
Gasoline C7-C12	9,400	200	EPA 8015B
MTBE	ND	8.0	EPA 8021B
Benzene	200	2.0	EPA 8021B
Toluene	6.9 C	2.0	EPA 8021B
Ethylbenzene	1,000	2.0	EPA 8021B
m,p-Xylenes	750	2.0	EPA 8021B
o-Xylene	23	2.0	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	131	73-134	EPA 8015B
Bromofluorobenzene (FID)	109	77-140	EPA 8015B
Trifluorotoluene (PID)	125	65-142	EPA 8021B
Bromofluorobenzene (PID)	115	74-135	EPA 8021B

Field ID: MW-9 Diln Fac: 2.000  
 Type: SAMPLE Analyzed: 09/18/07  
 Lab ID: 197632-004

Analyte	Result	RL	Analysis
Gasoline C7-C12	4,500	100	EPA 8015B
MTBE	ND	4.0	EPA 8021B
Benzene	60	1.0	EPA 8021B
Toluene	3.8	1.0	EPA 8021B
Ethylbenzene	420	1.0	EPA 8021B
m,p-Xylenes	220	1.0	EPA 8021B
o-Xylene	6.5	1.0	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	159 *	73-134	EPA 8015B
Bromofluorobenzene (FID)	109	77-140	EPA 8015B
Trifluorotoluene (PID)	128	65-142	EPA 8021B
Bromofluorobenzene (PID)	117	74-135	EPA 8021B

\*= Value outside of QC limits; see narrative  
 C= Presence confirmed, but RPD between columns exceeds 40%  
 H= Heavier hydrocarbons contributed to the quantitation  
 L= Lighter hydrocarbons contributed to the quantitation  
 ND= Not Detected  
 RL= Reporting Limit

**Curtis & Tompkins Laboratories Analytical Report**

Lab #: 197632	Location: Redwood Regional Park
Client: Stellar Environmental Solutions	Prep: EPA 5030B
Project#: 2006-16	
Matrix: Water	Sampled: 09/14/07
Units: ug/L	Received: 09/14/07
Batch#: 129518	

Field ID: MW-10 Diln Fac: 1.000  
 Type: SAMPLE Analyzed: 09/17/07  
 Lab ID: 197632-005

Analyte	Result	RL	Analysis
Gasoline C7-C12	84	50	EPA 8015B
MTBE	3.6	2.0	EPA 8021B
Benzene	3.6	0.50	EPA 8021B
Toluene	ND	0.50	EPA 8021B
Ethylbenzene	2.3	0.50	EPA 8021B
m,p-Xylenes	0.52 C	0.50	EPA 8021B
o-Xylene	ND	0.50	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	87	73-134	EPA 8015B
Bromofluorobenzene (FID)	84	77-140	EPA 8015B
Trifluorotoluene (PID)	85	65-142	EPA 8021B
Bromofluorobenzene (PID)	89	74-135	EPA 8021B

Field ID: MW-11 Diln Fac: 1.000  
 Type: SAMPLE Analyzed: 09/18/07  
 Lab ID: 197632-006

Analyte	Result	RL	Analysis
Gasoline C7-C12	5,500 H L	50	EPA 8015B
MTBE	ND	2.0	EPA 8021B
Benzene	86	0.50	EPA 8021B
Toluene	ND	0.50	EPA 8021B
Ethylbenzene	180	0.50	EPA 8021B
m,p-Xylenes	8.6 C	0.50	EPA 8021B
o-Xylene	7.5 C	0.50	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	134	73-134	EPA 8015B
Bromofluorobenzene (FID)	131	77-140	EPA 8015B
Trifluorotoluene (PID)	133	65-142	EPA 8021B
Bromofluorobenzene (PID)	142 *	74-135	EPA 8021B

\*= Value outside of QC limits; see narrative  
 C= Presence confirmed, but RPD between columns exceeds 40%  
 H= Heavier hydrocarbons contributed to the quantitation  
 L= Lighter hydrocarbons contributed to the quantitation  
 ND= Not Detected  
 RL= Reporting Limit

**Curtis & Tompkins Laboratories Analytical Report**

Lab #: 197632	Location: Redwood Regional Park
Client: Stellar Environmental Solutions	Prep: EPA 5030B
Project#: 2006-16	
Matrix: Water	Sampled: 09/14/07
Units: ug/L	Received: 09/14/07
Batch#: 129518	

Field ID: MW-12 Diln Fac: 1.000  
 Type: SAMPLE Analyzed: 09/18/07  
 Lab ID: 197632-007

Analyte	Result	RL	Analysis
Gasoline C7-C12	390 L	50	EPA 8015B
MTBE	ND	2.0	EPA 8021B
Benzene	ND	0.50	EPA 8021B
Toluene	ND	0.50	EPA 8021B
Ethylbenzene	2.4	0.50	EPA 8021B
m,p-Xylenes	0.94	0.50	EPA 8021B
o-Xylene	1.5	0.50	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	120	73-134	EPA 8015B
Bromofluorobenzene (FID)	101	77-140	EPA 8015B
Trifluorotoluene (PID)	98	65-142	EPA 8021B
Bromofluorobenzene (PID)	104	74-135	EPA 8021B

Type: BLANK Diln Fac: 1.000  
 Lab ID: QC406324 Analyzed: 09/17/07

Analyte	Result	RL	Analysis
Gasoline C7-C12	ND	50	EPA 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	73-134	EPA 8015B
Bromofluorobenzene (FID)	89	77-140	EPA 8015B
Trifluorotoluene (PID)	93	65-142	EPA 8021B
Bromofluorobenzene (PID)	88	74-135	EPA 8021B

\*= Value outside of QC limits; see narrative  
 C= Presence confirmed, but RPD between columns exceeds 40%  
 H= Heavier hydrocarbons contributed to the quantitation  
 L= Lighter hydrocarbons contributed to the quantitation  
 ND= Not Detected  
 RL= Reporting Limit



## Batch QC Report

**Curtis & Tompkins Laboratories Analytical Report**

Lab #:	197632	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2006-16	Analysis:	EPA 8021B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC406325	Batch#:	129518
Matrix:	Water	Analyzed:	09/17/07
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
MTBE	20.00	22.11	111	73-123
Benzene	20.00	18.66	93	80-120
Toluene	20.00	18.62	93	80-120
Ethylbenzene	20.00	18.46	92	80-120
m,p-Xylenes	20.00	18.86	94	80-121
o-Xylene	20.00	18.57	93	80-120

Surrogate	%REC	Limits
Trifluorotoluene (PID)	83	65-142
Bromofluorobenzene (PID)	83	74-135

**Batch QC Report**
**Curtis & Tompkins Laboratories Analytical Report**

Lab #: 197632	Location: Redwood Regional Park
Client: Stellar Environmental Solutions	Prep: EPA 5030B
Project#: 2006-16	
Field ID: ZZZZZZZZZZ	Batch#: 129518
MSS Lab ID: 197584-002	Sampled: 09/11/07
Matrix: Water	Received: 09/13/07
Units: ug/L	Analyzed: 09/17/07
Diln Fac: 10.00	

Type: MS Lab ID: QC406326

Analyte	MSS Result	Spiked	Result	%REC	Limits	Analysis
MTBE	<1.499	200.0	224.1	112	63-120	EPA 8021B
Benzene	648.4	200.0	832.3	92	80-124	EPA 8021B
Toluene	6.988	200.0	208.0	101	80-120	EPA 8021B
Ethylbenzene	357.9	200.0	539.0	91	80-132	EPA 8021B
m,p-Xylenes	108.1	200.0	317.6	105	80-122	EPA 8021B
o-Xylene	90.26	200.0	289.2	99	80-126	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	85	73-134	EPA 8015B
Bromofluorobenzene (FID)	87	77-140	EPA 8015B
Trifluorotoluene (PID)	90	65-142	EPA 8021B
Bromofluorobenzene (PID)	90	74-135	EPA 8021B

Type: MSD Lab ID: QC406327

Analyte	Spiked	Result	%REC	Limits	RPD	Lim	Analysis
MTBE	200.0	228.0	114	63-120	2	30	EPA 8021B
Benzene	200.0	832.1	92	80-124	0	30	EPA 8021B
Toluene	200.0	204.8	99	80-120	2	30	EPA 8021B
Ethylbenzene	200.0	554.0	98	80-132	3	30	EPA 8021B
m,p-Xylenes	200.0	313.9	103	80-122	1	30	EPA 8021B
o-Xylene	200.0	291.7	101	80-126	1	30	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	89	73-134	EPA 8015B
Bromofluorobenzene (FID)	93	77-140	EPA 8015B
Trifluorotoluene (PID)	93	65-142	EPA 8021B
Bromofluorobenzene (PID)	96	74-135	EPA 8021B

RPD= Relative Percent Difference

## Batch QC Report

**Curtis & Tompkins Laboratories Analytical Report**

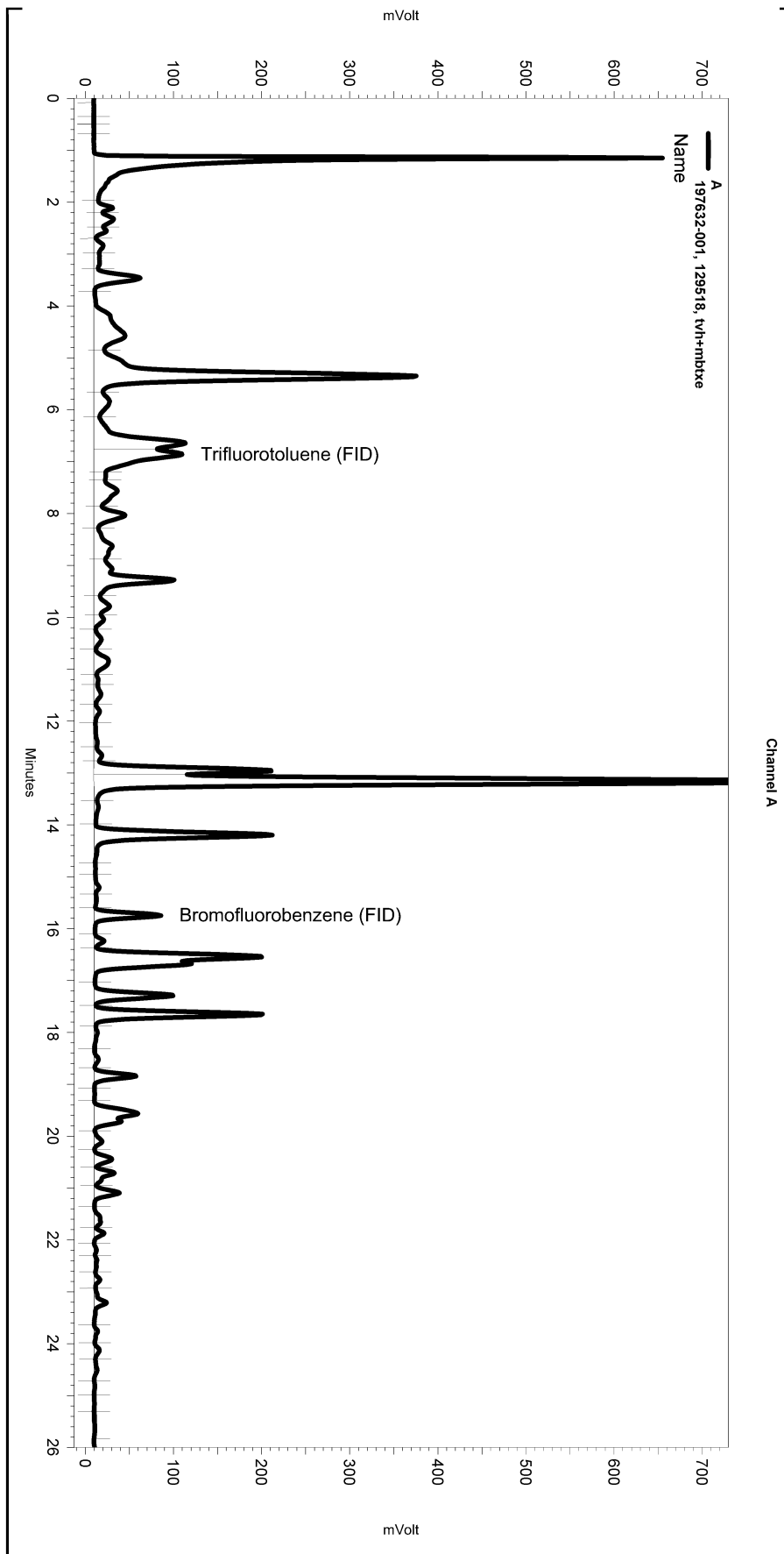
Lab #:	197632	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2006-16	Analysis:	EPA 8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC406525	Batch#:	129518
Matrix:	Water	Analyzed:	09/17/07
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	2,000	1,905	95	79-120

Surrogate	%REC	Limits
Trifluorotoluene (FID)	107	73-134
Bromofluorobenzene (FID)	101	77-140

Sequence File: \\Lims\gdrive\ezchrom\Projects\GC19\Sequence\260.seq  
 Sample Name: 197632-001, 129518, tvh+mbtxe  
 Data File: \\Lims\gdrive\ezchrom\Projects\GC19\Data\260\_019  
 Instrument: GC19 (Offline) Vial: N/A Operator: Tvh 2. Analyst (lims2k3\tvh2)  
 Method Name: \\Lims\gdrive\ezchrom\Projects\GC19\Method\tvhbtxe253.met

Software Version 3.1.7  
 Run Date: 9/17/2007 9:24:03 PM  
 Analysis Date: 9/20/2007 7:22:37 AM  
 Sample Amount: 5 Multiplier: 5  
 Vial & pH or Core ID: A1.3



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No items selected for this section

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No items selected for this section

Integration Events

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Yes	Threshold	0	0	50

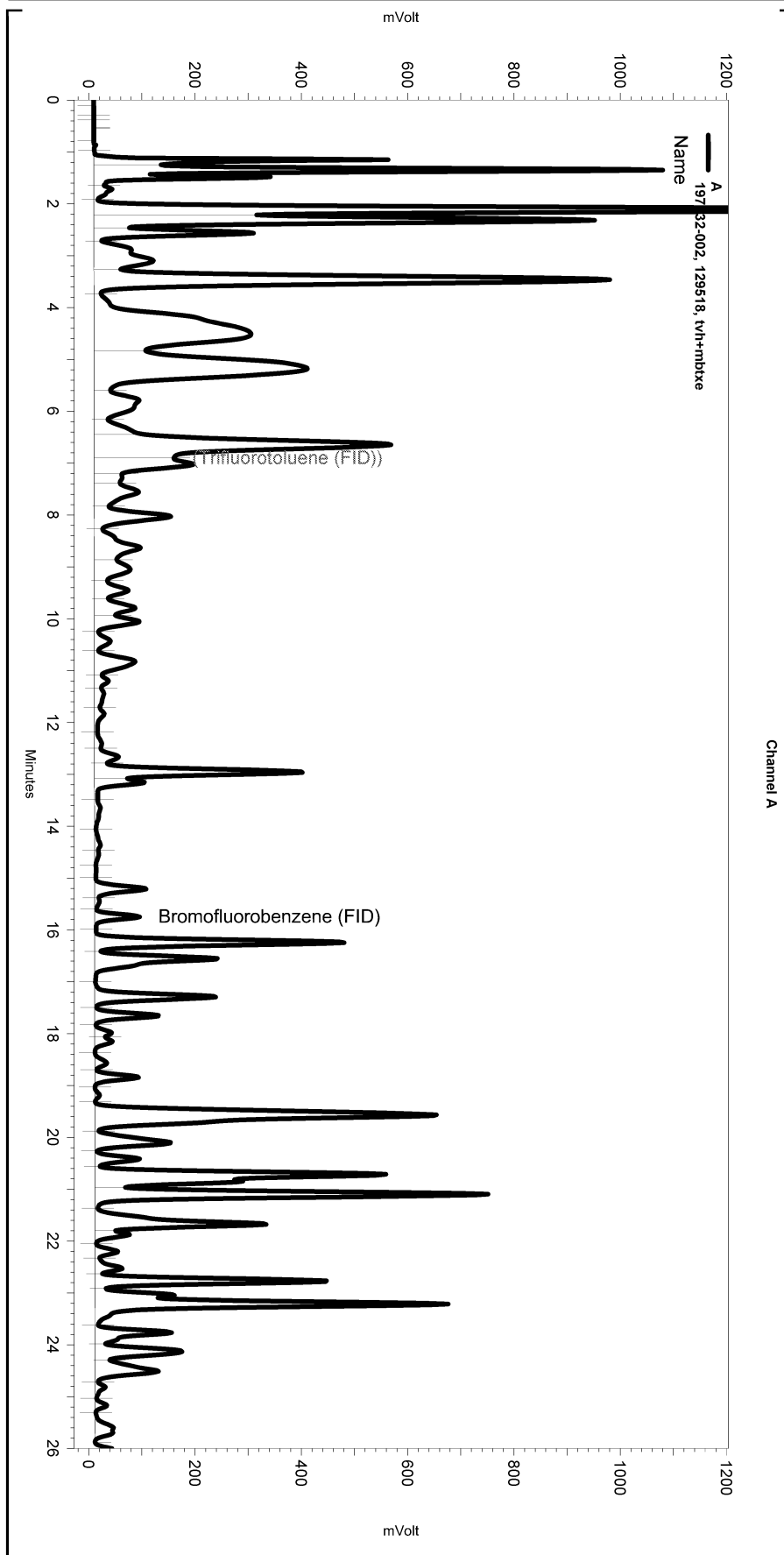
Manual Integration Fixes

Data File: \\Lims\gdrive\ezchrom\Projects\GC19\Data\260\_019

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 Sample Name: 197632-002, 129518, tvh+mbtixe  
 Data File: \\Lims\gdrive\ezchrom\Projects\GC19\Data\260\_020  
 Instrument: GC19 (Offline) Vial: N/A Operator: Tvh 2. Analyst (lims2k3\tvh2)  
 Method Name: \\Lims\gdrive\ezchrom\Projects\GC19\Method\tvhbtxe253.met

Software Version 3.1.7  
 Run Date: 9/17/2007 10:01:35 PM  
 Analysis Date: 9/20/2007 7:22:40 AM  
 Sample Amount: 5 Multiplier: 5  
 Vial & pH or Core ID: A1.3



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Integration Events

Enabled	Event Type	Start (Minutes)	Stop (Minutes)	Value
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Yes	Threshold	0	0	50

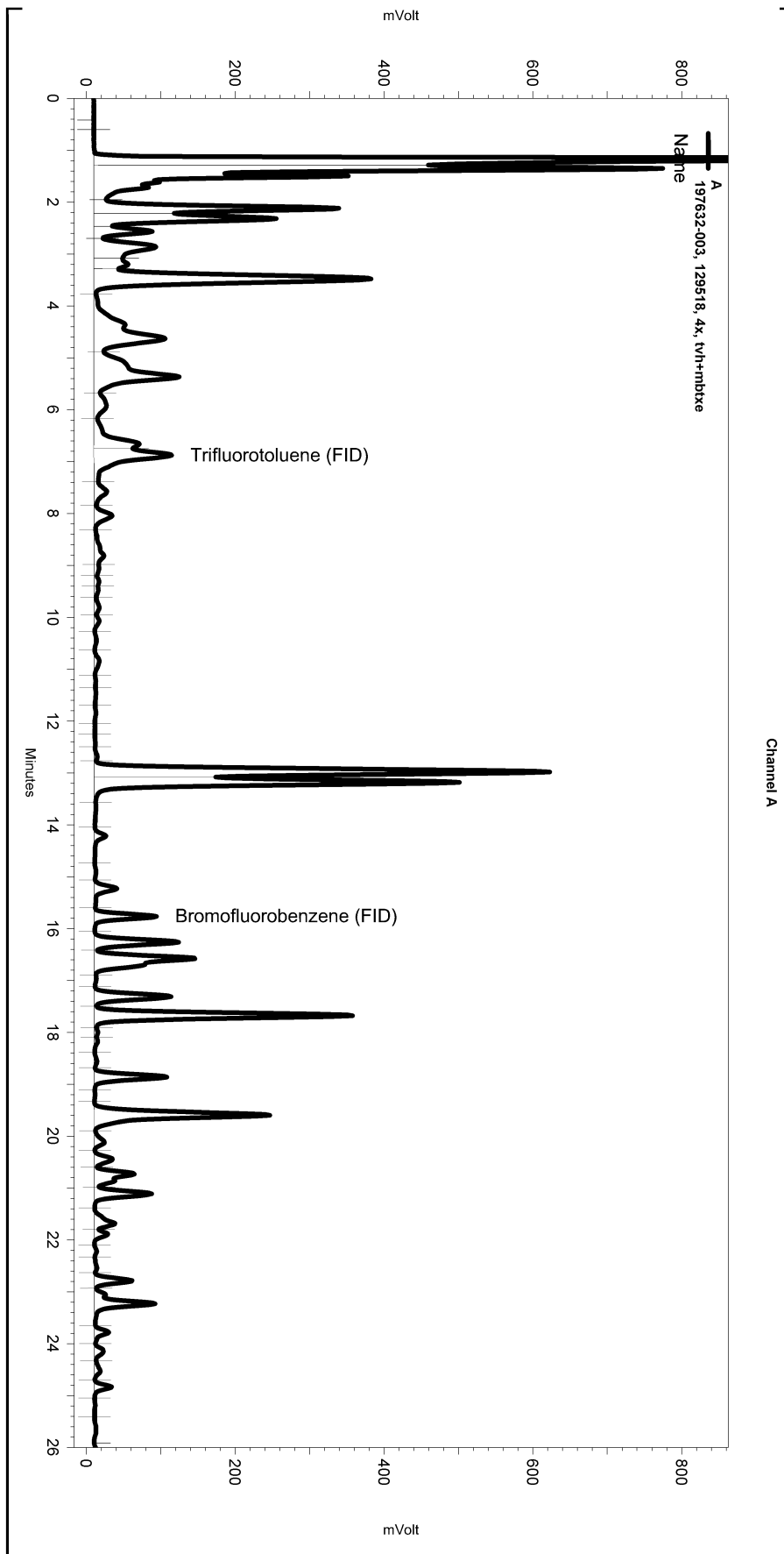
Manual Integration Fixes

Data File: \\Lims\gdrive\ezchrom\Projects\GC19\Data\260\_020

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Yes	Split Peak	7.201	0	0

Sequence File: \\Lims\gdrive\ezchrom\Projects\GC19\Sequence\260.seq  
 Sample Name: 197632-003, 129518, 4x, tvh+mbtxe  
 Data File: \\Lims\gdrive\ezchrom\Projects\GC19\Data\260\_031  
 Instrument: GC19 (Offline) Vial: N/A Operator: Tvh 2. Analyst (lims2k3\tvh2)  
 Method Name: \\Lims\gdrive\ezchrom\Projects\GC19\Method\TVHBTXE253.MET

Software Version 3.1.7  
 Run Date: 9/18/2007 9:57:50 AM  
 Analysis Date: 9/18/2007 10:37:23 AM  
 Sample Amount: 5 Multiplier: 5  
 Vial & pH or Core ID: B1.3



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Integration Events

Enabled	Event Type	Start (Minutes)	Stop (Minutes)	Value
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Yes	Threshold	0	0	50

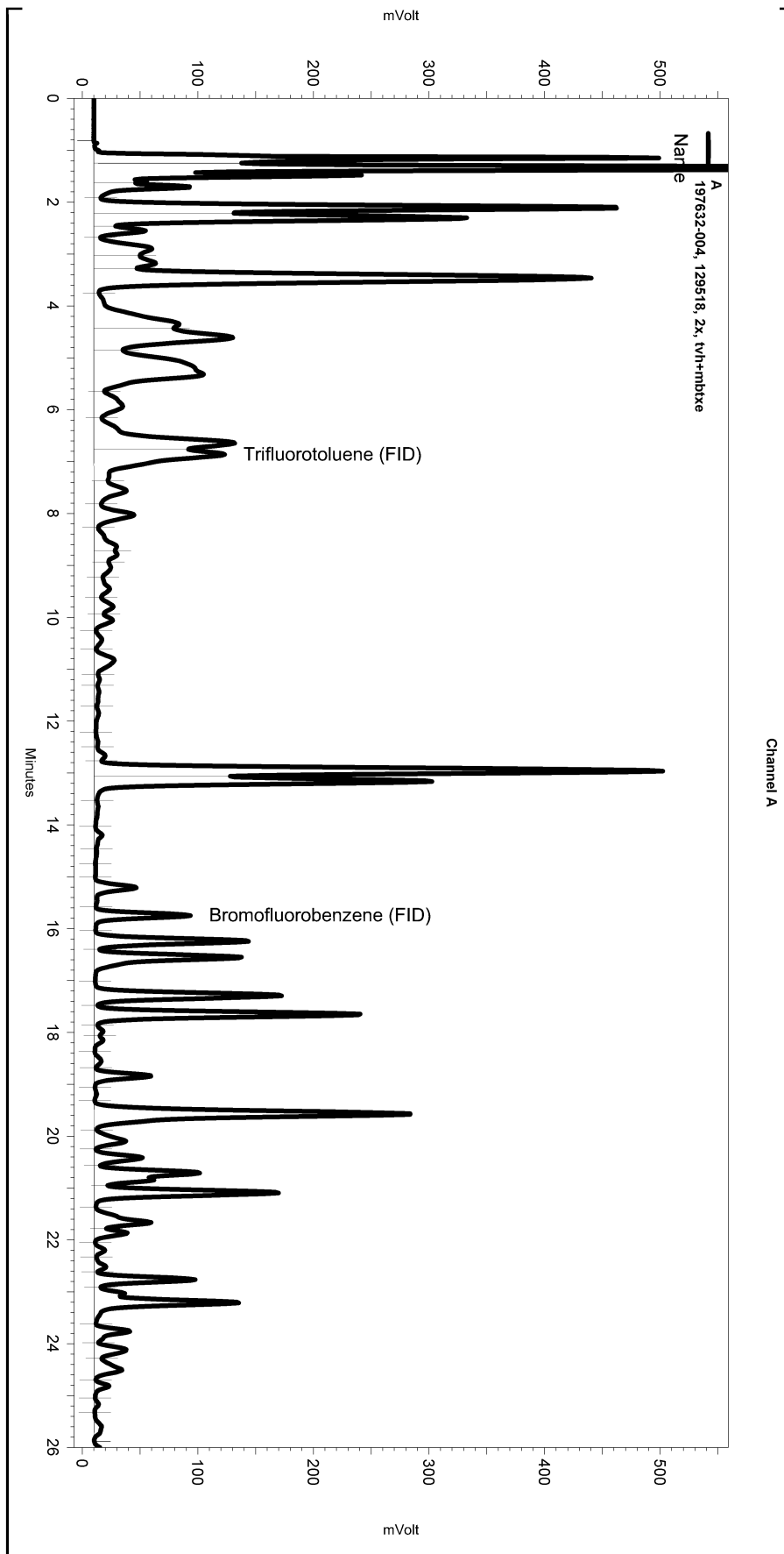
Manual Integration Fixes

Data File: \\Lims\gdrive\ezchrom\Projects\GC19\Data\260\_031

Enabled	Event Type	Start (Minutes)	Stop (Minutes)	Value
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Sequence File: \\Lims\gdrive\ezchrom\Projects\GC19\Sequence\260.seq  
 Sample Name: 197632-004, 129518, 2x, tvh+mbtxe  
 Data File: \\Lims\gdrive\ezchrom\Projects\GC19\Data\260\_032  
 Instrument: GC19 (Offline) Vial: N/A Operator: Tvh 2. Analyst (lims2k3\tvh2)  
 Method Name: \\Lims\gdrive\ezchrom\Projects\GC19\Method\TVHBTXE253.MET

Software Version 3.1.7  
 Run Date: 9/18/2007 10:35:19 AM  
 Analysis Date: 9/18/2007 11:24:31 AM  
 Sample Amount: 5 Multiplier: 5  
 Vial & pH or Core ID: B1.3



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Integration Events

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Yes	Threshold	0	0	50

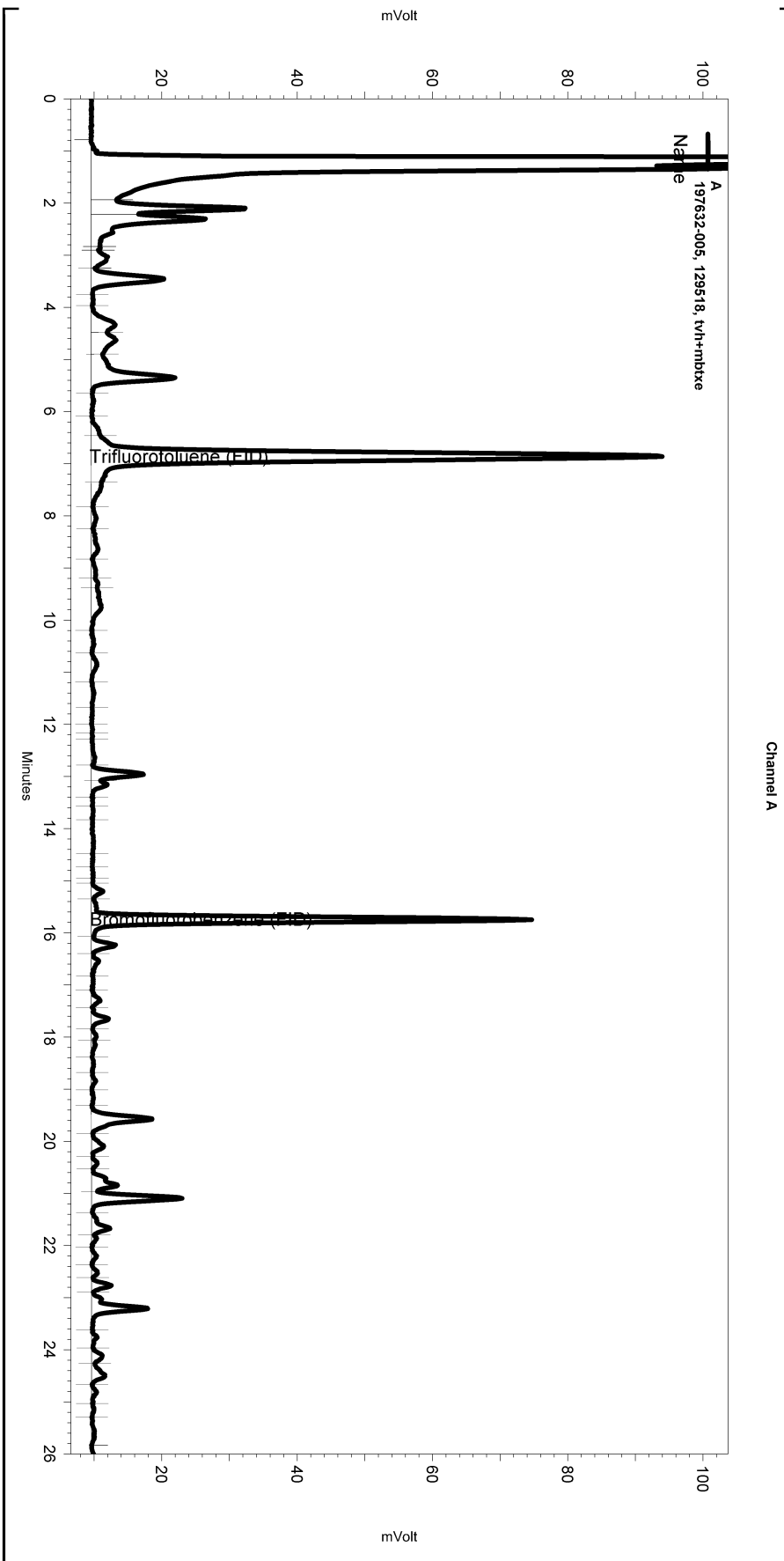
Manual Integration Fixes

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 Sample Name: 197632-005, 129518, tvh+mbtxe  
 Data File: \\Lims\gdrive\ezchrom\Projects\GC19\Data\260\_023  
 Instrument: GC19 (Offline) Vial: N/A Operator: Tvh 2. Analyst (lims2k3\tvh2)  
 Method Name: \\Lims\gdrive\ezchrom\Projects\GC19\Method\TVHBTXE253.MET

Software Version 3.1.7  
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 Analysis Date: 9/20/2007 7:22:52 AM  
 Sample Amount: 5 Multiplier: 5  
 Vial & pH or Core ID: A1.3



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No items selected for this section

Integration Events

Enabled	Event Type	Start (Minutes)	Stop (Minutes)	Value
Yes	Width	0	0	0.2
Yes	Threshold	0	0	50

Manual Integration Fixes

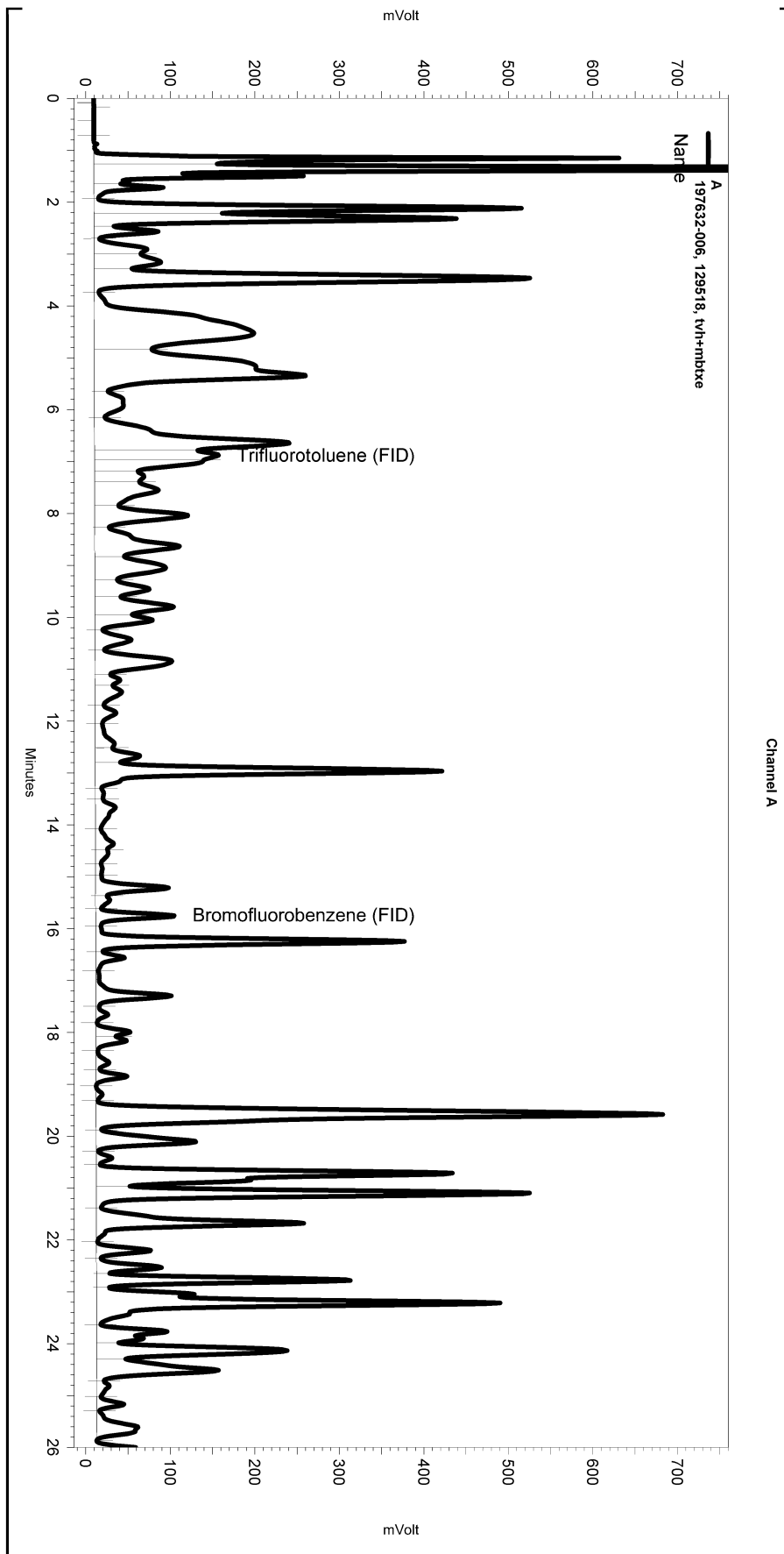
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Yes	Split Peak	6.469	0	0
Yes	Split Peak	7.356	0	0



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 Sample Name: 197632-006, 129518, tvh+mbtxe  
 Data File: \\Lims\gdrive\ezchrom\Projects\GC19\Data\260\_024  
 Instrument: GC19 (Offline) Vial: N/A Operator: Tvh 2. Analyst (lims2k3\tvh2)  
 Method Name: \\Lims\gdrive\ezchrom\Projects\GC19\Method\TVHBTXE253.MET

Software Version 3.1.7  
 Run Date: 9/18/2007 12:31:38 AM  
 Analysis Date: 9/18/2007 10:37:00 AM  
 Sample Amount: 5 Multiplier: 5  
 Vial & pH or Core ID: A1.3



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Integration Events

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Yes	Width	0	0	0.2
Yes	Threshold	0	0	50

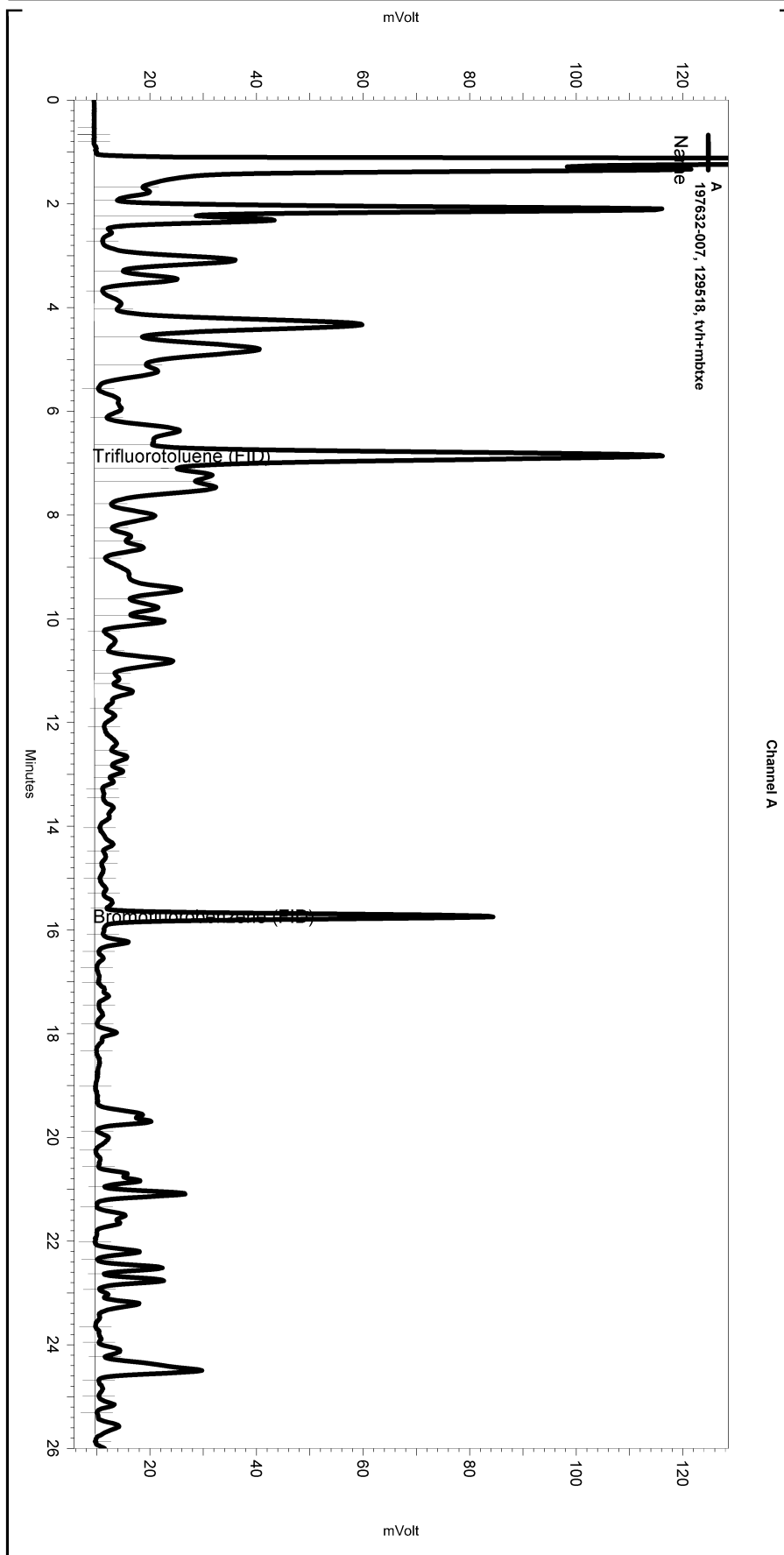
Manual Integration Fixes

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Yes	Split Peak	6.966	0	0

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 Data File: \\Lims\gdrive\ezchrom\Projects\GC19\Data\260\_025  
 Instrument: GC19 (Offline) Vial: N/A Operator: Tvh 2. Analyst (lims2k3\tvh2)  
 Method Name: \\Lims\gdrive\ezchrom\Projects\GC19\Method\tvhbtxe253.met

Software Version 3.1.7  
 Run Date: 9/18/2007 1:09:12 AM  
 Analysis Date: 9/18/2007 2:54:44 PM  
 Sample Amount: 5 Multiplier: 5  
 Vial & pH or Core ID: A1.3



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Integration Events

Enabled	Event Type	Start (Minutes)	Stop (Minutes)	Value
Yes	Width	0	0	0.2
Yes	Threshold	0	0	50

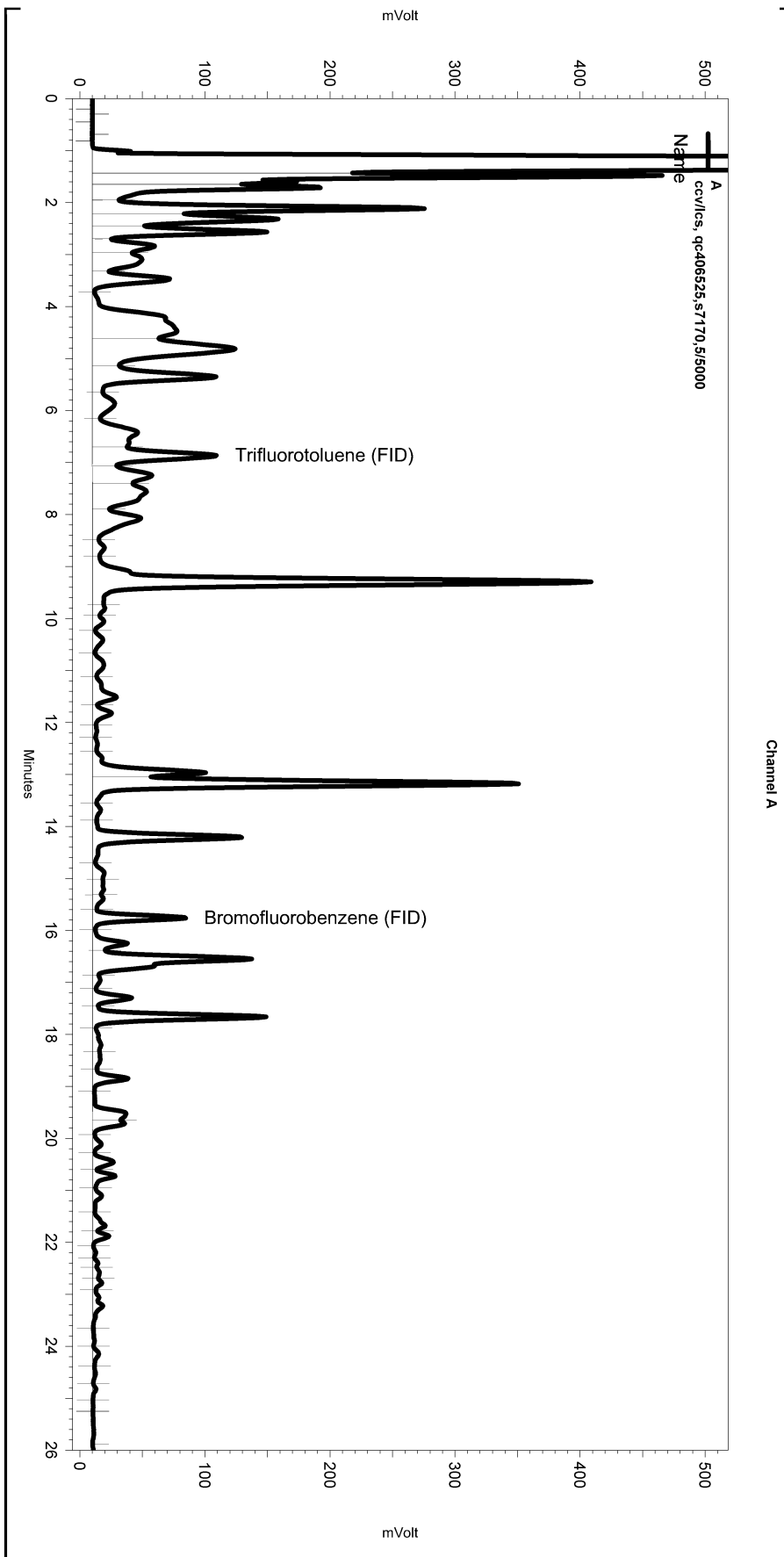
Manual Integration Fixes

Data File: \\Lims\gdrive\ezchrom\Projects\GC19\Data\260\_025

Enabled	Event Type	Start (Minutes)	Stop (Minutes)	Value
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 Sample Name: ccv/lcs, qc406525,s7170,5/5000  
 Data File: \\Lims\gdrive\ezchrom\Projects\GC19\Data\260\_004  
 Instrument: GC19 (Offline) Vial: N/A Operator: Tvh 2. Analyst (lims2k3\tvh2)  
 Method Name: \\Lims\gdrive\ezchrom\Projects\GC19\Method\lvhbtxe253.met

Software Version 3.1.7  
 Run Date: 9/17/2007 9:52:02 AM  
 Analysis Date: 9/18/2007 10:35:52 AM  
 Sample Amount: 5 Multiplier: 5  
 Vial & pH or Core ID: {Data Description}



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Integration Events

Enabled	Event Type	Start (Minutes)	Stop (Minutes)	Value
Yes	Width	0	0	0.2
Yes	Threshold	0	0	50

Manual Integration Fixes

Data File: \\Lims\gdrive\ezchrom\Projects\GC19\Data\260\_004

Enabled	Event Type	Start (Minutes)	Stop (Minutes)	Value
None				

**Total Extractable Hydrocarbons**

Lab #: 197632	Location: Redwood Regional Park
Client: Stellar Environmental Solutions	Prep: EPA 3520C
Project#: 2006-16	Analysis: EPA 8015B
Matrix: Water	Sampled: 09/14/07
Units: ug/L	Received: 09/14/07
Diln Fac: 1.000	Prepared: 09/17/07
Batch#: 129573	Analyzed: 09/19/07

Field ID: MW-2                      Lab ID: 197632-001  
Type: SAMPLE

Analyte	Result	RL
Diesel C10-C24	260 L Y	50
Surrogate	%REC	Limits
Hexacosane	102	61-133

Field ID: MW-7                      Lab ID: 197632-002  
Type: SAMPLE

Analyte	Result	RL
Diesel C10-C24	3,000 L Y	50
Surrogate	%REC	Limits
Hexacosane	104	61-133

Field ID: MW-8                      Lab ID: 197632-003  
Type: SAMPLE

Analyte	Result	RL
Diesel C10-C24	3,400 L Y	50
Surrogate	%REC	Limits
Hexacosane	107	61-133

Field ID: MW-9                      Lab ID: 197632-004  
Type: SAMPLE

Analyte	Result	RL
Diesel C10-C24	2,100 L Y	50
Surrogate	%REC	Limits
Hexacosane	101	61-133

Field ID: MW-10                      Lab ID: 197632-005  
Type: SAMPLE

Analyte	Result	RL
Diesel C10-C24	ND	50
Surrogate	%REC	Limits
Hexacosane	102	61-133

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

Total Extractable Hydrocarbons			
Lab #:	197632	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 3520C
Project#:	2006-16	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	09/14/07
Units:	ug/L	Received:	09/14/07
Diln Fac:	1.000	Prepared:	09/17/07
Batch#:	129573	Analyzed:	09/19/07

Field ID: MW-11 Lab ID: 197632-006  
 Type: SAMPLE

Analyte	Result	RL
Diesel C10-C24	2,700 L Y	50

Surrogate	%REC	Limits
Hexacosane	97	61-133

Field ID: MW-12 Lab ID: 197632-007  
 Type: SAMPLE

Analyte	Result	RL
Diesel C10-C24	180 L Y	50

Surrogate	%REC	Limits
Hexacosane	101	61-133

Type: BLANK Lab ID: QC406556

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	108	61-133

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

Batch QC Report

Total Extractable Hydrocarbons			
Lab #:	197632	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 3520C
Project#:	2006-16	Analysis:	EPA 8015B
Matrix:	Water	Batch#:	129573
Units:	ug/L	Prepared:	09/17/07
Diln Fac:	1.000	Analyzed:	09/19/07

Type: BS Cleanup Method: EPA 3630C  
 Lab ID: QC406557

Analyte	Spiked	Result	%REC	Limits
Diesel C10-C24	2,500	2,206	88	58-128

Surrogate	%REC	Limits
Hexacosane	85	61-133

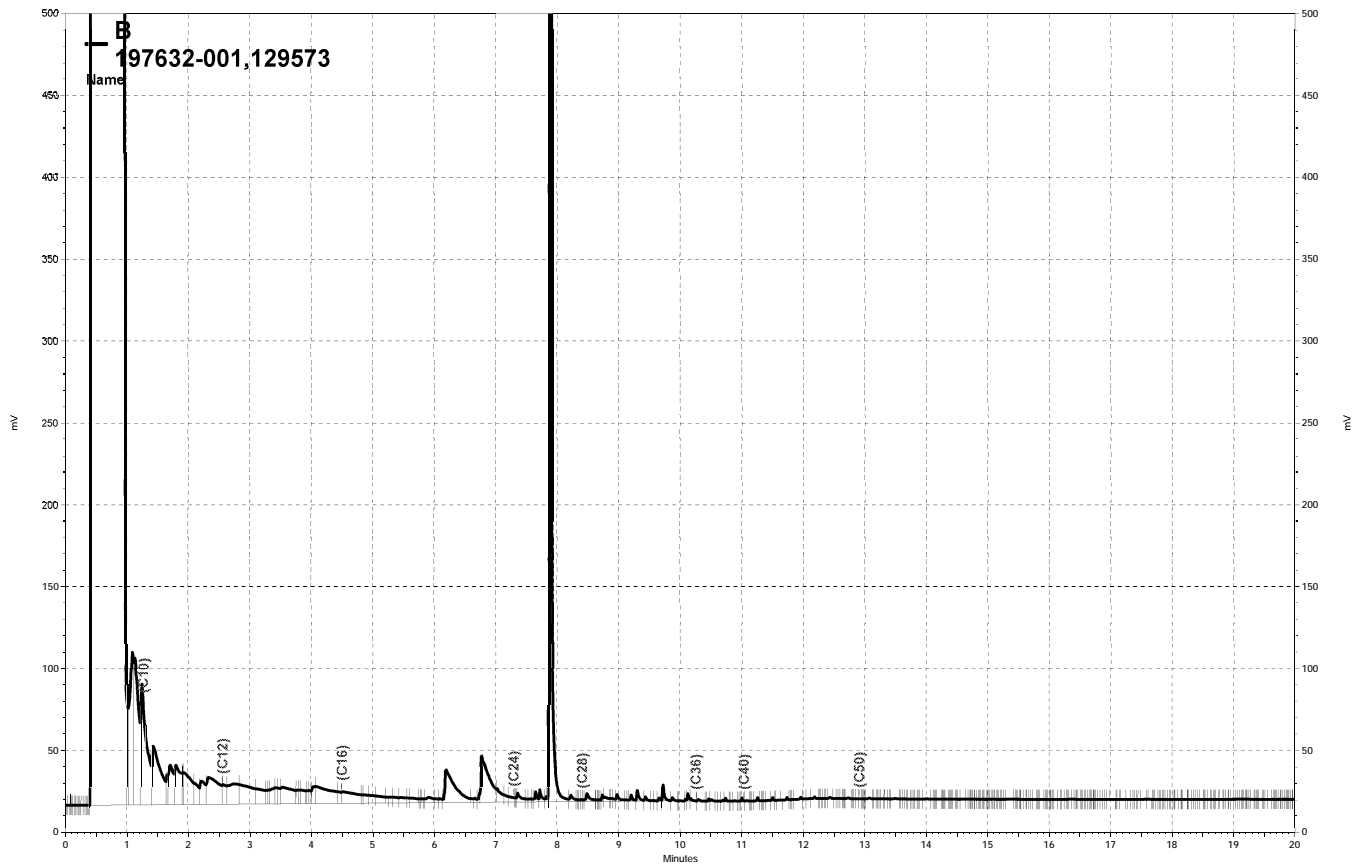
Type: BSD Cleanup Method: EPA 3630C  
 Lab ID: QC406558

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Diesel C10-C24	2,500	2,339	94	58-128	6	29

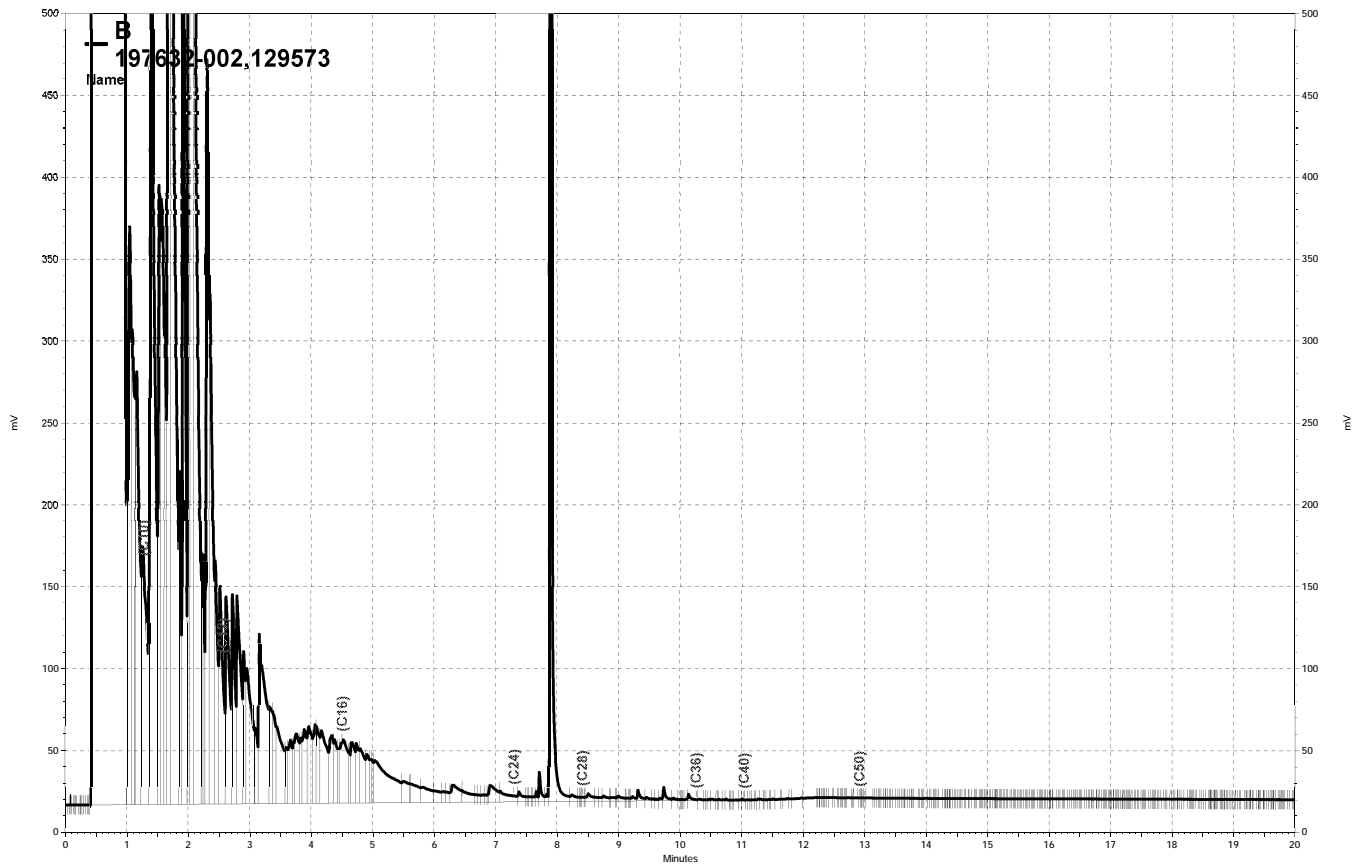
  

Surrogate	%REC	Limits
Hexacosane	99	61-133

RPD= Relative Percent Difference

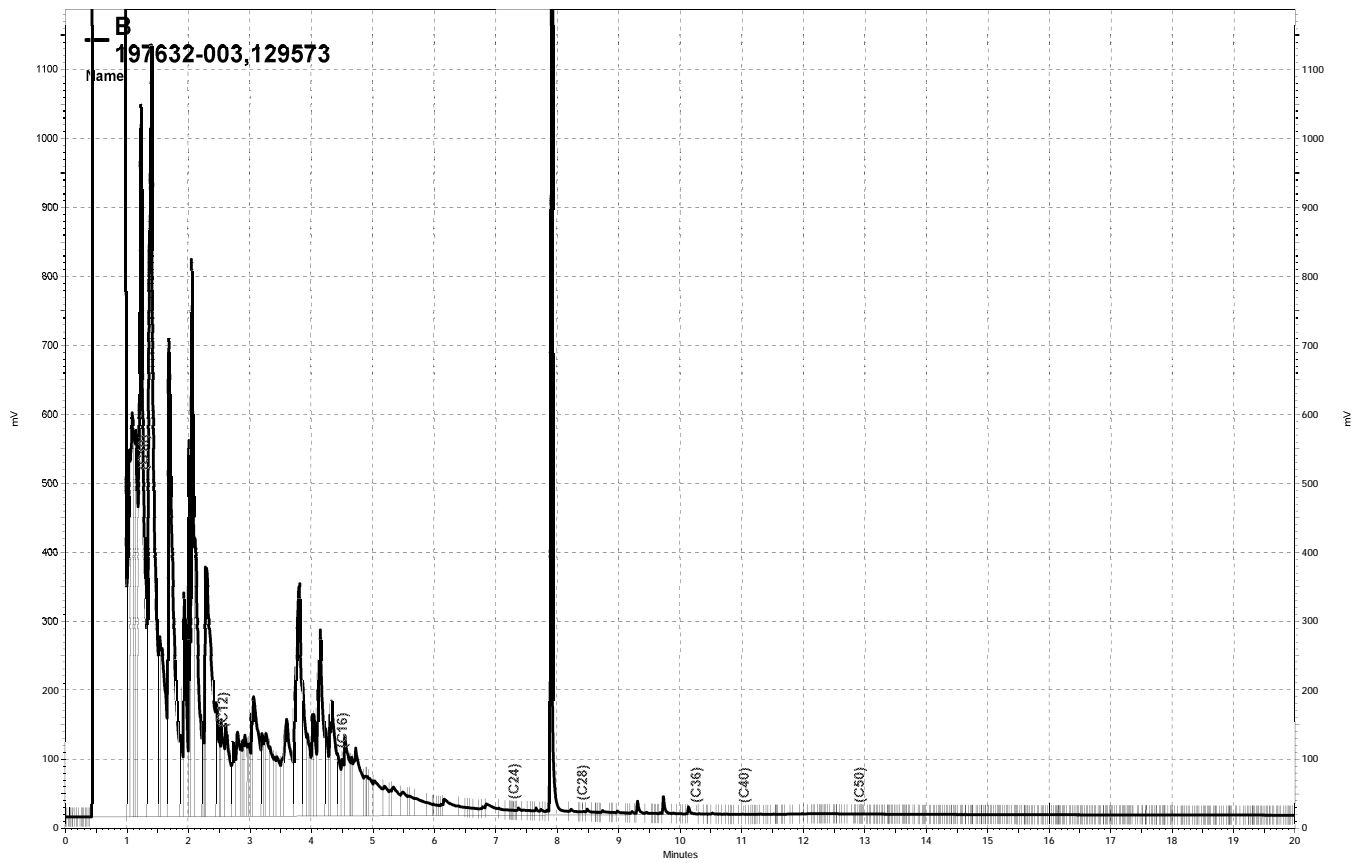


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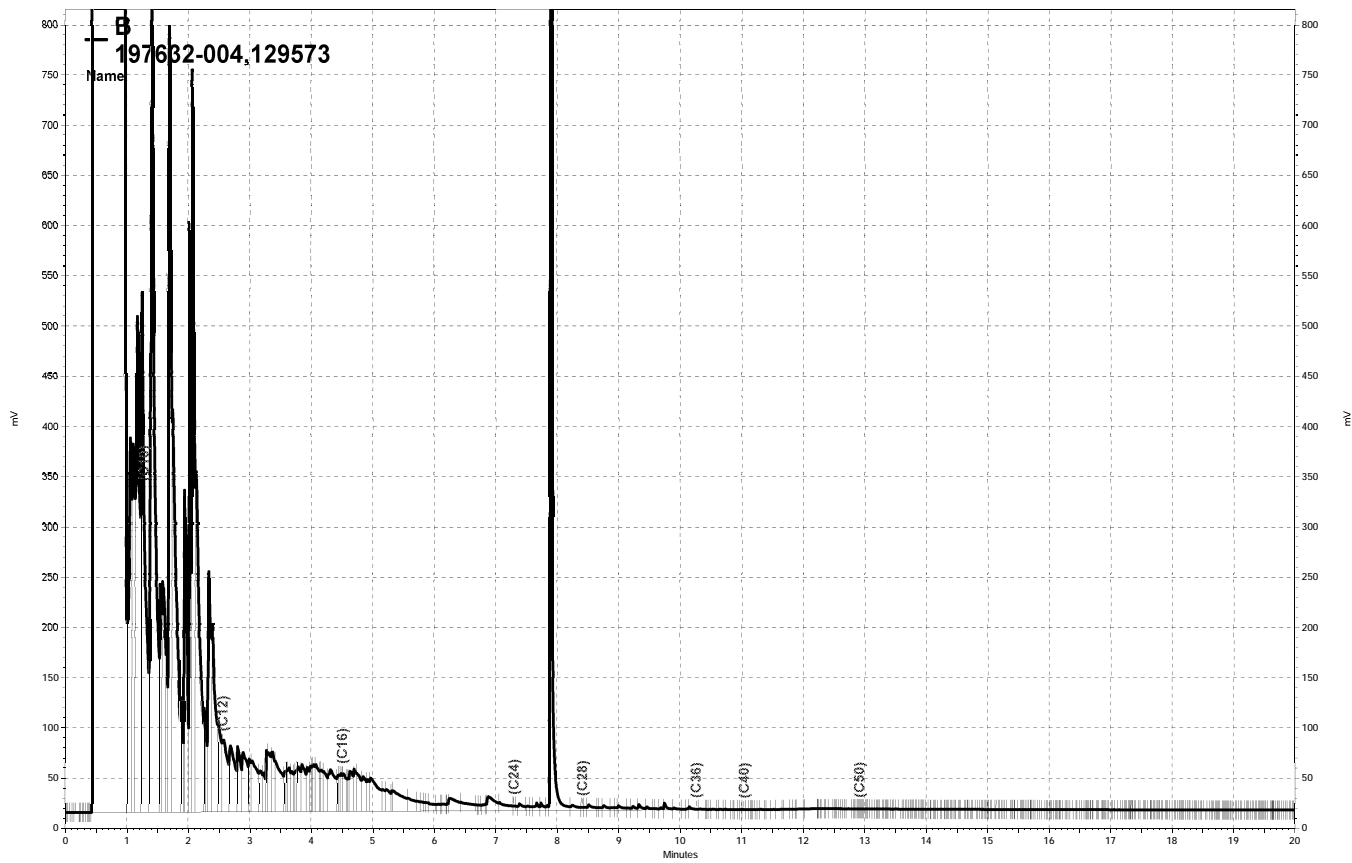


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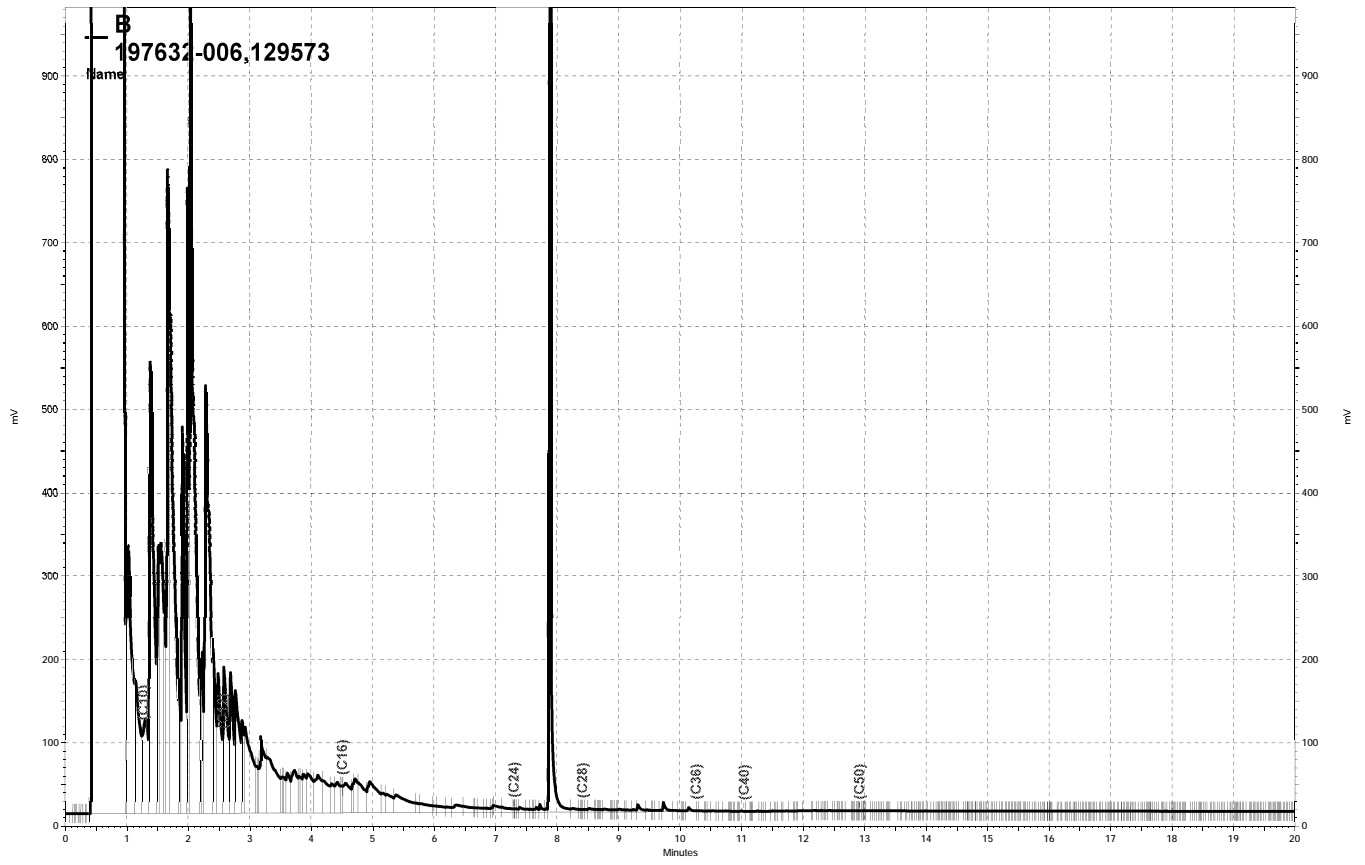




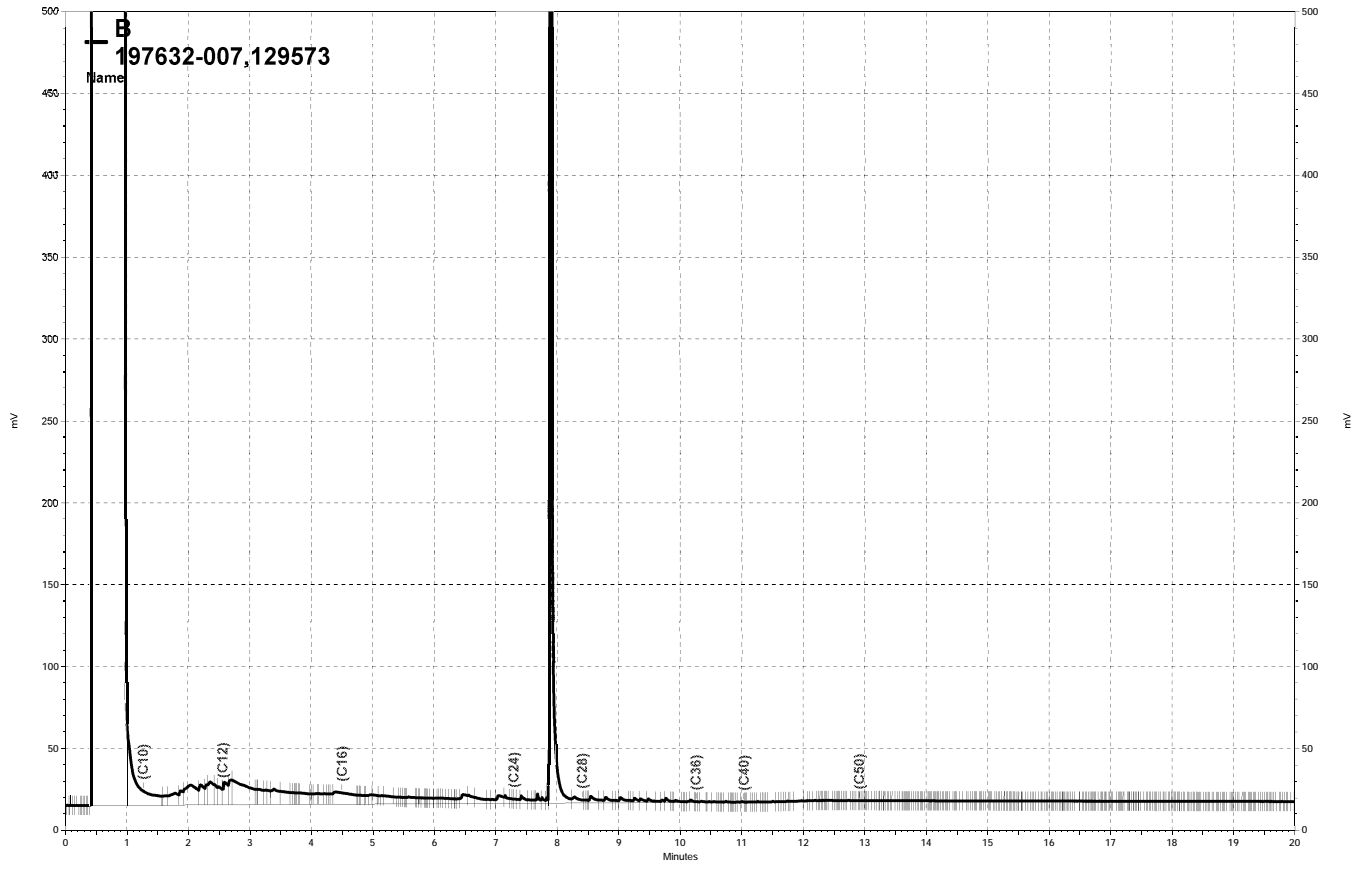
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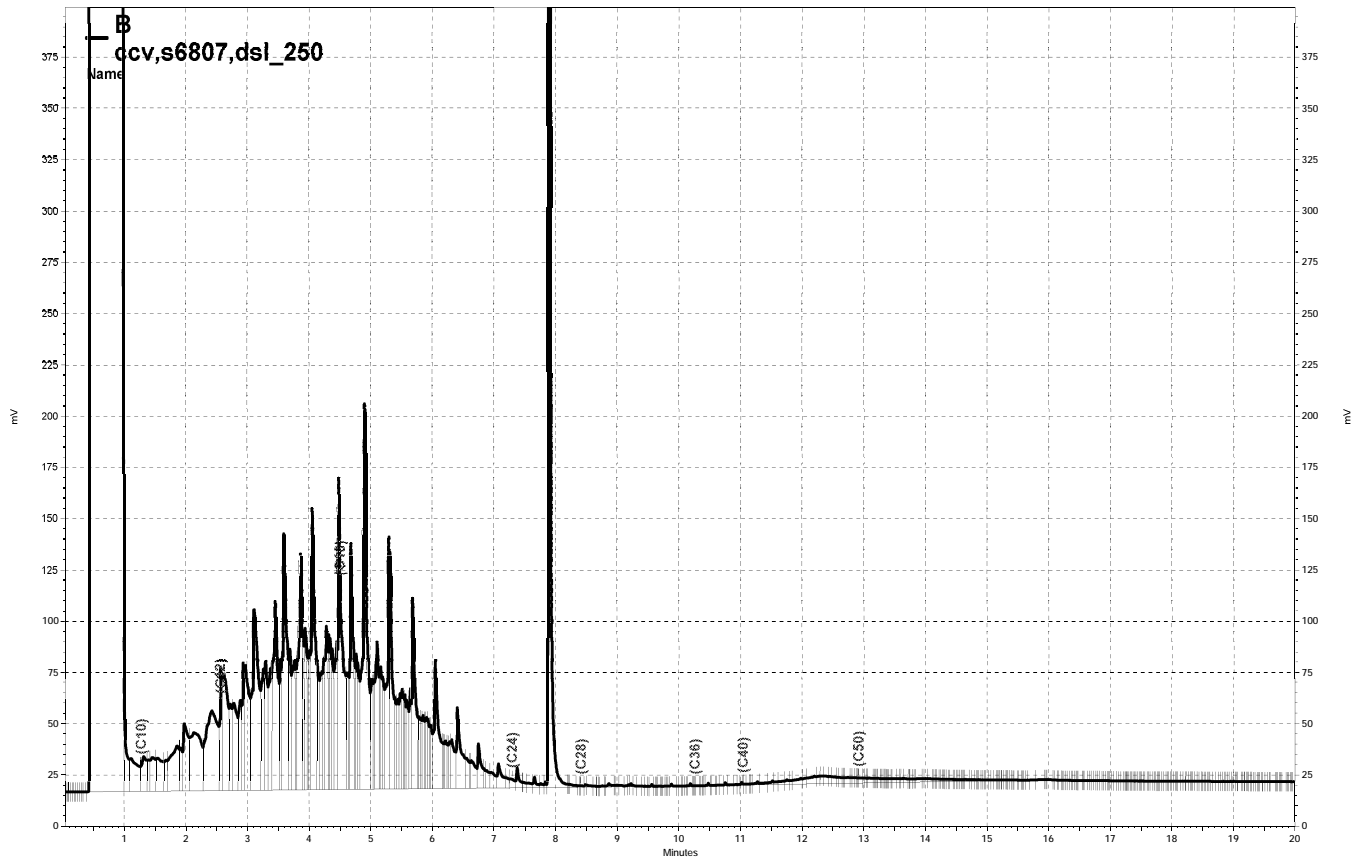
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# Chain of Custody Record

191634

Lab job no. \_\_\_\_\_  
 Date 9-14-07  
 Page 1 of 1

Laboratory Curtis and Tompkins, Ltd. Method of Shipment Hand Delivery  
 Address 2323 Fifth Street Shipment No. \_\_\_\_\_  
Berkeley, California 94710  
510-486-0900 Airbill No. \_\_\_\_\_  
 Project Owner East Bay Regional Park District Cooler No. \_\_\_\_\_  
 Site Address 7867 Redwood Road Project Manager Richard Makdisi  
Oakland, California Telephone No. (510) 644-3123  
 Project Name Redwood Regional Park Fax No. (510) 644-3859  
 Project Number 2006-16 Samplers: (Signature)

Analysis Required	Remarks

Field Sample Number	Location/ Depth	Date	Time	Sample Type	Type/Size of Container	Preservation									
						Cooler	Chemical								
SW-2	Creek	9/14/07	0930	W	1L 310A	Y	HCL 1M	ML	XXX						

Relinquished by: <u>[Signature]</u> Signature: <u>[Signature]</u> Printed: <u>Neal Glass</u> Company: <u>Stellar Environmental</u>	Date: <u>9/14/07</u> Time: <u>1015</u>	Received by: <u>[Signature]</u> Signature: <u>[Signature]</u> Printed: <u>Dave Walter</u> Company: <u>Blaine Tech</u>	Date: <u>9/14/07</u> Time: <u>1015</u>	Relinquished by: <u>[Signature]</u> Signature: <u>[Signature]</u> Printed: <u>Dave Walter</u> Company: <u>Blaine Tech</u>	Date: <u>9-14-07</u> Time: <u>1340</u>	Received by: <u>[Signature]</u> Signature: <u>[Signature]</u> Printed: <u>Louanna Curtis</u> Company: <u>Curtis &amp; Tompkins</u>	Date: <u>9-14-07</u> Time: <u>1340</u>
---	---	--	---	--	---	---	---

Turnaround Time: <u>5 Day TAT</u> Comments: <u>Please provide a GeoTracker EDF for groundwater samples only</u> <u>Surface water samples collected by Stellar Environmental Solutions.</u> <u>Groundwater samples collected by Blaine Tech Services.</u>	Relinquished by: _____ Signature: _____ Printed: _____ Company: _____
Date: _____ Time: _____	Received by: _____ Signature: _____ Printed: _____ Company: _____
Date: _____ Time: _____	Date: _____ Time: _____

REC'D intact; on site

2000-00-01



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

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

Laboratory Job Number 197634  
ANALYTICAL REPORT

Stellar Environmental Solutions  
2198 6th Street  
Berkeley, CA 94710

Project : 2006-16  
Location : Redwood Regional Park  
Level : II


Sample ID  
SW-2

Lab ID  
197634-001

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. This report may be reproduced only in its entirety.

Signature:   
Project Manager

Date: 09/21/2007

Signature:   
Operations Manager

Date: 09/21/2007

**CASE NARRATIVE**

Laboratory number: 197634  
Client: Stellar Environmental Solutions  
Project: 2006-16  
Location: Redwood Regional Park  
Request Date: 09/14/07  
Samples Received: 09/14/07

This hardcopy data package contains sample and QC results for one water sample, requested for the above referenced project on 09/14/07. The sample was received cold and intact.

**TPH-Purgeables and/or BTXE by GC (EPA 8015B and EPA 8021B):**

No analytical problems were encountered.

**TPH-Extractables by GC (EPA 8015B):**

No analytical problems were encountered.



**Curtis & Tompkins Laboratories Analytical Report**

Lab #:	197634	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2006-16		
Field ID:	SW-2	Batch#:	129518
Matrix:	Water	Sampled:	09/14/07
Units:	ug/L	Received:	09/14/07
Diln Fac:	1.000	Analyzed:	09/17/07

Type: SAMPLE                      Lab ID: 197634-001

Analyte	Result	RL	Analysis
Gasoline C7-C12	ND	50	EPA 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)	97	73-134	EPA 8015B
Bromofluorobenzene (FID)	93	77-140	EPA 8015B
Trifluorotoluene (PID)	97	65-142	EPA 8021B
Bromofluorobenzene (PID)	94	74-135	EPA 8021B

Type: BLANK                      Lab ID: QC406324

Analyte	Result	RL	Analysis
Gasoline C7-C12	ND	50	EPA 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	73-134	EPA 8015B
Bromofluorobenzene (FID)	89	77-140	EPA 8015B
Trifluorotoluene (PID)	93	65-142	EPA 8021B
Bromofluorobenzene (PID)	88	74-135	EPA 8021B

ND= Not Detected  
 RL= Reporting Limit

## Batch QC Report

**Curtis & Tompkins Laboratories Analytical Report**

Lab #:	197634	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2006-16	Analysis:	EPA 8021B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC406325	Batch#:	129518
Matrix:	Water	Analyzed:	09/17/07
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
MTBE	20.00	22.11	111	73-123
Benzene	20.00	18.66	93	80-120
Toluene	20.00	18.62	93	80-120
Ethylbenzene	20.00	18.46	92	80-120
m,p-Xylenes	20.00	18.86	94	80-121
o-Xylene	20.00	18.57	93	80-120

Surrogate	%REC	Limits
Trifluorotoluene (PID)	83	65-142
Bromofluorobenzene (PID)	83	74-135

## Batch QC Report

**Curtis & Tompkins Laboratories Analytical Report**

Lab #:	197634	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2006-16		
Field ID:	ZZZZZZZZZZ	Batch#:	129518
MSS Lab ID:	197584-002	Sampled:	09/11/07
Matrix:	Water	Received:	09/13/07
Units:	ug/L	Analyzed:	09/17/07
Diln Fac:	10.00		

Type: MS Lab ID: QC406326

Analyte	MSS Result	Spiked	Result	%REC	Limits	Analysis
MTBE	<1.499	200.0	224.1	112	63-120	EPA 8021B
Benzene	648.4	200.0	832.3	92	80-124	EPA 8021B
Toluene	6.988	200.0	208.0	101	80-120	EPA 8021B
Ethylbenzene	357.9	200.0	539.0	91	80-132	EPA 8021B
m,p-Xylenes	108.1	200.0	317.6	105	80-122	EPA 8021B
o-Xylene	90.26	200.0	289.2	99	80-126	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	85	73-134	EPA 8015B
Bromofluorobenzene (FID)	87	77-140	EPA 8015B
Trifluorotoluene (PID)	90	65-142	EPA 8021B
Bromofluorobenzene (PID)	90	74-135	EPA 8021B

Type: MSD Lab ID: QC406327

Analyte	Spiked	Result	%REC	Limits	RPD	Lim	Analysis
MTBE	200.0	228.0	114	63-120	2	30	EPA 8021B
Benzene	200.0	832.1	92	80-124	0	30	EPA 8021B
Toluene	200.0	204.8	99	80-120	2	30	EPA 8021B
Ethylbenzene	200.0	554.0	98	80-132	3	30	EPA 8021B
m,p-Xylenes	200.0	313.9	103	80-122	1	30	EPA 8021B
o-Xylene	200.0	291.7	101	80-126	1	30	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	89	73-134	EPA 8015B
Bromofluorobenzene (FID)	93	77-140	EPA 8015B
Trifluorotoluene (PID)	93	65-142	EPA 8021B
Bromofluorobenzene (PID)	96	74-135	EPA 8021B

RPD= Relative Percent Difference

## Batch QC Report

**Curtis & Tompkins Laboratories Analytical Report**

Lab #:	197634	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2006-16	Analysis:	EPA 8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC406525	Batch#:	129518
Matrix:	Water	Analyzed:	09/17/07
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	2,000	1,905	95	79-120

Surrogate	%REC	Limits
Trifluorotoluene (FID)	107	73-134
Bromofluorobenzene (FID)	101	77-140

Total Extractable Hydrocarbons			
Lab #:	197634	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 3520C
Project#:	2006-16	Analysis:	EPA 8015B
Field ID:	SW-2	Sampled:	09/14/07
Matrix:	Water	Received:	09/14/07
Units:	ug/L	Prepared:	09/17/07
Diln Fac:	1.000	Analyzed:	09/19/07
Batch#:	129573		

Type: SAMPLE Lab ID: 197634-001

Analyte	Result	RL
Diesel C10-C24	77 L Y	50

Surrogate	%REC	Limits
Hexacosane	98	61-133

Type: BLANK Lab ID: QC406556

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
Hexacosane	108	61-133

L= Lighter hydrocarbons contributed to the quantitation

Y= Sample exhibits chromatographic pattern which does not resemble standard

ND= Not Detected

RL= Reporting Limit

## Batch QC Report

Total Extractable Hydrocarbons			
Lab #:	197634	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 3520C
Project#:	2006-16	Analysis:	EPA 8015B
Matrix:	Water	Batch#:	129573
Units:	ug/L	Prepared:	09/17/07
Diln Fac:	1.000	Analyzed:	09/19/07

Type: BS Cleanup Method: EPA 3630C  
 Lab ID: QC406557

Analyte	Spiked	Result	%REC	Limits
Diesel C10-C24	2,500	2,206	88	58-128

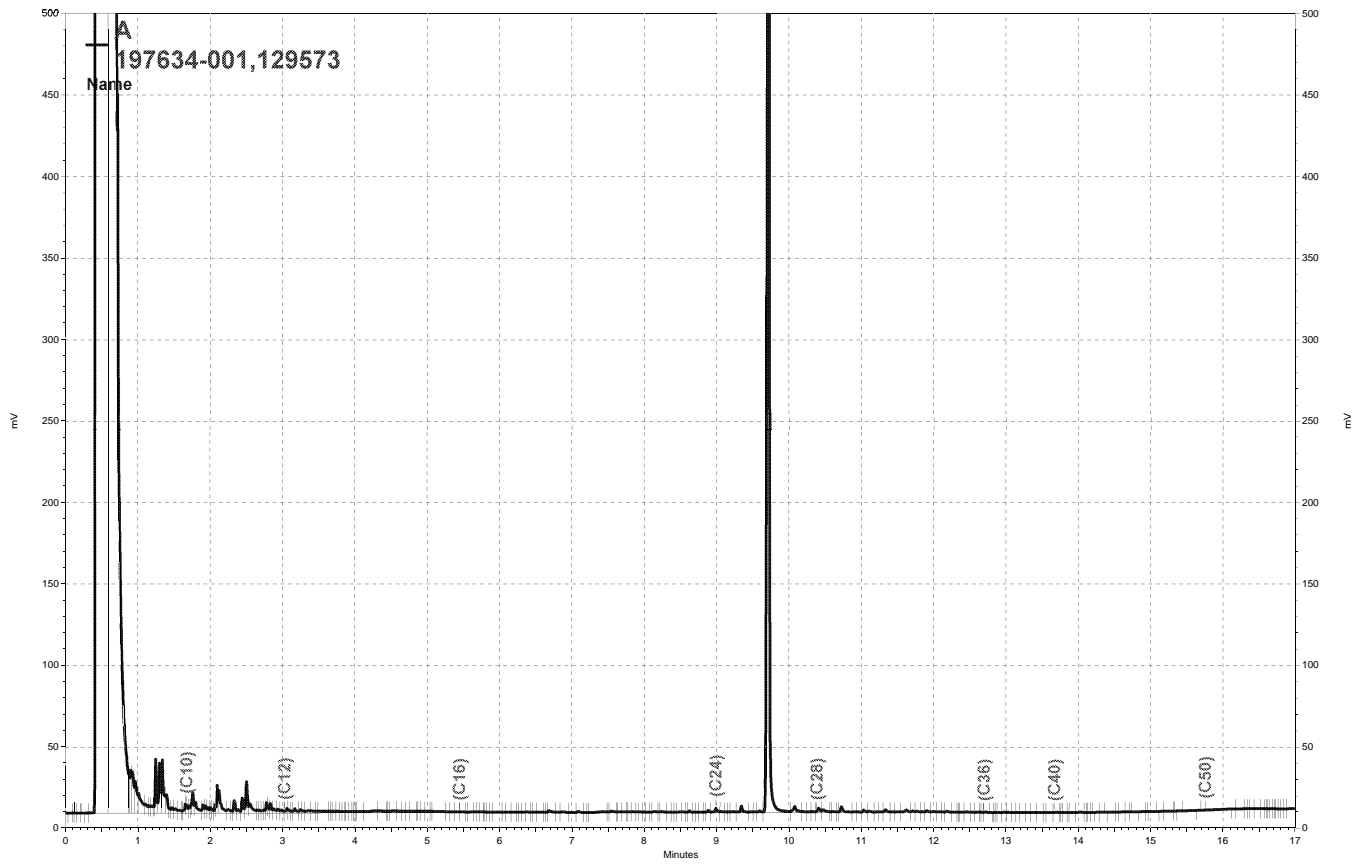
Surrogate	%REC	Limits
Hexacosane	85	61-133

Type: BSD Cleanup Method: EPA 3630C  
 Lab ID: QC406558

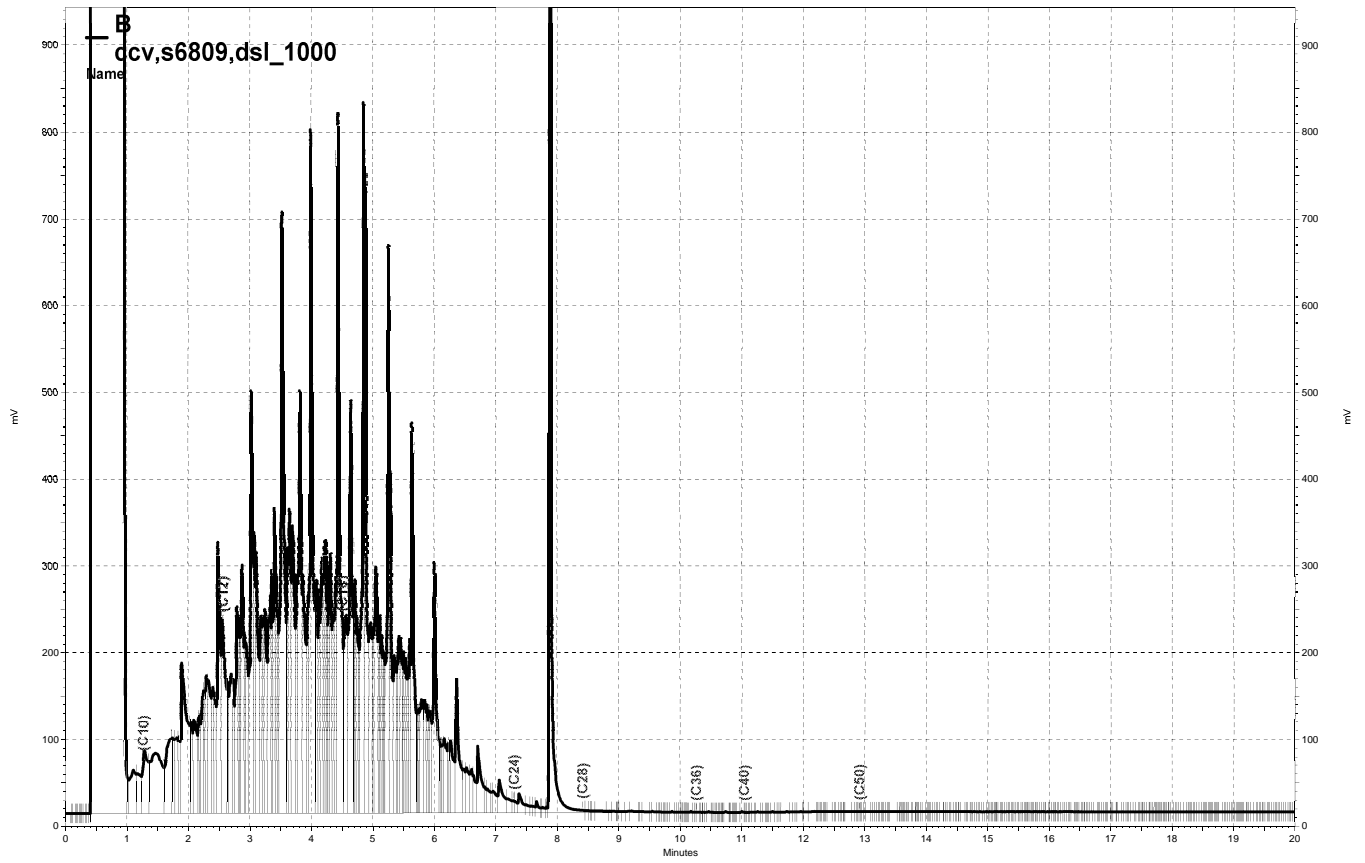
Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Diesel C10-C24	2,500	2,339	94	58-128	6	29

Surrogate	%REC	Limits
Hexacosane	99	61-133



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\\Lims\gdrive\ezchrom\Projects\GC15B\Data\261b034, B



## **APPENDIX D**

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### **Historical Groundwater and Surface Water Analytical Results**

**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	TVHg	TEHd	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	30	NA
3	May-95	< 50	< 50	3.9	< 0.5	1.6	2.5	8.0	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	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	—	7.0
14	Apr-99	82	710	4.2	< 0.5	3.4	4.0	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

Well MW-2 (continued)									
Event	Date	TVHg	TEHd	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
27	Sep-03	120	< 50	8.6	0.51	0.53	< 0.5	9.6	23
28	Dec-03	282	<100	4.3	1.6	1.3	1.2	8.4	9.4
29	Mar-04	374	<100	81	1.2	36	7.3	126	18
30	Jun-04	< 50	< 50	0.75	< 0.5	< 0.5	< 0.5	< 0.5	15
31	Sep-04	200	< 50	23	< 0.5	< 0.5	0.70	24	16
32	Dec-04	80	< 50	14	< 0.5	2.9	0.72	18	20
33	Mar-05	190	68	27	<0.5	14	11	52	26
34	Jun-05	68	< 50	7.1	< 0.5	6.9	1.8	16	24
35	Sep-05	< 50	< 50	2.5	< 0.5	< 0.5	< 1.0	2.5	23
36	Dec-05	< 50	< 50	3.9	< 0.5	< 0.5	< 1.0	3.9	23
37	Mar-06	1300	300	77	4.4	91	250	422	18
38	Jun-06	< 50	60	< 0.5	< 0.5	< 0.5	< 1.0	—	17
39	Sep-06	270	52	31	< 0.5	15	6.69	53	17
40	Dec-06	< 50	< 50	2.1	< 0.5	< 0.5	< 0.5	2	16
41	Mar-07	59	< 50	4	< 0.5	< 0.5	< 0.5	< 0.5	14
42	Jun-07	<50	<50	3.5	<0.5	<0.5	<0.5	3.5	8
43	Sep-07	2,600	260	160	44	86	431	721	15

Well MW-4									
Event	Date	TVHg	TEHd	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	2.0	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	4.0	2.0	26	14	46	< 2.0
16	Sep-00	570	380	< 0.5	< 0.5	16	4.1	20	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	5.0
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	—	< 2.0
22	Jun-02	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2.0
23	Sep-02	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2.0
24	Dec-02	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2.0
25	Mar-03	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2.0
26	Jun-03	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2.0
27	Sep-03	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2.0
28	Dec-03	< 50	< 100	< 0.3	< 0.3	< 0.3	< 0.6	—	< 5.0
29	Mar-04	< 50	< 100	< 0.3	< 0.3	< 0.3	< 0.6	—	< 5.0
30	Jun-04	< 50	2,500	< 0.3	< 0.3	< 0.3	< 0.6	—	< 5.0
31	Sep-04	< 50	< 50	< 0.5	< 0.5	< 0.5	< 1.0	—	< 2.0
32	Dec-04	< 50	< 50	< 0.5	< 0.5	< 0.5	< 1.0	—	< 2.0
33	Mar-05	< 50	< 50	< 0.5	< 0.5	< 0.5	< 1.0	—	< 2.0
34	Jun-05	< 50	< 50	< 0.5	< 0.5	< 0.5	< 1.0	—	< 2.0
35	Sep-05	< 50	< 50	< 0.5	< 0.5	< 0.5	< 1.0	—	< 2.0

Groundwater monitoring in this well discontinued with Alameda County Health Care Services Agency approval.

Well MW-5									
Event	Date	TVHg	TEHd	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 in 1998 with Alameda County Health Care Services Agency approval.									
Subsequent groundwater monitoring conducted to confirm plume's southern limit									
14	Jun-04	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	5.9
15	Sep-04	< 50	< 50	< 0.5	< 0.5	< 0.5	< 1.0	—	< 2.0

Well MW-7									
Event	Date	TVHg	TEHd	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	189	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
11	Sep-03	10,000	3,300	150	11	300	136	597	< 2.0
12	Dec-03	9,140	1,100	62	45	295	184	586	89
13	Mar-04	8,170	600	104	41	306	129	580	84
14	Jun-04	9,200	2,700	150	< 0.5	290	91	531	< 2.0
15	Sep-04	9,700	3,400	98	< 0.5	300	125	523	< 2.0
16	Dec-04	8200	4,000	95	< 0.5	290	124	509	< 2.0
17	Mar-05	10,000	4,300	150	<0.5	370	71	591	<2.0
18	Jun-05	10,000	3,300	210	<1.0	410	56	676	<4.0
19	Sep-05	7,600	2,700	110	<1.0	310	54	474	<4.0
20	Dec-05	2,900	3,300	31	<1.0	140	41	212	<4.0
21	Mar-06	6,800	3,000	110	< 1.0	280	42	432	110
22	Jun-06	6,900	3,600	63	< 2.5	290	43	396	< 10
23	Sep-06	7,900	3,600	64	< 0.5	260	58	382	49
24	Dec-06	7,300	2,400	50	< 0.5	220	42	312	< 2.0
25	Mar-07	6,200	2,900	34	< 0.5	190	15	239	< 2.0
26	Jun-07	6,800	3,000	30	<1.0	160	27	217	<4.0
27	Sep-07	6,400	3,000	<0.5	<0.5	170	43	213	<2.0

Well MW-8									
Event	Date	TVHg	TEHd	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
11	Sep-03	3,600	400	120	3.3	300	221	644	< 2.0
12	Dec-03	485	100	19	1.5	26	36	83	< 5.0
13	Mar-04	16,000	900	592	24	1,060	1,870	3,546	90
14	Jun-04	5,900	990	260	9.9	460	390	1,120	< 10
15	Sep-04	2,000	360	100	< 2.5	180	102	382	< 10
16	Dec-04	15,000	4,000	840	21	1,200	1,520	3,581	< 10
17	Mar-05	24,000	7,100	840	51	1,800	2,410	5,101	< 10
18	Jun-05	33,000	5,700	930	39	2,500	3,860	7,329	< 20
19	Sep-05	5,600	1,200	270	6.6	400	390	1,067	< 20
20	Dec-05	3,700	1,300	110	< 5.0	320	356	786	< 20
21	Mar-06	22,000	4,300	550	30	1,800	2,380	4,760	< 20
22	Jun-06	19,000	5,000	500	28	1,800	1,897	4,225	< 20
23	Sep-06	9,000	820	170	7.7	730	539	1,447	< 10
24	Dec-06	4,400	800	75	4.2	320	246	645	< 2.0
25	Mar-07	15,000	4,500	340	19	1,300	1,275	2,934	< 20
26	Jun-07	10,000	3,500	220	11	670	675	1,576	< 4.0
27	Sep-07	9,400	3,400	200	6.9	1,000	773	1,980	< 8.0

Well MW-9									
Event	Date	TVHg	TEHd	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
9	Sep-03	8,300	2,900	420	14	870	200	1,504	< 10
10	Dec-03	7,080	700	287	31	901	255	1,474	< 10
11	Mar-04	3,550	600	122	15	313	84	534	35
12	Jun-04	6,800	1,700	350	< 2.5	620	99	1,069	< 10
13	Sep-04	7,100	1,900	160	8.1	600	406	1,174	< 10
14	Dec-04	4,700	2,800	160	< 2.5	470	< 0.5	630	< 10
15	Mar-05	4,200	1,600	97	< 2.5	310	42	449	< 10
16	Jun-05	9,900	2,000	170	< 2.5	590	359	1,119	< 10
17	Sep-05	3,600	1,200	250	< 0.5	330	36	616	< 2.0
18	Dec-05	8,700	1,500	150	4	650	551	1,355	< 4.0
19	Mar-06	3,600	880	37	< 1.0	210	165	412	< 4.0
20	Jun-06	3,200	1,300	39	< 1.0	220	144	403	4.2
21	Sep-06	12,000	3,300	130	8	850	604	1,592	< 1.0
22	Dec-06	12,000	2,800	140	9.4	880	634	1,663	< 10
23	Mar-07	9,600	2,900	120	8.7	780	453	1,362	< 10
24	Jun-07	7,100	2,200	75	5.2	480	298	858	< 4.0
25	Sep-07	4,500	2,100	60	3.8	420	227	710	< 4.0



Well MW-10									
Event	Date	TVHg	TEHd	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
9	Sep-03	< 50	< 50	1.1	< 0.5	1.5	< 0.5	2.6	7.0
10	Dec-03	162	<100	6.9	<0.3	8.0	<0.6	15	9.9
11	Mar-04	94	<100	2.8	<0.3	5.7	7.0	16	<5.0
12	Jun-04	150	56	11	< 0.5	12	< 0.5	23	15
13	Sep-04	< 50	< 50	1.6	< 0.5	1.9	< 1.0	3.5	5.8
14	Dec-04	64	< 50	3.7	< 0.5	3.7	0.7	8.1	10
15	Mar-05	95	98	8.3	<0.5	7.7	0.77	17	13
16	Jun-05	150	57	14	<0.5	10	1.0	25	<2.0
17	Sep-05	87	< 50	5.0	<0.5	3.6	<1.0	8.6	<2.0
18	Dec-05	< 50	< 50	1.2	<0.5	<0.5	<1.0	1.2	7.8
19	Mar-06	58	71	3.2	<0.5	2.2	<1.0	5.4	8.8
20	Jun-06	73	140	4.9	<0.5	2.5	<1.0	7.4	5.3
21	Sep-06	88	51	<0.5	<0.5	<0.5	<0.5	<0.5	9.6
22	Dec-06	<50	<50	0.61	<0.5	0.55	<0.5	1.2	3.7
23	Mar-07	57	<50	3.6	<0.5	2.2	<0.5	5.8	3.1
24	Jun-07	60	65	2.4	<0.5	1.6	<0.5	4.0	4.0
25	Sep-07	84	<50	3.6	<0.5	2.3	0.52	6.4	3.6

Well MW-11									
Event	Date	TVHg	TEHd	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	1,100	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
9	Sep-03	10,000	3,000	250	9.9	700	527	1,487	< 4
10	Dec-03	15,000	1,100	314	60	1,070	802	2,246	173
11	Mar-04	4,900	400	72	17	342	233	664	61
12	Jun-04	10,000	2,300	210	2.8	690	514	1,417	< 10
13	Sep-04	7,200	2,300	340	< 2.5	840	75	1,255	< 10
14	Dec-04	11,000	3,900	180	5.1	780	695	1,660	< 10
15	Mar-05	4,600	1,900	69	< 2.5	300	206	575	< 10
16	Jun-05	1,400	590	85	< 0.5	110	8.2	203	< 2.0
17	Sep-05	12,000	3,100	220	< 1.0	840	762	1,822	< 4.0
18	Dec-05	2,500	2,100	120	< 2.5	260	16	396	< 10
19	Mar-06	2,200	1,300	27	< 2.5	130	5.2	162	< 10
20	Jun-06	3,700	1,900	170	< 1.0	230	14	414	< 4.0
21	Sep-06	3,600	2,100	80	< 0.5	230	8.8	319	< 2.0
22	Dec-06	6,000	3,500	83	< 1.0	260	16.4	359	< 4.0
23	Mar-07	4,500	1,900	110	< 0.5	170	7.9	288	< 2.0
24	Jun-07	4	2,200	120	< 0.5	140	6.6	267	< 4.0
25	Sep-07	5,500	2,700	86	< 0.5	180	16.1	282	< 2.0

Well MW-12									
Event	Date	TVHg	TEHd	Benzene	Toluene	Ethylbenzene	Total Xylenes	Total BTEX	MTBE
1	Dec-05	1,300	700	< 0.5	< 0.5	33	5.6	39	< 2.0
2	Mar-06	1,100	540	< 0.5	< 0.5	8.5	1.5	10	49
3	Jun-06	680	400	< 0.5	< 0.5	5.8	1.4	7.2	< 2.0
4	Sep-06	910	480	< 0.5	< 0.5	9.9	1.5	11.4	21
5	Dec-06	770	230	< 0.5	< 0.5	7.4	2.0	9.4	< 2.0
6	Mar-07	390	110	< 0.5	< 0.5	1.7	1.7	3.4	< 2.0
7	Jun-07	590	280	< 0.5	< 0.5	4.5	0.9	5.4	< 2.0
8	Sep-07	390	180	< 0.5	< 0.5	2.4	2.4	4.8	< 2.0

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

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

<b>Sampling Location SW-1 (Upstream of Contaminated Groundwater Discharge Location SW-2)</b>									
<b>Event</b>	<b>Date</b>	<b>TVHg</b>	<b>TEHd</b>	<b>Benzene</b>	<b>Toluene</b>	<b>Ethylbenzene</b>	<b>Total Xylenes</b>	<b>Total BTEX</b>	<b>MTBE</b>
1	Feb-94	50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
2	May-95	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
3	May-96	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
4	Aug-96	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
5	Dec-96	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
6	Feb-97	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
7	Aug-97	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
8	Dec-97	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
9	Feb-98	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
10	Sep-98	< 50	< 50	< 0.5	< 0.5	< 0.5	< 0.5	—	< 2.0
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.									

Sampling Location SW-2 (Area of Historical Contaminated Groundwater Discharge)									
Event	Date	TVHg	TEHd	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
25	Sep-03	190	92	2.1	< 0.5	4.2	< 0.5	6.3	< 2.0
26	Dec-03	86	< 100	< 0.3	< 0.3	< 0.3	< 0.6	—	< 5.0
27	Mar-04	<50	<100	<0.3	<0.3	1.1	<0.6	1.1	< 5.0
28	Jun-04	<50	<50	<0.5	<0.5	0.83	<0.5	0.83	< 2.0
29	Sep-04	260	370	4.4	<0.5	6.3	< 1.0	11	< 2.0
30	Dec-04	<50	<50	<0.5	<0.5	<0.5	< 1.0	—	< 2.0
31	Mar-05	<50	<50	<0.5	<0.5	<0.5	< 1.0	—	< 2.0
32	Jun-05	<50	<50	<0.5	<0.5	<0.5	< 1.0	—	< 2.0
33	Sep-05	<50	<50	<0.5	<0.5	<0.5	< 1.0	—	< 2.0
34	Dec-05	<50	<50	<0.5	<0.5	<0.5	< 1.0	—	< 2.0
35	Mar-06	<50	62	<0.5	<0.5	<0.5	< 1.0	—	< 2.0
36	Jun-06	<50	110	<0.5	<0.5	<0.5	< 1.0	—	< 2.0
37	Sep-06	62	94	<0.5	<0.5	0.81	<0.5	0.8	< 2.0
38	Dec-06	<50	<50	<0.5	<0.5	<0.5	< 1.0	—	< 2.0
39	Mar-07	<50	<50	<0.5	<0.5	<0.5	< 1.0	—	< 2.0
40	Jun-07	<50	<50	<0.5	<0.5	<0.5	<0.5	—	<2.0
41	Sep-07	<50	77	<50	<50	<50	<50	—	<2.0

Sampling Location SW-3 (Downstream of Contaminated Groundwater Discharge Location SW-2)									
Event	Date	TVHg	TEHd	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	<b>74</b>	< 0.5	< 0.5	< 0.5	< 0.5	—	NA
4	Aug-96	<b>69</b>	< 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	—	<b>2.4</b>
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
24	Sep-03	NS	NS	NS	NS	NS	NS	—	NS
25	Dec-03	<b>60</b>	< 100	< 0.3	< 0.3	< 0.3	< 0.6	—	< 5.0
26	Mar-04	<50	<100	<0.3	<0.3	<0.6	<0.6	—	< 5.0
27	Jun-04	NS	NS	NS	NS	NS	NS	—	NS
28	Sep-04	NS	NS	NS	NS	NS	NS	—	NS
29	Dec-04	<50	<50	<0.5	<0.5	<0.5	< 1.0	—	< 2.0
30	Mar-05	<50	<50	<0.5	<0.5	<0.5	< 1.0	—	< 2.0
31	Jun-05	<50	<50	<0.5	<0.5	<0.5	< 1.0	—	< 2.0
32	Sep-05	<50	<50	<0.5	<0.5	<0.5	< 1.0	—	< 2.0
33	Dec-05	<50	<50	<0.5	<0.5	<0.5	< 1.0	—	< 2.0
34	Mar-06	<50	<50	<0.5	<0.5	<0.5	< 1.0	—	< 2.0
35	Jun-06	<50	<b>120</b>	<0.5	<0.5	<0.5	< 1.0	—	< 2.0
36	Sep-06	<50	<b>120</b>	<0.5	<0.5	<0.5	<0.5	—	<b>7.8</b>
37	Dec-06	<50	<50	<0.5	<0.5	<0.5	< 1.0	—	< 2.0
38	Mar-07	<50	<50	<0.5	<0.5	<0.5	< 1.0	—	<b>3.3</b>
39	Jun-07	<50	<50	<0.5	<0.5	<0.5	<0.5	—	<2.0
40	Sep-07	NS	NS	NS	NS	NS	NS	—	NS

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