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FIRST SEMIANNUAL 2014 GROUNDWATER MONITORING REPORT

REDWOOD REGIONAL PARK
SERVICE YARD
OAKLAND, CALIFORNIA

Prepared for:

EAST BAY REGIONAL PARK DISTRICT
OAKLAND, CALIFORNIA

April 2014

STELLAR
ENVIRONMENTAL SOLUTIONS, INC.
GEOSCIENCE & ENGINEERING CONSULTING

FIRST SEMIANNUAL 2014
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Prepared for:

EAST BAY REGIONAL PARK DISTRICT
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Prepared by:

STELLAR ENVIRONMENTAL SOLUTIONS, INC.
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April 1, 2014

Project No. 2014-02

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April 1, 2014

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: First Semiannual 2014 Groundwater Monitoring Redwood Regional Park Service Yard Site – Oakland, California (ACEH Fuel Leak Case No. RO0000246)

Dear Mr. Wickham:

Attached is the referenced 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 Department of Environmental Health, the Regional Water Quality Control Board, and the California Department of Fish and Game.

This report summarizes the First Semiannual 2014 groundwater and surface water monitoring and sampling conducted on March 10, 2014. In addition to the activities typically conducted during a monitoring event, the water quality parameters including oxygen demand, dissolved oxygen and oxygen reduction potential were taken to assess the effectiveness of the Permeable Reactive Barrier (PRB) that was installed in November 2013.

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 either Mr. Matt Graul of the EBRPD or me (510-644-3123).

Sincerely,

Richard S. Makdisi, P.G., R.E.A.
Principal Geochemist/President

Matt Graul, Stewardship Manager
East Bay Regional Park District

cc: State of California GeoTracker database
Alameda County Department of Environmental Health 'ftp' system

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1.0 INTRODUCTION

PROJECT BACKGROUND

The subject property is the East Bay Regional Park District (EBRPD) Redwood Regional Park Service Yard located at 7867 Redwood Road in Oakland, Alameda County, California. The site has undergone extensive site investigations and remediation since 1993 to address subsurface contamination caused by leakage from one or both former underground fuel storage tanks (UFSTs) that contained gasoline and diesel fuel. The Alameda County Department of Environmental Health (ACEH) has provided regulatory oversight of the investigation since its inception (ACEH 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). This report presents the first semiannual 2014 groundwater monitoring report along with the annual trend analyses and recommendations for future work.

OBJECTIVES AND SCOPE OF WORK

The overall objective of site monitoring and the latest remedial action is to continue trying to reduce the site residual hydrocarbons. Historical remedial efforts have shown that residual hydrocarbons entrained in subsurface material and/or stratigraphic traps are continuing to release significant amounts of hydrocarbons into the groundwater. This report discusses the following activities conducted/coordinated by Stellar Environmental Solutions, Inc. (Stellar Environmental) for the first 2014 semiannual period from January 1, 2014 to March 31, 2014:

- 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

HISTORICAL CORRECTIVE ACTIONS AND INVESTIGATIONS

Other Stellar Environmental reports have discussed previous site remediation and investigations, site geology and hydrogeology, residual site contamination, conceptual model for contaminant fate and transport, and hydrochemical trends and plume stability. The References section of this report lists all technical reports for the site.

The general phases of site work included:

- An October 2000 Feasibility Study report for the site, submitted to ACEH, which provided detailed analyses of the regulatory implications of the site contamination and an assessment of viable corrective actions (Stellar Environmental, 2000d).
- Two instream bioassessment events, 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 Stellar Environmental and approved by ACEH 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 59 groundwater monitoring events have been conducted since project inception (February 1994). A total of 12 groundwater monitoring wells are currently available for monitoring.
- A bioventing pilot test conducted in September and October 2004 to evaluate the feasibility of this corrective action strategy, and installation of the full-scale bioventing system in November and December 2005. Bioventing well VW-3 was decommissioned, and two additional bioventing wells (VW-4 and VW-5) were installed on March 4, 2008. Bioventing activities conducted to date have been discussed in bioventing-specific technical reports, and updates were provided in groundwater monitoring progress reports as they relate to this ongoing program.
- An ORC™ injection pilot test, conducted by Stellar Environmental on March 10, 2009, to control historical high levels of hydrocarbons contamination that began to appear in September 2007 in source well MW-2.
- A Remedial Action Workplan (RAW), dated August 20, 2009, prepared by Stellar Environmental in response to a letter from ACEH. ACEH approved the RAW in a letter (dated October 2, 2009) to the EBRPD.
- An ORC™ injection conducted over the full footprint of plume during First Quarter 2010 (on February 1-2), followed by 30-day post-injection monitoring and sampling of key site wells (on March 2).
- Conversion of surface and groundwater monitoring frequency from quarterly to semiannual by ACEH at the request of Stellar Environmental on behalf of Park District occurred in June 2011.
- In concurrence with ACEH, the site bioventing system having accomplished its' design purpose, was discontinued on July 18, 2011.

- The RAW, dated November 28, 2011, prepared by Stellar Environmental. ACEH approved the PRB RAW in a subsequent letter, dated December 29, 2011and the PRB was installed in November 2013 and followed with a 30-day post-installation monitoring of key downgradient site wells in December 2013.

SITE DESCRIPTION

The site slopes to the west—from an elevation of approximately 564 feet above mean sea level at the eastern edge of the service yard to approximately 530 feet above mean sea level at Redwood Creek, which defines the approximate western edge of the project site with regard to this investigation.

Figure 1 shows the location of the project site. Figure 2 presents the site plan.

REGULATORY OVERSIGHT

The lead regulatory agency for the site investigation and remediation is ACEH (Case No. RO0000246), with oversight provided by the Water Board (GeoTracker Global ID T0600100489). The CDFG is also involved with regard to surface water quality impacts to Redwood Creek. No surface water quality impacts to aquatic organisms were found. The ACEH-approved revisions to the site monitoring program as of this date include:

- 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.
- Conversion of surface and groundwater monitoring frequency from quarterly to semiannual by ACEH, at the request of Stellar Environmental on behalf of Park District occurred in June 2011.
- Shut down of the site bioventing system in June 2011.
- Design and implementation of PRB workplan.

The site is in compliance with State Water Resources Control Board's GeoTracker requirements for uploading electronic data and reports. In addition, electronic copies of technical documentation reports published since Second Quarter 2005 have been uploaded to ACEH's file transfer protocol (ftp) system. Per ACEH'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 ACEH.

3-D TopoQuads Copyright © 1999 DeLorme Yarmouth, ME 04096 Source Data: USGS

750 ft Scale: 1 : 25,000 Detail: 13-0 Datum: WGS84

N

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

Redwood Reg. Park Service Yard Oakland, CA	By: MJC	MARCH 2006
	Figure 1	

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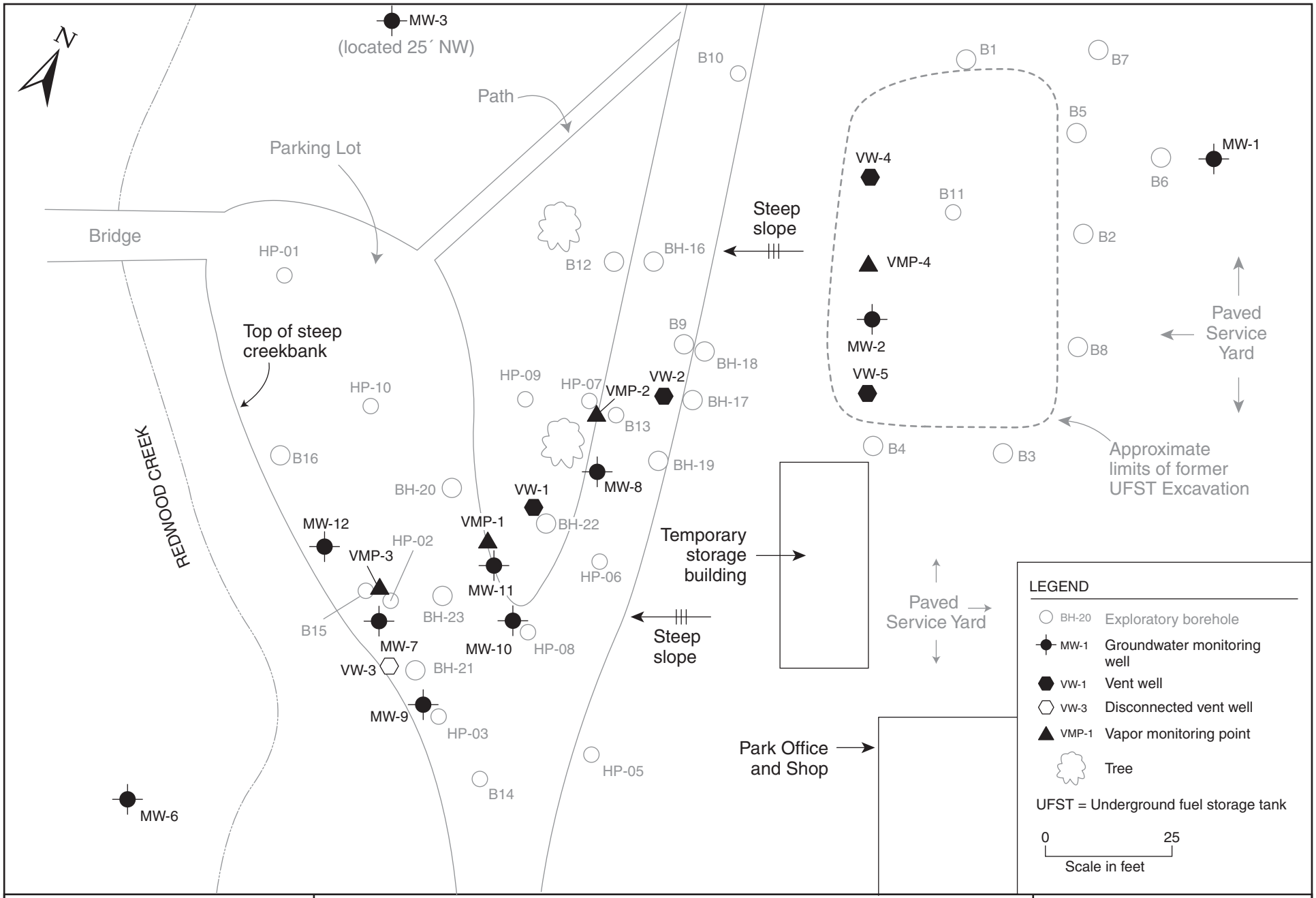
2006-17-01



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

Figure 2

by: MJC | APRIL 2011

2010-02-13

2.0 PHYSICAL SETTING

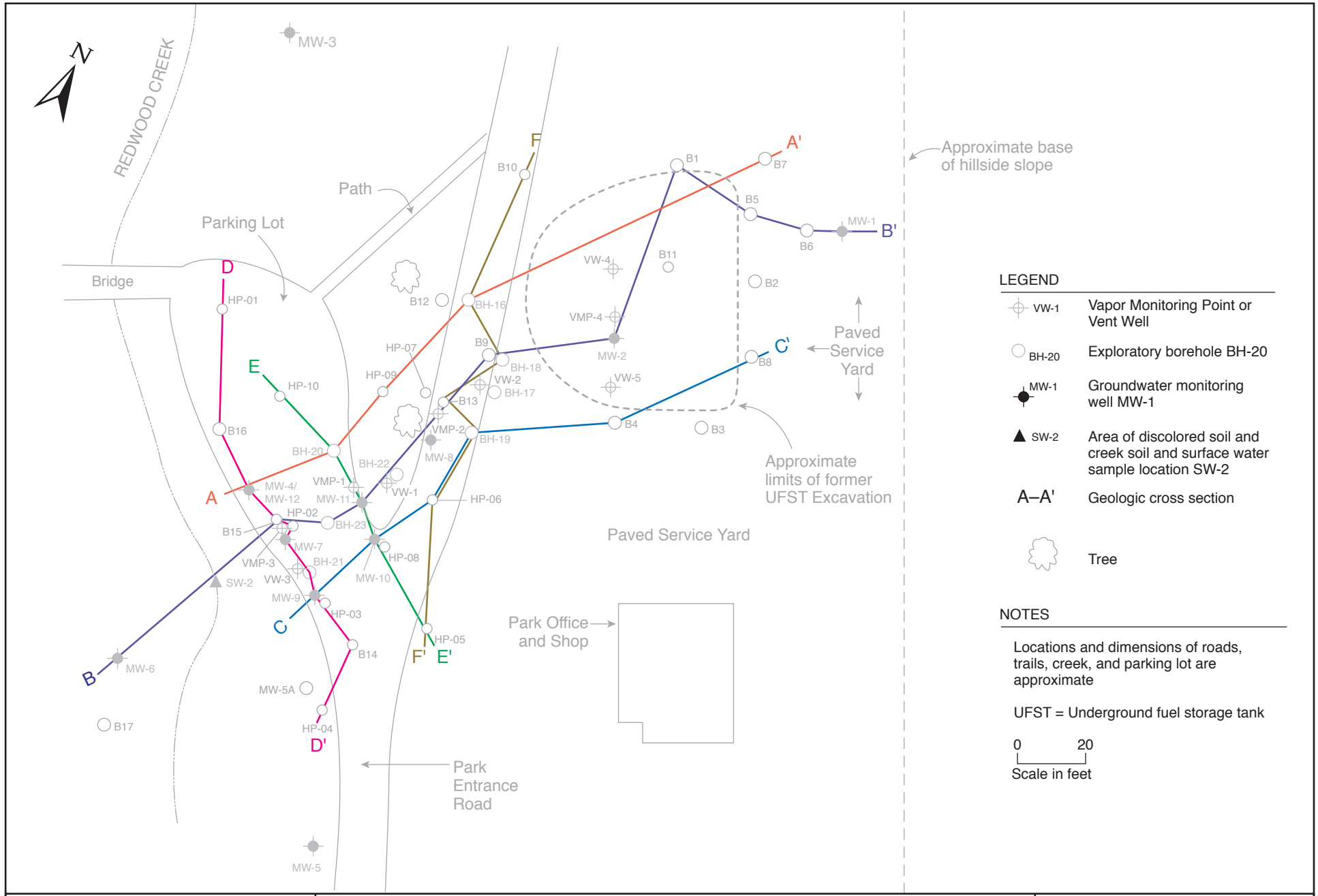
This section discusses the site hydrogeologic conditions based on geologic logging and water level measurements collected at the site since September 1993. Previous Stellar Environmental reports have included detailed discussions of site lithologic and hydrogeologic conditions. In May 2004, ACEH requested, via email, an additional evaluation of site lithology—specifically, the preparation of multiple geologic cross-sections both parallel 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 (Stellar Environmental, 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 Stellar Environmental report (Stellar Environmental, 2004c) presented a bedrock surface isopleth map (elevation contours for the top of the bedrock surface) in the contaminant plume area. The isopleth map indicates the following (as shown in Figures 4 and 5): 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 slopes gently from east to west in the downgradient portion of the site (under the gravel parking area) toward Redwood Creek.



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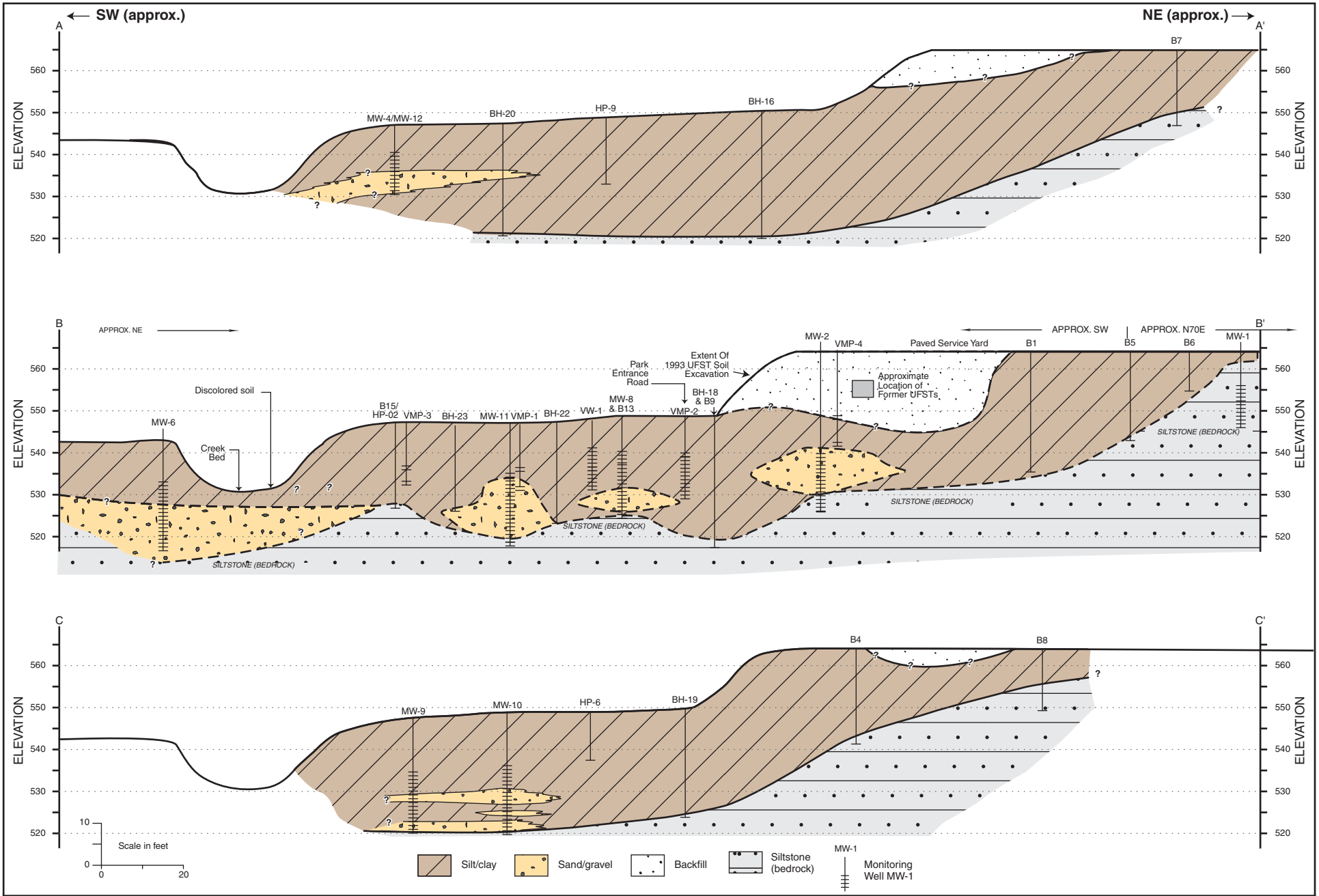
GEOLOGIC CROSS-SECTION LOCATIONS
Redwood Regional Park Service Yard, Oakland, CA

Figure 3

by: MJC | MARCH 2008

2008-02-05



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GEOLOGIC CROSS SECTIONS — A-A' through C-C'

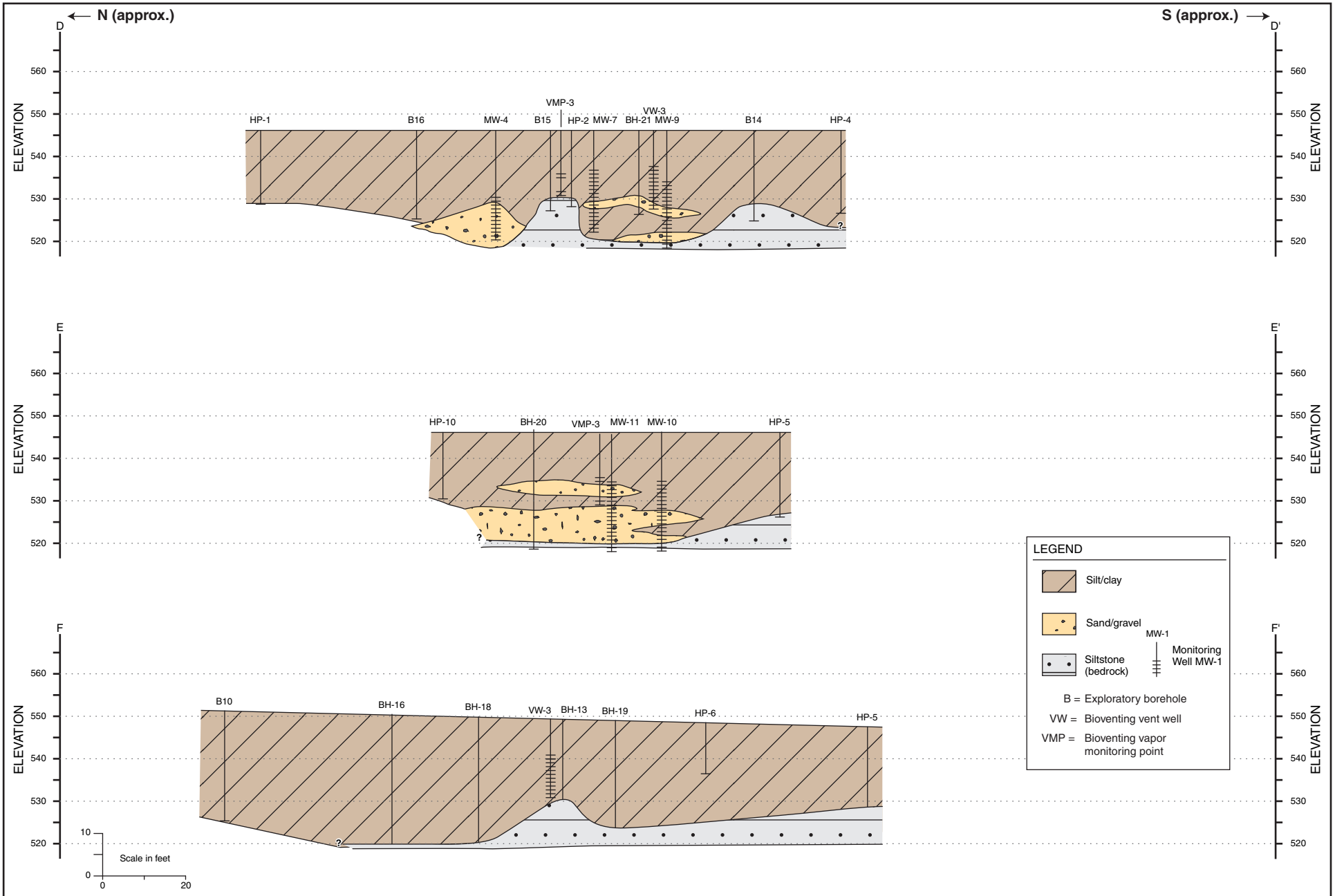
Redwood Regional Park Service Yard, Oakland, CA

Figure 4

by: MJC

DECEMBER 2007

2005-66-14



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

Figure 5

by: MJC | DECEMBER 2005

2005-66-13

This 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) suggests 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 subsection, local groundwater flow direction likely is more variable than expressed by groundwater monitoring well data, due to local variations in bedrock surface topography.

We estimate 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 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.

The following groundwater gradient information is based on the monitoring data contained in Section 4.0 of this report. 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 was measured at approximately 0.27 feet per foot. Downgradient from (west of) the UFST source area (between MW-2 and Redwood Creek) the groundwater gradient was approximately 0.06 feet per foot. The average groundwater elevation was 1.84 feet higher than the previous (October 2013) event, with the greatest increase of 5.46 feet measured in MW-3. 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.

3.0 REGULATORY CONSIDERATIONS

This section summarizes the regulatory considerations with regard to surface water and groundwater contamination. There are no ACEH 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* (Water Board, 1995), 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 residential sites where groundwater is a current or potential drinking water source; and 2) ESLs for residential sites where groundwater is not a current or potential drinking water source.

As stipulated in the ESL guidance (Water Board, 2008), 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. ACEH 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 3 (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, 2008), 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 macro-invertebrate 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.

4.0 FIRST SEMIANNUAL 2014 ACTIVITIES

This section presents the creek surface water and groundwater sampling procedures and methods for the groundwater monitoring event (First Semiannual 2014), conducted on March 10, 2014, along with the analytical results. 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 ACEH in the Stellar Environmental workplan (Stellar Environmental, 1998a).

The current monitoring period activities included:

- Measuring static water levels in all 12 site wells;
- Collecting post-purge groundwater samples for laboratory analysis of site contaminants and as well as the water quality parameters pH, temperature, conductivity, and turbidity during purging from wells located within (or potentially within) the groundwater plume (MW-2, MW-7, MW-8, MW-9, MW-10, MW-11, MW-12, SW-2 and SW-3);
- Collecting Redwood Creek surface water samples for laboratory analysis from locations SW-2 and SW-3; and
- Continue post-purge measurement of dissolved oxygen (DO) and redox to evaluate the effect of the permeable reactive barrier (PRB) that was installed across the distal contaminant plume. In addition, Stellar Environmental also analyzed wells MW-7, MW-9 and MW-12, located directly downgradient of the PRB, for alternate electron acceptors including nitrates, sulfates, biological oxygen demand (BOD), and chemical oxygen demand (COD) to evaluate the effect of PRB after installation;

The locations of all site monitoring wells and creek water sampling locations are shown on Figure 2 (in Section 1.0). Appendix A contains historical groundwater elevation data. Appendix B contains the groundwater monitoring field records for the current event.

Well construction information and the March 2014 groundwater elevation data are summarized in Table 1. Figure 6 is a groundwater elevation map constructed from the current event monitoring well groundwater elevation data.

Table 1
Groundwater Monitoring Well Construction
and Groundwater Elevation Data – March 10, 2014

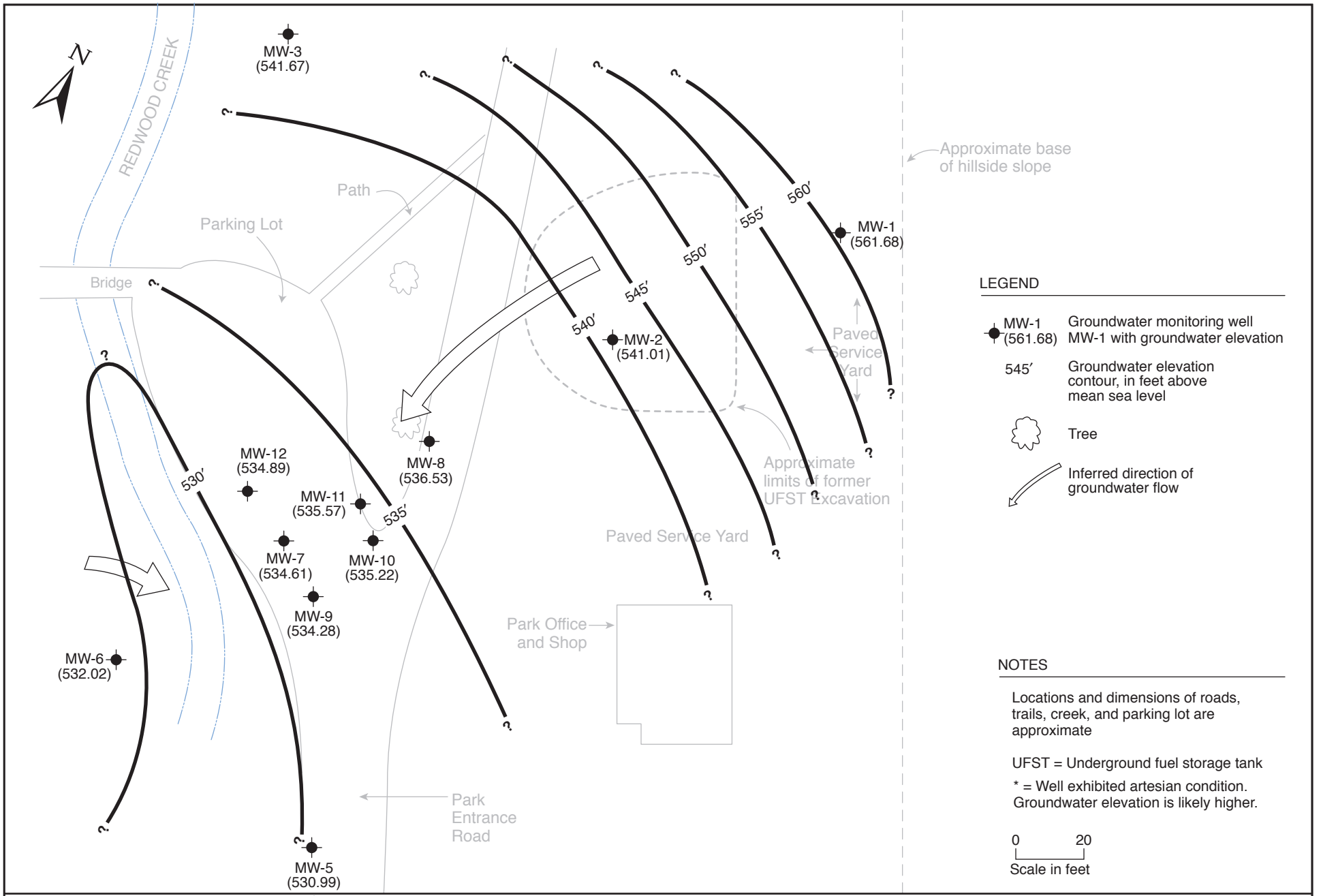
Well	Well Depth	Screened Interval	TOC Elevation	Groundwater Depth (bgs)	Groundwater Elevation
MW-1	18	7 to17	565.83	4.15	561.68
MW-2	36	20 to 35	566.42	21.29	541.01
MW-3	42	7 to 41	560.81	19.14	541.67
MW-5	26	10 to 25	547.41	16.42	530.99
MW-6	26	10 to 25	545.43	13.41	532.02
MW-7	24	9 to24	547.56	12.95	534.61
MW-8	23	8 to 23	549.13	12.60	536.53
MW-9	26	11 to 26	549.28	15.00	534.28
MW-10	26	11 to 26	547.22	12.00	535.22
MW-11	26	11 to 26	547.75	12.18	535.57
MW-12	25	10 to 25	544.67	9.78	534.89

Notes:
All measurements expressed in feet
TOC = top of casing
bgs = below ground surface
Wells MW-1 through MW-6 are 4-inch diameter; all other wells are 2-inch diameter.
All elevations are expressed in feet above mean sea level (amsl). (U.S. Geological Survey)

GROUNDWATER MONITORING AND SAMPLING

Groundwater monitoring well water level measurements, purging, sampling, and field measurements were conducted by Blaine Tech Services under the supervision of Stellar Environmental personnel. As the first task of the monitoring event, static water levels were measured using an electric water level indicator. 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 event).

The sampling-derived purge water and decontamination rinseate (approximately 92.5 gallons) from the current event was containerized in the onsite above-ground storage tank. Purge water is accumulated in the onsite tank until it is full, at which time the water is transported offsite for proper disposal.



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GROUNDWATER ELEVATION MAP—MARCH 10, 2014
Redwood Regional Park Service Yard, Oakland, CA

Figure 6

by: MJC | MARCH 2014

2014-07-01

CREEK SURFACE WATER SAMPLING

Surface water sampling was conducted by Blaine Tech Services under the supervision of Stellar Environmental personnel on March 10, 2014. 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 at SW-3 (located approximately 500 feet downstream of the SW-2 location). In accordance with a previous Stellar Environmental recommendation approved by ACEH, upstream sample location SW-1 is no longer part of the surface water sampling program.

BIOVENTING-RELATED ACTIVITIES

On July 18, 2011, in concurrence with ACEH, the site bioventing system, having accomplished its' design purpose, was discontinued.

PERMEABLE REACTIVE BARRIER (PRB) MONITORING INDICATORS

The permeable reactive barrier (PRB), installed on November 20, 2013, was designed to treat and/or intercept accessible subsurface groundwater hydrocarbon contamination. Alternate electron acceptors were measured during this monitoring and sampling event in wells MW-7, MW-9 and MW-12 located downgradient of the PRB location; which included nitrates, sulfates, biological oxygen demand (BOD), and chemical oxygen demand (COD) to track the effect of the oxygen release product (Adventus EHC-O™) utilization. One concern about the use of Adventus EHC-O™ is that other non-hydrocarbon-utilizing microorganisms will use the product as well, without the benefit of hydrocarbon reduction occurring as effectively. The oxygen demand exerted by extraneous oxygen sinks, such as nitrates and sulfates can then be estimated to evaluate its equivalent to the oxygen demand exerted by the contaminants of concern.

The main active ingredient in Adventus EHC-O™ is calcium peroxide. The optimal pH for hydrocarbon reduction is between seven and nine. The groundwater measured in site wells during this event had a pH range of 6.21 to 7.75, mostly within the optimum range. Under these conditions, the Adventus EHC-O™ remedy product will react to release hydrogen peroxide and oxygen. This allows for the initial chemical oxidation to take place; starting the breakup of the contaminants in groundwater as they reach the PRB. The oxygen is then released more slowly, which will assist bioremediation for several years.

Table 3 includes the baseline results of these additional analyses that have been collected in site monitoring wells located immediately downgradient of the proposed PRB.

Table 2
Analytical Results of Electron Acceptors and Oxygen Demand in Downgradient Wells – March 10, 2014

Location	Analytical Lab Concentrations			
	Nitrates	Sulfates	BOD	COD
MW-7	<0.05	25	9.3	63
MW-9	<0.05	32	15	180
MW-12	<0.05	24	<5.0	49

Notes:
COD = Chemical oxygen demand; BOD = biochemical oxygen demand;
Analytical laboratory concentrations are expressed in in milligrams per liter (mg/L) micrograms per liter (µg/L).

Dissolved Oxygen

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

The DO concentrations, post installation of the PRB, at monitoring wells MW-7, MW-9, MW-11 and MW12, of which MW-7 and MW-9 currently show the highest concentrations of hydrocarbons, are relatively low (0.22 – 0.24 mg/L) suggesting that less active aerobic biodegradation is currently occurring at these wells. The DO in well MW-10, located upgradient of the PRB is 0.68 mg/L suggests natural aerobic biodegradation is occurring. The trends will be monitored in subsequent monitoring events to evaluate the effectiveness of the PRB.

Oxidation-Reduction Potential

The oxidation-reduction potential (ORP) of groundwater is a measure of electron activity, and is an indicator of the relative tendency of a solute species to gain or lose electrons. The ORP of groundwater generally ranges from -400 millivolts (mV) to +800 mV. In oxidizing (aerobic) conditions favorable to bioremediation, the ORP of groundwater is typically positive; in reducing (anaerobic) conditions, the ORP is typically negative (or less positive).

Measurement of the baseline ORP during this sampling event ranged from -66 to -40 mV in wells MW-7, MW-9 and MW-12 located within 15 feet downgradient of the PRB and from -56 to +25 in wells MW-10 and MW-11, located within 15 feet upgradient of the PRB, respectfully. As with the DO, the ORP trend will be monitored to evaluate the effectiveness of the PRB in subsequent monitoring events. Measurements collected during the March 2014 monitoring event are included in Table 3.

GROUNDWATER AND SURFACE WATER ANALYTICAL RESULTS

The semiannual field and analytical laboratory results of the current monitoring event were collected in March 2014. Table 3 summarizes the contaminant analytical results. Figure 7 shows the contaminant results and the inferred limits of the gasoline groundwater plume. Appendix C contains the certified analytical laboratory report and chain-of-custody record. Appendix D summarizes the historical groundwater and surface water analytical results.

First Semiannual 2014 groundwater contaminant concentrations were as follows: The ESL for TVHg for residential areas where groundwater is a drinking water resource was exceeded in four of the seven wells sampled and was exceeded for TEHd in five of the seven wells sampled. The ESL for benzene was exceeded in wells MW-9 and MW-11 in which it was detected. Toluene was not detected above the laboratory detection limit in any of the seven wells sampled. Ethylbenzene was detected in wells MW-7, MW-8, MW-9, MW-10 and MW-11 but above the ESL in wells MW-7, MW-9 and MW-11. Total xylenes were detected in wells MW-7 and MW-9 but above the ESL only in well MW-9. MTBE was detected in wells MW-8, MW-10 and MW-12 but above the ESL only in well MW-8.

Well MW-7 contained both the maximum TVHg and TEHd concentrations in groundwater. MW-7 is located in the downgradient central area of the plume, adjacent to Redwood Creek. The northern edge of the downgradient edge of the plume is defined by well MW-12. The southern edge of the plume in the downgradient area is defined by well MW-5.

No contaminants were detected above their respective laboratory detection limits in either surface water sample location SW-2 or SW-3 during this March 2014 sampling event.

QUALITY CONTROL SAMPLE ANALYTICAL RESULTS

Laboratory quality control (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).

Table 3
Groundwater and Surface Water Samples
Analytical Results –March 10, 2014

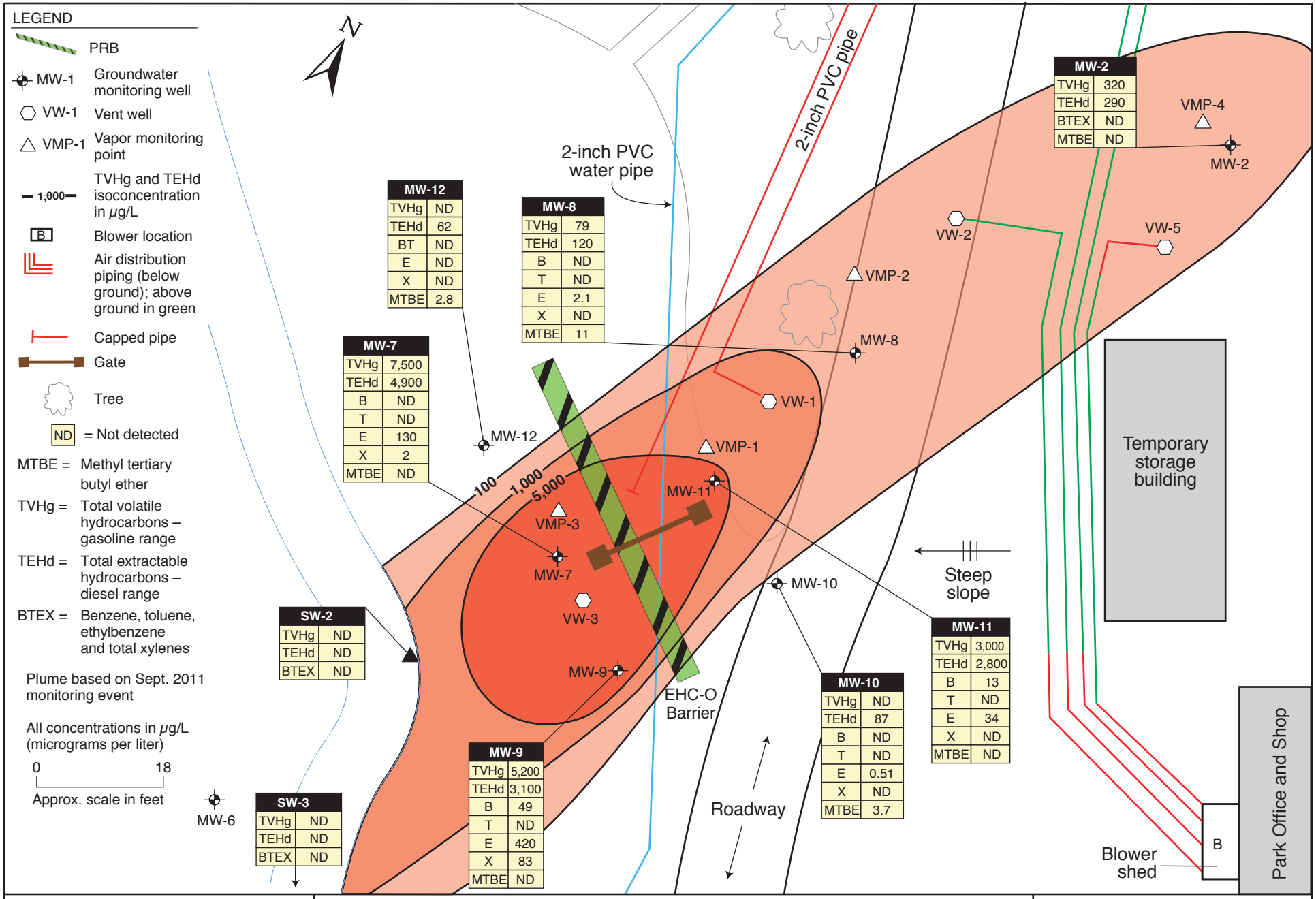
Location	Dissolved Oxygen	ORP	Contaminant Concentrations						
			TEHd	TVHg	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE
GROUNDWATER SAMPLES									
MW-2	4.1	-29	**290**	**320**	<0.5	<0.5	<0.5	<0.5	<2
MW-7	0.24	-54	**4,900**	**7,500**	<0.5	<0.5	**130**	2.0	<2.0
MW-8	0.22	-68	**120**	79	<0.5	<0.5	2.1	<0.5	**11**
MW-9	0.22	-66	**3,100**	**5,200**	**49**	<0.5	**420**	**83**	<2.0
MW-10	0.68	25	87	<50	<0.5	<0.5	0.51	<0.5	3.7
MW-11	0.23	-56	**2,800**	**3,000**	**13**	<0.5	**34**	<0.5	<2.0
MW-12	0.23	-40	62	<50	<0.5	<0.5	<0.5	<0.5	2.8
Groundwater ESLs [a]			100 / 640	100/ 500	1.0 / 27	40 / 130	30 / 43	20 / 100	5.0 / 1,800
REDWOOD CREEK SURFACE WATER SAMPLES									
SW-2	4.27	-6	<49	<50	<0.5	<0.5	<0.5	<0.5	<2.0
SW-3 (dry this event)	4.88	+16	<50	<50	<0.5	<0.5	<0.5	<0.5	<2.0
Surface Water Screening Levels [b]			100	100	1.0	40	30	20	5.0

Notes:
[a] ESLs = Water Board Environmental Screening Levels (where groundwater is/is not a potential drinking water resource) (Water Board, 2013).
[b] Water Board Surface Water Screening Levels for freshwater habitats (Water Board, 2008).
Samples in **bold-face type** exceed the ESLs and/or surface water screening levels where groundwater is a potential drinking water resource.

NA = not analyzed
NLP = no level published
NS = not sampled

MTBE = methyl tertiary-butyl ether
TVHg = total volatile hydrocarbons – gasoline range
TEHd = total extractable hydrocarbons – diesel range

All contaminant concentrations are expressed in micrograms per liter (µg/L), equivalent to parts per billion.
Dissolved oxygen concentrations are expressed in milligrams per liter (mg/L); post-purge measurement in all wells.
ORP = redox or oxidation reduction potential measured in millivolts (mV)



STELLAR ENVIRONMENTAL SOLUTIONS, INC
GEOSCIENCE & ENGINEERING CONSULTING

PLAN VIEW OF REMEDIAL EHC-O PRB TREATMENT WALL & TPH PLUME — MARCH 10, 2014
7867 Redwood Rd, Oakland, CA

Figure 7

by: MJC | MARCH 2014

2014-07-02

5.0 SUMMARY, CONCLUSIONS AND PROPOSED ACTIONS

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 sampling has been conducted on an approximately quarterly basis from November 1994 to June 2011 and on a semiannual basis since September 2011. A total of twelve site wells are available for monitoring; seven 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 gasoline, diesel, benzene and ethylbenzene in groundwater.
- The primary environmental risk is discharge of contaminated groundwater to the adjacent Redwood Creek. An in-stream bioassessment conducted in 1999 to 2000, concluded that there were no direct impacts to the surface water benthic macro-invertebrate 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, benzene, total xylenes, and ethylbenzene but generally only under low creek flow conditions.
- The existing well layout adequately constrains 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 plume of groundwater contamination above screening levels appears to be approximately 130 feet long and approximately 50 feet wide. The zone of greatest contamination (greater than 1,000 µg/L of TVHg) is currently centered around wells MW-7, MW-9, and MW-11 which are in the downgradient area of the plume. However, prior to March 2010, the greatest contamination was observed in MW-2, the historical source area well.
- The contaminant plume has historically appeared neither stable and reducing, the groundwater contaminant concentrations fluctuate seasonally, and the center of mass of the contaminant plume (represented by maximum concentrations) has alternated between the upgradient, mid-plume, and downgradient wells, however the contaminants in upgradient source area MW-2 have showed a steady decrease since March 2010, with the

mid and downgradient areas of the plume (MW-7, MW-9 and MW-11 exhibiting the highest contaminant concentrations.

- Historical remedial efforts indicate that residual hydrocarbons entrained in subsurface material and/or stratigraphic traps are continuing to release significant amounts of hydrocarbons into the groundwater. The dissolved fraction that results from this release forms a recalcitrant plume that still daylights at the Redwood Creek interface.
- 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 to ultimately obtain site closure.
- First Semiannual 2014 site groundwater contaminant concentrations exceeded the groundwater ESL for TVHg in four of the seven wells sampled and the ESL for TEHd in five of the seven wells. The ESL for benzene was exceeded in wells MW-9 and MW-11 in which it was detected. Toluene was not detected above the laboratory detection limit in any of the seven wells sampled. Ethylbenzene was detected in wells MW-7, MW-8, MW-9, MW-10 and MW-11 but above the ESL in wells MW-7, MW-9 and MW-11. Total xylenes were detected in wells MW-7 and MW-9 but above the ESL only in well MW-9. MTBE was detected in wells MW-8, MW-10 and MW-12 but above the ESL only in well MW-8.
- The current March 2014 event showed an increase in contaminant concentrations in downgradient wells MW-7, MW-9 and MW-12. Well MW-7 contained both the maximum TVHg and TEHd concentrations in groundwater. The increase in contaminant concentrations in these wells suggests that contaminant has traveled downgradient during or after the PRB installation, and an insufficient time has elapsed to see a reduction in concentration compared to previous monitoring events.
- No contaminants were detected above their respective laboratory detection limits in either surface water sample location SW-2 or SW-3 during this March 2014 sampling event.

PROPOSED ACTIONS

The EBRPD proposes to implement the following actions to address the current site conditions and regulatory concerns:

- Continue to monitor and evaluate the PRB with sampling of key wells MW-7, MW-9, MW-11 and MW-12 for the additional site chemical parameters to track the effect of the oxygen release product utilization and to investigate whether microbial biodegradation activity is occurring preferentially in natural site constituents in competition with the target residual hydrocarbons.

- We recommend additional quarterly monitoring and sampling of key wells; MW-7, MW-9, MW-11 and MW-12 for analysis of TPH constituents and the additional site chemical parameters to assess the seasonal variations of the PRB effectiveness.
- Continue to inform regulators of site progress and seek their concurrence with proposed actions.
- Continue to make the required electronic data and report uploads to the State of California GeoTracker database, and upload an electronic copy of technical reports to ACEH's ftp database.

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10.0 LIMITATIONS

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

The findings and conclusions presented in this report are based on the review of previous investigators' findings at the site, as well as onsite activities conducted by SES since September 1998. This report 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

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	531.4						
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
12/6/2007	560.62	541.22	536.85	(b)	530.68	531.48	533.21	535.08	532.62	533.3	533.61	533.64
3/14/2008	561.76	545.73	541.63	(b)	531.34	532.30	534.88	539.30	534.67	536.04	535.89	535.72
6/13/2008	560.92	543.61	540.6	(b)	530.83	532.02	534.42	536.86	533.81	534.84	535.16	534.67
9/18/2008	560.43	540.15	536.41	(b)	529.85	531.11	532.69	534.15	531.97	532.65	533.09	533.12
12/17/2008	561.11	540.88	536.77	(b)	530.68	531.67	533.26	534.04	532.35	532.94	533.29	533.66
3/16/2009	561.84	546.25	539.51	(b)	531.63	532.58	534.65	539.51	534.56	535.55	535.49	535.08
6/10/2009	561.05	545.02	541.38	(b)	531.02	532.08	534.45	537.94	534.08	535.40	535.18	534.96
9/25/2009	560.00	540.79	536.33	(b)	529.98	Dry	532.58	534.25	531.96	532.62	532.97	533.08
12/21/2009	560.93	543.49	541.22	(b)	530.96	532.06	534.03	536.17	533.46	534.13	534.57	534.69
3/29/2010	561.48	546.44	541.59	(b)	531.52	532.58	534.72	540.03	534.53	535.94	535.55	535.28
6/22/2010	561.17	545.62	541.40	(b)	531.26	532.41	534.63	538.90	534.37	535.62	535.27	535.21
9/28/2010	560.32	543.36	537.91	(b)	530.6	532.02	532.66	535.23	532.96	534.21	533.99	534.16
12/16/2010	561.33	545.52	541.51	(b)	531.11	532.31	534.52	537.21	534.00	534.38	535.10	535.15
3/23/2011	563.68	547.97	542.49	(b)	532.78	534.43	535.96	542.40	535.87	537.19	537.88	536.15
9/23/2011	561.03	543.54	539.52	(b)	530.81	532.31	534.34	536.41	533.59	534.67	534.85	534.86
3/22/2012	562.25	546.42	542.02	(b)	531.83	533.13	534.71	539.34	535.97	535.51	536.03	535.69
9/19/2012	560.93	541.83	537.53	(b)	530.6	531.91	533.55	534.88	532.95	534.33	534.17	534.17
3/14/2013	561.80	545.57	541.74	(b)	531.01	532.11	534.66	538.64	534.31	535.72	535.67	535.37
10/3/2013	560.95	541.01	536.21	(b)	530.02	531.14	532.74	533.74	531.89	532.54	533.08	533.06
3/10/2014	561.68	541.01	541.67	(b)	531.99	532.02	534.61	536.53	534.28	535.22	535.57	534.89

TOC = Top of well Casing

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

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

APPENDIX B

Groundwater Monitoring
Field Documentation

WELL GAUGING DATA

Project # 140310 - BW1 Date 3/10/14 Client Stellar

Site 7867 Redwood Rd. 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 (TOC)	Notes
MW-1	0832	4					4.15	19.18		
MW-2	0836	4					21.29	37.20		
MW-3	0912	4					19.14	45.00		
MW-5	0918	4					16.42	26.97		
MW-6	0925	2					13.41	27.44		
MW-7	0847	2	ODOR				12.95	25.35		
MW-8	0902	2					12.60	22.25		
MW-9	0856	2	ODOR				15.00	30.20		
MW-10	0842	2					12.00	28.40		
MW-11	0907	2					12.18	28.73		
MW-12	0851	2					9.78	20.80		

WELLHEAD INSPECTION CHECKLIST

Client Stellar Date 3/10/14

Site Address 7867 Redwood Rd, Oakland

Job Number 140310-BL01 Technician BL

Well ID	Well Inspected - No Corrective Action Required	Water Bailed From Wellbox	Wellbox Components Cleaned	Cap Replaced	Lock Replaced	Other Action Taken (explain below)	Well Not Inspected (explain below)	Repair Order Submitted
MW-1						X		
MW-2	X							
MW-3	X							
MW-5	X							
MW-6	X							
MW-7	X							
MW-8						X		
MW-9	X							
MW-10						X		
MW-11	X							
MW-12						X		

NOTES: MW-1: Standpipe hinge broken

MW-8: 3/3 bolts missing, MW-10: 2/2 Tabs Stripped, MW-12: 1/2 Tab broken

TEST EQUIPMENT CALIBRATION LOG

PROJECT NAME 7867 Redwood Rd. Oakland				PROJECT NUMBER 140310-BW1			
EQUIPMENT NAME	EQUIPMENT NUMBER	DATE/TIME OF TEST	STANDARDS USED	EQUIPMENT READING	CALIBRATED TO: OR WITHIN 10%:	TEMP.	INITIALS
Myron-L Ultrameter II	6220709	3/10/14 @0635	PH 7,10,4 Cond 3900 µs/cm	7.0,10.0,4.0 3900 µs/cm	OK	62.1°F	[illegible]
Hach 2100P Turbidimeter	BTS 002	3/10/14 @0640	800 ntu	803 ntu	OK	N/A	[illegible]
YSI 550A DO Meter	BTS 001	3/10/14 @0650	100% DO	100%	OK	62.8°F	[illegible]

WELL MONITORING DATA SHEET

Project #: 140310-BW1	Client: Stellar
Sampler: BW	Date: 3/10/14
Well I.D.: MW-2	Well Diameter: 2 3 (4) 6 8 ____
Total Well Depth (TD): 37.20	Depth to Water (DTW): 21.29
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]: 24.47	

Purge Method: Bailer; Disposable Bailer; Positive Air Displacement; X Electric Submersible; Waterra; Peristaltic; Extraction Pump; Other ____

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

10.3 (Gals.) X	3	= 30.9 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	radius² * 0.163

Time	Temp (°F or °C)	pH	Cond. (mS or µS)	Turbidity (NTUs)	Gals. Removed	Observations
0951	58.1	6.71	782	491	10.5	
	* Dewatered @ 11.0 gallons					
1300	59.2	7.01	770	104	—	

Did well dewater? (Yes) No Gallons actually evacuated: 11.0

Sampling Date: 3/10/14 Sampling Time: 1300 Depth to Water: 29.54 (2 hrs)

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

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

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:	4.10	mg/L
O.R.P. (if req'd):	Pre-purge:	mV	Post-purge:	-29	mV

WELL MONITORING DATA SHEET

Project #: 140310 - BW1	Client: Stellar
Sampler: BW	Date: 3/10/14
Well I.D.: MW-7	Well Diameter: (2) 3 4 6 8 ____
Total Well Depth (TD): 25.35	Depth to Water (DTW): 12.95
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]: 15.43	

Purge Method: Bailer; X Disposable Bailer; Positive Air Displacement; Electric Submersible; Waterra; Peristaltic; Extraction Pump; Other_____

Sampling Method: Bailer; X Disposable Bailer; Extraction Port; Dedicated Tubing; Other: _____

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

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

Time	Temp (°F or °C)	pH	Cond. (mS or µS)	Turbidity (NTUs)	Gals. Removed	Observations
1027	54.0	6.81	615	288	2.0	ODOR/Sheen
1029	54.7	6.82	572	>1000	4.0	
1033	54.8	6.83	560	>1000	6.0	

Did well dewater? Yes (No) Gallons actually evacuated: 6.0

Sampling Date: 3/10/14 Sampling Time: 1040 Depth to Water: 13.28

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

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

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:	0.24 mg/L
O.R.P. (if req'd):	Pre-purge:	mV	Post-purge:	-54 mV

WELL MONITORING DATA SHEET

Project #: 140310-BW1	Client: Stellar
Sampler: BW	Date: 3/10/14
Well I.D.: MW-8	Well Diameter: (2) 3 4 6 8 ____
Total Well Depth (TD): 22.25	Depth to Water (DTW): 12.60
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]: 14.53	

Purge Method: Bailer; X Disposable Bailer; Positive Air Displacement; Electric Submersible; Waterra; Peristaltic; Extraction Pump; Other_____

Sampling Method: Bailer; X Disposable Bailer; Extraction Port; Dedicated Tubing; Other: _____

1.5 (Gals.) X 3 = 4.5 Gals.
1 Case Volume | Specified Volumes | Calculated Volume

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

Time	Temp (°F or °C)	pH	Cond. (mS or µS)	Turbidity (NTUs)	Gals. Removed	Observations
1157	57.0	7.11	794	71000	1.5	
1201	57.2	7.09	801	71000	3.0	
1204	57.0	7.06	803	71000	4.5	

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

Sampling Date: 3/10/14 Sampling Time: 1210 Depth to Water: 12.97

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

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

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:	0.22	mg/L
O.R.P. (if req'd):	Pre-purge:	mV	Post-purge:	-68	mV

WELL MONITORING DATA SHEET

Project #: 140310-BW1	Client: Stellar
Sampler: BW	Date: 3/10/14
Well I.D.: MW-9	Well Diameter: (2) 3 4 6 8 ____
Total Well Depth (TD): 30.20	Depth to Water (DTW): 15.00
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]: 18.04	

Purge Method:
- Bailer
- X Disposable Bailer
- Positive Air Displacement
- Electric Submersible
- Waterra
- Peristaltic
- Extraction Pump
- Other_____

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

2.4 (Gals.) X 3 = 7.2 Gals.
1 Case Volume | Specified Volumes | Calculated Volume

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

Time	Temp (°F or °C)	pH	Cond. (mS or µS)	Turbidity (NTUs)	Gals. Removed	Observations
1121	55.0	6.93	846	>1000	2.5	ODOR/light sheen
1126	55.6	6.94	827	>1000	5.0	
1132	55.8	6.94	823	>1000	7.5	

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

Sampling Date: 3/10/14 Sampling Time: 1140 Depth to Water: 17.84

Sample I.D.: MW-9 Laboratory: Kiff CalScience Other C+T

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

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:	0.22 mg/L
O.R.P. (if req'd):	Pre-purge:	mV	Post-purge:	-66 mV

WELL MONITORING DATA SHEET

Project #: 140310 - BW1	Client: Stellar
Sampler: BW	Date: 3/10/14
Well I.D.: MW-10	Well Diameter: (2) 3 4 6 8 ____
Total Well Depth (TD): 28.40	Depth to Water (DTW): 12.00
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]: 15.28	

Purge Method: Bailer; X Disposable Bailer; Positive Air Displacement; Electric Submersible; Waterra; Peristaltic; Extraction Pump; Other____

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

2.6 (Gals.) X 3 = 7.8 Gals.
1 Case Volume | Specified Volumes | Calculated Volume

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

Time	Temp (°F or °C)	pH	Cond. (mS or µS)	Turbidity (NTUs)	Gals. Removed	Observations
1007	57.2	7.03	849	721	3.0	
1011	56.8	7.21	797	>1000	6.0	
1016	56.6	7.29	791	>1000	8.0	
						ORP - +25mV
						DO: 0.68 mg/L

Did well dewater? Yes (No) Gallons actually evacuated: 8.0

Sampling Date: 3/10/14 Sampling Time: 1020 Depth to Water: 14.32

Sample I.D.: MW-10 Laboratory: Kiff CalScience Other C+T

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

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:	0.68	mg/L
O.R.P. (if req'd):	Pre-purge:	mV	Post-purge:	+25mV	mV

WELL MONITORING DATA SHEET

Project #: 140310 - BW1	Client: Stellar
Sampler: BW	Date: 3/10/14
Well I.D.: MW-11	Well Diameter: (2) 3 4 6 8 ____
Total Well Depth (TD): 28.73	Depth to Water (DTW): 12.18
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]: 15.49	

Purge Method: Bailer / X Disposable Bailer / Positive Air Displacement / Electric Submersible / Waterra / Peristaltic / Extraction Pump / Other_____

Sampling Method: Bailer / X Disposable Bailer / Extraction Port / Dedicated Tubing / Other: _____

2.7 (Gals.) X 3 = 8.1 Gals.
1 Case Volume | Specified Volumes | Calculated Volume

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

Time	Temp (°F or °C)	pH	Cond. (mS or µS)	Turbidity (NTUs)	Gals. Removed	Observations
1226	55.7	6.74	670	384	3.0	
1231	55.9	6.71	634	412	6.0	
1236	56.0	6.72	629	488	8.5	

Did well dewater? Yes (No) Gallons actually evacuated: 8.5

Sampling Date: 3/10/14 Sampling Time: 1240 Depth to Water: 12.39

Sample I.D.: MW-11 Laboratory: Kiff CalScience Other C+T

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

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:	0.23	mg/L
O.R.P. (if req'd):	Pre-purge:	mV	Post-purge:	-56	mV

WELL MONITORING DATA SHEET

Project #: 140310 - BW1	Client: Stellar
Sampler: BW	Date: 3/10/14
Well I.D.: MW-12	Well Diameter: (2) 3 4 6 8 ____
Total Well Depth (TD): 20.80	Depth to Water (DTW): 9.78
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]: 11.98	

Purge Method: Bailer; X Disposable Bailer; Positive Air Displacement; Electric Submersible; Waterra; Peristaltic; Extraction Pump; Other____

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

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

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

Time	Temp (°F or °C)	pH	Cond. (mS or µS)	Turbidity (NTUs)	Gals. Removed	Observations
1047	54.3	6.91	681	>1000	2.0	
1051	54.5	6.89	674	>1000	4.0	
1055	54.7	6.87	668	>1000	5.5	

Did well dewater? Yes (No) Gallons actually evacuated: 5.5

Sampling Date: 3/10/14 Sampling Time: 1110 Depth to Water: 10.24

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

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

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:	0.23	mg/L
O.R.P. (if req'd):	Pre-purge:	mV	Post-purge:	-40	mV

WELL MONITORING DATA SHEET

Project #: 140310-BW1	Client: Stellar
Sampler: BW	Date: 3/10/14
Well I.D.: SW-2	Well Diameter: 2 3 4 6 8 ____
Total Well Depth (TD):	Depth to Water (DTW):
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 / Disposable Bailer / Positive Air Displacement / Electric Submersible / Waterra / Peristaltic / Extraction Pump / Other____

Sampling Method: Bailer / Disposable Bailer / Extraction Port / Dedicated Tubing / Other: Pole + Ladle - disp

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

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

Time	Temp (°F or °C)	pH	Cond. (mS or µS)	Turbidity (NTUs)	Gals. Removed	Observations
1320	54.8	7.75	468	14	—	

Did well dewater? Yes No Gallons actually evacuated: Ø

Sampling Date: 3/10/14 Sampling Time: 1320 Depth to Water: Ø

Sample I.D.: SW-2 Laboratory: Kiff CalScience Other C+T

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

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:	4.27	mg/L
O.R.P. (if req'd):	Pre-purge:	mV	Post-purge:	-6	mV

WELL MONITORING DATA SHEET

Project #: 140310 - BW1	Client: Stellar
Sampler: BW	Date: 3/10/14
Well I.D.: SW-3	Well Diameter: 2 3 4 6 8 ___
Total Well Depth (TD):	Depth to Water (DTW):
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, Disposable Bailer, Positive Air Displacement, Electric Submersible, Waterra, Peristaltic, Extraction Pump, Other ____

Sampling Method: Bailer, Disposable Bailer, Extraction Port, Dedicated Tubing, Other: Pole + dip ladle

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

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

Time	Temp (°F or °C)	pH	Cond. (mS or µS)	Turbidity (NTUs)	Gals. Removed	Observations
1340	54.9	7.56	466	18	—	

Did well dewater? Yes No Gallons actually evacuated: Ø

Sampling Date: 3/10/14 Sampling Time: 1340 Depth to Water: Ø

Sample I.D.: SW-3 Laboratory: Kiff CalScience Other C+T

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

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:	4.88	mg/L
O.R.P. (if req'd):	Pre-purge:	mV	Post-purge:	+16	mV

APPENDIX C

Analytical Laboratory Report and Chain-of-Custody Record


Curtis & Tompkins, Ltd.
Analytical Laboratories, Since 1878

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

Laboratory Job Number 254257
ANALYTICAL REPORT

Stellar Environmental Solutions	Project : 2013-02.
2198 6th Street	Location : Redwood Regional Park
Berkeley, CA 94710	Level : II

Sample ID	Lab ID
MW-2	254257-001
MW-7	254257-002
MW-8	254257-003
MW-9	254257-004
MW-10	254257-005
MW-11	254257-006
MW-12	254257-007
SW-2	254257-008
SW-3	254257-009

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 signature. 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: Tracy Babjar Date: 03/17/2014

Tracy Babjar
Project Manager
tracy.babjar@ctberk.com
(510) 204-2226

CA ELAP# 2896, NELAP# 4044-001

Curtis & Tompkins, Ltd.

CASE NARRATIVE

Laboratory number:	**254257**
Client:	**Stellar Environmental Solutions**
Project:	**2013-02.**
Location:	**Redwood Regional Park**
Request Date:	**03/10/14**
Samples Received:	**03/10/14**

This data package contains sample and QC results for nine water samples, requested for the above referenced project on 03/10/14. The samples were received cold and intact.

TPH-Purgeables and/or BTXE by GC (EPA 8015B and EPA 8021B):
High response was observed for MTBE in the CCV analyzed 03/12/14 03:33; affected data was qualified with "b". High surrogate recoveries were observed for bromofluorobenzene (FID) in a number of samples. High surrogate recovery was observed for bromofluorobenzene (PID) in MW-11 (lab # 254257-006). No other analytical problems were encountered.

TPH-Extractables by GC (EPA 8015B):
No analytical problems were encountered.

Ion Chromatography (EPA 300.0):
No analytical problems were encountered.

Chemical Oxygen Demand (SM5220D):
No analytical problems were encountered.

Biochemical Oxygen Demand (SM5210B):
High recoveries were observed for biochemical oxygen demand in the BS/BSD for batch 208868. No other analytical problems were encountered.

Chain of Custody Record

25257

Lab job no. _____
Date 3/10/14
Page 1 of 1

Laboratory Curtis and Tompkins, Ltd.
Address 2323 Fifth Street
Berkeley, California 94710
510-486-0900

Project Owner East Bay Regional Park District
Site Address 7867 Redwood Road
Oakland, California

Project Name Redwood Regional Park
Project Number 2013-02

Method of Shipment Hand Delivery
Shipment No. _____
Airbill No. _____
Cooler No. _____
Project Manager Richard Makdisi
Telephone No. (510) 644-3123
Fax No. (510) 644-3859
Samplers: (Signature) [signature]

	Field Sample Number	Location/ Depth	Date	Time	Sample Type	Type/Size of Container	Preservation: Cooler	Preservation: Chemical	Filtered	No. of Containers	TVH-g (8015m)	BTEX/MTBE (8021)	TEH-D (8015)	Nitrate	Sulfate	BOD	COD			Remarks
									Analysis Required											
1	MW-2		3/10/14	1300	W	MIX		HCL	N	5	X	X	X	X*						
2	MW-7			1040	W			MIX	N	8	X	X	X	X	X	X	X			
3	MW-8			1210	W			HCL	N	5	X	X	X							
4	MW-9			1140	W			MIX	N	8	X	X	X	X	X	X	X			
5	MW-10			1020	W			HCL	N	5	X	X	X							
6	MW-11			1240	W			MIX	N	5	X	X	X							
7	MW-12			1110	W			HCL	N	8	X	X	X	X	X	X	X			
8	SW-2			1320	W			HCL	N	5	X	X	X							
9	SW-3			1340	W			HCL	N	5	X	X	X							

Relinquished by:	Date	Received by:	Date	Relinquished by:	Date	Received by:	Date
Signature [signature]	3/10/14	Signature [signature]	3/10/14	Signature		Signature	
Printed Brian Weeks	Time 1445	Printed Pat Gonzalez	Time 1445	Printed	Time	Printed	Time
Company Stellar Environmental/SES		Company C&T		Company		Company	

Turnaround Time: 5 Day TAT
Comments: Samples on ice
* SHORT HOLD TIMES

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

2000-00-01

★ Stellar Environmental Solutions

2198 Sixth Street #201, Berkeley, CA 94710

COOLER RECEIPT CHECKLIST

Curtis & Tompkins, Ltd.

Login # 28257 Date Received 3/10/14 Number of coolers 2
Client SES Project REDWOOD REGIONAL PARK (2013-02)

Date Opened 3/10 By (print) MA (sign) [signature]
Date Logged in 4 By (print) TR (sign) Tina Rankin

1. Did cooler come with a shipping slip (airbill, etc) _____ YES (NO)
Shipping info _____

2A. Were custody seals present? .... ☐ YES (circle) on cooler on samples ☒ NO
How many _____ Name _____ Date _____
2B. Were custody seals intact upon arrival? _____ YES NO (N/A)
3. Were custody papers dry and intact when received? _____ YES NO
4. Were custody papers filled out properly (ink, signed, etc)? _____ YES NO
5. Is the project identifiable from custody papers? (If so fill out top of form) _____ YES NO
6. Indicate the packing in cooler: (if other, describe) _____

☐ Bubble Wrap ☐ Foam blocks ☑ Bags ☐ None
☐ Cloth material ☐ Cardboard ☐ Styrofoam ☐ Paper towels

7. Temperature documentation: * Notify PM if temperature exceeds 6°C

Type of ice used: ☑ Wet ☐ Blue/Gel ☐ None Temp(°C) 1.4, 0.8

☐ Samples Received on ice & cold without a temperature blank; temp. taken with IR gun

☒ Samples received on ice directly from the field. Cooling process had begun

8. Were Method 5035 sampling containers present? _____ YES (NO)
If YES, what time were they transferred to freezer? _____
9. Did all bottles arrive unbroken/unopened? _____ YES NO
10. Are there any missing / extra samples? _____ YES (NO)
11. Are samples in the appropriate containers for indicated tests? _____ YES NO
12. Are sample labels present, in good condition and complete? _____ YES NO
13. Do the sample labels agree with custody papers? _____ YES NO
14. Was sufficient amount of sample sent for tests requested? _____ YES NO
15. Are the samples appropriately preserved? _____ YES NO N/A
16. Did you check preservatives for all bottles for each sample? _____ YES NO N/A
17. Did you document your preservative check? _____ YES NO N/A
18. Did you change the hold time in LIMS for unpreserved VOAs? _____ YES NO N/A
19. Did you change the hold time in LIMS for preserved terracores? _____ YES NO N/A
20. Are bubbles > 6mm absent in VOA samples? _____ YES NO N/A
21. Was the client contacted concerning this sample delivery? _____ YES (NO)
If YES, Who was called? _____ By _____ Date: _____

COMMENTS

_____

_____

_____

_____

_____

_____

Rev 10; 11/11

Curtis & Tompkins Sample Preservation for 254257

Sample	pH: <2	>9	>12	Other
-002a	[ ]	[ ]	[ ]	_____
b	[ ]	[ ]	[ ]	_____
c	[ ]	[ ]	[ ]	_____
d	[X]	[ ]	[ ]	_____
e	[ ]	[ ]	[ ]	_____
f	[ ]	[ ]	[ ]	_____
g	[ ]	[ ]	[ ]	_____
h	[ ]	[ ]	[ ]	_____
-004a	[ ]	[ ]	[ ]	_____
b	[ ]	[ ]	[ ]	_____
c	[ ]	[ ]	[ ]	_____
d	[X]	[ ]	[ ]	_____
e	[ ]	[ ]	[ ]	_____
f	[ ]	[ ]	[ ]	_____
g	[ ]	[ ]	[ ]	_____
h	[ ]	[ ]	[ ]	_____
-007a	[ ]	[ ]	[ ]	_____
b	[ ]	[ ]	[ ]	_____
c	[ ]	[ ]	[ ]	_____
d	[X]	[ ]	[ ]	_____
e	[ ]	[ ]	[ ]	_____
f	[ ]	[ ]	[ ]	_____
g	[ ]	[ ]	[ ]	_____
h	[ ]	[ ]	[ ]	_____

Analyst: TR
Date: 3/10/14

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	254257	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2013-02.		
Matrix:	Water	Sampled:	03/10/14
Units:	ug/L	Received:	03/10/14

Field ID:	MW-2	Diln Fac:	1.000
Type:	SAMPLE	Batch#:	208848
Lab ID:	254257-001	Analyzed:	03/11/14

Analyte	Result	RL	Analysis
Gasoline C7-C12	320 Y	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
Bromofluorobenzene (FID)	128	77-128	EPA 8015B
Bromofluorobenzene (PID)	123	75-132	EPA 8021B

Field ID:	MW-7	Diln Fac:	1.000
Type:	SAMPLE	Batch#:	208887
Lab ID:	254257-002	Analyzed:	03/12/14

Analyte	Result	RL	Analysis
Gasoline C7-C12	7,500 Y	50	EPA 8015B
MTBE	ND	2.0	EPA 8021B
Benzene	ND	0.50	EPA 8021B
Toluene	ND	0.50	EPA 8021B
Ethylbenzene	130	0.50	EPA 8021B
m,p-Xylenes	ND	0.50	EPA 8021B
o-Xylene	2.0 C	0.50	EPA 8021B

Surrogate	%REC	Limits	Analysis
Bromofluorobenzene (FID)	148 *	77-128	EPA 8015B
Bromofluorobenzene (PID)	131	75-132	EPA 8021B

Field ID:	MW-8	Lab ID:	254257-003
Type:	SAMPLE	Diln Fac:	1.000

Analyte	Result	RL	Batch#	Analyzed	Analysis
Gasoline C7-C12	79 Y	50	208848	03/11/14	EPA 8015B
MTBE	11	2.0	208887	03/12/14	EPA 8021B
Benzene	ND	0.50	208887	03/12/14	EPA 8021B
Toluene	ND	0.50	208887	03/12/14	EPA 8021B
Ethylbenzene	2.1	0.50	208848	03/11/14	EPA 8021B
m,p-Xylenes	ND	0.50	208887	03/12/14	EPA 8021B
o-Xylene	ND	0.50	208887	03/12/14	EPA 8021B

Surrogate	%REC	Limits	Batch#	Analyzed	Analysis
Bromofluorobenzene (FID)	124	77-128	208848	03/11/14	EPA 8015B
Bromofluorobenzene (PID)	129	75-132	208887	03/12/14	EPA 8021B

*= Value outside of QC limits; see narrative
C= Presence confirmed, but RPD between columns exceeds 40%
Y= Sample exhibits chromatographic pattern which does not resemble standard
ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	254257	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2013-02.		
Matrix:	Water	Sampled:	03/10/14
Units:	ug/L	Received:	03/10/14

Field ID:	MW-9	Diln Fac:	16.67
Type:	SAMPLE	Batch#:	208887
Lab ID:	254257-004	Analyzed:	03/12/14

Analyte	Result	RL	Analysis
Gasoline C7-C12	5,200 Y	830	EPA 8015B
MTBE	ND	33	EPA 8021B
Benzene	49 C	8.3	EPA 8021B
Toluene	ND	8.3	EPA 8021B
Ethylbenzene	420	8.3	EPA 8021B
m,p-Xylenes	74	8.3	EPA 8021B
o-Xylene	9.0	8.3	EPA 8021B

Surrogate	%REC	Limits	Analysis
Bromofluorobenzene (FID)	122	77-128	EPA 8015B
Bromofluorobenzene (PID)	121	75-132	EPA 8021B

Field ID:	MW-10	Diln Fac:	1.000
Type:	SAMPLE	Batch#:	208887
Lab ID:	254257-005	Analyzed:	03/12/14

Analyte	Result	RL	Analysis
Gasoline C7-C12	ND	50	EPA 8015B
MTBE	3.7	2.0	EPA 8021B
Benzene	ND	0.50	EPA 8021B
Toluene	ND	0.50	EPA 8021B
Ethylbenzene	0.51	0.50	EPA 8021B
m,p-Xylenes	ND	0.50	EPA 8021B
o-Xylene	ND	0.50	EPA 8021B

Surrogate	%REC	Limits	Analysis
Bromofluorobenzene (FID)	125	77-128	EPA 8015B
Bromofluorobenzene (PID)	125	75-132	EPA 8021B

*= Value outside of QC limits; see narrative
C= Presence confirmed, but RPD between columns exceeds 40%
Y= Sample exhibits chromatographic pattern which does not resemble standard
ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	254257	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2013-02.		
Matrix:	Water	Sampled:	03/10/14
Units:	ug/L	Received:	03/10/14

Field ID:	MW-11	Diln Fac:	1.000
Type:	SAMPLE	Batch#:	208848
Lab ID:	254257-006	Analyzed:	03/11/14

Analyte	Result	RL	Analysis
Gasoline C7-C12	3,000 Y	50	EPA 8015B
MTBE	ND	2.0	EPA 8021B
Benzene	13 C	0.50	EPA 8021B
Toluene	ND	0.50	EPA 8021B
Ethylbenzene	34	0.50	EPA 8021B
m,p-Xylenes	ND	0.50	EPA 8021B
o-Xylene	ND	0.50	EPA 8021B

Surrogate	%REC	Limits	Analysis
Bromofluorobenzene (FID)	166 *	77-128	EPA 8015B
Bromofluorobenzene (PID)	143 *	75-132	EPA 8021B

Field ID:	MW-12	Diln Fac:	1.000
Type:	SAMPLE	Batch#:	208887
Lab ID:	254257-007	Analyzed:	03/12/14

Analyte	Result	RL	Analysis
Gasoline C7-C12	ND	50	EPA 8015B
MTBE	2.8	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
Bromofluorobenzene (FID)	117	77-128	EPA 8015B
Bromofluorobenzene (PID)	116	75-132	EPA 8021B

*= Value outside of QC limits; see narrative
C= Presence confirmed, but RPD between columns exceeds 40%
Y= Sample exhibits chromatographic pattern which does not resemble standard
ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	254257	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2013-02.		
Matrix:	Water	Sampled:	03/10/14
Units:	ug/L	Received:	03/10/14

Field ID:	SW-2	Diln Fac:	1.000
Type:	SAMPLE	Batch#:	208848
Lab ID:	254257-008	Analyzed:	03/12/14

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
Bromofluorobenzene (FID)	119	77-128	EPA 8015B
Bromofluorobenzene (PID)	119	75-132	EPA 8021B

Field ID:	SW-3	Diln Fac:	1.000
Type:	SAMPLE	Batch#:	208848
Lab ID:	254257-009	Analyzed:	03/12/14

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
Bromofluorobenzene (FID)	131 *	77-128	EPA 8015B
Bromofluorobenzene (PID)	129	75-132	EPA 8021B

*= Value outside of QC limits; see narrative
C= Presence confirmed, but RPD between columns exceeds 40%
Y= Sample exhibits chromatographic pattern which does not resemble standard
ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	254257	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2013-02.		
Matrix:	Water	Sampled:	03/10/14
Units:	ug/L	Received:	03/10/14

Type: BLANK
Lab ID: QC731188
Diln Fac: 1.000

Batch#: 208848
Analyzed: 03/11/14

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
Bromofluorobenzene (FID)	103	77-128	EPA 8015B
Bromofluorobenzene (PID)	103	75-132	EPA 8021B

Type: BLANK
Lab ID: QC731349
Diln Fac: 1.000

Batch#: 208887
Analyzed: 03/12/14

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
Bromofluorobenzene (FID)	87	77-128	EPA 8015B
Bromofluorobenzene (PID)	86	75-132	EPA 8021B

*= Value outside of QC limits; see narrative
C= Presence confirmed, but RPD between columns exceeds 40%
Y= Sample exhibits chromatographic pattern which does not resemble standard
ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Curtis & Tompkins Laboratories Analytical Report

Lab #:	254257	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2013-02.	Analysis:	EPA 8021B
Matrix:	Water	Batch#:	208848
Units:	ug/L	Analyzed:	03/11/14
Diln Fac:	1.000		

Type: BS Lab ID: QC731185

Analyte	Spiked	Result	%REC	Limits
MTBE	10.00	11.32	113	74-132
Benzene	10.00	10.74	107	80-120
Toluene	10.00	9.595	96	80-120
Ethylbenzene	10.00	9.676	97	80-120
m,p-Xylenes	10.00	9.860	99	80-120
o-Xylene	10.00	9.683	97	80-120

Surrogate	%REC	Limits
Bromofluorobenzene (PID)	96	75-132

Type: BSD Lab ID: QC731186

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	10.00	12.00 b	120	74-132	6	36
Benzene	10.00	10.57	106	80-120	2	20
Toluene	10.00	9.706	97	80-120	1	20
Ethylbenzene	10.00	9.641	96	80-120	0	20
m,p-Xylenes	10.00	9.748	97	80-120	1	20
o-Xylene	10.00	9.550	96	80-120	1	20

Surrogate	%REC	Limits
Bromofluorobenzene (PID)	100	75-132

b= See narrative
RPD= Relative Percent Difference

Batch QC Report

Curtis & Tompkins Laboratories Analytical Report

Lab #:	254257	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2013-02.	Analysis:	EPA 8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC731187	Batch#:	208848
Matrix:	Water	Analyzed:	03/11/14
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	1,000	962.4	96	80-120

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	99	77-128

Batch QC Report

Curtis & Tompkins Laboratories Analytical Report

Lab #:	254257	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2013-02.	Analysis:	EPA 8015B
Field ID:	MW-2	Batch#:	208848
MSS Lab ID:	254257-001	Sampled:	03/10/14
Matrix:	Water	Received:	03/10/14
Units:	ug/L	Analyzed:	03/12/14
Diln Fac:	1.000		

Type: MS Lab ID: QC731189

Analyte	MSS Result	Spiked	Result	%REC	Limits
Gasoline C7-C12	319.0	2,000	2,366	102	74-120

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	123	77-128

Type: MSD Lab ID: QC731190

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	2,000	2,406	104	74-120	2	27

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	135 *	77-128

*= Value outside of QC limits; see narrative
RPD= Relative Percent Difference

Batch QC Report

Curtis & Tompkins Laboratories Analytical Report

Lab #:	254257	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2013-02.	Analysis:	EPA 8021B
Matrix:	Water	Batch#:	208887
Units:	ug/L	Analyzed:	03/12/14
Diln Fac:	1.000		

Type: BS Lab ID: QC731346

Analyte	Spiked	Result	%REC	Limits
MTBE	10.00	9.993	100	74-132
Benzene	10.00	10.17	102	80-120
Toluene	10.00	9.241	92	80-120
Ethylbenzene	10.00	9.504	95	80-120
m,p-Xylenes	10.00	9.352	94	80-120
o-Xylene	10.00	9.182	92	80-120

Surrogate	%REC	Limits
Bromofluorobenzene (PID)	99	75-132

Type: BSD Lab ID: QC731347

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	10.00	10.77	108	74-132	8	36
Benzene	10.00	10.40	104	80-120	2	20
Toluene	10.00	9.576	96	80-120	4	20
Ethylbenzene	10.00	9.680	97	80-120	2	20
m,p-Xylenes	10.00	9.492	95	80-120	1	20
o-Xylene	10.00	9.383	94	80-120	2	20

Surrogate	%REC	Limits
Bromofluorobenzene (PID)	99	75-132

RPD= Relative Percent Difference

Batch QC Report

Curtis & Tompkins Laboratories Analytical Report

Lab #:	254257	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2013-02.	Analysis:	EPA 8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC731348	Batch#:	208887
Matrix:	Water	Analyzed:	03/12/14
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	1,000	966.0	97	80-120

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	99	77-128

Batch QC Report

Curtis & Tompkins Laboratories Analytical Report

Lab #:	254257	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 5030B
Project#:	2013-02.	Analysis:	EPA 8015B
Field ID:	ZZZZZZZZZZ	Batch#:	208887
MSS Lab ID:	254259-001	Sampled:	03/10/14
Matrix:	Water	Received:	03/10/14
Units:	ug/L	Analyzed:	03/13/14
Diln Fac:	1.000		

Type: MS Lab ID: QC731393

Analyte	MSS Result	Spiked	Result	%REC	Limits
Gasoline C7-C12	1,749	2,000	3,548	90	74-120

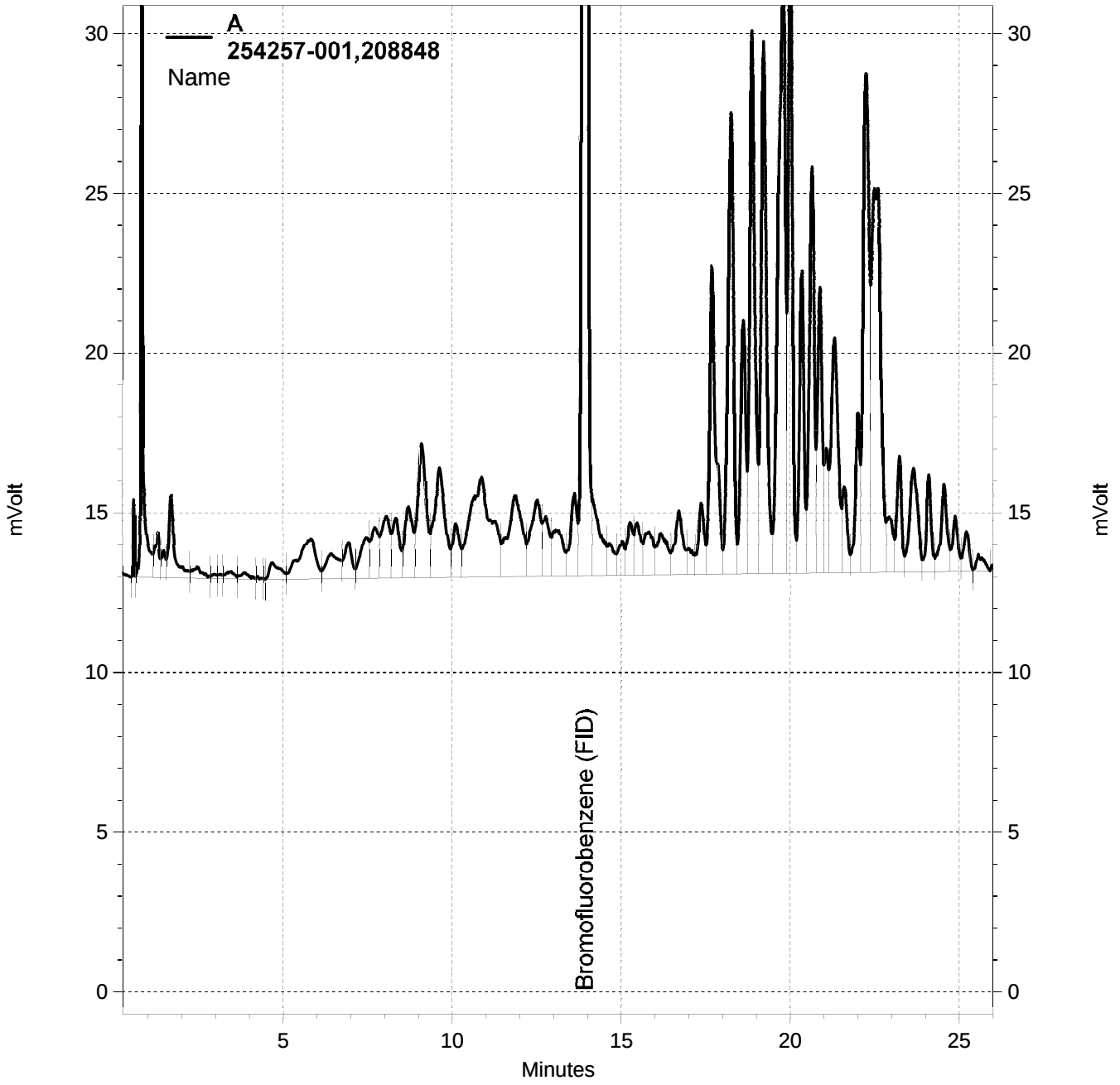
Surrogate	%REC	Limits
Bromofluorobenzene (FID)	132 *	77-128

Type: MSD Lab ID: QC731394

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	2,000	3,922	109	74-120	10	27

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	144 *	77-128

*= Value outside of QC limits; see narrative
RPD= Relative Percent Difference


A
254257-001,208848
Name
mVolt
mVolt
Bromofluorobenzene (FID)
Minutes
0
5
10
15
20
25
30
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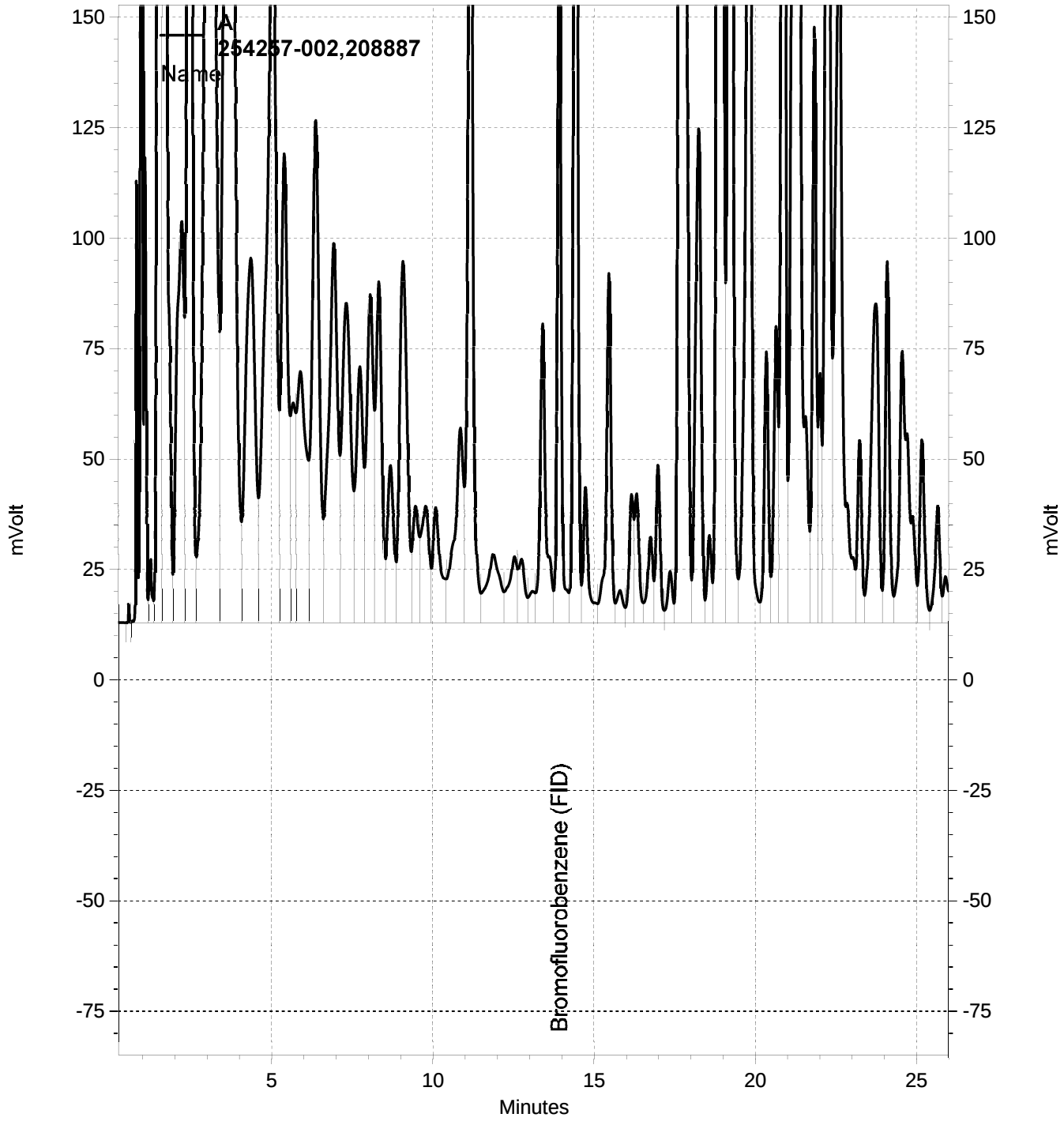

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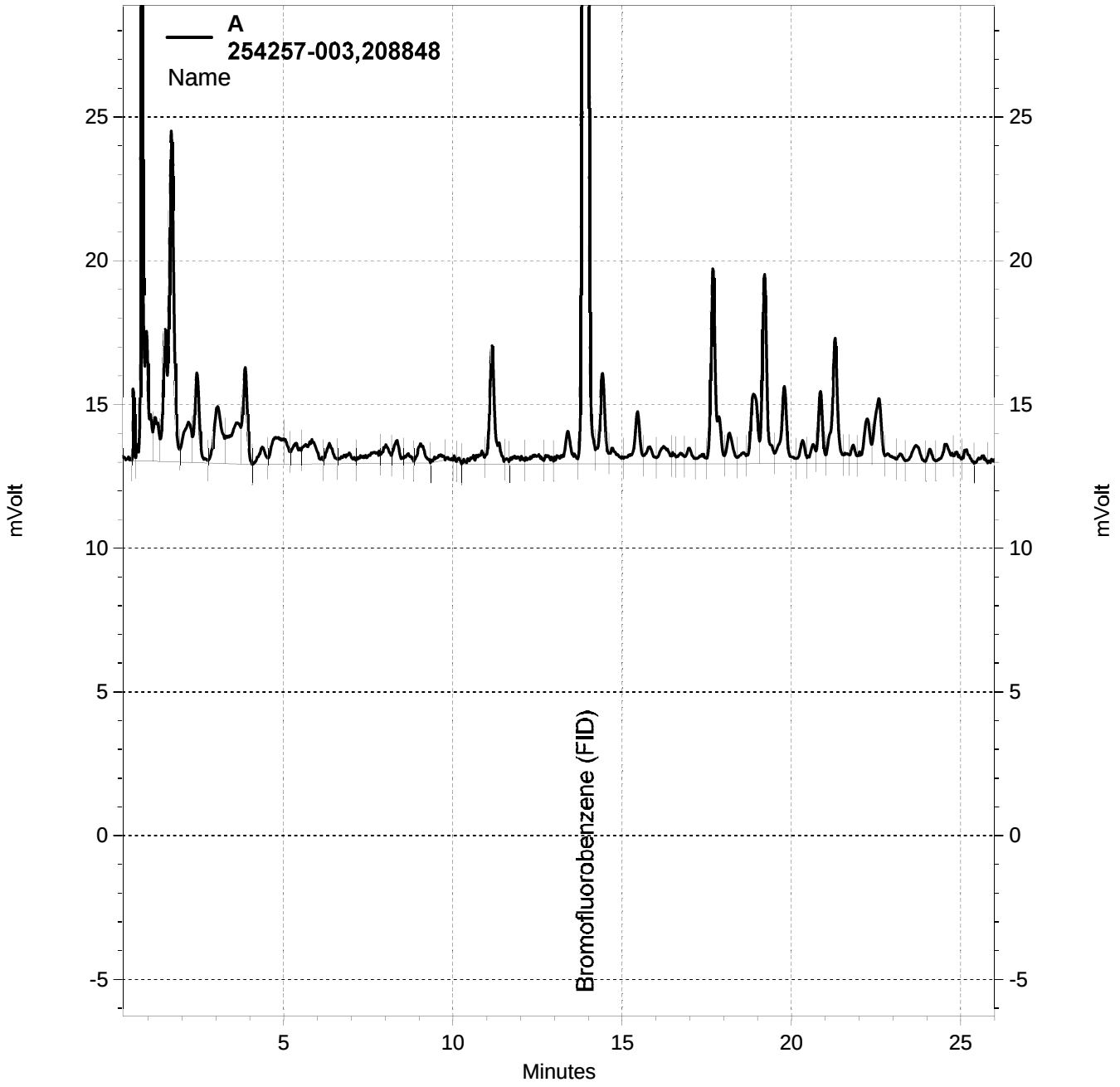

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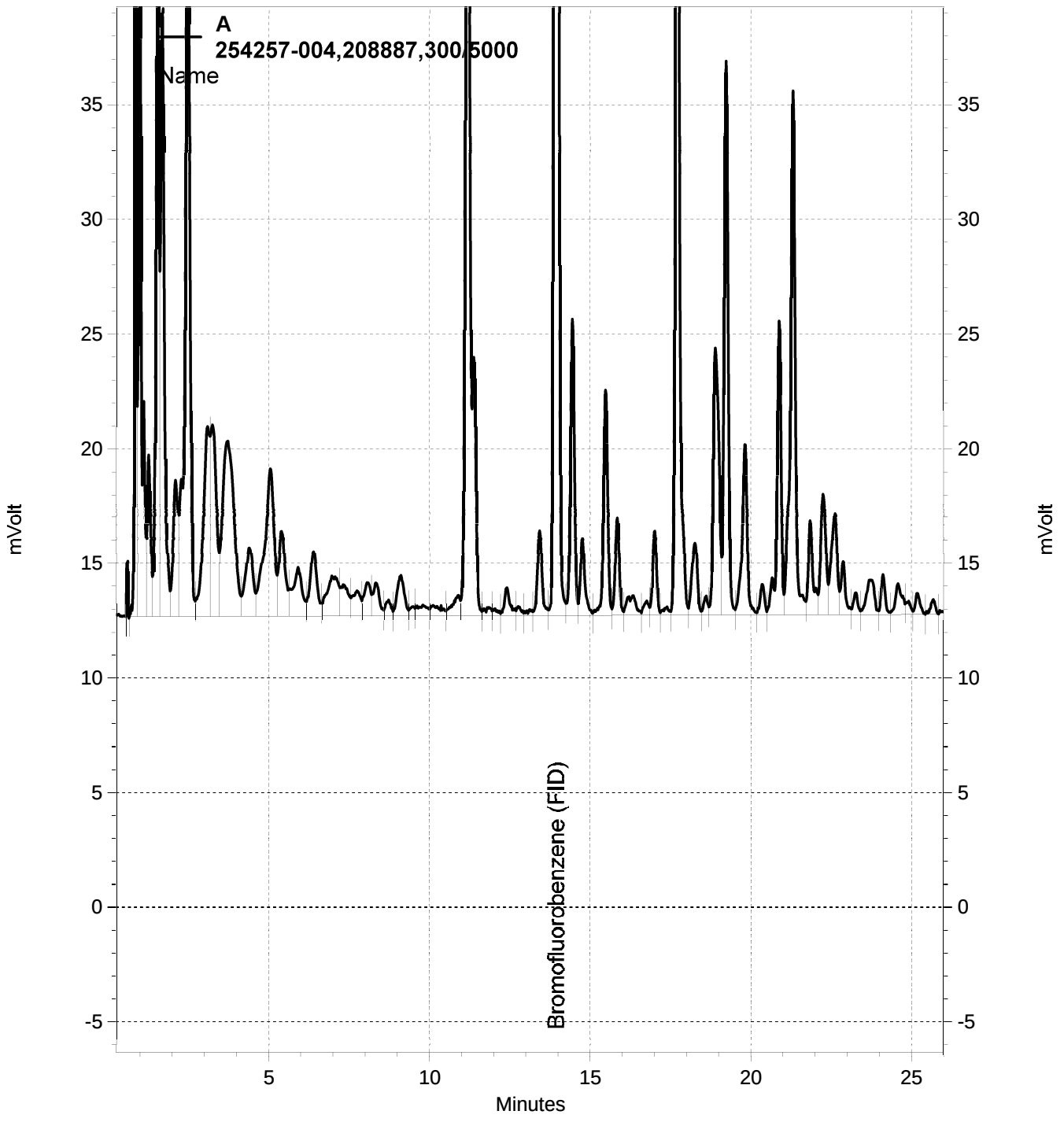

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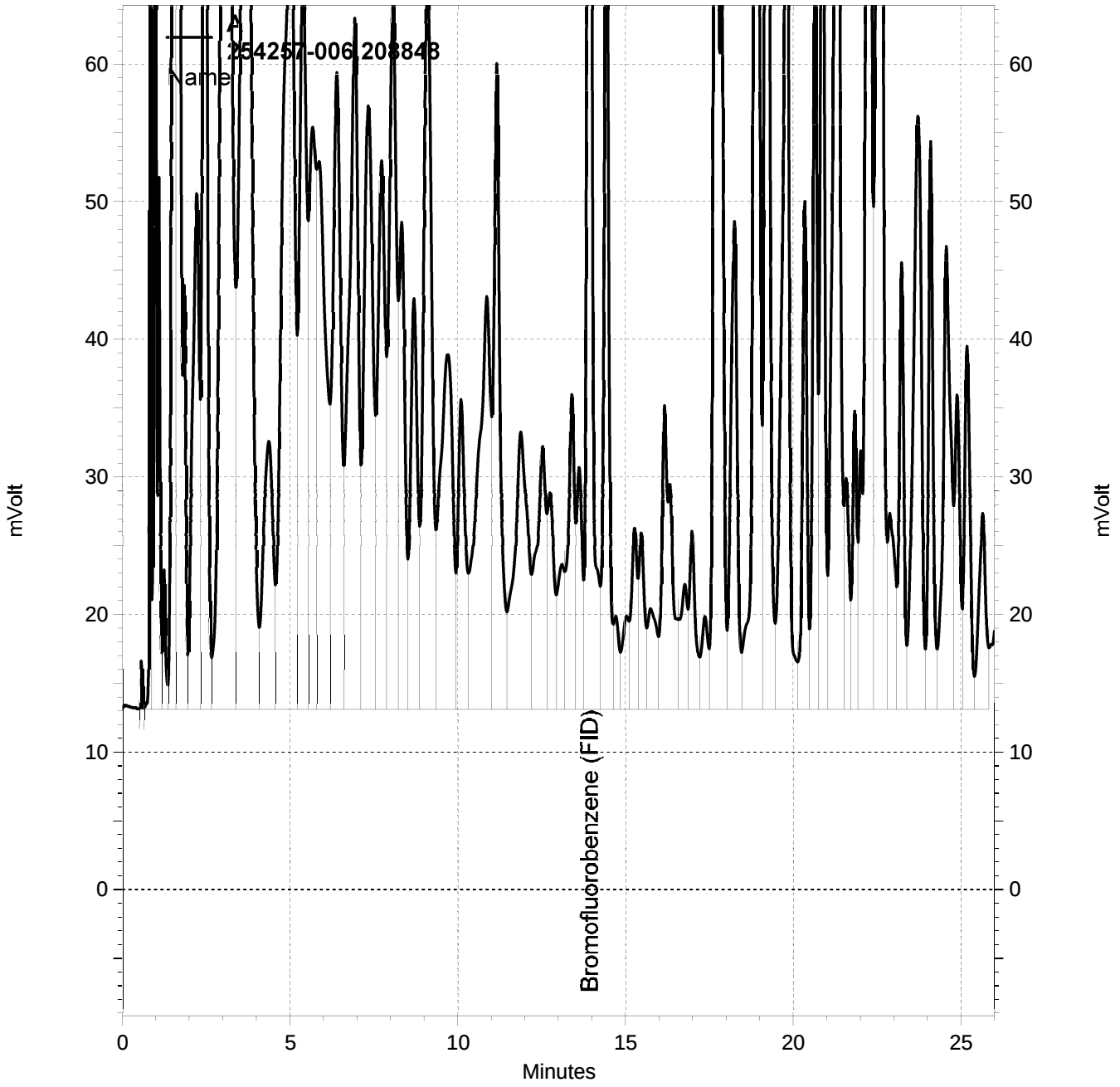

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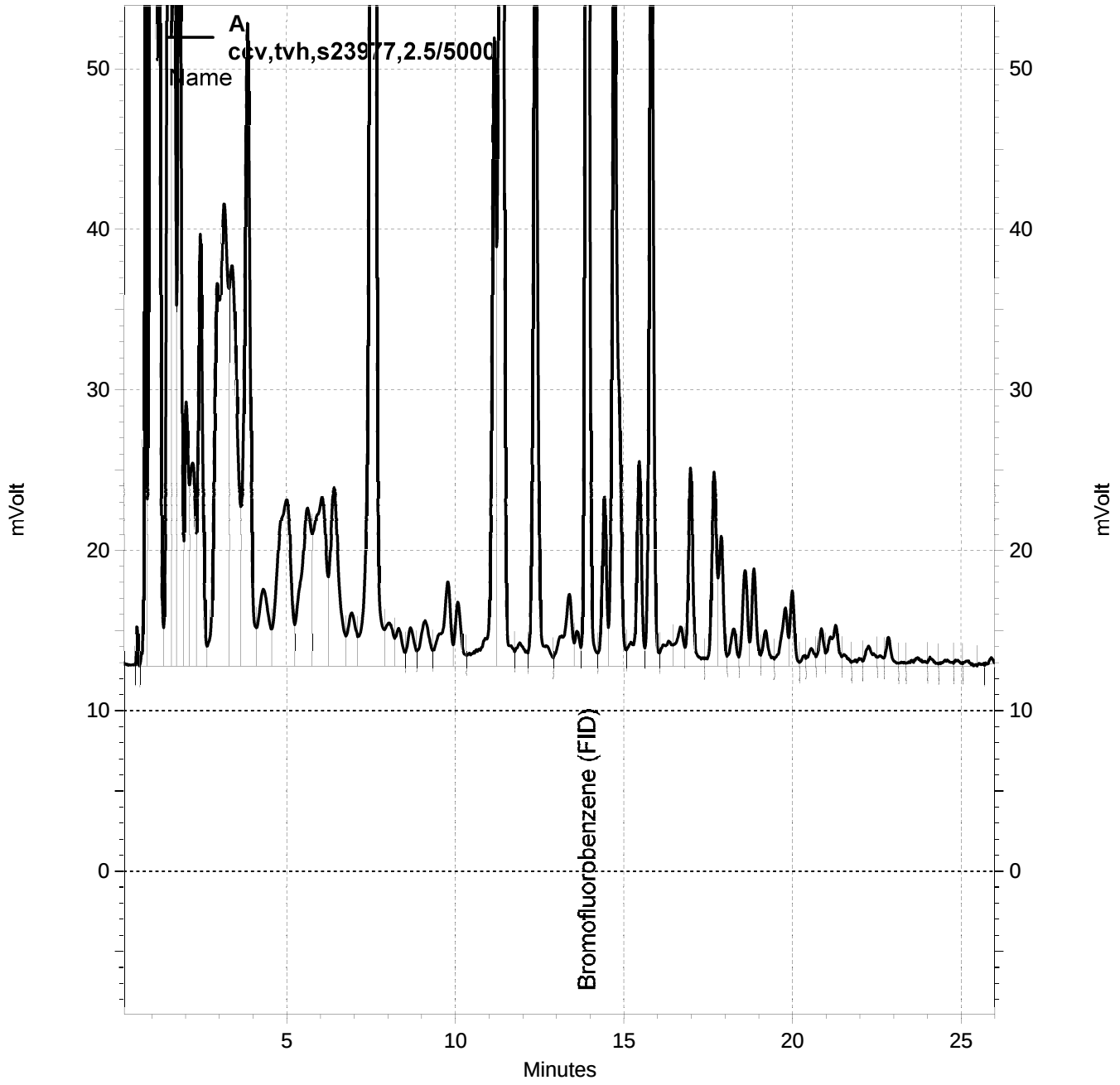
A
ccv,tvh,s23977,2.5/5000
Name
50
40
30
20
10
0
mVolt
Bromofluorobenzene (FID)
5
10
15
20
25
Minutes
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Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	254257	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 3520C
Project#:	2013-02.	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	03/10/14
Units:	ug/L	Received:	03/10/14
Diln Fac:	1.000	Prepared:	03/12/14
Batch#:	208898	Analyzed:	03/13/14

Field ID: MW-2 Lab ID: 254257-001
Type: SAMPLE

Analyte	Result	RL
Diesel C10-C24	290	49

Surrogate	%REC	Limits
o-Terphenyl	115	66-129

Field ID: MW-7 Lab ID: 254257-002
Type: SAMPLE

Analyte	Result	RL
Diesel C10-C24	4,900	49

Surrogate	%REC	Limits
o-Terphenyl	112	66-129

Field ID: MW-8 Lab ID: 254257-003
Type: SAMPLE

Analyte	Result	RL
Diesel C10-C24	120	49

Surrogate	%REC	Limits
o-Terphenyl	108	66-129

Field ID: MW-9 Lab ID: 254257-004
Type: SAMPLE

Analyte	Result	RL
Diesel C10-C24	3,100	49

Surrogate	%REC	Limits
o-Terphenyl	110	66-129

Field ID: MW-10 Lab ID: 254257-005
Type: SAMPLE

Analyte	Result	RL
Diesel C10-C24	87	49

Surrogate	%REC	Limits
o-Terphenyl	115	66-129

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	254257	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 3520C
Project#:	2013-02.	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	03/10/14
Units:	ug/L	Received:	03/10/14
Diln Fac:	1.000	Prepared:	03/12/14
Batch#:	208898	Analyzed:	03/13/14

Field ID: MW-11 Lab ID: 254257-006
Type: SAMPLE

Analyte	Result	RL
Diesel C10-C24	2,800	49

Surrogate	%REC	Limits
o-Terphenyl	124	66-129

Field ID: MW-12 Lab ID: 254257-007
Type: SAMPLE

Analyte	Result	RL
Diesel C10-C24	62	49

Surrogate	%REC	Limits
o-Terphenyl	115	66-129

Field ID: SW-2 Lab ID: 254257-008
Type: SAMPLE

Analyte	Result	RL
Diesel C10-C24	ND	49

Surrogate	%REC	Limits
o-Terphenyl	123	66-129

Field ID: SW-3 Lab ID: 254257-009
Type: SAMPLE

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
o-Terphenyl	116	66-129

Type: BLANK Lab ID: QC731404

Analyte	Result	RL
Diesel C10-C24	ND	50

Surrogate	%REC	Limits
o-Terphenyl	101	66-129

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Total Extractable Hydrocarbons

Lab #:	254257	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	EPA 3520C
Project#:	2013-02.	Analysis:	EPA 8015B
Matrix:	Water	Batch#:	208898
Units:	ug/L	Prepared:	03/12/14
Diln Fac:	1.000	Analyzed:	03/13/14

Type: BS
Lab ID: QC731405
Cleanup Method: EPA 3630C

Analyte	Spiked	Result	%REC	Limits
Diesel C10-C24	2,500	1,631	65	61-120

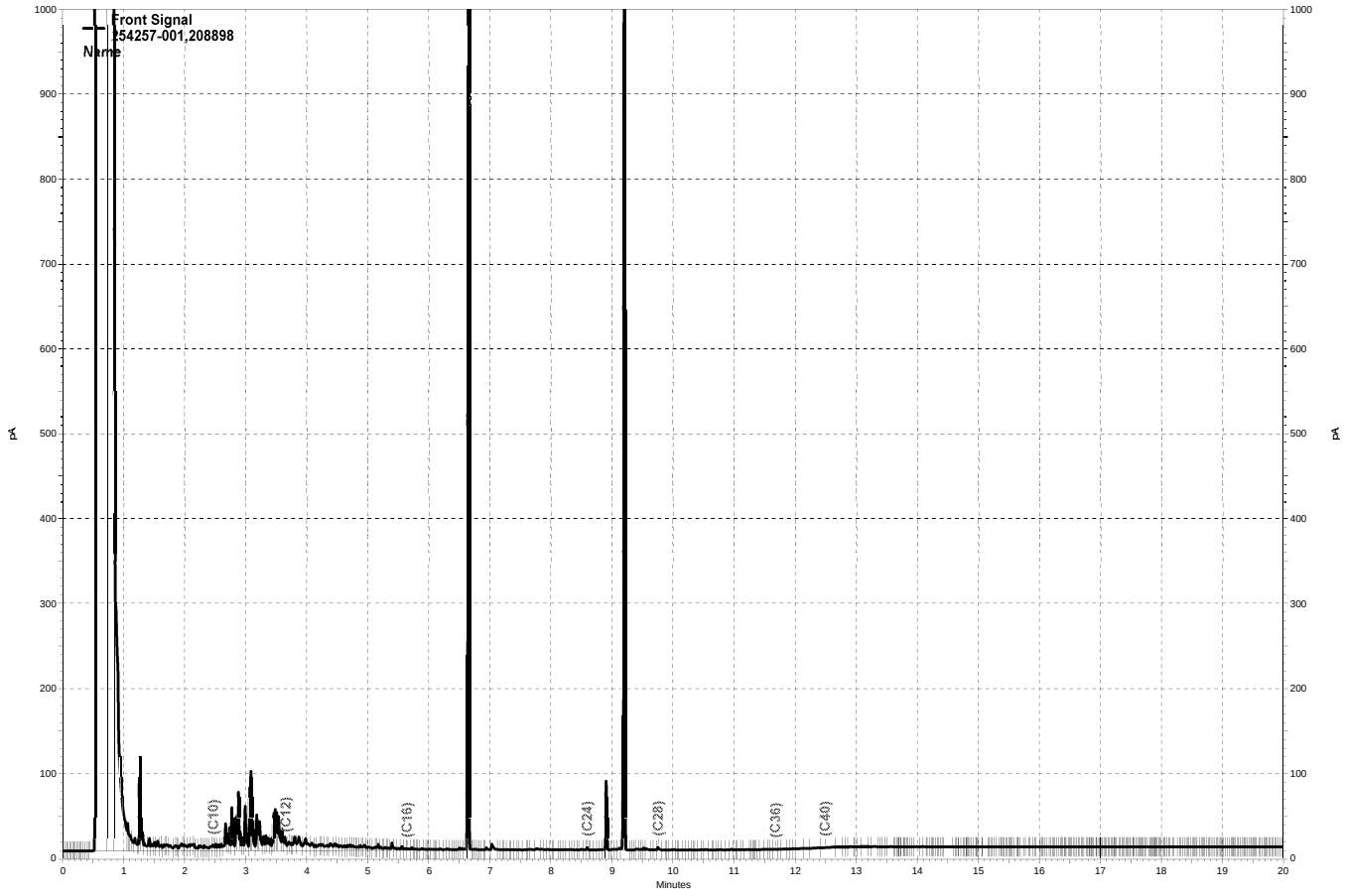
Surrogate	%REC	Limits
o-Terphenyl	98	66-129

Type: BSD
Lab ID: QC731406
Cleanup Method: EPA 3630C

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Diesel C10-C24	2,500	1,695	68	61-120	4	45

Surrogate	%REC	Limits
o-Terphenyl	100	66-129

RPD= Relative Percent Difference



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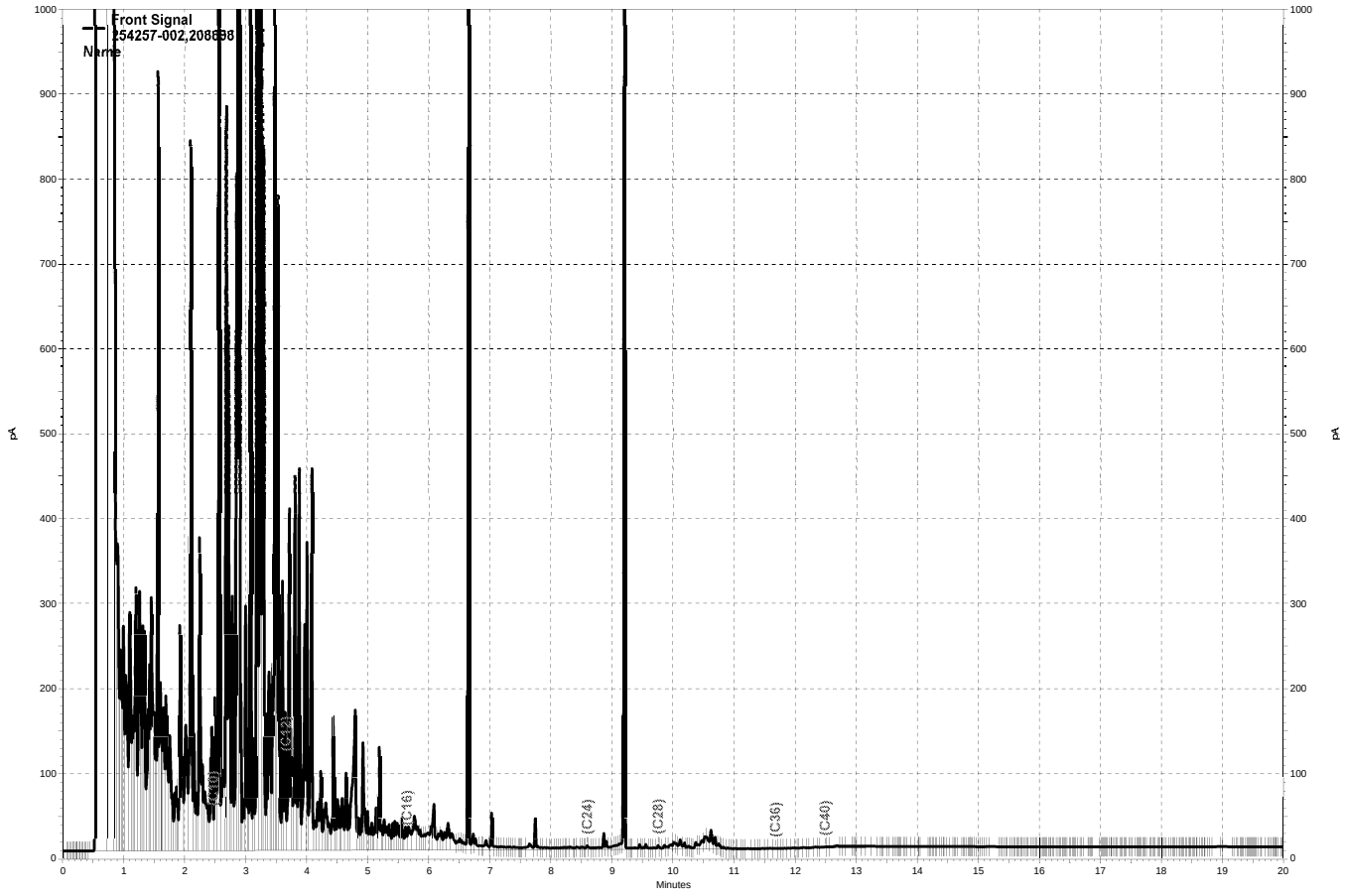

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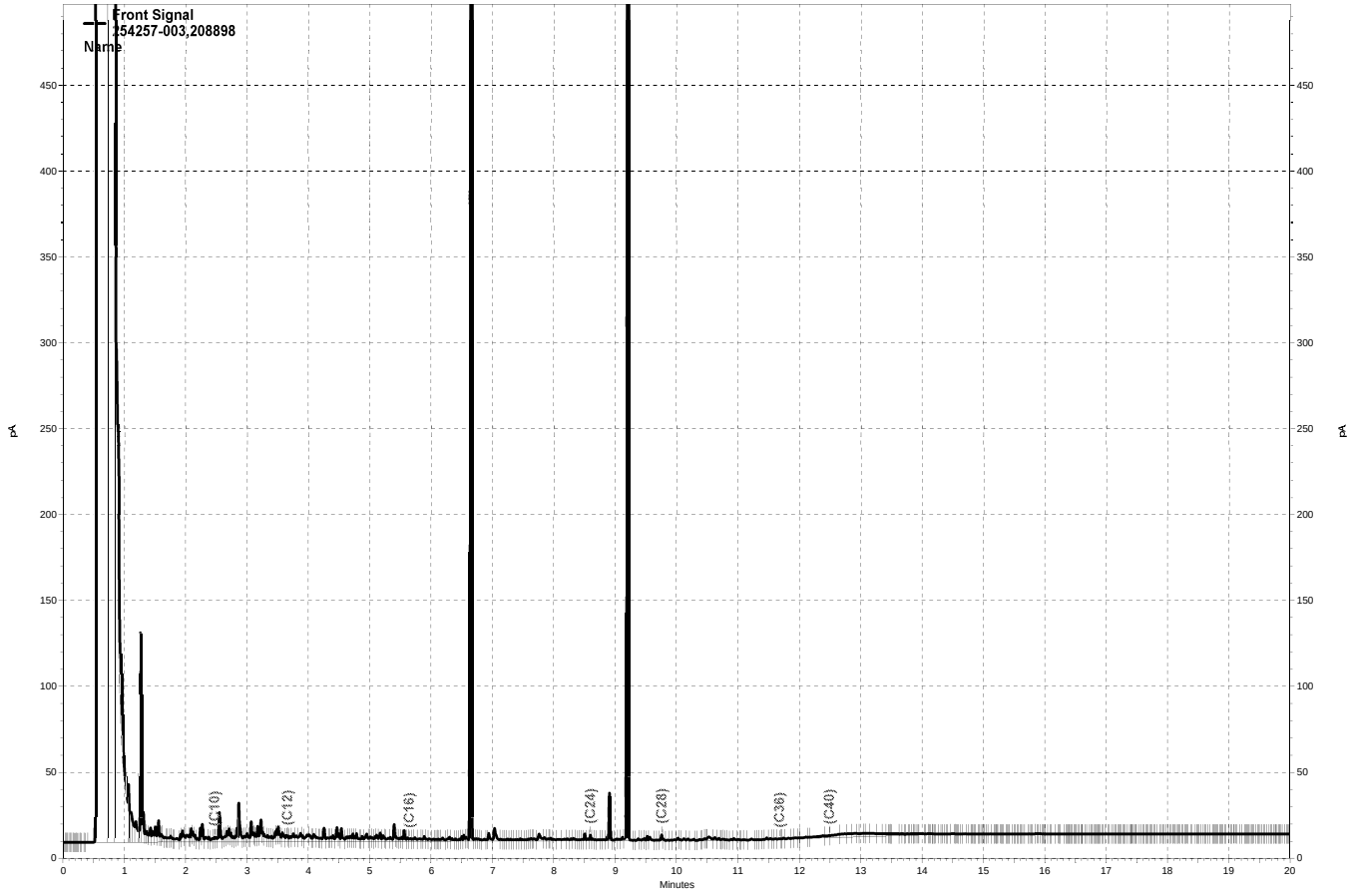

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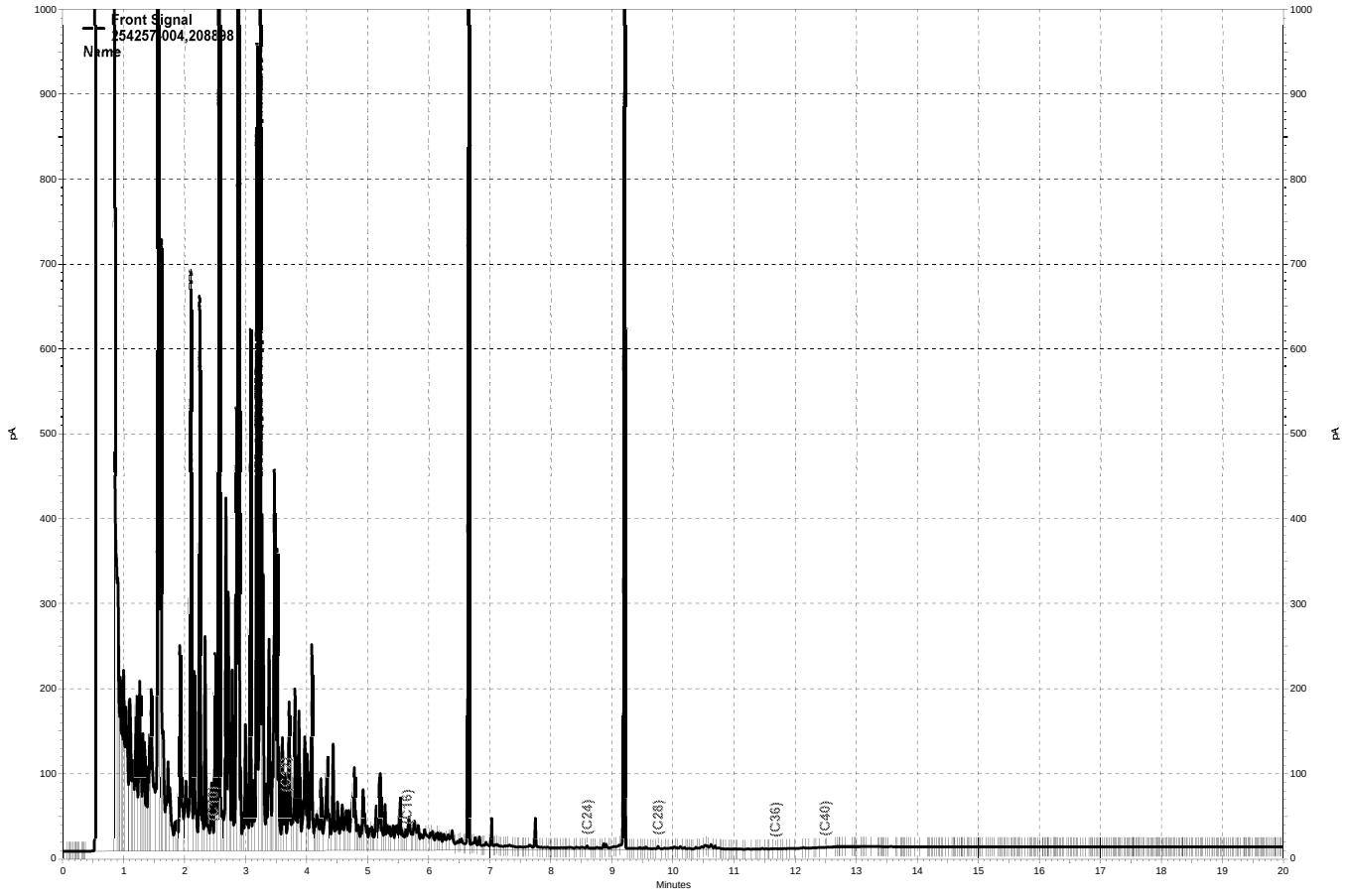

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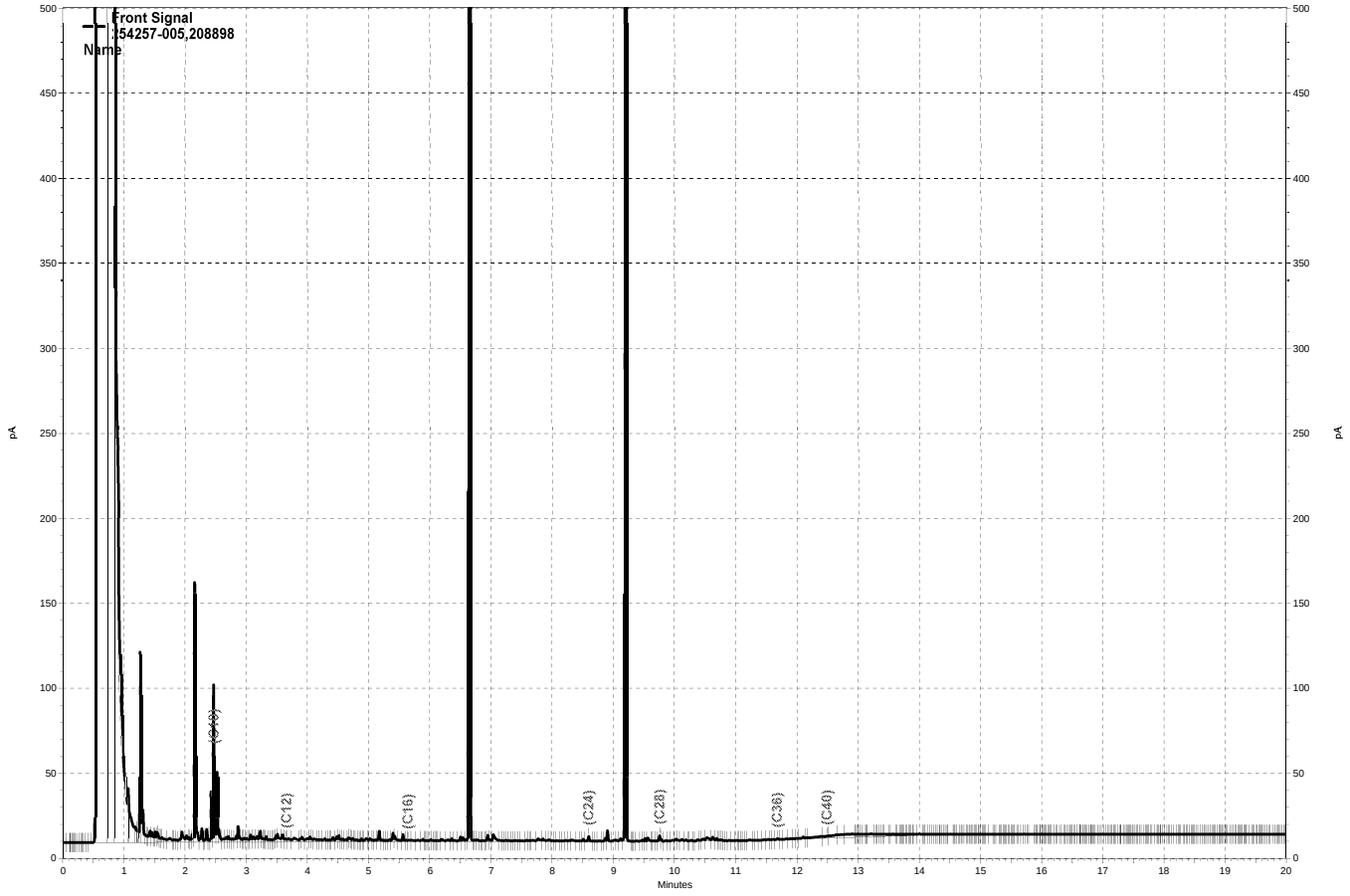

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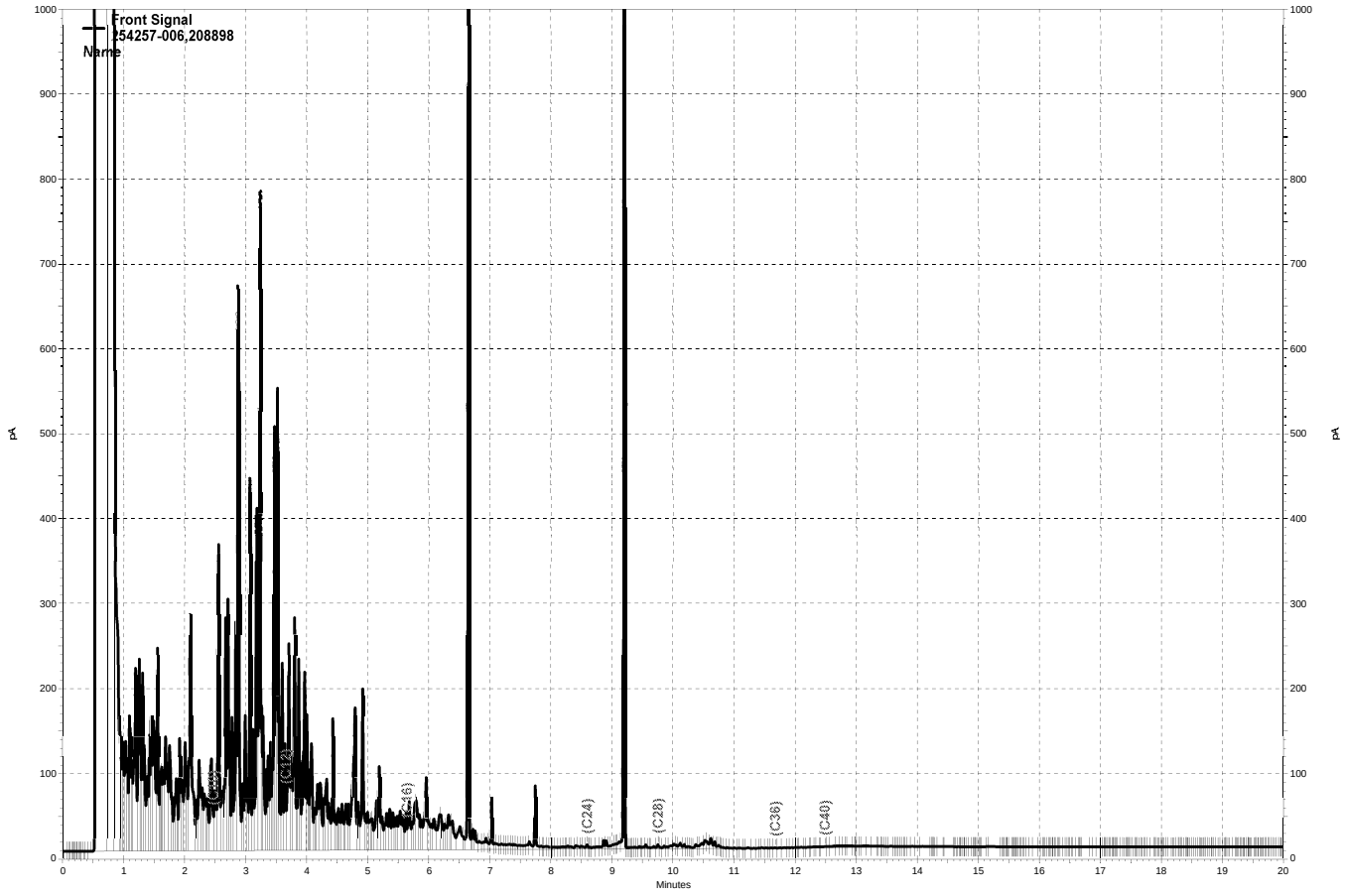

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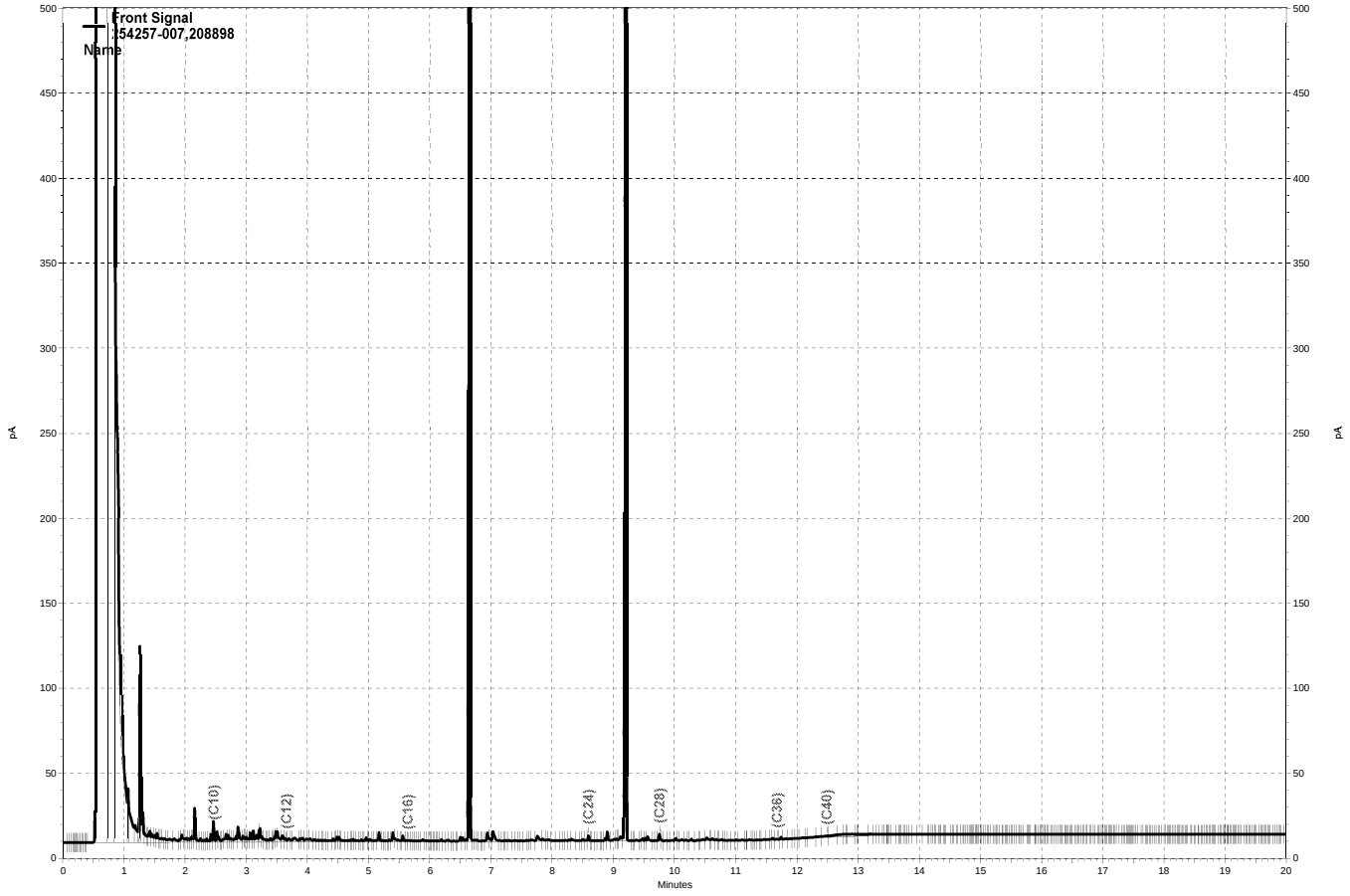

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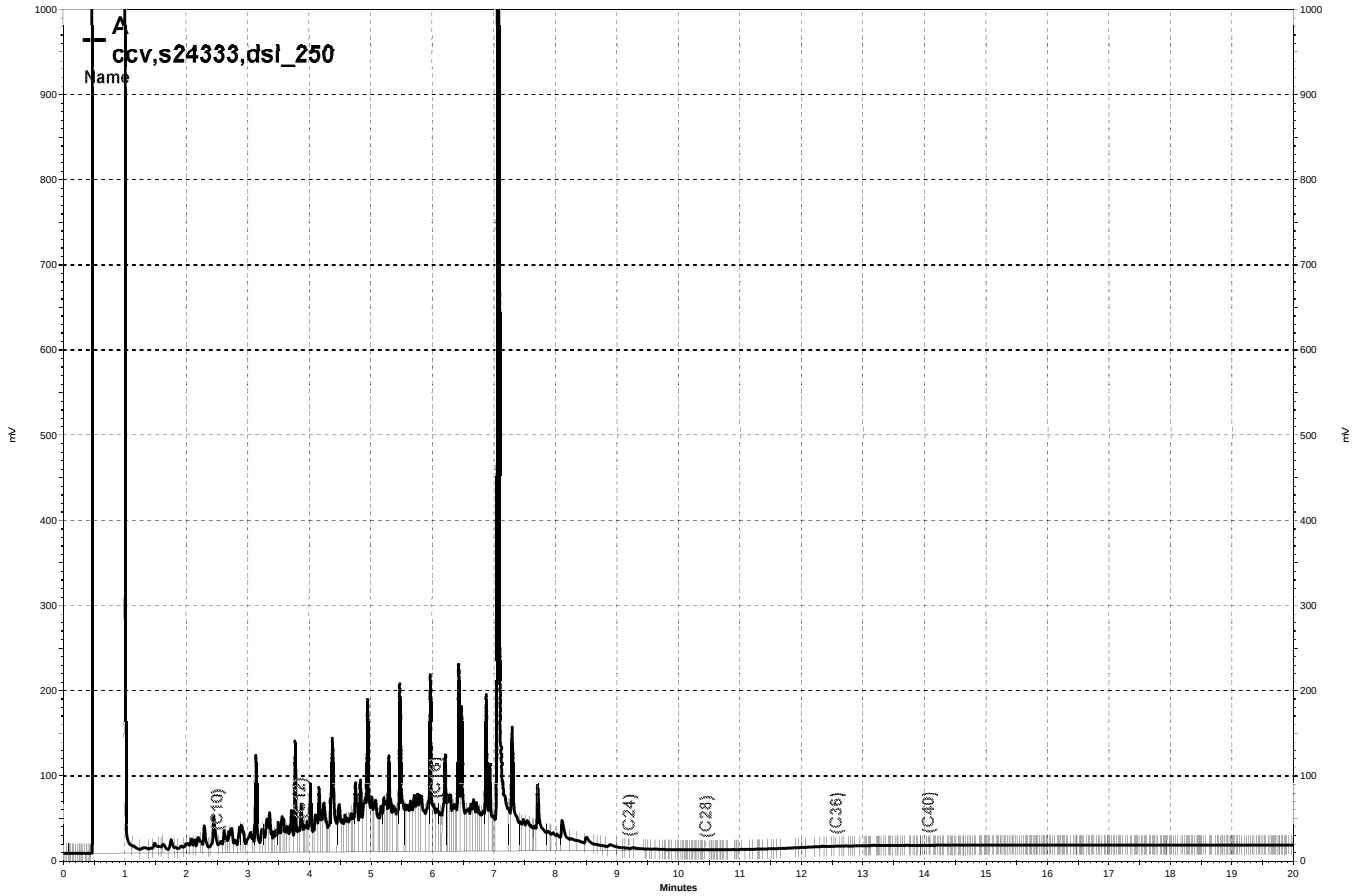

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Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	254257	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	METHOD
Project#:	2013-02.	Analysis:	EPA 300.0
Matrix:	Water	Batch#:	208771
Units:	mg/L	Received:	03/10/14
Diln Fac:	1.000		

Field ID: MW-7 Sampled: 03/10/14 10:40
Type: SAMPLE Analyzed: 03/10/14 16:42
Lab ID: 254257-002

Analyte	Result	RL
Nitrogen, Nitrate	ND	0.05
Sulfate	25	0.50

Field ID: MW-9 Sampled: 03/10/14 11:40
Type: SAMPLE Analyzed: 03/10/14 17:37
Lab ID: 254257-004

Analyte	Result	RL
Nitrogen, Nitrate	ND	0.05
Sulfate	32	0.50

Field ID: MW-12 Sampled: 03/10/14 11:10
Type: SAMPLE Analyzed: 03/10/14 18:41
Lab ID: 254257-007

Analyte	Result	RL
Nitrogen, Nitrate	ND	0.05
Sulfate	24	0.50

Type: BLANK Analyzed: 03/10/14 12:34
Lab ID: QC730890

Analyte	Result	RL
Nitrogen, Nitrate	ND	0.05
Sulfate	ND	0.50

ND= Not Detected
RL= Reporting Limit

Batch QC Report

Curtis & Tompkins Laboratories Analytical Report

Lab #:	254257	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	METHOD
Project#:	2013-02.	Analysis:	EPA 300.0
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC730891	Batch#:	208771
Matrix:	Water	Analyzed:	03/10/14 13:02
Units:	mg/L		

Analyte	Spiked	Result	%REC	Limits
Nitrogen, Nitrate	1.000	1.013	101	80-120
Sulfate	10.00	9.914	99	80-120

Curtis & Tompkins, Ltd.

Batch QC Report

Curtis & Tompkins Laboratories Analytical Report

Lab #:	254257	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	METHOD
Project#:	2013-02.	Analysis:	EPA 300.0
Field ID:	MW-7	Diln Fac:	5.000
MSS Lab ID:	254257-002	Batch#:	208771
Matrix:	Water	Sampled:	03/10/14 10:40
Units:	mg/L	Received:	03/10/14

Type: MS Analyzed: 03/11/14 05:41
Lab ID: QC731015

Analyte	MSS Result	Spiked	Result	%REC	Limits
Nitrogen, Nitrate	<0.005240	2.500	2.464	99	80-120
Sulfate	25.30	25.00	49.20	96	79-120

Type: MSD Analyzed: 03/11/14 06:08
Lab ID: QC731016

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Nitrogen, Nitrate	2.500	2.456	98	80-120	0	20
Sulfate	25.00	49.73	98	79-120	1	20

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Biochemical Oxygen Demand

Lab #:	254257	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	METHOD
Project#:	2013-02.	Analysis:	SM5210B
Analyte:	Biochemical Oxygen Demand	Batch#:	208868
Matrix:	Water	Received:	03/10/14
Units:	mg/L	Prepared:	03/12/14 10:07
Diln Fac:	1.000	Analyzed:	03/17/14 10:33

Field ID	Type	Lab ID	Result	RL	Sampled
MW-7	SAMPLE	254257-002	9.3	5.0	03/10/14 10:40
MW-9	SAMPLE	254257-004	15	5.7	03/10/14 11:40
MW-12	SAMPLE	254257-007	ND	5.0	03/10/14 11:10
	BLANK	QC731276	ND	5.0	

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Biochemical Oxygen Demand

Lab #:	254257	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	METHOD
Project#:	2013-02.	Analysis:	SM5210B
Analyte:	Biochemical Oxygen Demand	Batch#:	208868
Field ID:	ZZZZZZZZZZ	Sampled:	03/11/14 10:00
MSS Lab ID:	254315-001	Received:	03/11/14
Matrix:	Water	Prepared:	03/12/14 10:07
Units:	mg/L	Analyzed:	03/17/14 10:33
Diln Fac:	1.000		

Type	Lab ID	MSS Result	Spiked	Result	RL	%REC	Limits	RPD	Lim
BS	QC731277		198.0	229.1		116 *	85-115		
BSD	QC731278		198.0	229.6		116 *	85-115	0	26
SDUP	QC731279	771.7		741.7	300.0			4	29

*= Value outside of QC limits; see narrative
RL= Reporting Limit
RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Chemical Oxygen Demand

Lab #:	254257	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	METHOD
Project#:	2013-02.	Analysis:	SM5220D
Analyte:	Chemical Oxygen Demand	Received:	03/10/14
Matrix:	Water	Prepared:	03/14/14 13:15
Units:	mg/L	Analyzed:	03/14/14 15:00
Batch#:	208993		

Field ID	Type	Lab ID	Result	RL	Diln Fac	Sampled
MW-7	SAMPLE	254257-002	63	10	1.000	03/10/14 10:40
MW-9	SAMPLE	254257-004	180	20	2.000	03/10/14 11:40
MW-12	SAMPLE	254257-007	49	10	1.000	03/10/14 11:10
	BLANK	QC731795	ND	10	1.000	

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Chemical Oxygen Demand

Lab #:	254257	Location:	Redwood Regional Park
Client:	Stellar Environmental Solutions	Prep:	METHOD
Project#:	2013-02.	Analysis:	SM5220D
Analyte:	Chemical Oxygen Demand	Batch#:	208993
Field ID:	MW-7	Sampled:	03/10/14 10:40
MSS Lab ID:	254257-002	Received:	03/10/14
Matrix:	Water	Prepared:	03/14/14 13:15
Units:	mg/L	Analyzed:	03/14/14 15:00

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim	Diln Fac
LCS	QC731796		75.00	70.26	94	90-110			1.000
MS	QC731797	62.51	300.0	356.5	98	78-120			2.000
MSD	QC731798		300.0	342.3	93	78-120	4	20	2.000

RPD= Relative Percent Difference

APPENDIX D

Historical 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
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
44	Dec-07	16,000	5,800	23	91	230	2,420	2764	16
44a	Jan-08	480	200	1.1	3.2	5.5	68	77.8	11
45	Mar-08	20,000	24,000	21	39	300	2,620	2980	13
45a	Apr-08	800	640	2.6	2.1	13	155	172.7	13
46a	May-08	7,100	3,900	14	8.8	140	710	872.8	11
46	Jun-08	5,700	1,000	9.4	5.2	80	550	644.6	11
46a	Jul-08	6,400	2,200	13	5.1	140	570	728.1	2.9
46b	Jul-08	390	55	1.3	0.77	4.6	44.4	51.07	9
46c	Aug-08	28,000	7,100	12	19	260	2,740	3031	<20
46d	Aug-08	8,700	2,700	5.7	7.4	130	900.0	1043.1	3.5
47	Sep-08	40,000	9,100	1.6	<0.5	110	910.0	1021.6	9.5
48	Dec-08	9,200	2,200	0.52	<0.5	<0.5	201.0	201.52	12
49	Mar-09	3,100	37,000	1.1	1.4	7.9	35.0	45.4	14
50	May-09	5,000	15,000	1.5	<0.5	9.8	39.0	50	13
51	Jun-09	2,400	8,000	5.4	<0.5	11	20.2	36.6	13
52	Aug-09	1,900	3,100	1.6	1.8	11	23.8	38.2	7.1
53	Sep-09	1,400	1,800	<0.5	<0.5	<0.5	4.2	4.24	12
54	Dec-09	590	1,800	<0.5	<0.5	1.2	1.2	2.4	3.6
55	Mar-10	1,900	3,200	<0.5	<0.5	<0.5	2.2	2.2	2.2
56	Mar-10	2,000	4,300	<0.5	<0.5	<0.5	3.5	3.45	<2.0
57	Jun-10	1,300	2,400	<0.5	<0.5	<0.5	1.7	-	<2.0
58	Sep-10	910	<50	<0.5	<0.5	<0.5	1.5	1.45	<2.0
59	Dec-10	910	1,600	<0.5	<0.5	<0.5	<0.5	<0.5	2.6
60	Mar-11	860	1,100	<0.5	<0.5	<0.5	<0.5	—	3.1
61	Sep-11	780	810	<0.5	<0.5	<0.5	<0.5	—	<2.0
62	Mar-12	460	610	<0.5	<0.5	<0.5	<0.5	—	<2.0
63	Sep-12	160	190	<0.5	<0.5	<0.5	<0.5	—	<2.0

Well MW-2 Continued

Well MW-2									
Event	**Date**	**TVHg**	**TEHd**	**Benzene**	**Toluene**	**Ethylbenzene**	**Total Xylenes**	**Total BTEX**	**MTBE**
64	Mar-13	**470**	**810**	*<0.5*	*<0.5*	*<0.5*	*<0.5*	—	*<2.0*
65	Oct-13	**120**	**67**	*<0.5*	*<0.5*	*<0.5*	*<0.5*	—	**2.3**
66	Mar-14	**320**	**290**	*<0.5*	*<0.5*	*<0.5*	*<0.5*	—	*<2.0*

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*
28	Dec-07	**4,800**	**2,800**	*<0.5*	*<0.5*	**100**	**26.5**	**126.5**	*2.7*
30	Mar-08	**5,400**	**5,900**	**21**	*<0.5*	**150**	**15**	**186**	**51**
31	Jun-08	**4,800**	**3,500**	**55**	*<0.5*	**140**	**7.0**	**202**	*<2.0*
32	Sep-08	**6,400**	**2,800**	**22**	*<0.5*	**100**	**9.3**	**131**	*<2.0*
33	Dec-08	**3,500**	**3,600**	**5**	*<0.5*	**100**	**9.1**	**114**	*<2.0*
34	Mar-09	**5,100**	**6,700**	**19**	*<0.5*	**140**	**12.3**	**171**	**51**
35	Jun-09	**4,600**	**5,400**	**40**	*< 0.5*	**140**	**5.1**	**185**	**260**
36	Sep-09	**4,400**	**4,700**	*<0.5*	*<0.5*	**96**	**5.6**	**102**	**3.5**
37	Dec-09	**4,900**	**4,500**	*< 0.5*	*< 0.5*	**90**	**2.9**	**93**	**57.0**
38	Mar-10	**5,300**	**4,300**	**17**	*<0.5*	**110**	**2.6**	**130**	**16.0**
39	Mar-10	**2,600**	**6,100**	**11**	*<0.5*	**76**	**4.5**	**92**	*<2.0*
40	Jun-10	**5,800**	**5,000**	**20**	*<0.5*	**140**	**9.9**	**170**	*<2.0*
41	Sep-10	**6,300**	**4,100**	*<0.5*	*<0.5*	**93**	**6.0**	**99**	**69.0**
42	Dec-10	**5,400**	**3,500**	*<0.5*	*<0.5*	**99**	**9.2**	**108**	**87.0**
43	Mar-11	**5,500**	**3,400**	**11**	*<0.5*	**94**	**8.5**	**114**	*<2.0*
44	Sep-11	**5,800**	**3,300**	*<0.5*	*<0.5*	**97**	**3.1**	**100**	*<2.0*
45	Mar-12	**6,400**	**3,500**	*<0.5*	*<0.5*	**110**	**5.6**	**116**	*<2.0*
46	Sep-12	**5,700**	**3,000**	*<0.5*	*<0.5*	**84**	*<0.5*	**84**	*<2.0*
47	Mar-13	**6,000**	**3,300**	*<0.5*	*<0.5*	**82**	*<0.5*	**82**	*<2.0*
48	Oct-13	**6,400**	**6,000**	**35**	*<0.5*	**75**	**5.10**	**115**	*<2.0*
49	Dec-13	**6,000**	**4,200**	*<0.5*	*<0.5*	**100**	*<0.5*	**100**	*<2.0*
50	Mar-14	**7,500**	**4,900**	*<0.5*	*<0.5*	**130**	*2.0*	**132**	*<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*
28	Dec-07	**1,200**	**500**	**15**	**0.88**	**95**	**57.7**	**168.58**	*<2.0*
30	Mar-08	**11,000**	**13,000**	**150**	**13**	**1,100**	**950.0**	**2,213**	**76**
31	Jun-08	**2,000**	**1,700**	**27**	**2.5**	**190**	**113.2**	**333**	*<2.0*
32	Sep-08	**5,500**	**4,400**	**89**	**3.9**	**630**	**194.4**	**917**	*<2.0*
33	Dec-08	**520**	**400**	**1.5**	*<0.5*	**20**	**4.4**	**26**	**4.5**
34	Mar-09	**4,600**	**7,300**	**55**	*<5.0*	**410**	**639.0**	**1,104**	*<20*
35	Jun-09	**2,100**	**3,400**	**32**	*< 0.5*	**260**	**80.8**	**373**	**55**
36	Sep-09	**440**	**1,700**	**2.8**	*<0.5*	**33**	**2.7**	**39**	**3.7**
37	Dec-09	**560**	**540**	**1.5**	*< 0.5*	**39**	**7.1**	**48**	**4.2**
38	Mar-10	**220**	**270**	**0.8**	*<0.5*	**14**	**3.1**	**18**	**3.9**
39	Mar-10	**3,400**	**5,700**	**28.0**	*<0.5*	**340**	**255.7**	**624**	*<2.0*
40	Jun-10	**4,700**	**4,200**	**27.0**	**2.9**	**400**	**103.2**	**533**	**27**
41	Sep-10	**900**	**1,300**	**2.9**	*<0.5*	**22**	*<2.5*	**25**	*<10*
42	Dec-10	**180**	**260**	*<0.5*	*<0.5*	**5**	**1.0**	**6.4**	**7.2**
43	Mar-11	**6,000**	**5,900**	**39**	*<0.5*	**510**	**431.0**	**980.0**	*<2.0*
44	Sep-11	**1,700**	**1,200**	**7**	**0.9**	**120**	**12.2**	**139.7**	*<2.0*
45	Mar-12	**1,200**	**790**	**11**	**0.9**	*<0.5*	**99.0**	**110.9**	*<2.0*
46	Sep-12	**730**	**430**	**4.7**	*<0.5*	**45**	**3.8**	**53.5**	**9.2**
47	Mar-13	**840**	**690**	**5.6**	*<0.5*	**47**	**9.9**	**62.51**	**15**
48	Oct-13	**150**	**140**	*<0.5*	*<0.5*	**3.3**	*<0.5*	**3.3**	*<2.0*
49	Mar-14	**79**	**120**	*<0.5*	*<0.5*	2.1	*<0.5*	**2.1**	*11*

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*
26	Dec-07	**6,200**	**2,000**	**51**	*<0.5*	**340**	**128.8**	**519.8**	*<2.0*
27	Mar-08	**6,400**	**3,500**	**67**	**5.2**	**480**	**177.6**	**724.6**	**38**
28	Jun-08	**10,000**	**3,400**	**89**	*<2.5*	**510**	**231.0**	**830.0**	*<10*
29	Sep-08	**4,800**	**2,700**	**53**	*<0.5*	**250**	**66.4**	**369.4**	*<2.0*
30	Dec-08	**4,300**	**2,300**	**45**	*<0.5*	**330**	**39.1**	**414.1**	*<2.0*
31	Mar-09	**4,000**	**2,200**	*<2.0*	*<0.5*	**160**	**34.9**	**194.9**	*<2.0*
32	Jun-09	**4,100**	**3,600**	**62**	*< 0.5*	**280**	**41.7**	**383.7**	**160**
33	Sep-09	**2,200**	**2,900**	**15**	*<0.5*	**110**	**11.8**	**136.8**	*<2.0*
34	Dec-09	**2,500**	**4,000**	**27**	*<0.5*	**170**	**8.7**	**205.7**	*<2.0*
35	Mar-10	**3,300**	**2,600**	**15**	*<0.5*	**140**	**12.0**	**167.0**	**8.6**
36	Mar-10	**2,500**	**3,400**	**16**	*<0.5*	**70**	**15.4**	**101.4**	**2.1**
37	Jun-10	**1,700**	**1,300**	**13**	*<0.5*	**48**	**4.9**	**65.9**	**11**
38	Sep-10	**13,000**	**2,900**	**43**	*<0.5*	**300**	**47.9**	**390.9**	**43**
39	Dec-10	**3,900**	**2,400**	**32**	*<0.5*	**240**	**20.5**	**292.5**	**82**
40	Mar-11	**700**	**680**	**1.6**	*<0.5*	**10**	**3.5**	**15.1**	**14**
41	Sep-11	**2,600**	**1,900**	**12**	*<0.5*	**160**	**10.2**	**182.2**	*<2.0*
42	Mar-12	**1,100**	**940**	**9**	*<0.5*	**25**	**1.6**	**35.6**	*<2.0*
43	Sep-12	**10,000**	**8,600**	**25**	<0.5	**260**	**19.0**	**304.0**	*<2.0*
44	Mar-13	**4,000**	**2,400**	**9.1**	<0.5	**73**	**9.7**	**91.8**	*<2.0*
45	Oct-13	**3,200**	**1,500**	**20**	<0.5	**51**	**6.6**	**77.6**	*<2.0*
49	Dec-13	**3,000**	**2,700**	**22**	*<0.5*	**120**	**4.6**	**147**	*<2.0*
50	Mar-14	**3,100**	**5,200**	**49**	*<0.5*	**420**	**83**	**552**	*<2.0*

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
26	Dec-07	130	67	0.77	<0.5	340	0.83	341.6	<2.0
27	Mar-08	78	170	1.7	<0.5	3.1	0.97	5.8	2.4
28	Jun-08	230	320	12	<0.5	9.9	3.50	25.4	<2.0
29	Sep-08	80	<50	1.6	<0.5	0.52	<0.5	2.1	3.0
30	Dec-08	<50	66	0.89	<0.5	<0.5	<0.5	0.9	2.1
31	Mar-09	76	230	<2.0	<0.5	1.4	<0.5	1.4	<2.0
32	Jun-09	72	120	2.0	< 0.5	4.4	1.3	7.7	<2.0
33	Sep-09	74	220	1.6	<0.5	<0.5	<0.5	1.6	<2.0
34	Dec-09	72	150	0.6	<0.5	1.6	1.2	3.4	<2.0
36	Mar-10	63	280	1.3	<0.5	48	<0.5	49.3	<2.0
37	Jun-10	110	340	1.4	<0.5	2.6	0.74	4.7	2.4
38	Sep-10	140	360	2.1	<0.5	1.4	<0.5	3.5	4.3
39	Dec-10	80	440	<0.5	<0.5	0.69	<0.5	0.7	4.1
40	Mar-11	170	1,200	1.0	<0.5	3.7	1.8	6.5	6.3
41	Sep-11	150	220	0.8	<0.5	1.9	1	3.7	<2.0
42	Mar-12	80	92	0.81	<0.5	1.5	<0.5	2.3	3.4
43	Sep-12	170	200	<0.5	<0.5	2	0.94	2.9	<2.0
44	Mar-13	310	58	<0.5	<0.5	7.3	7.94	15.2	<2.0
45	Oct-13	69	<50	<0.5	<0.5	0.84	<0.5	0.8	4.8
46	Dec-13	<52	220	<0.5	0.61	2	1.5	4.1	3.7
47	Mar-14	<50	87	<0.5	<0.5	0.51	<0.5	0.5	3.7

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	**4,300**	**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*
26	Dec-07	**7,100**	**4,000**	**68**	*<0.5*	**140**	**14**	**222**	**35**
27	Mar-08	**5,300**	**4,000**	**130**	*<0.5*	**120**	**13**	**263**	**8.8**
28	Jun-08	**3,600**	**4,200**	**190**	*<0.5*	**140**	**11**	**341**	*<2.0*
29	Sep-08	**7,300**	**4,600**	**130**	*<0.5*	**110**	**4.5**	**245**	*<2.0*
30	Dec-08	**2,800**	**1,600**	**93**	*<0.5*	**82**	**0.69**	**176**	*<2.0*
31	Mar-09	**4,100**	**4,600**	**18**	*<0.5*	**82**	**8**	**108**	**8.0**
32	Jun-09	**2,100**	**2,700**	**38**	*< 0.5*	**80**	**3.3**	**121**	**3.3**
33	Sep-09	**830**	**2,400**	**11**	*<0.5*	**19**	*<0.5*	**30**	*<2.0*
34	Dec-09	**2,200**	**3,100**	**19**	*<0.5*	**46**	**0.78**	**66**	**14.0**
35	Mar-10	**2,300**	**2,500**	**13**	*<0.5*	**59**	**0.79**	**73**	**3.4**
36	Mar-10	**1,500**	**3,400**	**12**	*<0.5*	**48**	*<0.5*	**60**	*<2.0*
37	Jun-10	**2,000**	**3,500**	**14**	*<0.5*	**42**	**0.92**	**57**	**7.9**
38	Sep-10	**3,000**	**2,200**	**18**	*<0.5*	**41**	**0.55**	**60**	**8.0**
39	Dec-10	**1,800**	**2,900**	**13**	*<0.5*	**49**	**1.9**	**64**	**15.0**
40	Mar-11	**180**	**1,600**	*<0.5*	*<0.5*	**1.2**	*<0.5*	**1.2**	**6.9**
41	Sep-11	**2,200**	**2,500**	**12**	*<0.5*	**44**	**2.2**	**58.2**	*<2.0*
42	Mar-12	**1,300**	**1,200**	**8.7**	*<0.5*	**29**	*<0.5*	**37.7**	*<2.0*
43	Sep-12	**2,400**	**1,800**	**7.7**	*<0.5*	**29**	*<0.5*	**36.7**	*<2.0*
44	Mar-13	**1,500**	**1,900**	**4.8**	*<0.5*	**22**	*<0.5*	**26.8**	*<2.0*
45	Oct-13	**3,000**	**1,600**	**14**	*<0.5*	**35**	*<0.5*	**49**	*<2.0*
46	Dec-13	**2,500**	**2,000**	*<0.5*	**13**	*<0.5*	**0.68**	**13.7**	*<2.0*
47	Mar-14	**3,000**	**2,800**	***13***	*<0.5*	***34***	<0.5	**47.0**	*<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*
9	Dec-07	**210**	**140**	*<0.5*	*<0.5*	**2.1**	**1.3**	**3.4**	*<2.0*
10	Mar-08	**720**	**500**	*<0.5*	**4.4**	**9.0**	**2.8**	**16.2**	*<2.0*
11	Jun-08	**220**	**50**	*<0.5*	*<0.5*	**2.0**	*<0.5*	**2.0**	*<2.0*
12	Sep-08	**370**	**95**	*<0.5*	*<0.5*	**2.8**	**0.98**	**3.8**	*<2.0*
13	Dec-08	**93**	**170**	*<0.5*	*<0.5*	**0.76**	*<0.5*	**0.8**	*<2.0*
14	Mar-09	**180**	**130**	*<0.5*	*<0.5*	**1.70**	*<0.5*	**1.7**	*<2.0*
15	Jun-09	**300**	**280**	*< 0.5*	*< 0.5*	**4.60**	*< 0.5*	**4.6**	*<2.0*
16	Sep-09	**330**	**270**	*<0.5*	*<0.5*	**2.30**	*<0.5*	**2.3**	*<2.0*
17	Dec-09	**76**	**170**	*<0.5*	*<0.5*	*<0.5*	*<0.5*	**0.0**	*<2.0*
18	Mar-10	**240**	**380**	*<0.5*	*<0.5*	**2.7**	*<0.5*	**2.7**	*<2.0*
19	Jun-10	**540**	**370**	*<0.5*	*<0.5*	**3.5**	**0.92**	**4.4**	**7.9**
20	Sep-10	**380**	**220**	*<0.5*	*<0.5*	**1.7**	*<0.5*	**1.7**	**8**
21	Dec-10	**320**	**350**	*<0.5*	*<0.5*	**1.5**	*<0.5*	**1.5**	**3.9**
22	Mar-11	**290**	**450**	*<0.5*	**0.74**	**1.3**	*<0.5*	**2.0**	**11**
23	Sep-11	**530**	**340**	*<0.5*	*<0.5*	**2.2**	*<0.5*	**2.2**	*<2.0*
24	Mar-12	**410**	**240**	*<0.5*	*<0.5*	**1.9**	*<0.5*	**1.9**	*<2.0*
25	Sep-12	**340**	**210**	*<0.5*	*<0.5*	**1.1**	*<0.5*	**1.1**	*<2.0*
26	Mar-13	**430**	**200**	*<0.5*	*<0.5*	**1.2**	*<0.5*	**1.2**	**7.1**
27	Oct-13	**350**	**200**	*<0.5*	*<0.5*	**0.92**	*<0.5*	**0.92**	*<2.0*
28	Dec-13	**290**	**210**	*<0.5*	*<0.5*	**0.68**	*<0.5*	**0.68**	**2.5**
29	Mar-14	<50	**62**	*<0.5*	*<0.5*	*<0.5*	*<0.5*	**0**	**2.8**

HISTORICAL SURFACE WATER ANALYTICAL RESULTS

REDWOOD REGIONAL PARK SERVICE YARD, OAKLAND, CALIFORNIA

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

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

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*	*<0.5*	*NA*
3	Aug-95	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*<0.5*	*NA*
4	May-96	*< 50*	*< 50*	*< 0.5*	*< 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*	*<0.5*	*NA*
7	Feb-97	*< 50*	*< 50*	*< 0.5*	*< 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*	*<0.5*	*NA*
10	Feb-98	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*<0.5*	*NA*
11	Sep-98	*< 50*	*<50*	*< 0.5*	*< 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*	*<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*	*<0.5*	*< 2.0*
19	Mar-02	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*<0.5*	*< 2.0*
20	Jun-02	*< 50*	*< 50*	*< 0.5*	*< 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*	*<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*	*<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*	*<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*	*1.0*	*< 2.0*
31	Mar-05	*<50*	*<50*	*<0.5*	*<0.5*	*<0.5*	*< 1.0*	*<1.0*	*< 2.0*
32	Jun-05	*<50*	*<50*	*<0.5*	*<0.5*	*<0.5*	*< 1.0*	*<1.0*	*< 2.0*
33	Sep-05	*<50*	*<50*	*<0.5*	*<0.5*	*<0.5*	*< 1.0*	*<1.0*	*< 2.0*
34	Dec-05	*<50*	*<50*	*<0.5*	*<0.5*	*<0.5*	*< 1.0*	*<1.0*	*< 2.0*
35	Mar-06	*<50*	**62**	*<0.5*	*<0.5*	*<0.5*	*< 1.0*	*<1.0*	*< 2.0*
36	Jun-06	*<50*	**110**	*<0.5*	*<0.5*	*<0.5*	*< 1.0*	*<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*	*<1.0*	*< 2.0*
39	Mar-07	*<50*	*<50*	*<0.5*	*<0.5*	*<0.5*	*< 1.0*	*<1.0*	*< 2.0*
40	Jun-07	*<50*	*<50*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<1.0*	*<2.0*
41	Sep-07	*<50*	**77**	*<0.5*	*<0.5*	*<0.5*	*<0.5*	<1.0	*<2.0*
42	Dec-07	**130**	**430**	*<0.5*	*<0.5*	**1.5**	*<0.5*	**1.5**	*<2.0*
43	Mar-08	*<50*	**130**	*<0.5*	*<0.5*	*<0.5*	**0.61**	**0.61**	*<2.0*
44	Jun-08	*<50*	*<50*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<2.0*
45	Sep-08	**530**	**690**	*<0.5*	*<0.5*	**4.3**	*<0.5*	**4.3**	*<2.0*
46	Dec-08	*<50*	**83**	*<5.0*	*<5.0*	*<5.0*	*<5.0*	**<0.5**	*<2.0*
47	Mar-09	*<50*	*<50*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<1.0*	*<2.0*
48	Jun-09	*<50*	*<50*	*<5.0*	*<5.0*	*<5.0*	*<5.0*	*<0.5*	*<2.0*
49	Sep-09	**110**	**220**	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<2.0*
50	Dec-09	*<50*	*<50*	*<5.0*	*<5.0*	*<5.0*	*<5.0*	*<0.5*	*<2.0*
51	Mar-10	*<50*	*<50*	*<5.0*	*<5.0*	*<5.0*	*<5.0*	*<0.5*	*<2.0*
52	Jun-10	*<50*	**240**	*<5.0*	*<5.0*	*<5.0*	*<5.0*	*<0.5*	*<2.0*
53	Sep-10	*<50*	**66**	*<5.0*	*<5.0*	*<5.0*	*<5.0*	*<0.5*	*<2.0*
54	Dec-10	*<50*	*<50*	*<0.5*	*<0.5*	*<0.5*	*<5.0*	*<0.5*	*NA*
55	Mar-11	*<50*	*<50*	*<0.5*	*<0.5*	*<0.5*	*<5.0*	*<0.5*	*NA*
56	Sep-11	*<50*	*<50*	*<0.5*	*<0.5*	*<0.5*	*<5.0*	*<0.5*	*NA*
57	Mar-12	*<50*	*<50*	*<0.5*	*<0.5*	*<0.5*	*<5.0*	*<0.5*	*<2.0*
58	Sep-12	*<50*	*<50*	*<0.5*	*<0.5*	*<0.5*	*<5.0*	*<0.5*	*<2.0*
59	Mar-13	*<50*	*<50*	*<0.5*	*<0.5*	*<0.5*	*<5.0*	*<0.5*	*<2.0*
60	Oct-13	*<50*	**930**	*<0.5*	*<0.5*	*<0.5*	*<5.0*	*<0.5*	**4.8**
61	Mar-14	*<50*	<49	*<0.5*	*<0.5*	*<0.5*	*<5.0*	*<0.5*	*<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*	*< 0.5*	*NA*
2	Aug-95	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*NA*
3	May-96	*< 50*	**74**	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*NA*
4	Aug-96	**69**	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*NA*
5	Dec-96	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*NA*
6	Feb-97	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*NA*
7	Aug-97	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*NA*
8	Dec-97	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*NA*
9	Feb-98	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*NA*
10	Sep-98	*< 50*	*<50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 2.0*
11	Apr-99	*< 50*	*<50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 2.0*
12	Dec-99	*< 50*	*<50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 2.0*
13	Sep-00	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*
14	Jan-01	*< 50*	*<50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 2.0*
15	Apr-01	*< 50*	*<50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 2.0*
16	Sep-01	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*	*< 0.5*	*NS*
17	Dec-01	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 2.0*
18	Mar-02	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 2.0*
19	Jun-02	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	**2.4**
20	Sep-02	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*
21	Dec-02	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 2.0*
22	Mar-03	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 2.0*
23	Jun-03	*< 50*	*< 50*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 0.5*	*< 2.0*
24	Sep-03	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*
25	Dec-03	**60**	*< 100*	*< 0.3*	*< 0.3*	*< 0.3*	*< 0.6*	*<0.6*	*< 5.0*
26	Mar-04	*<50*	*<100*	*<0.3*	*<0.3*	*<0.6*	*<0.6*	*<0.6*	*< 5.0*
27	Jun-04	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*
28	Sep-04	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*
29	Dec-04	*<50*	*<50*	*<0.5*	*<0.5*	*<0.5*	*< 1.0*	*<1.0*	*< 2.0*
30	Mar-05	*<50*	*<50*	*<0.5*	*<0.5*	*<0.5*	*< 1.0*	*<1.0*	*< 2.0*
31	Jun-05	*<50*	*<50*	*<0.5*	*<0.5*	*<0.5*	*< 1.0*	*<1.0*	*< 2.0*
32	Sep-05	*<50*	*<50*	*<0.5*	*<0.5*	*<0.5*	*< 1.0*	*<1.0*	*< 2.0*
33	Dec-05	*<50*	*<50*	*<0.5*	*<0.5*	*<0.5*	*< 1.0*	*<1.0*	*< 2.0*
34	Mar-06	*<50*	*<50*	*<0.5*	*<0.5*	*<0.5*	*< 1.0*	*<1.0*	*< 2.0*
35	Jun-06	*<50*	**120**	*<0.5*	*<0.5*	*<0.5*	*< 1.0*	*<1.0*	*< 2.0*
36	Sep-06	*<50*	**120**	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*0.5*	**7.8**
37	Dec-06	*<50*	*<50*	*<0.5*	*<0.5*	*<0.5*	*< 1.0*	*<1.0*	*< 2.0*
38	Mar-07	*<50*	*<50*	*<0.5*	*<0.5*	*<0.5*	*< 1.0*	*<1.0*	**3.3**
39	Jun-07	*<50*	*<50*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*0.5*	*<2.0*
40	Sep-07	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*
41	Dec-07	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*
42	Mar-08	*<50*	**200**	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<2.0*
43	Jun-08	*<50*	**55**	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<2.0*
44	Sep-08	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*
45	Dec-08	*<50*	**360**	*<5.0*	*<5.0*	*<5.0*	*<5.0*	*<5.0*	*<2.0*
46	Mar-09	*<50*	*<50*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*0.5*	*<2.0*
47	Jun-09	*<50*	*<50*	*<5.0*	*<5.0*	*<5.0*	*<5.0*	*<5.0*	*<2.0*
48	Sep-09	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*
49	Dec-09	*<50*	*<50*	*<5.0*	*<5.0*	*<5.0*	*<5.0*	*<0.5*	*<2.0*
50	Mar-10	*<50*	*<50*	*<5.0*	*<5.0*	*<5.0*	*<5.0*	*<0.5*	*<2.0*
51	Jun-10	*<50*	*<50*	*<5.0*	*<5.0*	*<5.0*	*<5.0*	*<0.5*	*<2.0*
52	Sep-10	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*
53	Dec-10	*<50*	*<50*	*<0.5*	**0.57**	*<0.5*	**0.81**	**1.4**	*NA*
54	Mar-11	*<50*	*<50*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*NA*
55	Sep-11	*<50*	*<50*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*NA*
57	Mar-12	*<50*	*<50*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<2.0*
58	Sep-12	*<50*	*<50*	*<0.5*	*<0.5*	*<0.5*	*<5.0*	*<0.5*	*<2.0*
59	Mar-13	*<50*	*<50*	*<0.5*	*<0.5*	*<0.5*	*<5.0*	*<0.5*	*<2.0*
60	Oct-13	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*	*NS*
61	Mar-14	*<50*	*<50*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<0.5*	*<2.0*

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