PORT OF OAKLAND

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Alameda County
Environmental Health

December 8, 2011

Mr. Paresh Khatri
Hazardous Materials Specialist
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

RE: RO#0000010_2011 Second Semi-Annual Groundwater Monitoring and Remediation System Operation and Maintenance Report - Port of Oakland, 651 Maritime Street, Oakland, CA_2011-12-08

Dear Mr. Khatri:

Please find enclosed the report entitled *2011 Second Semi-Annual Groundwater Monitoring and Remediation System Operation and Maintenance Report - Port of Oakland, 651 Maritime Street, Oakland, CA ("Report")* dated November 2011, prepared by Malcolm Pirnie, Inc. ("Malcolm Pirnie") on behalf of the Port of Oakland ("Port")[1]. This Report is being submitted in accordance with Alameda County Health Care Services Agency ("County") requirements, as specified in County letters dated March 23, 2006[2], January 19, 2007[3], September 30, 2008[4], and June 23, 2011.[5]

---

[1] The Site has been referred to historically as the "Shippers" and "Ringsby" sites, based on the Port tenants that occupied the site at the time of release discoveries. Prior to site redevelopment in 2004, the site was also referred to as 2277 and 2225 Seventh Street. After redevelopment, the Site address became 651 and 555 Maritime Street, although referenced hereafter (including within this Report) as only **651 Maritime Street *(Fuel Leak Case RO0000010).***

[2] Letter from Mr. Barney Chan (County) to Mr. Jeff Rubin (Port), regarding *Fuel Leak Cases RO0000010 and RO0000185, 2277 and 2225 7th St., Oakland, CA 94607*, dated March 23, 2006.

[3] Letter from Mr. Barney Chan (County) to Mr. Jeff Rubin (Port), regarding *Fuel Leak Cases RO0000010 and RO0000185, 2277 and 2225 7th St., Oakland, CA 94607*, dated January 19, 2007.

[4] Letter from Mr. Steven Plunkett (County) to Mr. Jeffrey Rubin (Port) regarding *Fuel Leak Case RO0000187 (Global ID# T0600100892), Port of Oakland, 651 Maritime Street, Oakland, CA*, dated September 30, 2008.

[5] Letter from Mr. Paresh Khatri (County) to Messrs. Jeffrey Jones and Jeffrey Rubin (Port) regarding *Feasibility Study Evaluation for Fuel Leak Case No. RO0000010 & RO0000187 (GeoTracker Global ID# T0600100892), Port of Oakland, 651 Maritime Street, Oakland, CA*, dated June 23, 2011.

530 Water Street ■ Jack London Square ■ P.O. Box 2064 ■ Oakland, California 94604-2064
Telephone: (510) 627-1100 ■ Facsimile: (510) 627-1826 ■ Web Page: www.portofoakland.com

The Port has retained Malcolm Pirnie to perform groundwater monitoring and maintenance of the remediation system. Results of the second 2011 semi-annual sampling event are contained in the enclosed report. The next monitoring event will be performed during the June/July 2012 time frame. If you have any questions or comments regarding the results, please contact Jeff Rubin at (510) 627-1134.

I declare, under penalty of perjury, that the information and/or recommendations contained in the attached report prepared by Malcolm Pirnie are true and correct to the best of my knowledge. Please note that the report is stamped by a Registered Professional Geologist in the State of California.

Sincerely,

Jeffrey R. Jones
Supervisor
Environmental Programs and Planning

Jeffrey L. Rubin, CPSS, REA
Port Associate Environmental Scientist
Environmental Programs and Planning

Enclosure: noted

Cc (w encl.): Michele Heffes
James McCarty (Baseline Environmental)

Cc (w/o encl.): Todd Miller (Malcolm Pirnie)
Yane Nordhav (Baseline Environmental)

Port of Oakland
530 Water Street • Oakland, CA 94607

2011 Second Semi-Annual Groundwater Monitoring and Remediation System Operation and Maintenance Report

Port of Oakland
651 Maritime Street
Oakland, California

November 2011

Report Prepared By:

Malcolm Pirnie, Inc.

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4656016

MALCOLM PIRNIE

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December 9, 2011

Mr. Jeffrey L. Rubin, CPSS REA
Associate Environmental Scientist
Port of Oakland
530 Water Street
Oakland, California 94607

Subject: **2011 Second Semi-Annual Groundwater Monitoring and Remediation System Operation and Maintenance Report - Port of Oakland, 651 Maritime Street, Oakland, California**

Dear Mr. Rubin:

Enclosed please find the 2011 Second Semi-Annual Groundwater Monitoring and Remediation System Operation and Maintenance Report for 651 Maritime Street (formerly 2277 and 2225 Seventh Street), Alameda County Local Oversight Program case number RO0000010. This report has been prepared for submittal to Alameda County Health Care Services, Department of Environmental Health (ACHCS) on behalf of the Port of Oakland (the Port) as required in ACHCS's letter to the Port dated March 23, 2006. The ACHCS requires semi-annual groundwater monitoring and reporting at the Site.

Malcolm Pirnie assumed responsibility for implementing the groundwater monitoring program and operation of the free product recovery system on May 1, 2009. The enclosed report documents the groundwater sampling event conducted at the subject site in September 2011 by Malcolm Pirnie. This report also presents free product measurements collected by Malcolm Pirnie since July 1, 2011.

If you have any questions or comments, please contact me at (510) 596-9695.

Sincerely,

Todd Miller

PROFESSIONAL GEOLOGIST
Todd Miller
No. 695
Certified
Hydrogeologist
STATE OF CALIFORNIA

Todd Miller, CHG
Project Manager

Enclosure

Contents

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Acronyms Used in the Report

ACHCS	Alameda County Health Care Services
amsl	Above mean sea level
BASELINE	BASELINE Environmental Consultants, Inc.
BTEX	Benzene, toluene, ethylbenzene, and total xylenes
C&T	Curtis & Tompkins, Ltd.
DO	Dissolved oxygen
FS/CAP	Feasibility Study/Corrective Action Plan
LOP	Local Oversight Program
mg/L	Milligrams per liter
MNA	Monitored natural attenuation
MSD	Matrix spike duplicate
MSE	MSE Group
MTBE	Methyl tert-butyl ether
NESCO	National Environmental Service Company
NAVD	North American Vertical Datum
O&M	Operation and Maintenance
ORC	Oxygen Releasing Compound™
ORP	Oxidation/reduction potential
PAHs	Polycyclic aromatic hydrocarbons
QA/QC	Quality assurance/quality control
RAMCON	RAMCON Engineering and Environmental Contracting
RPD	Relative percent difference
TPHd	Total petroleum hydrocarbons as diesel fuel
TPHg	Total petroleum hydrocarbons as gasoline
TPHmo	Total petroleum hydrocarbons as motor oil
Uribe	Uribe and Associates
USEPA	U.S. Environmental Protection Agency
UST	Underground storage tank
µg/L	Micrograms per liter

1. Introduction

This 2011 Second Semi-Annual Groundwater Monitoring and Remediation System Operation and Maintenance Report (Report) for 651 Maritime Street, Oakland, California (Site)[1] has been prepared by Malcolm Pirnie on behalf of the Port of Oakland (Port). This Report includes the period from January through December. The Alameda County Health Care Services (ACHCS) is providing regulatory oversight under the Local Oversight Program (LOP), case number RO0000010.

The Site encompasses an approximate 13-acre parcel, located between the former Oakland Naval Supply Center and former Oakland Army Base (Figure 1). Groundwater impacts beneath the Site are related to petroleum releases from two former underground storage tank (UST) sites located at 2277 Seventh Street and 2225 Seventh Street. A brief history of the two sites is provided below.

Former 2277 Seventh Street Site

In 1993, Uribe and Associates (Uribe) removed four Port-owned USTs from 2277 Seventh Street. Uribe collected soil samples from beneath the tanks at the time of the removal and submitted them for laboratory analyses. The laboratory reported that soil contained total petroleum hydrocarbons as diesel fuel (TPHd) and as gasoline (TPHg), as well as benzene, toluene, ethylbenzene, and total xylenes (BTEX) compounds. Uribe also observed free-phase product on the groundwater within the excavation. In 1994, Uribe installed three groundwater monitoring wells (MW-1 through MW-3) and in 1995 Alisto Engineering Group installed five additional wells (MW-4 through MW-8). Quarterly groundwater monitoring was initiated in 1996 in accordance with an ACHCS-approved workplan dated April 18, 1995.

Former 2225 Seventh Street Site

Former Port tenant Ringsby Terminals (formerly Dongary Investments) and/or its tenant owned and operated nine USTs at 2225 Seventh Street. One of the tanks in the cluster failed a tank integrity test in 1989. National Environmental Service Company (NESCO) removed the UST in March 1990. During the UST removal, NESCO collected soil and groundwater samples from the excavation. Analytical results indicated the presence of

[1] The Site has been referred to in the past as the "Shippers" and "Ringsby" sites, based on the Port tenants occupying the site at the time of release discoveries. In addition, prior to site redevelopment in 2004, the site was referred to as 2277 and 2225 Seventh Street; the Site addresses after redevelopment are 651 and 555 Maritime Street, although referenced in this report as 651 Maritime Street.

TPHd and BTEX. RAMCON Engineering and Environmental Contracting (RAMCON) removed seven of the USTs (six diesel and one fuel oil) in 1992. RAMCON observed a hole in the fuel oil tank and a thin layer of an unspecified petroleum product floating on the groundwater in the excavation. During a separate event in 1992, RAMCON removed the remaining UST (a waste oil tank). Soil samples collected from that excavation indicated the presence of TPHd, TPH as motor oil (TPHmo), benzene, xylenes, and polycyclic aromatic hydrocarbons (PAHs). A water sample collected from the excavation also contained TPHd. In 1993, RAMCON installed three groundwater monitoring wells (MW-1 through MW-3) at the site and in 1994 quarterly groundwater monitoring began, as required by the ACHCS.[2]

651 Maritime Site

In 2004, the Port completed the development of the eastern-most eight acres of the Site into the Harbor Facilities Complex with an address of 651 Maritime Street (Figure 2). In 2006, the remaining five acres of the Site were developed by the Port into the Maritime Support Center with an address of 555 Maritime Street. The Maritime Support Center is currently leased to Shippers Transport Express.

Historic site investigations indicate that groundwater beneath the Site is impacted by a co-mingled plume containing dissolved and free-phase petroleum hydrocarbons, primarily in the diesel fuel range. In addition, well MW-4 (Figure 3, the western-most well) has historically contained dissolved petroleum hydrocarbons in the gasoline range.

In 1996, the Port installed a remediation system to recover free-phase product from beneath the Site. The free product recovery system was operated until 2003 when it was removed, with approval from the ACHCS.[3] The ACHCS approved the removal of the system with the stipulation that a new free product recovery system will be installed. A new system was installed in 2004.

In 1998, Harding Lawson Associates abandoned MW-8 to facilitate the expansion of the railroad tracks to the north of the Site. Replacement well MW-8A was installed in 2001 (Figure 3). In 2002, monitoring wells MW-1, MW-2, and MW-3 at the former 2225 Seventh Street site, and MW-6 and MW-7 at the former 2277 Seventh Street site were abandoned to facilitate construction of the new Harbor Facilities Complex. [4]

In 2006, the ACHCS approved a modification of the groundwater monitoring frequency from quarterly to semi-annually at the Site. The first semi-annual monitoring event

[2] Letter from ACHCS to Dongary Investments dated July 26, 1994.
[3] Letter from ACHCS to Port of Oakland dated March 27, 2003.
[4] February 2009, *Second Semi-Annual 2008 Groundwater Monitoring and Remediation System Operation and Maintenance Report*.

occurred on July 28, 2006. The ACHCS also approved the use of Oxygen Release Compound™ (ORC) in well MW-4 to increase the dissolved oxygen (DO) concentration in groundwater and stimulate aerobic biodegradation of the petroleum hydrocarbons present in the groundwater at that location.[5]

In 2007, the product recovery system was enhanced by adding a low vacuum to the recovery well heads to increase product recovery rates. Air drawn from the recovery wells is treated with granular activated carbon (GAC) and discharged to the atmosphere under a permit from the Bay Area Air Quality Management District.

On September 30, 2008, ACHCS approved a plan to install four additional groundwater monitoring wells, MW-9 through MW-12 (Figure 3), to enhance the existing monitoring well network and to replace wells removed during Site redevelopment.[6] The wells were installed by MSE Group (MSE) and sampled in December 2008, along with the remaining Site wells. Well installation activities and sample results were reported by MSE in February 2009.[4]

[5] Letter from ACHCS to Port of Oakland dated March 23, 2006.
[6] Letter from Mr. Steven Plunkett (ACHCS) to Mr. Jeffrey Rubin (Port of Oakland) dated September 30, 2008.

2. Groundwater Sampling Activities

Malcolm Pirnie conducted the 2011 second semi-annual groundwater monitoring event at the Site on September 26 and 27, 2011. The September 2011 groundwater monitoring event consisted of measuring the depth to groundwater and free-phase product thickness, where present, in the 10 groundwater monitoring wells on-site and collecting groundwater samples from the wells without free-phase product. The depth to groundwater and free-phase product thickness was measured to the nearest one-hundredth of a foot from the top of the well casing using a dual-phase interface probe where free product was anticipated or a water level meter where free product was not anticipated. The dual-phase interface probe and water level meter were decontaminated before each measurement by washing in a Liquinox solution then rinsing with water. Field observations and instrument readings indicated that there was free-phase product in monitoring wells MW-3 and MW-1 (Table 1); hence, these wells were neither purged nor sampled. Water level measurements for the September 2011 monitoring event are summarized in Table 1 and included on the groundwater sampling forms in Appendix A.

Malcolm Pirnie purged wells MW-2, MW-4, MW-5, MW-8A, MW-9, MW-10, MW-11, and MW-12 using a peristaltic pump equipped with dedicated silicone and polyethylene tubing. Malcolm Pirnie monitored field water quality parameters (including temperature, pH, oxidation/reduction potential (ORP), DO concentration, and electrical conductivity) of the purge water using portable field instruments calibrated to manufacturer's specifications. Purging continued until water quality parameters stabilized as recharge rates permitted. Field-measured groundwater quality information collected during the September 2011 monitoring event is provided on groundwater sampling forms included in Appendix A.

After purging, Malcolm Pirnie collected groundwater samples directly into laboratory-supplied sample bottles using the peristaltic pump. Malcolm Pirnie collected a duplicate sample from monitoring well MW-4 (MW-4DUP). Following sample collection, each sample bottle was labeled with a project name, date and time of collection, samplers' initials, and unique sample identification and stored in a cooler containing ice. The groundwater samples were submitted to Curtis and Tompkins, Ltd. (C&T), a California-certified analytical laboratory, under appropriate chain-of-custody procedures for the following analyses:

- TPHg in accordance with U.S. Environmental Protection Agency (USEPA) Method 8015B;
- TPHd and TPHmo in accordance with USEPA Method 8015B;

- BTEX and methyl tert-butyl ether (MTBE) in accordance with USEPA Method 8260B.
- Total dissolved solids (TDS) in accordance with USEPA Method 160.1;
- Dissolved metals and cations (sodium, potassium, calcium, magnesium, manganese, and iron) in accordance with USEPA Method 6010B;
- Major anions (sulfate, chloride, nitrate, and nitrite) in accordance with USEPA Method 300.0;
- Alkalinity (bicarbonate and carbonate) in accordance with Standard Method 2320B;
- Orthophosphate in accordance with Standard Method 4500P-E; and
- Dissolved sulfide in accordance with Standard Method 4500S2-D.

Groundwater samples were also submitted to Microseeps, Inc., a National Environmental Laboratory Accreditation Program-certified analytical laboratory, under appropriate chain-of-custody procedures, for analysis of methane and carbon dioxide in accordance with AM20GAX (equivalent to USEPA RSK-175);

Samples collected for dissolved metals analysis were field filtered using a 0.45 micrometer (µm) glass fiber filter to remove suspended sediment. Groundwater from each well was also field-analyzed for ferrous iron using a Hach DR/890 Portable Colorimeter (Hach Colorimeter). After the sample was passed through a 0.45 micrometer to remove sediment, a three-minute reaction was initiated between the sample and phenanthroline in AccuVac® Ampules. Upon reaction completion, the sample was placed in the Hach Colorimeter and analyzed.

Prior to analyzing the water samples for TPHd and TPHmo, a portion of each sample was passed through a silica gel column, in accordance with USEPA Method 3630C, to remove non-petroleum-based organics that could potentially interfere with the analyses.

Under approval from the ACHCS, well MW-4 has historically been outfitted with ORC socks to increase the DO concentration in groundwater and stimulate aerobic biodegradation of the petroleum hydrocarbons. The ORC socks have historically been removed one-week prior to sampling and replaced immediately after sampling. As part of the Free Product Recovery System shut-down activities in May and June 2011, the socks were removed on June 15 and not replaced; thus they were not removed or replaced during the September 2011 sampling event.

Approximately 25 gallons of purge and decontamination water were generated during the September 2011 monitoring event. Malcolm Pirnie placed the water in a properly labeled 55-gallon drum, which was stored in the free product recovery system enclosure located within the Harbor Facilities Complex. The Port's environmental services contractor will dispose of the water in accordance with applicable laws and regulations.

3. Results

The following sections summarize the field and laboratory results collected during the second six months of 2011.

3.1. Groundwater Flow Direction

Based on the depth-to-water measurements collected, groundwater levels beneath the Site in September 2011 were slightly lower than those observed in June 2011. In June 2011, groundwater elevations ranged from 4.35 feet above mean sea level (amsl) to 6.33 feet amsl. In September 2011, groundwater elevations ranged from 3.11 feet amsl to 6.09 feet amsl. The groundwater flow direction was judged to range from the northeast to northwest. Groundwater gradients at the Site ranged from 0.016 to 0.002 feet per foot. A shallow groundwater elevation contour map for September 2011 is included as Figure 4. Current and historical depth-to-water measurements and calculated groundwater elevations are summarized in Table 1.

3.2. Product Thickness

Free-phase product was identified in monitoring wells MW-1 and MW-3 during the September 2011 monitoring event. The product thickness in MW-1 was not measurable with an interface probe, but product was observed on the interface probe after measuring the depth to water. Since April 2000, MW-1 has contained free-phase product ranging in thickness from not-measurable (a sheen) to 1.30 feet (Table 1). The product thickness in well MW-3 was measured to be 1.84 feet. Product thickness in this well has ranged from not-measurable to 2.70 feet since April 2000. During previous reporting periods, product was manually removed from MW-3 on a weekly basis using a peristaltic pump and placed in the 500-gallon concrete-encased aboveground storage tank (Convault) located within the system enclosure. Manual product removal from MW-3 was discontinued on May 25, 2011.

3.3. Analytical Results

Analytical results for the groundwater samples collected during the September 2011 monitoring event are illustrated on Figure 5A and summarized in Tables 2 and 3. Figure 5B illustrates the laboratory results reported for the June 2011 groundwater sampling event. The laboratory analytical reports are provided in Appendix B.

3.3.1. TPHg

The laboratory reported TPHg in the groundwater samples collected from wells MW-4, MW-9, MW-10, and MW-12 at concentrations ranging from 62 micrograms per liter (µg/L) to 260 µg/L. The laboratory also reported that chromatograms resulting from the TPHg analyses exhibited patterns that do not match the gasoline standard. Chromatograms are included in the laboratory reports in Appendix B.

Figure 6 illustrates the TPHg concentrations over time for those wells where it has been reported above the analytical method reporting limit in at least 10 percent of the samples (excluding MW-1, which historically has contained free product). The graph shows a decreasing trend over time except for the concentrations reported in well MW-10, which is located near the edge of the free-product plume. TPHg concentrations reported during this sampling event are below the Site remedial goal of 3,700 µg/L.[7]

3.3.2. BTEX and MTBE

The laboratory reported benzene in the groundwater samples collected from wells MW-4 (13 µg/L), MW-9 (21 µg/L), and MW-10 (61 µg/L). MTBE was reported in the sample collected from well MW-12 at 4.2 µg/L. Ethylbenzene, toluene, and xylenes were reported to be below the analytical method reporting limit in the samples analyzed.

Figures 7 and 8 illustrate the benzene and MTBE concentrations over time for those wells where the constituents have been reported above their respective analytical method reporting limits in at least 10 percent of the samples (except MW-1, which historically contains free product). Figure 7 shows that except for well MW-10, benzene concentrations beneath the Site are stable and/or decreasing. The concentrations reported in well MW-10 show an increasing trend with time. The increase may be related to the location of the well relative to the free product plume. The reported concentration in MW-10 is above the Site remedial goal of 46 µg/L[7]. The remaining reported benzene concentrations are below the Site remedial goal. Figure 8 shows MTBE concentrations beneath the site are stable and/or decreasing, with reported concentrations below the Site remedial goal of 1,800 µg/L.[7]

3.3.3. TPHd and TPHmo

The laboratory analyzed the groundwater samples before and after treating the aliquots with silica gel. Analyzing the samples prior to silica gel clean-up identifies the concentration of petroleum and non-petroleum hydrocarbons in shallow groundwater; whereas results from the post silica gel cleanup analyses is representative of the petroleum hydrocarbons in the groundwater samples. A further explanation and

[7] Malcolm Pirnie, 2011, *Feasibility Study / Correct Action Plan, Port of Oakland's Harbor Facilities Complex, 651 Maritime Street, Oakland, CA, March 15.*

comparison of the results reported by the laboratory is included in Appendix C. The following summarizes the results of the TPH analyses, post silica gel cleanup, which is consistent with previous groundwater monitoring events.

The laboratory reported TPHd in the groundwater samples collected from wells MW-4, MW-9, MW-10, and MW-12 at concentrations ranging from 72 µg/L to 780 µg/L. The laboratory reported TPHmo concentrations below the analytical method reporting limit in the samples analyzed..

Figure 9 illustrates the TPHd concentrations over time for those wells where it has been reported above the analytical method reporting limit in at least 10 percent of the samples (except MW-1, which historically contains free product). The graph shows TPHd concentrations beneath the Site are generally stable or decreasing. However, during the September 2011 sampling event, TPHd was detected in MW-10 at a higher concentration than historical values. The detection in MW-10 is likely related to its proximity to the free product plume. The Site remedial goal for TPHd is 640 µg/L.

3.3.4. Monitored Natural Attenuation Parameters

In accordance with the *Feasibility Study/Corrective Action Plan* (FS/CAP),[7] samples were analyzed for monitored natural attenuation (MNA) parameters. Methane was detected in the eight wells sampled at concentrations ranging from 18 µg/L to 9,500 µg/L. DO was below 1 mg/L in the eight wells sampled. Ferrous iron was detected in seven of the eight wells (not detected in MW-2), at concentrations ranging from 0.27 mg/L to 8.8 mg/L. Dissolved sulfide was detected in the samples collected from wells MW-9, MW-10, and MW-12 at concentrations of 0.08 mg/L to 3.3 mg/L.

The above results indicate that groundwater conditions beneath the site are consistent with a reduced environment. The presence of methane indicates strongly reducing conditions across the site, with areas of moderately reducing conditions near well MW-2. Ferrous iron in the wells nearest the free product plume also indicates that strongly reducing conditions appear to co-locate with areas of greater hydrocarbon impact. MW-2 appears to be in the least reducing area of the site, with low concentrations of ferrous iron (<0.10 mg/L) and methane (18 µg/L). In general, the results indicate that anaerobic degradation of the petroleum hydrocarbon constituents is occurring, resulting from depressed oxygen levels and low ORP. The above results are consistent with the MNA results reported as part of the June 2011 sampling event.

3.4. ORC Use

As described in Section 2, Malcolm Pirnie removed the ORC socks from well MW-4 on June 15, 2011. The socks were not replaced. Concentrations of DO in MW-4 were less than 1 mg/L during the September 2011 sampling event, consistent with the reducing conditions observed across the site.

3.5. Quality Assurance / Quality Control

Malcolm Pirnie collected a field duplicate from one monitoring well to assess the representativeness of the sample collection procedures. Two samples from well MW-4 (MW-4 and MW-4DUP) were analyzed for the constituents indicated in Section 2.

The laboratory reported benzene in sample MW-4 and duplicate sample MW-4DUP at concentrations of 13 µg/L and 12 µg /L. The relative percent difference (RPD) between the two samples is calculated below:

Benzene RPD |13-12|/ [(13+12)/2] = 8%

The RPD for benzene is within the analytical laboratory's maximum allowable RPD for matrix spike duplicates and indicates that the field sampling procedures produce acceptable data.

The laboratory prepared a trip blank using deionized water as a water quality control sample. The trip blank was stored in the coolers and accompanied groundwater samples from collection to transport to the laboratory. The trip blank was analyzed for TPHg, BTEX, and MTBE using USEPA Methods 8015M and 8260B. The laboratory reported concentrations of the constituents of concern below their respective method reporting limits for the analyses performed, indicating that volatile constituents of concern were not introduced into the samples through the collection, transportation, storage, and analysis procedures.

Malcolm Pirnie also reviewed the laboratory data for completeness and accuracy (see Quality Control Checklist in Appendix B). Results for TDS samples collected on September 27 (MW-4, MW-4DUP, MW-5, and MW-9) were qualified because the laboratory's batch spike duplicate was out of the acceptable RPD range. The remaining laboratory Quality Assurance / Quality Control (QA/QC) goals were met.

Based on the above QA/QC evaluation, Malcolm Pirnie considers the data collected during the September 2011 monitoring event reliable for its intended use.

4. Free Product Recovery System

On June 7, 2011, in accordance with the FS/CAP and the letter submitted to the Alameda County Health Care Services Agency on May 16, 2011, Malcolm Pirnie shut down the free-phase product recovery system. The skimmer pumps were removed from the wells. The low vacuum system was also shut down, and the GAC vessels were removed. Free product and water level measurements were collected from monitoring and recovery wells on June 7, 2011, June 21, 2011 and September 26, 2010 to confirm stability of the free-phase product.

Free product measurements were also collected from the recovery wells on October 5, October 15 and December 5. Free product and water level measurements for these dates are included in Table 4. Based on the measurements collected, the free-phase product plume appears stable. The observed area of free-phase product as assess in June 2011 and September 2011 are illustrated on Figures 5A and 5B. Field sheets documenting these measurements are provided in Appendix D.

5. Conclusions

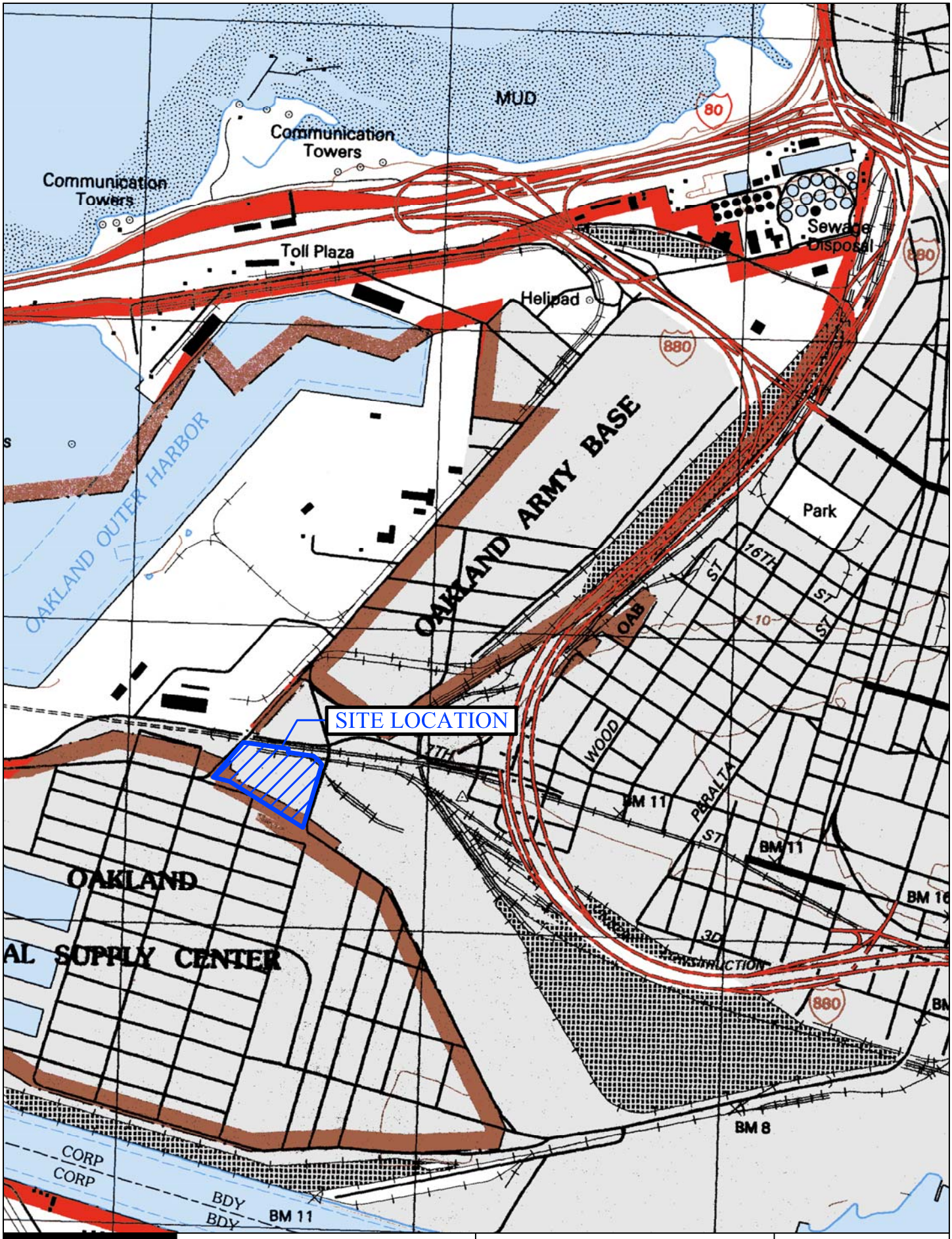
The results of the September 2011 monitoring and free product recovery system O&M tasks indicate that the free-phase product plume is stable, and groundwater concentrations are generally stable and/or decreasing (Figures 6 through 9). Results of the MNA assessment indicate that petroleum hydrocarbons are actively being reduced through anaerobic degradation. Remedial goals for the Site were derived following the RWQCB's Environmental Screening Level program and are based on: (1) dissolved constituents are not migrating off-Site at concentrations that would impact ecological receptors in the San Francisco Bay; and (2) groundwater beneath the Site is considered non-potable (TDS in well MW-11 exceeds 3,000 ppm) and risks are managed through implementation of institutional controls and deed restrictions. The historical data indicate that dissolved constituents of concern reported in monitoring wells beneath the Site other than MW-10, which is located in the immediate vicinity of the free product plume, are below their respective Site-specific remedial goals, signifying that active remediation of groundwater is not warranted.

Port of Oakland
530 Water Street • Oakland, CA 94607

Figures

4656016

MALCOLM PIRNIE



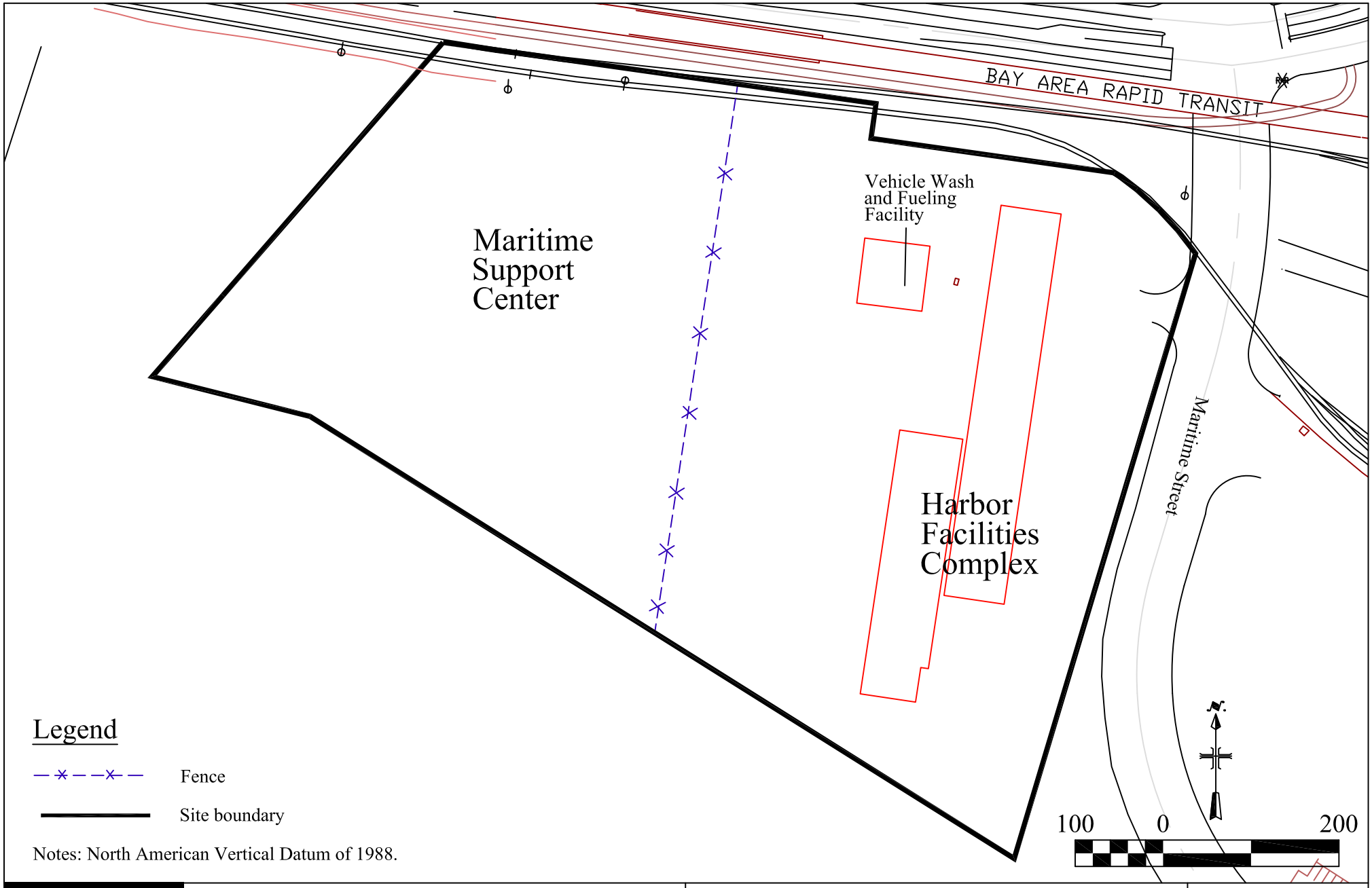
MALCOLM PIRNIE

PORT OF OAKLAND
HARBOR FACILITIES COMPLEX
651 MARITIME STREET

SITE LOCATION MAP

MALCOLM PIRNIE, INC.
NOVEMBER 2011
FIGURE 1

User:Orsi Spec:PIRNIE STANDARD File:P:\4656\016\acad\2nd Semi 2011\FIGURES.DWG



MALCOLM PIRNIE

PORT OF OAKLAND

HARBOR FACILITIES COMPLEX
651 MARITIME STREET

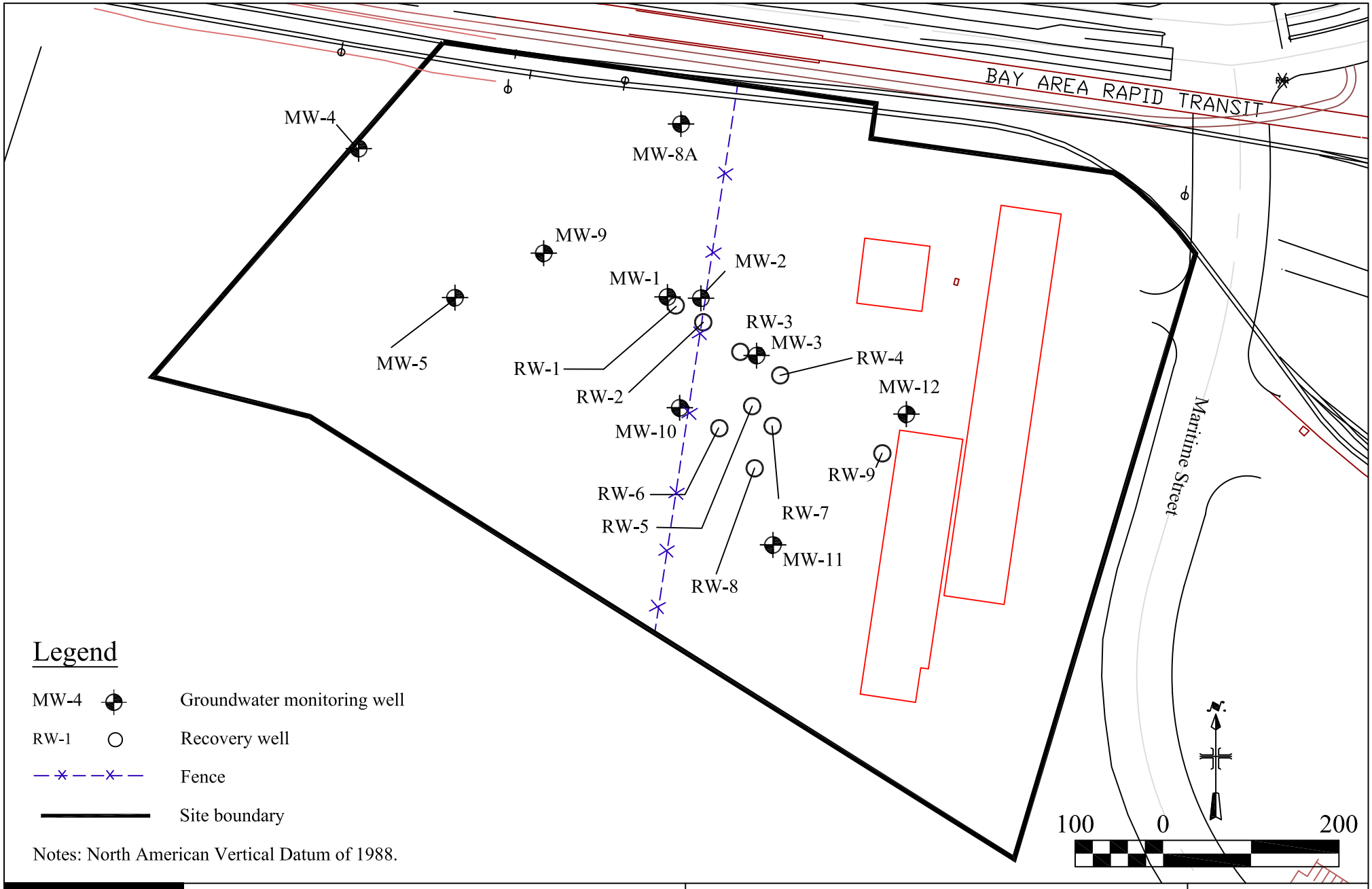
HARBOR FACILITIES COMPLEX LAYOUT

MALCOLM PIRNIE, INC.

NOVEMBER 2011

FIGURE 2

User:Orsi Spec:PIRNIE STANDARD File:P:\4656\016\acad\2nd Semi 2011\FIGURES.DWG



MALCOLM PIRNIE

PORT OF OAKLAND

HARBOR FACILITIES COMPLEX
651 MARITIME STREET

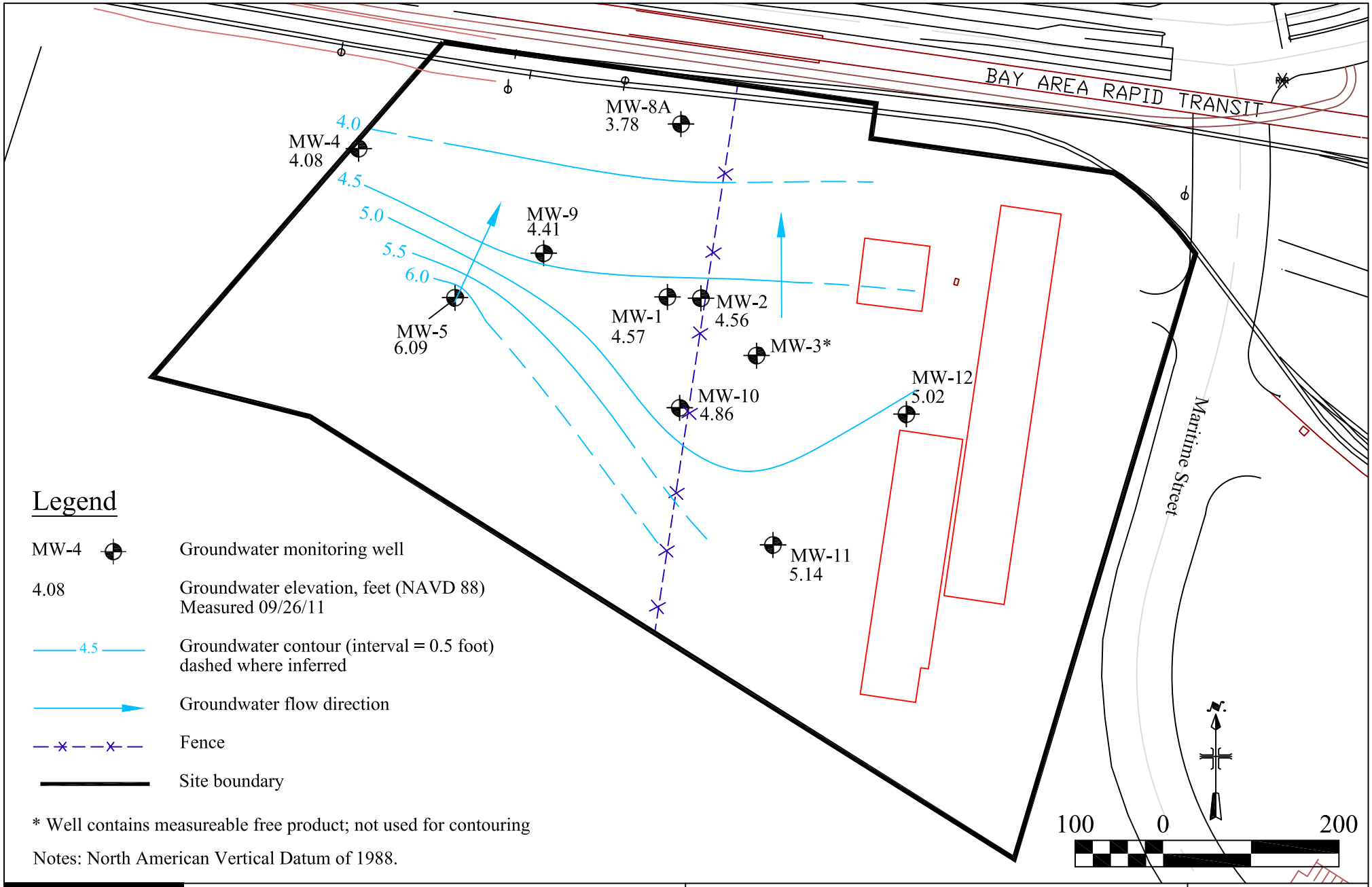
SITE PLAN

MALCOLM PIRNIE, INC.

NOVEMBER 2011

FIGURE 3

User:Orsi Spec:PIRNIE STANDARD File:P:\4656\016\acad\2nd Semi 2011\FIGURES.DWG



MALCOLM PIRNIE

PORT OF OAKLAND

HARBOR FACILITIES COMPLEX
651 MARITIME STREET

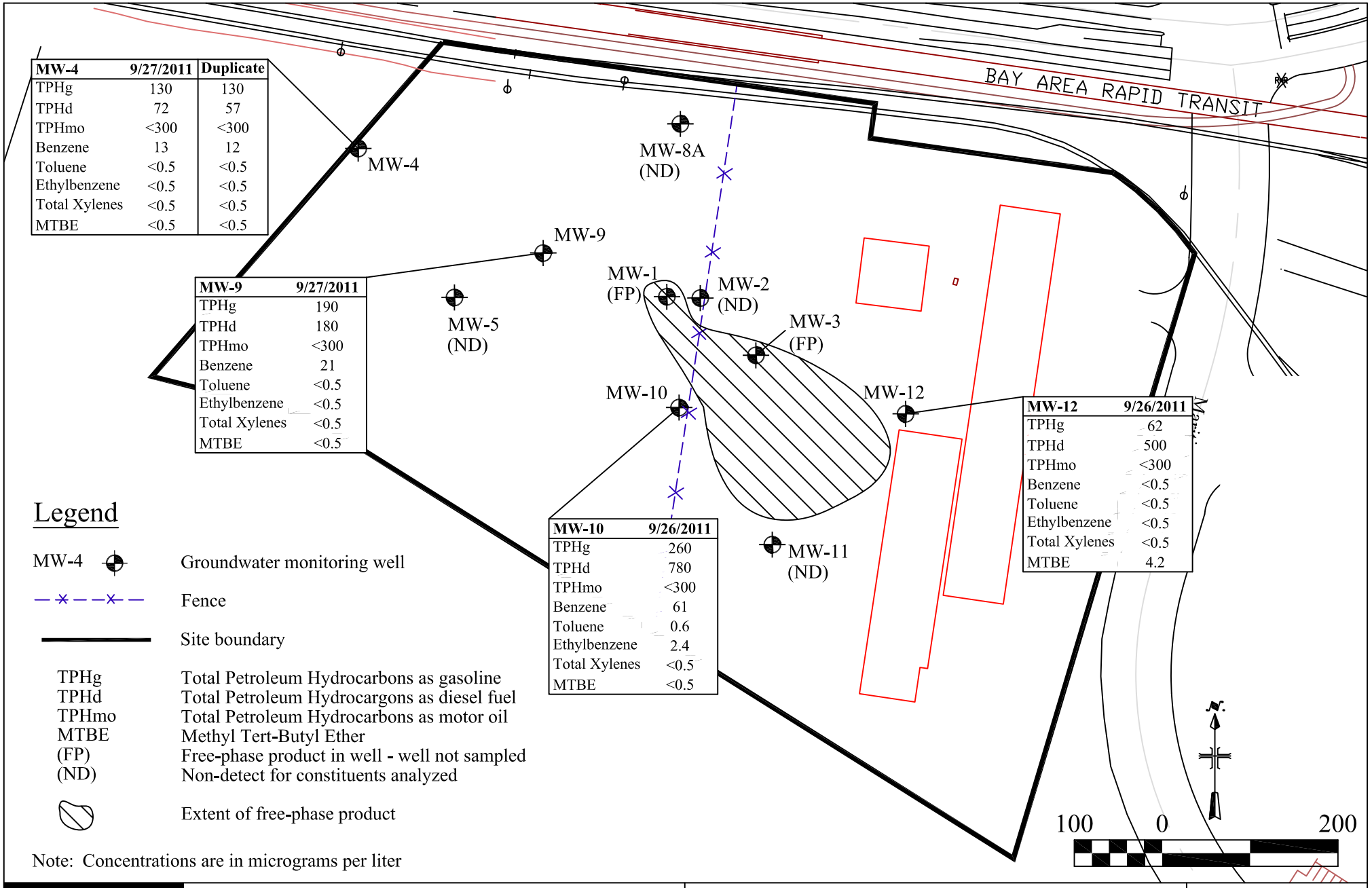
GROUNDWATER ELEVATION
ISOCONTOUR MAP - SEPTEMBER 2011

MALCOLM PIRNIE, INC.

NOVEMBER 2011

FIGURE 4

User:Orsi Spec:PIRNIE STANDARD File:P:\4656\016\acad\2nd Semi 2011\FIGURES.DWG



MALCOLM PIRNIE

PORT OF OAKLAND

HARBOR FACILITIES COMPLEX
651 MARITIME STREET

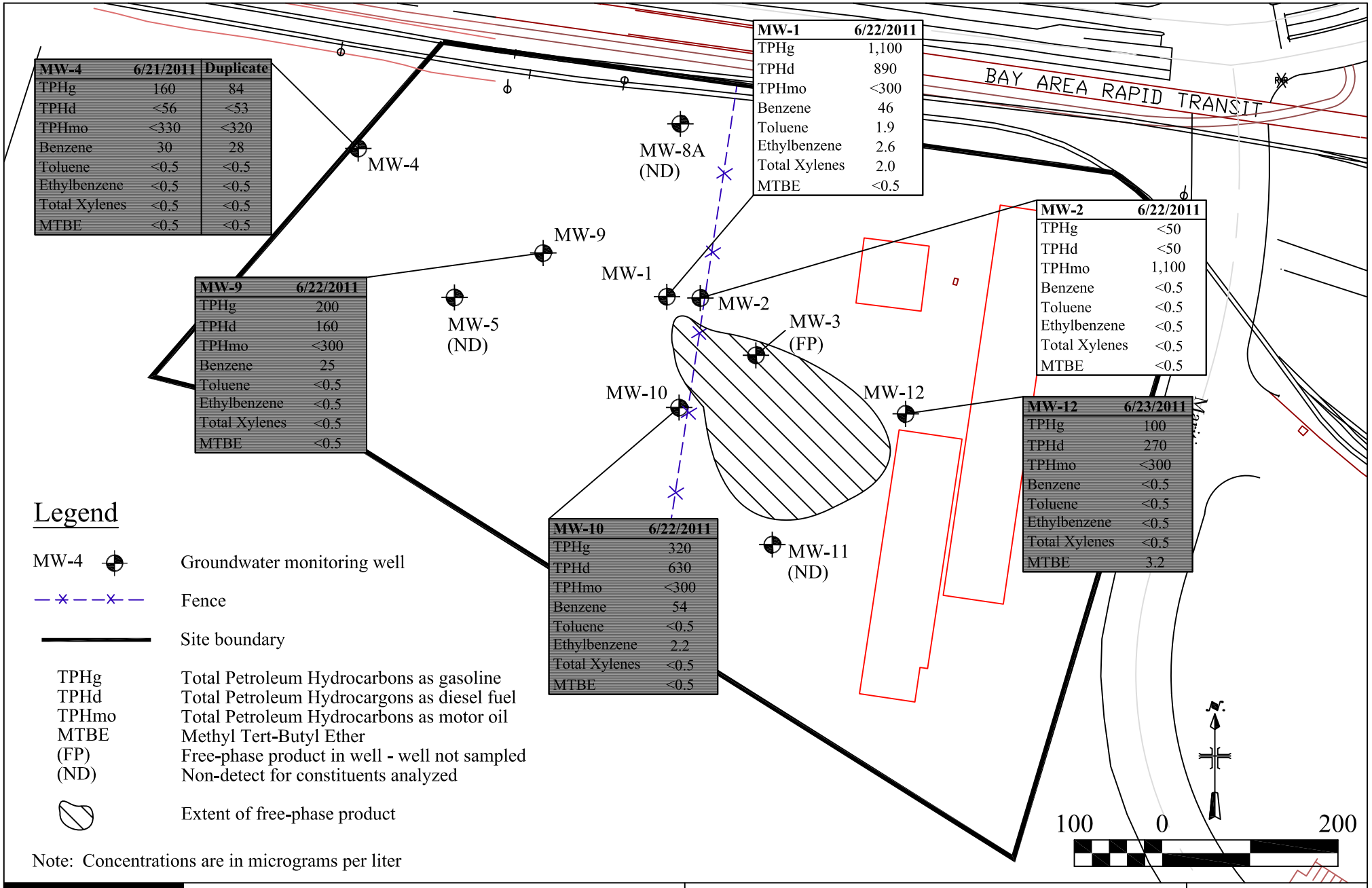
SHALLOW GROUNDWATER
SAMPLE RESULTS - SEPTEMBER 2011

MALCOLM PIRNIE, INC.

NOVEMBER 2011

FIGURE 5A

User:Orsi Spec:PIRNIE STANDARD File:P:\4656\016\acad\2nd Semi 2011\FIGURES.DWG



MALCOLM PIRNIE

PORT OF OAKLAND

HARBOR FACILITIES COMPLEX
651 MARITIME STREET

SHALLOW GROUNDWATER
SAMPLE RESULTS - JUNE 2011

MALCOLM PIRNIE, INC.

JULY 2011

FIGURE 5B

User:Orsi Spec:PIRNIE STANDARD File:P:\4656\016\acad\1st Semi 2011\FIGURES.DWG

Figure 6
TPHg Concentration versus Time

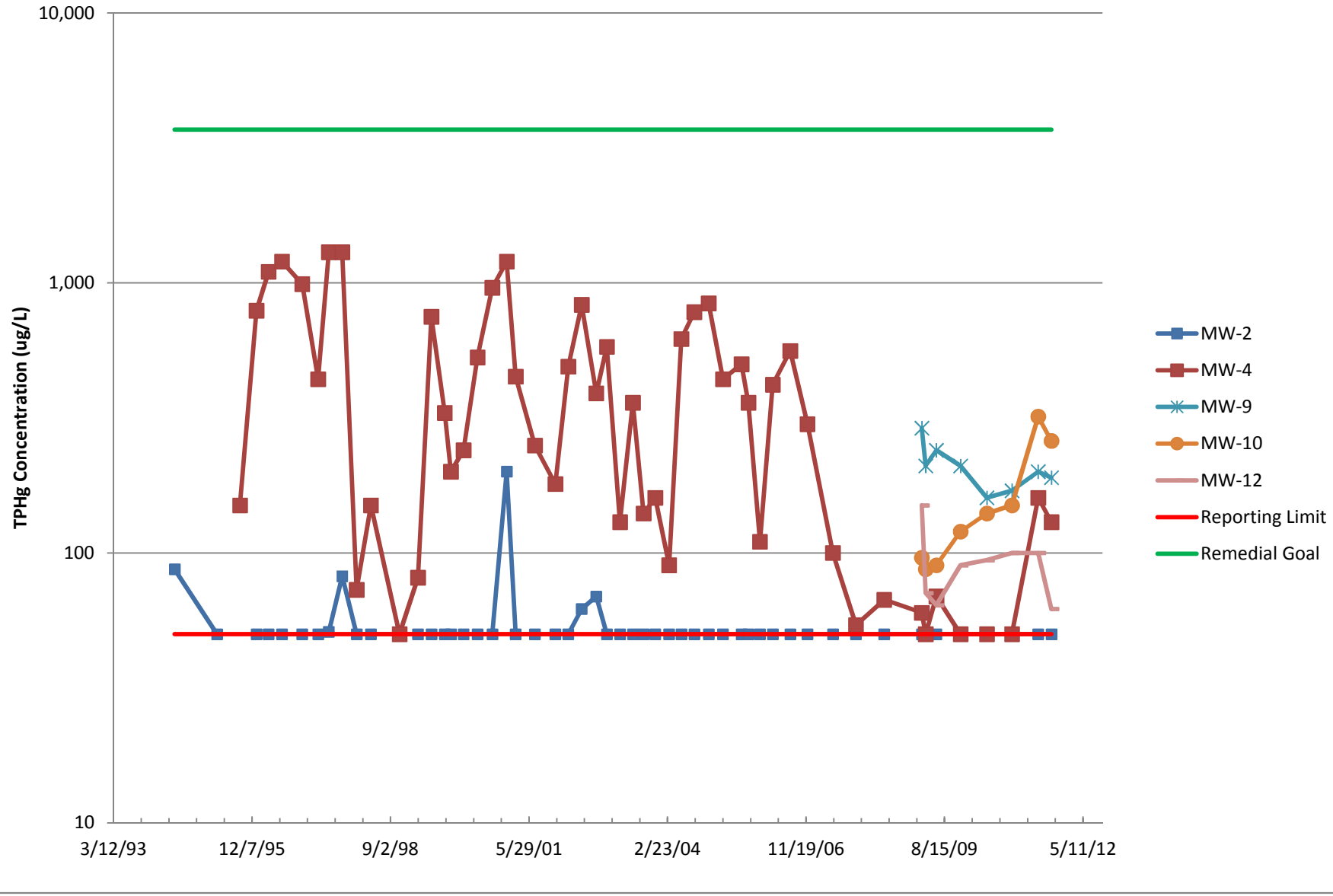


Figure 7
Benzene Concentration versus Time

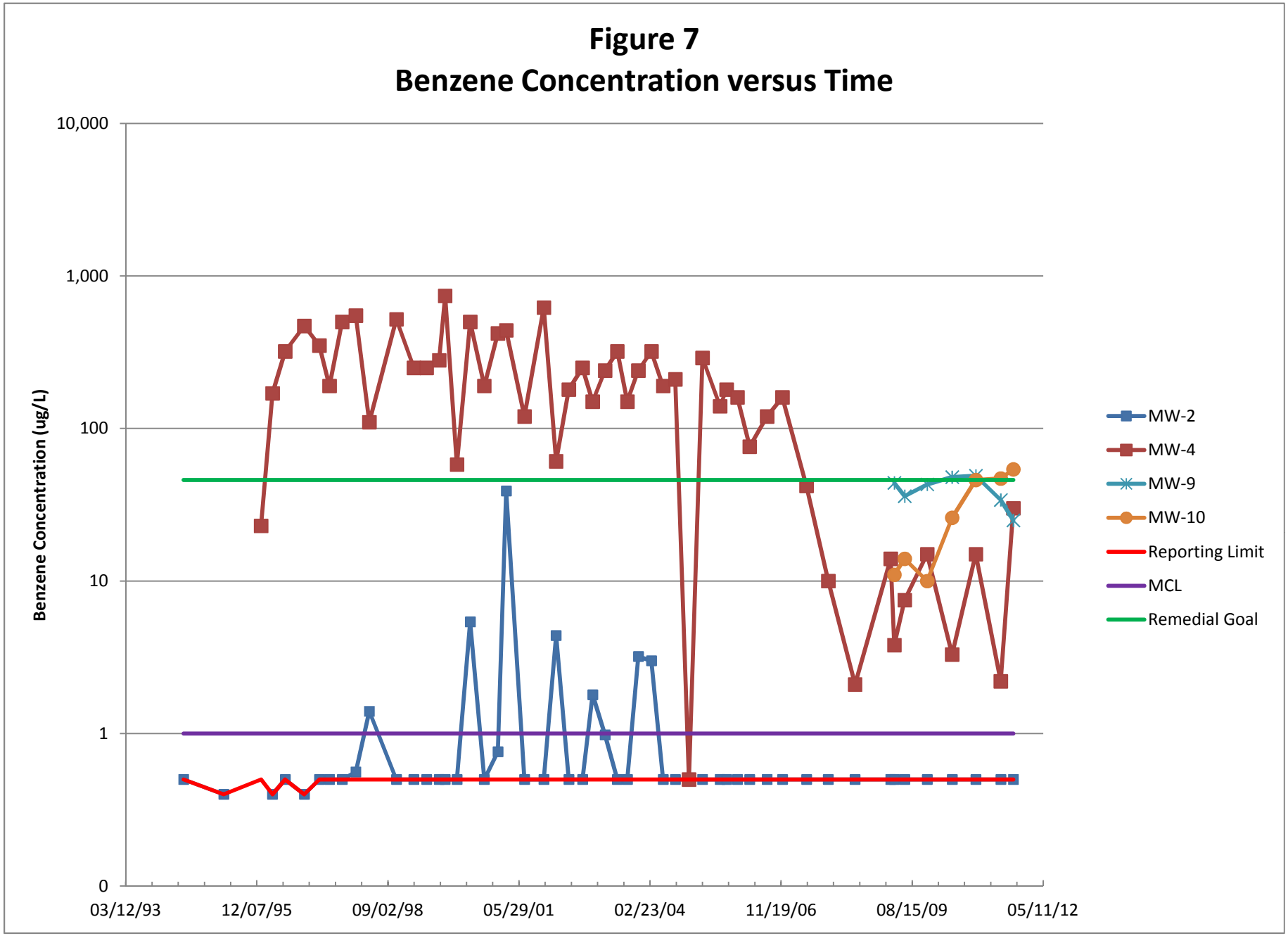


Figure 8
MTBE Concentration versus Time

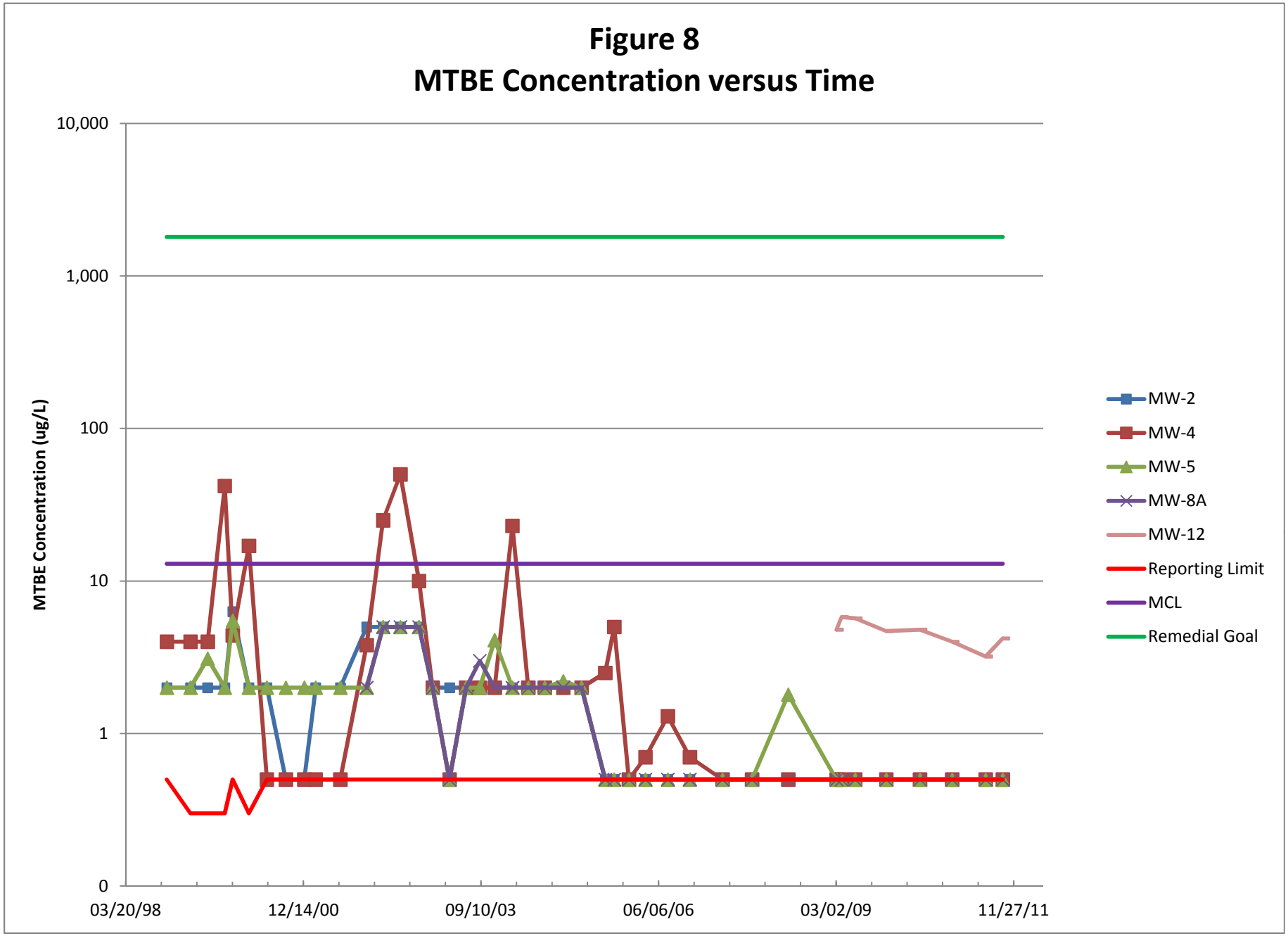
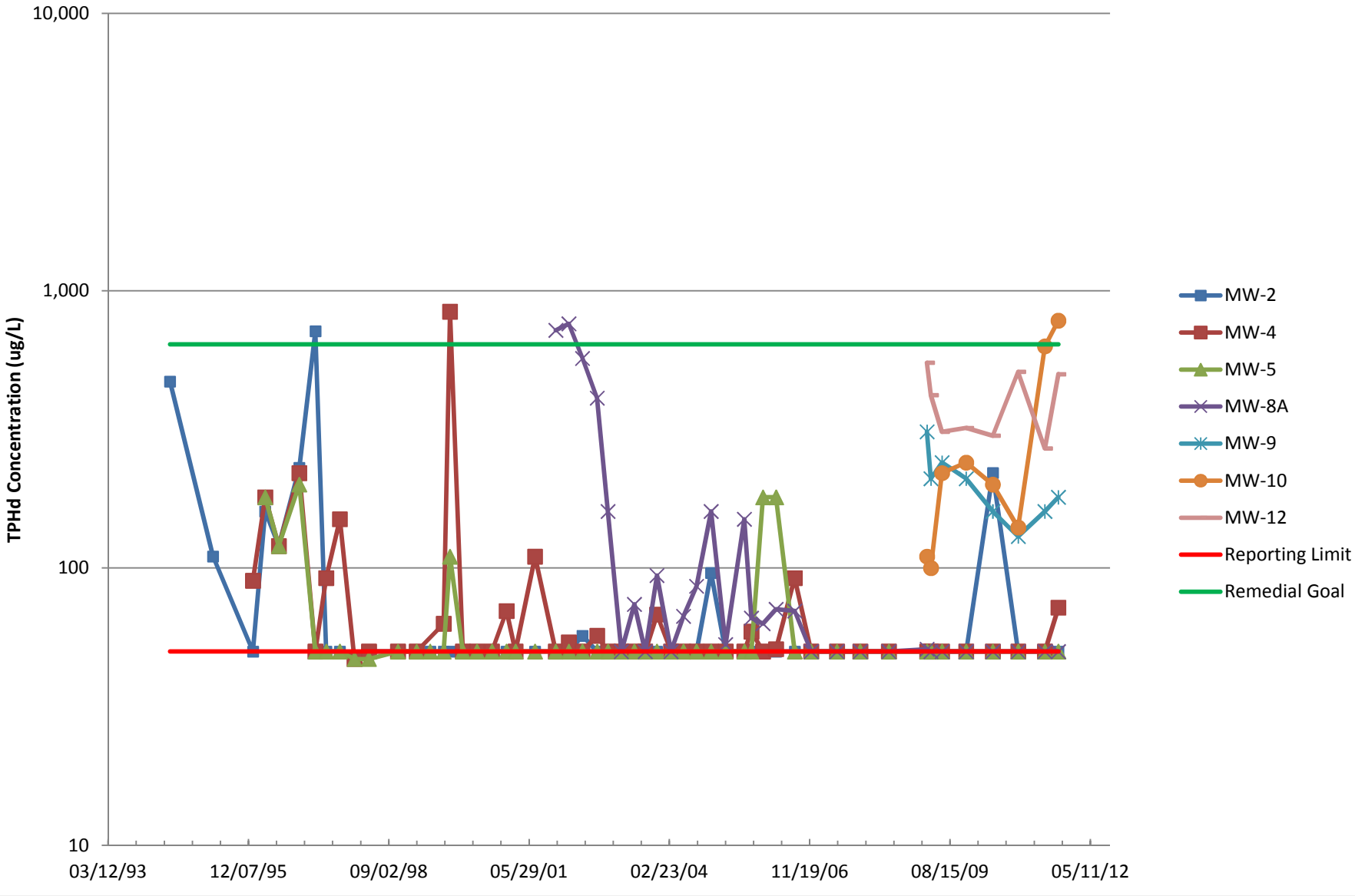


Figure 9
TPHd Concentration versus Time



Port of Oakland
530 Water Street • Oakland, CA 94607

Tables

4656016

TABLE 1. Historical Groundwater Elevation and Free Product Data
Port of Oakland's Harbor Facilities Complex Site
555 - 651 Maritime Street, Oakland, California

Monitoring Well	Date Measured	Elevation [1] Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation [1] (feet)
MW-1						
	04/18/00	13.65	NM	8.21	0.0	5.44
	05/22/00	13.65	NM	8.51	0.0	5.14
	07/10/01	13.65	8.8	10.00	1.20	3.65
	12/12/01	13.65	NM	NA	NA	NA
	03/08/02	13.65	NM	NA	NA	NA
	06/13/02	13.65	8.70	10.00	1.30	3.65
	09/26/02	13.65	8.60	9.50	0.90	4.15
	03/17/03	13.65	7.61	8.88	1.27	4.77
	06/18/03	13.65	8.20	9.44	1.24	4.21
	09/03/03	13.65	8.50	9.40	0.90	4.25
	11/26/03	13.65	8.85	9.25	0.40	4.40
	03/05/04	13.65	6.76	7.07	0.31	6.58
	06/02/04	13.65	8.26	8.71	0.45	4.94
	09/03/04	13.65	8.70	9.11	0.41	4.54
	12/16/04	13.65	7.75	7.92	0.17	5.73
	03/29/05	13.65	6.21	6.38	0.17	7.27
	06/14/05	13.65	7.41	7.61	0.20	6.04
	08/10/05	13.65	8.05	8.55	0.50	5.10
	09/29/05	13.65	8.28	8.95	0.67	4.70
	12/21/05	13.65	5.70	5.90	0.20	7.75
	03/24/06	13.65	5.98	6.27	0.29	7.38
	07/28/06	13.65	7.88	8.35	0.47	5.30
	11/29/06	NA	10.58	10.81	0.23	NA
	06/01/07	15.80	11.11	11.45	0.34	4.35
	11/14/07	15.80	10.87	10.93	0.06	4.87
	06/05/08	15.80	11.36	11.46	0.10	4.34
	12/18/08	15.80	10.82	10.89	0.07	4.91
	03/04/09	15.80	9.38	9.52	0.14	6.28
	04/01/09	15.80	10.65	10.67	0.02	5.13
	06/17/09	15.80	11.21	11.28	0.07	4.52
	12/08/09	15.80	NP	10.79	0.0	5.01
	06/17/10	15.80	10.79 [4]	10.79	0.0	5.01
	12/14/10	15.80	9.42 [4]	9.42	0.0	6.38
	06/07/11	15.80	NP	10.77	0.0	5.03
	06/21/11	15.80	NP	10.37	0.0	5.43
	09/26/11	15.80	11.23 [4]	11.23	0.0	4.57
	12/05/11	15.80	11.15 [4]	11.15	0.0	4.65
MW-2						
	12/31/97	13.87	NP	8.73	0.0	5.14
	04/13/98	13.87	NP	7.72	0.0	6.15
	11/06/98	13.87	NP	9.43	0.0	4.44
	03/19/99	13.87	NP	8.21	0.0	5.66
	06/24/99	13.87	NP	8.91	0.0	4.96
	09/28/99	13.87	NP	9.42	0.0	4.45
	11/12/99	13.87	NP	9.63	0.0	4.24
	02/11/00	13.87	NP	8.54	0.0	5.33
	05/22/00	13.87	NP	8.10	0.0	5.77
	09/06/00	13.87	NP	8.79	0.0	5.08
	12/19/00	13.87	NP	9.19	0.0	4.68
	02/21/01	13.87	NP	7.99	0.0	5.88
	04/03/01	13.87	NP	8.23	0.0	5.64
	07/10/01	13.87	NP	8.70	0.0	5.17
	12/12/01	13.87	NP	8.16	0.0	5.71
	01/22/02	13.87	NP	7.64	0.0	6.23
	03/08/02	13.87	NP	8.31	0.0	5.56
	06/13/02	13.87	NP	8.64	0.0	5.23

TABLE 1. Historical Groundwater Elevation and Free Product Data
Port of Oakland's Harbor Facilities Complex Site
555 - 651 Maritime Street, Oakland, California

Monitoring Well	Date Measured	Elevation [1] Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation [1] (feet)
MW-2 (cont)	09/26/02	13.87	NP	8.95	0.0	4.92
	12/12/02	13.87	NP	9.17	0.0	4.70
	03/17/03	13.87	NP	7.77	0.0	6.10
	06/18/03	13.87	NP	8.44	0.0	5.43
	09/03/03	13.87	NP	8.98	0.0	4.89
	11/26/03	16.72	NP	12.01	0.0	4.71
	03/05/04	16.72	NP	9.75	0.0	6.97
	06/02/04	16.72	NP	11.22	0.0	5.50
	09/03/04	16.72	NP	11.62	0.0	5.10
	12/16/04	16.72	NP	10.80	0.0	5.92
	03/29/05	16.72	NP	9.67	0.0	7.05
	06/14/05	16.72	NP	10.68	0.0	6.04
	08/10/05	16.72	NP	11.05	0.0	5.67
	09/29/05	16.72	NP	11.32	0.0	5.40
	12/21/05	16.47	NP	9.57	0.0	6.90
	03/24/06	16.47	NP	9.55	0.0	6.92
	07/28/06	16.47	NP	10.85	0.0	5.62
	11/29/06	NA	NP	11.69	0.0	NA
	06/01/07	16.43	NP	11.72	0.0	4.71
	11/14/07	16.43	NP	12.28	0.0	4.15
	06/05/08	16.43	NP	12.01	0.0	4.42
	12/18/08	16.43	NP	12.20	0.0	4.23
	03/04/09	16.43	NP	10.19	0.0	6.24
	04/01/09	16.43	NP	11.34	0.0	5.09
	06/17/09	16.43	NP	11.90	0.0	4.53
	12/09/09	16.43	NP	12.13	0.0	4.30
	06/16/10	16.43	NP	11.57	0.0	4.86
	12/14/10	16.43	NP	11.04	0.0	5.39
	06/07/11	16.43	NP	10.70	0.0	5.73
	06/21/11	16.43	NP	11.18	0.0	5.25
	09/26/11	16.43	NP	11.87	0.0	4.56
	12/05/11	16.43	NP	11.95	0.0	4.48
MW-3						
	11/06/98	13.73	8.84	9.94	1.10	NC
	03/19/99	13.73	7.52	8.05	0.53	NC
	06/24/99	13.73	8.38	8.56	0.18	NC
	11/12/99	13.73	9.14	9.23	0.09	NC
	02/11/00	13.73	7.97	8.37	0.40	NC
	03/01/00	13.73	6.59	7.24	0.65	NC
	03/21/00	13.73	6.50	6.56	0.06	NC
	05/22/00	13.73	7.51	8.05	0.54	NC
	06/26/00	13.73	7.82	8.20	0.38	NC
	07/25/00	13.73	7.90	8.92	1.02	NC
	08/31/00	13.73	8.15	9.50	1.35	NC
	09/06/00	13.73	8.21	9.42	1.21	NC
	09/21/00	13.73	8.30	8.88	0.58	NC
	12/19/00	13.73	8.60	9.65	1.05	NC
	02/22/01	13.73	6.36	8.15	1.79	NC
	04/03/01	13.73	7.48	8.88	1.40	NC
	04/23/01	13.73	7.85	9.10	1.25	NC
	05/30/01	13.73	7.75	9.10	1.35	NC
	07/10/01	13.73	8.10	9.60	1.50	NC
	03/08/02	13.73	7.80	8.00	0.20	NC

TABLE 1. Historical Groundwater Elevation and Free Product Data
Port of Oakland's Harbor Facilities Complex Site
555 - 651 Maritime Street, Oakland, California

Monitoring Well	Date Measured	Elevation [1] Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation [1] (feet)
MW-3 (cont)	04/03/02	13.73	7.60	7.70	0.10	NC
	04/23/02	13.73	7.90	8.40	0.50	NC
	04/25/02	13.73	7.90	8.80	0.90	NC
	05/10/02	13.73	8.10	8.20	0.10	NC
	05/24/02	13.73	8.05	8.10	0.05	NC
	06/13/02	13.73	8.10	8.70	0.60	NC
	07/05/02	13.73	8.10	8.95	0.85	NC
	07/19/02	13.73	8.10	8.90	0.80	NC
	07/30/02	13.73	8.10	8.90	0.80	NC
	08/14/02	13.73	8.10	8.90	0.80	NC
	09/13/02	13.73	8.30	9.30	1.00	NC
	09/26/02	13.73	8.30	9.00	0.70	NC
	10/14/02	13.73	8.60	9.50	0.90	NC
	11/04/02	13.73	8.75	9.99	1.24	NC
	11/21/02	13.73	8.59	11.29	2.70	NC
	12/06/02	13.73	8.56	9.30	0.74	NC
	12/18/02	13.73	7.35	8.43	1.08	NC
	12/30/02	13.73	6.50	7.15	0.65	NC
	01/02/03	13.73	6.20	6.20	0.00	7.53
	01/03/03	13.73	6.21	6.21	0.00	7.52
	01/14/03	13.73	6.20	6.21	0.01	7.52
	01/30/03	13.73	6.81	6.85	0.04	6.88
	02/18/02	13.73	7.09	7.15	0.06	NC
	02/26/03	13.73	7.04	7.11	0.07	NC
	03/13/03	13.73	7.22	8.11	0.89	NC
	03/17/03	13.73	7.15	7.50	0.35	NC
	04/16/03	13.73	7.27	8.25	0.98	NC
	06/18/03	13.73	7.78	9.00	1.22	NC
	09/03/03	13.73	8.31	9.96	1.65	NC
	11/26/03	15.69	10.79	12.85	2.06	NC
	03/05/04	15.69	8.39	9.85	1.46	NC
	06/02/04	15.69	10.03	11.35	1.32	NC
	09/03/04	15.69	10.46	12.06	1.60	NC
	12/16/04	15.69	9.41	10.38	0.97	NC
	03/29/05	15.69	8.17	9.01	0.84	NC
	06/14/05	15.69	9.59	10.55	0.96	NC
	08/10/05	15.69	9.91	11.15	1.24	NC
	09/29/05	15.69	10.21	11.61	1.40	NC
	12/21/05	15.69	8.21	8.28	0.07	NC
	03/24/06	15.69	8.20	8.82	0.62	NC
	07/28/06	15.69	9.81	9.83	0.02	NC
	11/29/06	NA	10.72	11.70	0.98	NA
	06/01/07	15.66	10.77	11.46	0.69	NC
	11/14/07	15.66	10.98	12.19	1.21	NC
	06/05/08	15.66	10.51	11.96	1.45	NC
	12/18/08	15.66	10.78	12.00	1.22	3.66
	03/04/09	15.66	9.31	9.93	0.62	5.73
	04/01/09	15.66	10.38	11.10	0.72	4.56
	06/17/09	15.66	10.79	12.30	1.51	3.36
	12/08/09	15.66	11.05	12.81	1.76	2.85
	06/17/10	15.66	10.39	12.29	1.90	3.37
	12/15/10	15.66	10.13	10.74	0.61	4.92

TABLE 1. Historical Groundwater Elevation and Free Product Data
Port of Oakland's Harbor Facilities Complex Site
555 - 651 Maritime Street, Oakland, California

Monitoring Well	Date Measured	Elevation [1] Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation [1] (feet)
MW-3 (cont)	06/07/11	15.66	9.91	10.95	1.04	4.71
	06/21/11	15.66	10.74	11.20	0.46	4.46
	09/26/11	15.66	10.71	12.55	1.84	3.11
	12/05/11	15.66	10.83	12.20	1.37	3.46
MW-4						
	12/31/97	12.66	NP	7.09	0.0	5.57
	04/13/98	12.66	NP	7.71	0.0	4.95
	11/06/98	12.66	NP	8.69	0.0	3.97
	03/19/99	12.66	NP	8.00	0.0	4.66
	06/24/99	12.66	NP	8.45	0.0	4.21
	09/28/99	12.66	NP	8.73	0.0	3.93
	11/12/99	12.66	NP	8.83	0.0	3.83
	02/11/00	12.66	NP	7.71	0.0	4.95
	05/22/00	12.66	NP	8.09	0.0	4.57
	09/06/00	12.66	NP	8.32	0.0	4.34
	12/19/00	12.66	NP	8.47	0.0	4.19
	02/21/01	12.66	NP	7.51	0.0	5.15
	04/03/01	12.66	NP	8.13	0.0	4.53
	07/10/01	12.66	NP	8.12	0.0	4.54
	12/12/01	12.66	NP	7.65	0.0	5.01
	01/22/02	12.66	NP	7.60	0.0	5.06
	03/08/02	12.66	NP	7.96	0.0	4.70
	06/13/02	12.66	NP	8.20	0.0	4.46
	09/26/02	12.66	NP	8.21	0.0	4.45
	12/12/02	12.66	NP	8.38	0.0	4.28
	03/17/03	12.66	NP	7.72	0.0	4.94
	06/18/03	12.66	NP	8.02	0.0	4.64
	09/03/03	12.66	NP	8.29	0.0	4.37
	11/26/03	12.66	NP	8.69	0.0	3.97
	03/05/04	12.66	NP	7.45	0.0	5.21
	06/02/04	12.66	NP	8.25	0.0	4.41
	09/03/04	12.66	NP	8.31	0.0	4.35
	12/16/04	12.66	NP	7.96	0.0	4.70
	03/29/05	12.66	NP	7.11	0.0	5.55
	06/14/05	12.66	NP	7.90	0.0	4.76
	08/10/05	12.66	NP	7.86	0.0	4.80
	09/29/05	12.66	NP	8.00	0.0	4.66
	12/21/05	12.66	NP	7.30	0.0	5.36
	03/24/06	12.66	NP	7.05	0.0	5.61
	07/28/06	12.66	NP	7.92	0.0	4.74
	11/29/06	NA	NP	11.63	0.0	NA
	06/01/07	15.91	NP	11.82	0.0	4.09
	11/14/07	15.91	NP	11.88	0.0	4.03
	06/05/08	15.91	NP	11.67	0.0	4.24
	12/18/08	15.91	NP	11.20	0.0	4.71
	03/04/09	15.91	NP	10.93	0.0	4.98
	04/01/09	15.91	NP	11.63	0.0	4.28
	06/17/09	15.91	NP	11.88	0.0	4.03
	12/08/09	15.91	NP	12.03	0.0	3.88
	06/16/10	15.91	NP	11.75	0.0	4.16
	12/14/10	15.91	NP	11.62	0.0	4.29
	06/07/11	15.91	NP	11.80	0.0	4.11

TABLE 1. Historical Groundwater Elevation and Free Product Data
Port of Oakland's Harbor Facilities Complex Site
555 - 651 Maritime Street, Oakland, California

Monitoring Well	Date Measured	Elevation [1] Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation [1] (feet)
MW-4 (cont)	06/21/11	15.91	NP	11.42	0.0	4.49
	09/26/11	15.91	NP	11.83	0.0	4.08
	12/05/11	15.91	NP	12.03	0.0	3.88
MW-5						
	12/31/97	13.00	NP	6.38	0.0	6.62
	04/13/98	13.00	NP	5.56	0.0	7.44
	11/06/98	13.00	NP	6.59	0.0	6.41
	03/19/99	13.00	NP	6.20	0.0	6.80
	06/24/99	13.00	NP	6.73	0.0	6.27
	09/28/99	13.00	NP	6.91	0.0	6.09
	11/12/99	13.00	NP	7.06	0.0	5.94
	02/11/00	13.00	NP	7.00	0.0	6.00
	05/22/00	13.00	NP	6.21	0.0	6.79
	09/06/00	13.00	NP	6.56	0.0	6.44
	12/19/00	13.00	NP	6.68	0.0	6.32
	02/21/01	13.00	NP	6.08	0.0	6.92
	04/03/01	13.00	NP	6.38	0.0	6.62
	07/10/01	13.00	NP	6.58	0.0	6.42
	12/12/01	13.00	NP	6.40	0.0	6.60
	01/22/02	13.00	NP	6.10	0.0	6.90
	03/08/02	13.00	NP	6.10	0.0	6.90
	06/13/02	13.00	NP	6.31	0.0	6.69
	09/26/02	13.00	NP	6.60	0.0	6.40
	12/12/02	13.00	NP	6.75	0.0	6.25
	03/17/03	13.00	NP	5.73	0.0	7.27
	06/18/03	13.00	NP	6.10	0.0	6.90
	09/03/03	13.00	NP	6.50	0.0	6.50
	11/26/03	13.00	NP	6.70	0.0	6.30
	03/05/04	13.00	NP	5.70	0.0	7.30
	06/02/04	13.00	NP	6.27	0.0	6.73
	09/03/04	13.00	NP	6.61	0.0	6.39
	12/16/04	13.00	NP	6.02	0.0	6.98
	03/29/05	13.00	NP	5.25	0.0	7.75
	06/14/05	13.00	NP	5.82	0.0	7.18
	08/10/05	13.00	NP	6.00	0.0	7.00
	09/29/05	13.00	NP	6.26	0.0	6.74
	12/21/05	13.00	NP	5.91	0.0	7.09
	03/24/06	13.00	NP	NA[2]	NA[2]	NA
	07/28/06	13.00	NP	6.08	0.0	6.92
	11/29/06	NA	NP	9.39	0.0	NA
	06/01/07	15.39	NP	10.60	0.0	4.79
	11/14/07	15.39	NP	9.77	0.0	5.62
	06/05/08	15.39	NP	9.74	0.0	5.65
	12/18/08	15.39	NP	9.80	0.0	5.59
	03/04/09	15.39	NP	8.78	0.0	6.61
	04/01/09	15.39	NP	9.16	0.0	6.23
	06/17/09	15.39	NP	9.51	0.0	5.88
	12/08/09	15.39	NP	9.52	0.0	5.87
	06/16/10	15.39	NP	9.31	0.0	6.08
	12/14/10	15.39	NP	9.31	0.0	6.08
	06/07/11	15.39	NP	9.06	0.0	6.33
	06/21/11	15.39	NP	9.06	0.0	6.33
	09/26/11	15.39	NP	9.30	0.0	6.09
	12/05/11	15.39	NP	9.31	0.0	6.08

TABLE 1. Historical Groundwater Elevation and Free Product Data
Port of Oakland's Harbor Facilities Complex Site
555 - 651 Maritime Street, Oakland, California

Monitoring Well	Date Measured	Elevation [1] Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation [1] (feet)
MW-6						
	06/24/99	13.51	NP	8.61	0.0	4.90
	09/28/99	13.51	NP	9.26	0.0	4.25
	11/12/99	13.51	NP	8.01	0.0	5.50
	02/11/00	13.51	NP	7.20	0.0	6.31
	05/22/00	13.51	NP	7.13	0.0	6.38
	09/06/00	13.51	NP	7.12	0.0	6.39
	12/19/00	13.51	NP	7.57	0.0	5.94
	02/21/01	13.51	NP	7.50	0.0	6.01
	04/03/01	13.51	NP	6.88	0.0	6.63
	07/10/01	13.51	NP	7.15	0.0	6.36
	12/12/01	13.51	NP	9.50	0.0	4.01
	01/22/02	13.51	NP	6.69	0.0	6.82
	03/08/02	13.51	NP	6.98	0.0	6.53
	06/13/02	13.51	NP	7.45	0.0	6.06
	09/26/02	13.51	NP	7.95	0.0	5.56
	12/12/02	13.51	NP	7.71	0.0	5.80
	12/18/02	Monitoring well was destroyed				
MW-7						
	12/31/97	13.86	NP	8.88	0.0	4.98
	04/13/98	13.86	NP	7.86	0.0	6.00
	11/06/98	13.86	NP	9.55	0.0	4.31
	03/19/99	13.86	NP	8.41	0.0	5.45
	06/24/99	13.86	NP	9.08	0.0	4.78
	09/28/99	13.86	NP	9.60	0.0	4.26
	11/12/99	13.86	NP	9.77	0.0	4.09
	02/11/00	13.86	NP	8.67	0.0	5.19
	05/22/00	13.86	NP	8.43	0.0	5.43
	09/06/00	13.86	NP	8.88	0.0	4.98
	12/19/00	13.86	NP	9.21	0.0	4.65
	02/21/01	13.86	NP	8.13	0.0	5.73
	04/03/01	13.86	NP	8.45	0.0	5.41
	07/10/01	13.86	NP	8.87	0.0	4.99
	12/12/01	13.86	NP	8.39	0.0	5.47
	01/22/02	13.86	NP	7.99	0.0	5.87
	03/08/02	13.86	NP	8.51	0.0	5.35
	06/13/02	13.86	NP	8.90	0.0	4.96
	09/26/02	13.86	NP	9.00	0.0	4.86
	12/12/02	13.86	NP	9.28	0.0	4.58
	12/18/02	Monitoring well was destroyed				
MW-8 [3]						
	12/31/97	12.45	8.49	8.82	0.33	NC
	11/06/98	12.45	9.25	10.30	1.05	NC
	11/21/98	Monitoring well was destroyed and replaced with well MW-8A				

TABLE 1. Historical Groundwater Elevation and Free Product Data
Port of Oakland's Harbor Facilities Complex Site
555 - 651 Maritime Street, Oakland, California

Monitoring Well	Date Measured	Elevation [1] Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation [1] (feet)
MW-8A						
	12/12/01	12.45	NP	7.20	0.0	NA
	01/22/02	12.45	NP	7.20	0.0	5.25
	03/08/02	12.45	NP	7.70	0.0	4.75
	06/13/02	12.45	NP	7.72	0.0	4.73
	09/26/02	12.45	NP	7.91	0.0	4.54
	12/12/02	12.45	NP	8.15	0.0	4.30
	03/17/03	12.45	NP	7.28	0.0	5.17
	06/18/03	12.45	NP	7.72	0.0	4.73
	09/03/03	12.45	NP	8.18	0.0	4.27
	11/26/03	12.45	NP	8.55	0.0	3.90
	03/05/04	12.45	NP	6.92	0.0	5.53
	06/02/04	12.45	NP	7.92	0.0	4.53
	09/03/04	12.45	NP	8.16	0.0	4.29
	12/16/04	12.45	NP	7.62	0.0	4.83
	03/29/05	12.45	NP	6.63	0.0	5.82
	06/14/05	12.45	NP	7.60	0.0	4.85
	08/10/05	12.45	NP	7.50	0.0	4.95
	09/29/05	12.45	NP	7.76	0.0	4.69
	12/21/05	12.45	NP	6.90	0.0	5.55
	03/24/06	12.45	NP	6.65	0.0	5.80
	07/28/06	12.45	NP	7.34	0.0	5.11
	11/29/06	NA	NP	11.41	0.0	NA
	06/01/07	14.99	NP	11.26	0.0	3.73
	11/14/07	14.99	NP	11.40	0.0	3.59
	06/05/08	14.99	NP	11.45	0.0	3.54
	12/18/08	14.99	NP	11.30	0.0	3.69
	03/04/09	14.99	NP	10.07	0.0	4.92
	04/01/09	14.99	NP	10.92	0.0	4.07
	06/17/09	14.99	NP	11.40	0.0	3.59
	12/08/09	14.99	NP	11.64	0.0	3.35
	06/16/10	14.99	NP	11.75	0.0	3.24
	12/14/10	14.99	NP	10.75	0.0	4.24
	06/07/11	14.99	NP	10.51	0.0	4.48
	06/21/11	14.99	NP	10.64	0.0	4.35
	09/26/11	14.99	NP	11.21	0.0	3.78
	12/05/11	14.99	NP	11.29	0.0	3.70
MW-9						
	12/18/08	16.33	NP	12.88	0.0	3.45
	03/04/09	16.33	NP	11.04	0.0	5.29
	04/01/09	16.33	NP	11.51	0.0	4.82
	06/17/09	16.33	NP	11.95	0.0	4.38
	12/08/09	16.33	NP	12.30	0.0	4.03
	06/16/10	16.33	NP	11.75	0.0	4.58
	12/14/10	16.33	NP	11.51	0.0	4.82
	06/07/11	16.33	NP	11.32	0.0	5.01
	06/21/11	16.33	NP	11.37	0.0	4.96
	09/26/11	16.33	NP	11.92	0.0	4.41
	12/05/11	16.33	NP	11.99	0.0	4.34

TABLE 1. Historical Groundwater Elevation and Free Product Data
Port of Oakland's Harbor Facilities Complex Site
555 - 651 Maritime Street, Oakland, California

Monitoring Well	Date Measured	Elevation [1] Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation [1] (feet)
MW-10						
	12/18/08	15.65	NP	14.34	0.0	1.31
	03/04/09	15.65	NP	9.78	0.0	5.87
	04/01/09	15.65	NP	10.33	0.0	5.32
	06/17/09	15.65	NP	10.79	0.0	4.86
	12/08/09	15.65	NP	10.96	0.0	4.69
	06/16/10	15.65	NP	10.62	0.0	5.03
	12/14/10	15.65	NP	10.31	0.0	5.34
	06/07/11	15.65	NP	10.11	0.0	5.54
	06/21/11	15.65	NP	10.19	0.0	5.46
	09/26/11	15.65	NP	10.79	0.0	4.86
	12/05/11	15.65	NP	10.80	0.0	4.85
MW-11						
	12/18/08	15.47	NP	13.42	0.0	2.05
	03/04/09	15.47	NP	9.57	0.0	5.90
	04/01/09	15.47	NP	9.94	0.0	5.53
	06/17/09	15.47	NP	10.40	0.0	5.07
	12/09/09	15.47	NP	10.68	0.0	4.79
	06/16/10	15.47	NP	10.02	0.0	5.45
	12/01/10	15.47	NP	10.02	0.0	5.45
	06/07/11	15.47	NP	10.00	0.0	5.47
	06/21/11	15.47	NP	9.85	0.0	5.62
	09/26/11	15.47	NP	10.33	0.0	5.14
	12/05/11	15.47	NP	10.59	0.0	4.88
MW-12						
	12/18/08	16.79	NP	12.75	0.0	4.04
	03/04/09	16.79	NP	10.60	0.0	6.19
	04/01/09	16.79	NP	11.23	0.0	5.56
	6/17/2009	16.79	NP	11.83	0.0	4.96
	12/8/2009	16.79	NP	12.13	0.0	4.66
	6/16/2010	16.79	NP	11.31	0.0	5.48
	12/14/2010	16.79	NP	11.15	0.0	5.64
	6/7/2011	16.79	NP	10.81	0.0	5.98
	6/21/2011	16.79	NP	11.01	0.0	5.78
	9/26/2011	16.79	NP	11.77	0.0	5.02
	12/5/2011	16.79	NP	11.89	0.0	4.90

Notes:
Source of data prior to December 2005: Innovative Technical Solutions, Inc. *Third Quarter of 2005 Groundwter Monitoring and Product Monitoring Report* , 8 November 2005.
NP = no product detected with the interface probe
NC = not calculated due to the presence of free-phase product in the well
btc = below top of the well casing
NA = not available
NM = not measured
-- = no measurable product.

[1] Wells were resurveyed on January 24, 2009. Elevation data is relative to North American Vertical Datum of 1988 (NAVD 88).
[2] Well could not be measured due to abundant surface water covering well head.
[3] Viscous product not related to the lighter product identified in other wells.
[4] Product not measureable, but visible evidence of product on interface probe

TABLE 2. Groundwater Analytical Results Summary
Port of Oakland's Harbor Facilities Complex Site
555 - 651 Maritime Street, Oakland, California

Monitoring Well	Date Sampled	Concentration (µg/L)							
		TPH-G	TPH-D	TPH-MO	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE
MW-1									
	05/22/00	3,600	41,000	<3,000	100	13 [8]	2.9	2.05	3.2 [8]
	12/08/09	1,400	1,200 [2]	<300	120	2.9	1.8	3.0	<1.0
	06/22/11	1,100 [2]	890 [24]	<300 [24]	46	1.9	2.6	2.0	<0.5
MW-2									
	05/27/94	87	470	NA	<0.5	<0.5	<0.5	<0.5	NA
	03/29/95	<50	110	1,400	<0.4	<0.3	<0.3	<0.4	NA
	09/06/95	<50	NA	NA	<0.4	<0.3	<0.3	<0.4	NA
	01/08/96	<50	<50	1200	<0.4	<0.3	<0.3	<0.4	NA
	04/04/96	<50	160	320	<0.5	<0.5	<0.5	<1.0	NA
	07/10/96	<50	120	1400	<0.4	<0.3	<0.3	<0.4	NA
	12/03/96	<50	230 [1,2]	<250	<0.5	<0.5	<0.5	<1.0	NA
	03/28/97	<50	714	<250	<0.5	<0.5	<0.5	<1.0	NA
	06/13/97	51	<50	<250	<0.5	<0.5	<0.5	<1.0	NA
	09/18/97	82	<50	<250	0.56	<0.5	<0.5	<1.0	NA
	12/31/97	<50	<47	<280	1.4	<0.5	<0.5	<1.0	NA
	04/13/98	<50	<50	<300	<0.5	<0.5	<0.5	<1.0	NA
	11/06/98	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	03/19/99	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	06/24/99	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	09/28/99	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	11/12/99	<50	120 [2,6]	<300	<0.5	<0.5	<0.5	<0.5	6.3 [8,9]
	02/11/00	<50	<50	<300	5.4	<0.5	<0.5	<0.5	<2
	05/22/00	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2
	09/06/00	<50	<50	<300	0.76 [8]	<0.5	<0.5	<0.5	<0.5 [10]
	12/19/00	200 [3,11]	<50	<300	39	1.8	<0.5	2.6	<0.5 [10,12]
	02/21/01	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	07/10/01	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	12/05/01	<50	<50	<300	4.4	<0.5	<0.5	<0.5	5.0 [14]
	03/08/02	<50	<50	<500	<0.5	<0.5	<0.5	<0.5	<5.0
	06/13/02	62 [15]	<57	<570	<0.5	<0.5	<0.5	<0.5	<5.0
	09/26/02	69 [2]	<50	<500	1.8	<0.5	<0.5	<0.5	<5.0
	12/12/02	<50	<50	<300	0.98	<0.5	<0.5	<0.5	<2.0
	03/17/03	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	06/18/03	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	09/03/03	<50	<50	<300	3.2	<0.5	<0.5	<0.5	<2.0
	11/26/03	<50	<50	<300	3	<0.5	<0.5	<0.5	<2.0
	03/05/04	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	06/02/04	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	09/03/04	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	12/16/04	<50	96 [6, 15]	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	03/29/05	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0

TABLE 2. Groundwater Analytical Results Summary
Port of Oakland's Harbor Facilities Complex Site
555 - 651 Maritime Street, Oakland, California

Monitoring Well	Date Sampled	Concentration (µg/L)							
		TPH-G	TPH-D	TPH-MO	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE
MW-2 (cont)	08/10/05	<50	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5
	09/29/05	<50	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5
	12/21/05	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	03/24/06	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	07/28/06	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	11/29/06	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/01/07	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	11/14/07	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/05/08	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	12/18/08	390 [2]	840	<300	1.1	<0.5	0.9	<0.5	<0.5
	03/04/09	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	04/01/09	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/17/09	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	12/09/09	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/17/10	<50	220 [2]	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	12/15/10	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/22/11	<50	<50	<300 [2,3]	<0.5	<0.5	<0.5	<0.5	<0.5
	09/26/11	<50	<50 [24]	<300 [24]	<0.5	<0.5	<0.5	<0.5	<0.5
MW-3									
	Not sampled due to the presence of free-phase product								
MW-4									
	09/11/95	150	<200	500	23	<0.3	<0.3	<0.4	NA
	01/08/96	790	90	400	170	1.2	0.6	0.6	NA
	04/04/96	1,100	180	300	320	1.6	1.1	1.2	NA
	07/10/96	1,200	120	300	470	1.5	0.8	0.8	NA
	12/03/96	990	220 [1,2]	<250	350	3.3	1.3	1.3	NA
	03/28/97	440 [2]	<50	<250	190	1.2	0.64	<1.0	NA
	06/13/97	1,300	92 [5]	<250	500	5.5	3.4	2.8	NA
	09/18/97	1,300	150	<250	550	4.9	2.1	2.00	NA
	12/31/97	73 [1,2,3]	<47	<280	110 [1]	1.0 [1]	<0.5	<1.0	NA
	04/13/98	150 [2,3]	<50	<300	520	2.9	<2.5	<5.0	NA
	11/06/98	<50	<50	<300	250	1.7	<1.0	<1.0	<4
	03/19/99	81	<50	<300	250	<1	1.2	<1.0	<4
Dup.	06/24/99	190	<50	<300	360	1.4	2.2	1.0	24
	09/28/99	750 [3,5]	63 [3,5]	<300	280	1.5	<1.0	<1.0	<4
	11/12/99	330 [3]	840 [2]	<300	740	<2.5	<2.5	<2.5	42 [9]
	02/11/00	200 [2]	<50	<300	58	0.73	<0.5	<0.5	4.4 [8]
	05/22/00	240	<50	<300	500	<2.5	<2.5	<2.5	17
	09/06/00	530 [2,3]	<50	<300	190	0.93	0.6	0.57	<0.5 [10]
	12/19/00	960 [3,11]	70 [5]	<300	420	<2.5	<2.5	<2.5	<0.5 [10,12]
	12/19/00	1,200 [3,11]	<50	<300	440	<2.5	<2.5	<2.5	<0.5 [10,12]
	02/21/01	450 [13]	<50	<300	120	<0.5	<0.5	<0.5	<0.5 [10]

TABLE 2. Groundwater Analytical Results Summary
Port of Oakland's Harbor Facilities Complex Site
555 - 651 Maritime Street, Oakland, California

Monitoring Well	Date Sampled	Concentration (µg/L)							
		TPH-G	TPH-D	TPH-MO	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE
MW-4 (cont.)	07/10/01	<250	110 [2,13]	<300	620	2.6	2.9	<2.5	<0.5 [8,10]
	12/05/01	180	<50	<300	61	<0.5	<0.5	<0.5	3.8 [14]
	03/08/02	490 [2]	54 [2]	<500	180	<2.5	<2.5	<2.5	<25
	06/13/02	830 [2]	<50	<500	250	<5.0	<5.0	<5.0	<50
Dup.	06/13/02	820 [2]	<56	<560	240	<5.0	<5.0	<5.0	<50
	09/26/02	390 [2]	57	<500	150	2.1	<1.0	<1.0	<10
Dup.	09/26/02	500 [2]	<50 [16]	<500 [16]	200	1.5	<1.0	<1.0	<10
	12/12/02	580	<50	<300	240	1.4	0.56	<0.5	<2.0
Dup.	12/12/02	2,400	<50	<300	680	5.0	2.3	1.4	<2.0
	03/17/03	130 [15]	<50	<300	320 [17]	<0.5	<0.5	<0.5	<0.5 [10]
Dup.	03/17/03	82 [15]	<50	<300	190	0.64 [17]	0.56	0.53	<0.5 [10]
	06/18/03	360 [11, 15]	<50	<300	150	<0.5	<0.5	<0.5	<2.0
Dup.	06/18/03	330 [11, 15]	<50	<300	140	<0.5	<0.5	<0.5	<2.0
	09/03/03	140 [11, 15]	<50	<300	240	1.3	<0.5	<0.5	<2.0
Dup.	09/03/03	83 [11, 15]	<50	<300	130	0.58 [17]	<0.5	<0.5	<2.0
	11/26/03	160 [15]	68 [15]	<300	320	0.91 [17]	<0.5	0.53	<2.0
Dup.	11/26/03	120 [15]	<50	<300	210	0.66 [17]	<0.5	<0.5	<2.0
	03/05/04	90 [11]	<50	<300	190	1.1	0.55	0.50 [17]	23 [14,17], <0.5 [10]
Dup.	03/05/04	84 [11]	<50	<300	180	0.81	<0.5	<0.5	21 [14,17], <0.5 [10]
	06/02/04	620 [13]	<50	<300	210	0.55 [17]	<0.5	<0.5	<2.0
Dup.	06/02/04	400 [13]	<50	<300	130	<0.5	<0.5	<0.5	<2.0
	09/03/04	780 [13, 15]	<50	<300	<0.5	1.0 [17]	<0.5	0.57	<2.0
Dup.	09/03/04	370 [13, 15]	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	12/16/04	840	<50	<300	290	1.3 [17]	0.69	0.75	<2.0
Dup.	12/16/04	670	<50	<300	230	1.3 [17]	<0.5	<0.5	<2.0
	03/29/05	440 [13]	<50	<300	140	0.57	<0.5	<0.5	<2.0
Dup.	03/29/05	540 [13]	<50	<300	170	0.72	<0.5	<0.5	<2.0
	08/10/05	500 [18]	<50	<250	180	<2.5	<2.5	<2.5	<2.5
	09/29/05	360 [18]	59 [20]	<250	160	<5.0	<5.0	<5.0	<5.0
Dup.	09/29/05	420 [18]	<50	<250	150	<5.0	<5.0	<5.0	<5.0
	12/21/05	110	<50	<300	76	<0.5	<0.5	<0.5	<0.5
Dup.	12/21/05	160	<50	<300	76	<0.5	<0.5	<0.5	<0.5
	03/24/06	420	51	<300	120	0.8	<0.7	<0.7	<0.7
Dup.	03/24/06	440	<50	<300	130	<0.7	<0.7	<0.7	<0.7
	08/04/06	560	92 [2]	<300	160	<1.3	4.3	<1.3	<1.3
Dup.	08/04/06	590	100 [2]	<300	150	<1.3	4.5	<1.3	<1.3
	11/29/06	300	<50	<300	42	<0.7	1.0	<0.7	<0.7
Dup.	11/29/06	300	<50	<300	60	<0.7	<0.7	<0.7	<0.7
	06/01/07	100 [13, 15]	<50	<300	10	<0.5	<0.5	<0.5	<0.5
Dup.	06/01/07	100 [13, 15]	<50	<300	11	<0.5	<0.5	<0.5	<0.5
	11/14/07	54 [15]	<50	<300	2.1	<0.5	<0.5	<0.5	<0.5
Dup.	11/14/07	51 [15]	<50	<300	2.1	<0.5	<0.5	<0.5	<0.5

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Monitoring Well	Date Sampled	Concentration (µg/L)							
		TPH-G	TPH-D	TPH-MO	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE
MW-4 (cont)	06/05/08	67 [15]	<50	<300	14	<0.5	<0.5	<0.5	<0.5
Dup.	06/05/08	91 [15]	<50	<300	15	<0.5	<0.5	<0.5	<0.5
	12/18/08	99 [2]	520	<300	0.5	<0.5	<0.5	<0.5	<0.5
Dup.	12/18/08	88 [2]	850	<300	0.7	<0.5	0.6	<0.5	<0.5
	03/04/09	60 [2]	<50	<300	3.8	<0.5	<0.5	<0.5	<0.5
Dup.	03/04/09	<50	<50	<300	4.4	<0.5	<0.5	<0.5	<0.5
	04/01/09	<50	<50	<300	7.5	<0.5	<0.5	<0.5	<0.5
Dup.	04/01/09	<50	<50	<300	7.8	<0.5	<0.5	<0.5	<0.5
	06/19/09	69 [2]	<50	<300	15	<0.5	<0.5	<0.5	<0.5
	12/08/09	<50	<50	<300	3.3	<0.5	<0.5	<0.5	<0.5
Dup.	12/08/09	<50	<50	<300	3.5	<0.5	<0.5	<0.5	<0.5
	06/16/10	<50	<50	<300	15	<0.5	<0.5	<0.5	<0.5
Dup.	06/16/10	<50	<50	<300	18	<0.5	<0.5	<0.5	<0.5
	12/14/10	<50	<50	<300	2.2	<0.5	<0.5	<0.5	<0.5
Dup.	12/14/10	<50	<50	<300	2.7	<0.5	<0.5	<0.5	<0.5
	06/21/11	160 [2]	<56	<330	30	<0.5	<0.5	<0.5	<0.5
Dup.	06/21/11	84 [2]	<53	<320	28	<0.5	<0.5	<0.5	<0.5
	09/27/11	130 [2]	72	<300	13	<0.5	<0.5	<0.5	<0.5
Dup.	09/27/11	130 [2]	57 [24]	<300 [24]	12	<0.5	<0.5	<0.5	<0.5
MW-5									
	09/11/95	90	<300	2,500	3.3	<0.3	<0.3	<0.4	NA
	04/04/96	<50	180	520	<0.5	<0.5	<0.5	<1.0	NA
	07/10/96	<50	120	1,500	<0.4	<0.3	<0.3	<0.4	NA
	12/03/96	<50	200 [1,2]	<250	<0.5	<0.5	<0.5	<1.0	NA
	03/28/97	<50	<50	<250	<0.5	<0.5	<0.5	<1.0	NA
	06/13/97	<50	<50	<250	<0.5	<0.5	<0.5	<1.0	NA
	09/18/97	<50	<50	<250	<0.5	<0.5	<0.5	<1.0	NA
	12/31/97	<50	<47	<280	<0.5	<0.5	<0.5	<1.0	NA
	04/13/98	<50	<47	<280	<0.5	<0.5	<0.5	<1.0	NA
	11/06/98	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	03/19/99	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	06/24/99	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	3.1
	09/28/99	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	11/12/99	<50	110 [2,6]	<300	<0.5	<0.5	<0.5	<0.5	5.5 [9]
	02/11/00	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	05/22/00	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	09/06/00	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	12/19/00	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	02/21/01	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	07/10/01	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	12/05/01	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	03/08/02	<50	<50	<500	<0.5	<0.5	<0.5	<0.5	<5.0

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		TPH-G	TPH-D	TPH-MO	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE
MW-5 (cont)	06/13/02	<50	<50	<500	<0.5	<0.5	<0.5	<0.5	<5.0
	09/26/02	<50	<50	<500	<0.5	<0.5	<0.5	<0.5	<5.0
	12/12/02	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	03/17/03	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5 [10]
	06/18/03	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	09/03/03	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	11/26/03	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	4.1 [14], <0.5 [10]
	03/05/04	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	06/02/04	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	09/03/04	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	12/16/04	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	2.2 [14], <0.5 [10]
	03/29/05	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	08/10/05	<50	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5
Dup.	08/10/05	<50 [19]	<50 [19]	<250	<0.5	<0.5	<0.5	<0.5	<0.5
	09/29/05	<50	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5
	12/21/05	<50	180 [15,22]	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	07/28/06	<50	180	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	11/29/06	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/01/07	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	11/14/07	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/05/08	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	12/18/08	3,100 [2]	3,600	<300	0.5	<0.5	<0.5	<0.5	1.8
	03/04/09	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	04/01/09	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	04/01/09	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/19/09	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	12/08/09	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/16/10	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	12/14/10	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/22/11	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	09/27/11	<50	<50 [24]	<300 [24]	<0.5	<0.5	<0.5	<0.5	<0.5

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Monitoring Well	Date Sampled	Concentration (µg/L)							
		TPH-G	TPH-D	TPH-MO	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE
MW-6									
	11/06/98	120	12,000	1,200	19	0.65	1.8	<0.5	<2
	03/19/99	170	3,800	580	21	0.86	1.5	2.9	<2
	06/24/99	120	1,700 [7]	<300 [7]	18	<0.5	1.0	<0.5	54
	09/28/99	130 [3,5]	820	<300	20	0.51	2.2	<0.5	<2
	11/12/99	150	11,000 [2,6]	3,000 [3,6]	27	<0.5	2.2	<0.5	13 [9]
	02/11/00	270 [2]	2,300	<300	23	0.51	2.7	<0.5	5.8
	05/22/00	350	3,000	<300	18	0.51	<0.5	<0.5	7.7
	09/06/00	190	610	<300	26	<0.5	1.7	<0.5	<0.5 [10]
	12/19/00	130 [3,11]	620	<300	24	<0.5	1.6	<0.5	<2
	02/21/01	120 [13]	440	<300	21	<0.5	0.96	<0.5	<2
	07/10/01	120	560	<300	29	<0.5	0.99	<0.5	<2
	12/12/01	53	550	<300	27	<0.5	1.3	<0.5	<2.0
	03/08/02	160 [2]	640 [2]	<500	30	<0.5	<0.5	<0.5	5.0 [14]
	06/13/02	160 [2]	670 [2]	<500	34	<0.5	<0.5	<0.5	<5.0
	09/26/02	230 [2]	1400 [2]	<500	40	0.64	0.8	<0.5	<5.0
	12/12/02	53	110	<300	43	<0.5	<0.5	<0.5	<2.0
	12/18/02	Monitoring well was destroyed							
MW-7									
	09/06/95	<50	<300	800	<0.4	<0.3	<0.3	<0.4	NA
	01/08/96	<50	410	110	<0.4	<0.3	<0.3	<0.4	NA
	04/04/96	<50	530	340	<0.5	<0.5	<0.5	<1.0	NA
	07/10/96	80	840	1,700	<0.4	<0.3	<0.3	<0.4	NA
	12/03/96	<50	280 [1,2]	<250	<0.5	<0.5	<0.5	<1.0	NA
	03/28/97	65 [6]	94 [2]	<250	<0.5	<0.5	<0.5	<1.0	NA
	06/13/97	<50	100	<250	<0.5	<0.5	<0.5	<1.0	NA
	09/18/97	<50	240	<250	<0.5	<0.5	<0.5	<1.0	NA
	12/31/97	<50	53 [2,3]	<280	<0.5	<0.5	<0.5	<1.0	NA
	04/13/98	<50	<48	<290	<0.5	<0.5	<0.5	<1.0	NA
	11/06/98	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2
	03/19/99	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	5.3
	06/24/99	73	<50	<300	<0.5	<0.5	<0.5	<0.5	12
	09/28/99	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	14
	11/12/99	<50	600 [2,6]	420 [3]	<0.5	<0.5	<0.5	<0.5	15 [9]
	02/11/00	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	51
	05/22/00	110	53 [2]	<300	<0.5	<0.5	<0.5	<0.5	75
	09/06/00	50 [6]	<50	<300	<0.5	<0.5	<0.5	<0.5	40 [10]
	12/19/00	54 [11]	51 [5]	<300	<0.5	<0.5	<0.5	<0.5	47 [10,12]
	02/21/01	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	66 [10]
Dup.	02/21/01	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	60 [10]
	07/10/01	<50	51 [2]	<300	<0.5	<0.5	<0.5	<0.5	76 [10]
Dup.	07/10/01	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	75 [10]

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		TPH-G	TPH-D	TPH-MO	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE
MW-7 (cont)	12/12/01	51	<50	<300	<0.5	<0.5	<0.5	<0.5	98 [14]
Dup.	12/12/01	64	52 [13, 15]	<300	<0.5	<0.5	<0.5	<0.5	96 [14]
	03/08/02	52 [2]	<50	<500	<0.5	<0.5	<0.5	<0.5	24 [14]
	06/13/02	87 [2]	54 [2]	<500	<0.5	<0.5	<0.5	<0.5	51
	09/26/02	83 [2]	84 [2]	<500	<0.5	<0.5	<0.5	<0.5	75 [10]
	12/12/02	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	58 [14]
	12/18/02	Monitoring well was destroyed							
MW-8									
	Not sampled due to the presence of free-phase product								
MW-8A									
	12/12/01	68	720 [11,15]	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	03/08/02	<50	760 [2]	<570	<0.5	<0.5	<0.5	<0.5	<5.0
Dup.	03/08/02	<50	350 [2]	<580	<0.5	<0.5	<0.5	<0.5	<5.0
	06/13/02	<50	570 [2]	<570	<0.5	<0.5	<0.5	<0.5	<5.0
	09/26/02	<50	410 [2]	<500	<0.5	<0.5	<0.5	<0.5	<5.0
	12/12/02	<50	160 [15]	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	03/17/03	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5 [10]
	06/18/03	<50	74 [15]	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	09/03/03	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	3.0 [14]/<0.5 [10]
	11/26/03	<50	94 [15]	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	03/05/04	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	06/02/04	<50	67 [15]	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	09/03/04	<50	86 [15]	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	12/16/04	<50	160 [6, 15]	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	03/29/05	<50	53	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	08/10/05	<50 [19]	150 [15, 19]	<250	<0.5	<0.5	<0.5	<0.5	<0.5
	09/29/05	<50	66 [21]	<250	<0.5	<0.5	<0.5	<0.5	<0.5
	12/21/05	<50	63 [15,22]	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	03/24/06	<50	71	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	07/28/06	<50	70 [15]	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	11/29/06	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/01/07	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	11/14/07	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/05/08	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	12/18/08	350 [2]	7,800	2,200 [2]	<0.5	<0.5	<0.5	<0.5	1.3
	03/04/09	<50	51 [2]	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	04/01/09	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/17/09	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	12/08/09	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/16/10	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5

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		TPH-G	TPH-D	TPH-MO	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE
MW-8A (cont)	12/14/10	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/23/11	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	09/26/11	<50	<50 [24]	<300 [24]	<0.5	<0.5	<0.5	<0.5	<0.5
MW-9									
	12/18/08	52 [2]	72	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	03/04/09	290 [2]	310 [2]	<300	44	<0.5	0.6	0.6	<0.5
	04/01/09	210 [2]	210 [2]	<300	36	<0.5	<0.5	<0.5	<0.5
	06/19/09	240 [2]	240 [2]	<300	43	<0.5	<0.5	<0.5	<0.5
	12/08/09	210 [2]	210 [2]	<300	48	<0.5	<0.5	<0.5	<0.5
	06/16/10	160 [2]	160 [2]	<300	49	<0.5	1.0	0.6	<0.5
	12/14/10	170 [2]	130 [2]	<300	34	<0.5	<0.5	0.6	<0.5
	06/22/11	200 [2]	160 [2]	<300	25	<0.5	<0.5	<0.5	<0.5
	09/27/11	190 [2]	180 [24]	<300 [24]	21	<0.5	<0.5	<0.5	<0.5
MW-10									
	12/18/08	140 [2]	8,000	430 [2]	<0.5	<0.5	<0.5	<0.5	1.0
	03/04/09	96 [2]	110 [2]	<300	11	<0.5	0.5	<0.5	<0.5
	04/01/09	87 [2]	100 [2]	<300	14	<0.5	0.5	<0.5	<0.5
	06/17/09	90 [2]	220 [2]	<300	10	<0.5	1.0	<0.5	<0.5
	12/08/09	120 [2]	240 [2]	<300	26	<0.5	0.8	<0.5	<0.5
	06/16/10	140 [2]	200	<300	46	<0.5	<0.5	<0.5	<0.5
	12/14/10	150 [2]	140 [2]	<300	47	<0.5	<0.5	<0.5	<0.5
	06/22/11	320 [2]	630	<300	54	<0.5	2.2	<0.5	<0.5
	09/26/11	260 [2]	780 [24]	<300 [24]	61	0.6	2.4	<0.5	<0.5
MW-11									
	12/18/08	1,900 [2]	15,000	800 [2]	<0.5	<0.5	<0.5	<0.5	5.0
	03/04/09	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	04/01/09	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/19/09	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	12/09/09	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/16/10	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	12/14/10	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/21/11	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	09/26/11	<50	<50 [24]	<300 [24]	<0.5	<0.5	<0.5	<0.5	<0.5
MW-12									
	12/18/08	25,000 [2]	19,000	980 [2]	<0.5	<0.5	<0.5	<0.5	5.1
	03/04/09	150 [2]	550 [2]	<300	<0.5	<0.5	<0.5	<0.5	4.8

TABLE 2. Groundwater Analytical Results Summary
Port of Oakland's Harbor Facilities Complex Site
555 - 651 Maritime Street, Oakland, California

Monitoring Well	Date Sampled	Concentration (µg/L)							
		TPH-G	TPH-D	TPH-MO	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE
MW-12 (cont)	04/01/09	71 [2]	420 [2]	<300	<0.5	<0.5	<0.5	<0.5	5.8
	06/17/09	64 [2]	310 [2]	<300	<0.5	<0.5	<0.5	<0.5	5.7
Dup.	06/17/09	67 [2]	310 [2]	<300	<0.5	<0.5	<0.5	<0.5	5.4
	12/08/09	90 [2]	320 [2]	<300	<0.5	<0.5	<0.5	<0.5	4.7
	06/16/10	94 [2]	300	<300	<0.5	<0.5	<0.5	<0.5	4.8
	12/14/10	100 [2]	510	<300	<0.5	<0.5	<0.5	<0.5	4.0
	06/23/11	100 [2]	270 [2]	<300	<0.5	<0.5	<0.5	<0.5	3.2
	09/26/11	62 [2]	500 [24]	<300 [24]	<0.5	<0.5	<0.5	<0.5	4.2

Notes:

Data prior to December 2005 from *3rd Quarterly Groundwater Monitoring, and Product Recovery Report* dated 8 November 2005, by Innovative Technical Solutions, Inc.

µg/L = micrograms per liter

Dup. = duplicate sample

NA = not analyzed

TPHg = total petroleum hydrocarbons in gasoline range.

TPHd = total petroleum hydrocarbons in diesel range.

TPHmo = total petroleum hydrocarbons in motor oil range.

MTBE = methyl tert-butyl ether

[1] Analyte found in the associated blank as well as in the sample.

[2] Hydrocarbons present do not match profile of laboratory standard.

[3] Low boiling point/lighter hydrocarbons are present in the sample.

[4] Chromatographic pattern matches known laboratory contaminant.

[5] Hydrocarbons are present in the requested fuel quantification range, but do not resemble pattern of available fuel standard.

[6] High boiling point/heavier hydrocarbons are present in sample.

[7] Sample did not pass laboratory QA/QC and may be biased low.

[8] Presence of this compound confirmed by second column, however, the confirmation concentration differed from the reported result by more than a factor of two.

[9] Trip blank contained MTBE at a concentration of 4.2 µg/L.

[10] MTBE detections confirmed by EPA Test Method 8260; 8260 results displayed.

[11] Sample exhibits unknown single peak or peaks.

[12] EPA Method 8260 confirmation analyzed past holding time.

[13] Lighter hydrocarbons contributed to the quantitation.

[14] MTBE results from EPA Test Method 8021B.

[15] Sample exhibits fuel pattern that does not resemble standard.

[16] Sample extracted out of hold time.

[17] Presence confirmed, but Relative Percent Difference (RPD) between columns exceeds 40%.

[18] Unmodified or weakly modified gasoline is significant.

[19] Liquid sample contains greater than ~1 vol. % sediment.

[20] Gasoline compounds are significant.

[21] Diesel range compounds are significant; no recognizable pattern.

[22] Heavier hydrocarbons contributed to the quantitation.

[23] Analyzed outside of holdtime after confirmation of laboratory contamination by (2-ethylhexyl)phthalate.

[24] Analyzed both pre- and post-silica gel cleanup. Post-silica gel cleanup results are reported herein. Pre-silica gel cleanup results are included in Appendix B.

TABLE 3. Groundwater Analytical Results Summary
Monitored Natural Attenuation Parameters
Port of Oakland's Harbor Facilities Complex Site
555 - 651 Maritime Street, Oakland, California

Monitoring Well	Date Sampled	Field Parameters			Analytical Concentrations																	
		DO (mg/L)	ORP (mV)	Iron (II) (mg/L)	Carbon Dioxide (mg/L)	Methane (µg/L)	Iron (II) (mg/L)	Manganese (II) (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Sulfide (Dissolved, mg/L)	Nitrate (as N, mg/L)	Nitrite (as N, mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Orthophosphate (as P, mg/L)	Carbonate (mg/L)	Bicarbonate (mg/L)	Alkalinity, Total (as $CaCO_3$, mg/L)	Total Dissolved Solids (mg/L)
MW-1																						
	06/22/11	0.04	-99.7	0.91	17	6,300	0.84	0.52	25	16	1.0	48	0.24	<0.05	<0.05	<0.50	11	0.13	<6.7	250	250	270
	09/26/11	Not sampled due to the presence of free-phase product																				
MW-2																						
	06/22/11	3.27	27.3	0.00	23	0.69	<0.10	0.077	26	27	1.1	150	<0.04	0.25	<0.05	31	19	0.13	<6.7	500	500	610
	09/26/11	0.38	108.5	0.00	31	18	<0.10	0.19	29	29	1.3	180	<0.04	<0.05	<0.05	29	23	0.15	<10	560	560	660
MW-3																						
	6/22/2011	Not sampled due to the presence of free-phase product																				
	9/26/2011	Not sampled due to the presence of free-phase product																				
MW-4																						
	06/21/11	0.09	-32.0	0.05	2.5 J	3,400	<0.10	0.18	21	57	14	340	<0.04	<0.05	<0.05	5.3	280	0.64	<6.7	800	800	1,280
Dup.	06/21/11	0.09	-32.0	0.04	3.1	3,500	<0.10	0.18	20	58	14	340	<0.04	<0.05	<0.05	5.5	280	0.64	<6.7	770	770	1,270
	09/27/11	0.42	-137.0	0.51	15	4,100	0.46	0.31	41	68	9.8	250	<0.04	<0.05	<0.05	1.9	170	0.53	<10	860	860	1,150 [1]
Dup.	09/27/11	0.42	-137.0	0.51	16	4,100	0.27	0.25	36	65	9.2	240	<0.04	<0.05	<0.05	2.0	150	0.51	<10	810	810	1,150 [1]
MW-5																						
	06/22/11	0.24	-52.5	0.30	27	74	0.46	0.67	48	21	16	230	<0.04	<0.05	<0.05	69	300	0.35	<6.7	360	360	960
	09/27/11	0.33	-68.5	0.59	30	78	0.59	0.77	54	22	17	260	<0.04	<0.05	<0.05	74	290	0.33	<10	350	350	1,010 [1]
MW-6																						
	12/18/02	Monitoring well was destroyed																				
MW-7																						
	12/18/02	Monitoring well was destroyed																				
MW-8																						
	11/21/98	Monitoring well was destroyed and replaced with well MW-8A																				
MW-8A																						
	06/23/11	0.44	-203.1	1.85	5.0	400	2.3	0.67	46	58	15	230	<0.04	<0.05	<0.05	38	140	1.3	<6.7	760	760	1,060
	09/26/11	0.16	-109.1	2.57	52	310	2.9	0.85	53	65	18	280	<0.04	<0.05	<0.05	47	160	1.3	<10	810	810	360
MW-9																						
	06/22/11	0.14	-130.1	3.30*	71	10,000	6.3	0.87	70	46	14	280	0.09	<0.05	<0.05	0.54	290	1.3	<6.7	750	750	1,240
	09/27/11	0.22	-122.2	3.62	71	9,500	6.6	0.93	71	46	15	350	0.08	<0.05	<0.05	0.69	270	1.3	<10	770	770	1,360 [1]
MW-10																						
	06/22/11	0.03	-118	3.30*	160	7,300	7.8	4.2	130	67	30	420	0.09	<0.05	<0.10	4.1	530	0.46	<6.7	1,100	1,100	2,030
	09/26/11	0.15	-138.7	2.1	170	7,300	8.8	4.5	150	72	31	450	0.11	<0.05	<0.05	28	520	0.60	<10	1,100	1,100	680
MW-11																						
	06/21/11	0.06	-178.4	0.93	44	7,900	1.4	0.39	25	52	46	970	<0.04	<0.10	<0.10	<1.0	970	9.6	<6.7	1,500	1,500	3,140
	09/26/11	0.20	-198.9	0.47	46	8,300	1.5	0.38	25	51	49	1,100	<0.04	<0.05	<0.05	<1.0	1,000	7.7	<10	1,500	1,500	3,180
MW-12																						
	06/23/11	0.18	-253.8	0.41	85	5,100	0.46	1.3	93	43	15	160	4.7	<0.05	<0.05	2.4	180	0.76	<6.7	620	620	940
	09/26/11	0.36	-260.9	0.40	88	4,900	0.67	1.4	96	43	15	180	3.3	<0.05	<0.05	1.5	180	0.73	<10	640	640	1,000

Notes:

* Sample iron (II) concentration exceeded range of instrument.
DO = dissolved oxygen
ORP = oxidation-reduction potential
mg/L = milligrams per liter
ug/L = microgram per Liter
N = nitrogen
P = phosphorus
$CaCO_3$ = calcium carbonate
J = estimated value
[1] Batch spike duplicate for TDS outside of acceptable relative percent difference range.

TABLE 4. Free Product Recovery System Groundwater Elevation and Free Product Data
January 1, 2011 Through December 5, 2011
Port of Oakland's Harbor Facilities Complex Site
555 - 651 Maritime Street, Oakland, California

Recovery Well	Date Measured	Elevation [1] Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation [1] (feet)
RW-1						
Well inaccessible; product and water levels not measured						
RW-2						
	06/07/11	15.56	NP	7.19	0.00	8.37
	06/21/11	15.56	NP	9.02	0.00	6.54
	12/05/11	15.56	NP	9.44	0.00	6.12
RW-3						
	01/12/11	15.56	9.87	11.04	1.17	4.52
	01/26/11	15.56	10.28	10.43	0.15	5.13
	02/10/11	15.56	10.45	10.90	0.45	4.66
	02/24/11	15.56	9.42	12.13	2.71	3.43
	03/09/11	15.56	9.45	13.04	3.60	2.52
	03/23/11	15.56	8.63	12.18	3.55	3.38
	04/06/11	15.56	9.10	11.49	2.39	4.07
	04/20/11	15.56	9.70	10.88	1.18	4.68
	05/04/11	15.56	10.05	10.47	0.42	5.09
	05/18/11	15.56	9.95	10.17	0.22	5.39
	06/07/11	15.56	9.73	13.52	3.79	2.04
	06/21/11	15.56	10.10	11.20	1.10	4.36
	09/26/11	15.56	10.63	12.66	2.03	2.90
	10/05/11	15.56	10.48	10.98	0.50	4.58
	10/19/11	15.56	10.64	11.91	1.27	3.65
	12/05/11	15.56	10.75	12.67	1.92	2.89
RW-4						
	01/12/11	14.92	9.12	9.20	0.08	5.72
	01/26/11	14.92	9.39	9.89	0.50	5.03
	02/10/11	14.92	9.52	10.54	1.02	4.38
	02/24/11	14.92	8.80	9.10	0.30	5.82
	03/09/11	14.92	8.93	8.96	0.03	5.96
	03/23/11	14.92	8.39	8.43	0.04	6.49
	04/06/11	14.92	8.46	8.50	0.04	6.42
	04/14/11	14.92	8.88	8.91	0.03	6.01
	05/04/11	14.92	9.13	9.17	0.04	5.75
	05/18/11	14.92	9.18	9.20	0.02	5.72
	06/07/11	14.92	NP	8.95	0.00	5.97
	06/21/11	14.92	9.33 [2]	9.33	0.00	5.59
	09/26/11	14.92	9.82	10.41	0.59	4.51
	10/05/11	14.92	9.68	10.17	0.49	4.75
	10/19/11	14.92	9.60	10.26	0.66	4.66
	12/05/11	14.92	9.70	10.00	0.30	4.92

TABLE 4. Free Product Recovery System Groundwater Elevation and Free Product Data
January 1, 2011 Through December 5, 2011
Port of Oakland's Harbor Facilities Complex Site
555 - 651 Maritime Street, Oakland, California

Recovery Well	Date Measured	Elevation [1] Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation [1] (feet)
RW-5						
	04/14/11	14.79	6.74	9.72	2.98	5.07
	05/18/11	14.79	6.78 [2]	6.78	0.00	8.01
	06/07/11	14.79	7.38	7.47	0.09	7.32
	09/26/11	14.79	8.95	9.75	0.80	5.04
	10/05/11	14.79	8.66	9.09	0.43	5.70
RW-6						
	01/12/11	15.75	8.51	9.68	1.17	6.07
	01/26/11	15.75	8.65	9.55	0.90	6.20
	02/10/11	15.75	8.44	9.74	1.30	6.01
	02/24/11	15.75	8.15	9.82	1.67	5.93
	03/09/11	15.75	8.25	9.37	1.12	6.38
	03/23/11	15.75	8.18	8.96	0.78	6.79
	04/06/11	15.75	8.19	8.95	0.76	6.80
	04/20/11	15.75	8.43	8.54	0.11	7.21
	05/04/11	15.75	8.51	8.62	0.11	7.13
	05/18/11	15.75	8.53	8.70	0.17	7.05
	06/07/11	15.75	8.82	9.05	0.23	6.70
	06/21/11	15.75	8.89	9.20	0.31	6.55
	09/26/11	15.75	8.86	10.20	1.34	5.55
	10/05/11	15.75	9.05	9.72	0.67	6.03
	10/19/11	15.75	8.99	10.16	1.17	5.59
	12/05/11	15.75	9.05	10.62	1.57	5.13

TABLE 4. Free Product Recovery System Groundwater Elevation and Free Product Data
January 1, 2011 Through December 5, 2011
Port of Oakland's Harbor Facilities Complex Site
555 - 651 Maritime Street, Oakland, California

Recovery Well	Date Measured	Elevation [1] Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation [1] (feet)
RW-7						
	01/12/11	15.02	7.86	7.91	0.05	7.11
	01/26/11	15.02	7.55	7.64	0.09	7.38
	02/10/11	15.02	7.50	7.68	0.18	7.34
	02/24/11	15.02	7.82	8.92	1.10	6.10
	03/09/11	15.02	7.42	7.53	0.11	7.49
	03/23/11	15.02	NP	7.24	0.00	7.78
	04/06/11	15.02	7.73	7.73	0.00	7.29
	04/20/11	15.02	7.54	7.56	0.02	7.46
	05/04/11	15.02	7.68	7.74	0.06	7.28
	05/18/11	15.02	7.35 [2]	7.35	0.00	7.67
	06/07/11	15.02	7.98 [2]	7.98	0.00	7.04
	06/21/11	15.02	8.07	8.09	0.00	6.93
	09/26/11	15.02	8.29	8.90	0.61	6.12
	10/05/11	15.02	8.19	8.45	0.26	6.57
	10/19/11	15.02	8.24	8.90	0.66	6.12
	12/05/11	15.02	8.26	9.77	1.51	5.25
RW-8						
	01/12/11	15.91	9.07	9.21	0.14	6.70
	01/26/11	15.91	9.23	9.31	0.08	6.60
	02/10/11	15.91	9.13	9.33	0.20	6.58
	02/24/11	15.91	8.86	9.23	0.37	6.68
	03/09/11	15.91	8.78	9.01	0.23	6.90
	03/23/11	15.91	8.42	8.70	0.28	7.21
	04/06/11	15.91	8.55	8.80	0.25	7.11
	04/20/11	15.91	8.92	9.14	0.22	6.77
	05/04/11	15.91	9.04	9.20	0.16	6.71
	05/18/11	15.91	8.85	9.10	0.25	6.81
	06/07/11	15.91	10.23	10.34	0.11	5.57
	06/21/11	15.91	9.27	9.41	0.14	6.50
	09/26/11	15.91	9.23	9.62	0.39	6.29
	10/05/11	15.91	9.28	9.40	0.12	6.51
	10/19/11	15.91	9.54	9.77	0.23	6.14
	12/05/11	15.91	9.62	10.19	0.57	5.72

TABLE 4. Free Product Recovery System Groundwater Elevation and Free Product Data
January 1, 2011 Through December 5, 2011
Port of Oakland's Harbor Facilities Complex Site
555 - 651 Maritime Street, Oakland, California

Recovery Well	Date Measured	Elevation [1] Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation [1] (feet)
RW-9						
	01/12/11	16.57	9.26	9.45	0.19	7.12
	01/26/11	16.57	9.32	9.53	0.21	7.04
	02/10/11	16.57	9.42	9.63	0.21	6.94
	02/24/11	16.57	9.24	9.43	0.19	7.14
	03/09/11	16.57	9.16	9.35	0.19	7.22
	03/23/11	16.57	9.07	9.23	0.16	7.34
	04/06/11	16.57	9.00	9.16	0.16	7.41
	04/20/11	16.57	9.10	9.29	0.19	7.28
	05/04/11	16.57	9.19	9.40	0.21	7.17
	05/18/11	16.57	9.26	9.46	0.20	7.11
	06/07/11	16.57	9.35	9.56	0.21	7.01
	06/21/11	16.57	9.30	9.50	0.20	7.07
	09/26/11	16.57	9.67	9.85	0.18	6.72
	10/05/11	16.57	9.70	9.81	0.11	6.76
	10/19/11	16.57	9.67	9.78	0.11	6.79
	12/05/11	16.57	9.75	10.14	0.39	6.43
MW-3						
	01/05/11	15.66	9.58	9.67	0.09	5.99
	01/12/11	15.66	9.85	10.39	0.54	5.27
	01/21/11	15.66	10.03	10.97	0.94	4.69
	01/26/11	15.66	9.32	9.53	0.21	6.13
	02/02/11	15.66	10.28	11.43	1.94	4.23
	02/10/11	15.66	10.35	11.50	1.15	4.16
	02/24/11	15.66	9.53	10.74	1.21	4.92
	03/09/11	15.66	9.63	10.79	2.94	4.87
	03/16/11	15.66	9.26	10.43	1.17	5.23
	03/23/11	15.66	8.71	9.07	0.36	6.59
	03/30/11	15.66	8.87	9.54	3.94	6.12
	04/06/11	15.66	9.16	10.42	1.26	5.24
	04/14/11	15.66	9.65	10.53	0.88	5.13
	04/20/11	15.66	9.69	10.61	4.94	5.05
	04/27/11	15.66	9.88	11.07	1.19	4.59
	05/04/11	15.66	9.95	11.14	1.19	4.52
	05/13/11	15.66	10.16	11.45	5.94	4.21
	05/18/11	15.66	9.78	11.60	1.82	4.06
	06/07/11	15.66	9.91	10.95	1.04	4.71
	06/21/11	15.66	10.74	11.20	0.46	4.46
	09/26/11	15.66	10.71	12.55	1.84	3.11
	10/05/11	15.66	10.21	11.73	1.52	3.93
	10/19/11	15.66	10.65	12.11	1.46	3.55
	12/05/11	15.66	10.83	12.20	1.37	3.46

TABLE 4. Free Product Recovery System Groundwater Elevation and Free Product Data
January 1, 2011 Through December 5, 2011
Port of Oakland's Harbor Facilities Complex Site
555 - 651 Maritime Street, Oakland, California

Recovery Well	Date Measured	Elevation [1] Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation [1] (feet)
Convault						
	01/12/11	NA	1.75	2.24	0.49	NA
	01/26/11	NA	1.72	2.22	0.50	NA
	02/10/11	NA	1.71	2.01	0.30	NA
	02/24/11	NA	1.68	2.19	0.51	NA
	03/09/11	NA	1.58	2.12	0.54	NA
	03/23/11	NA	1.57	2.13	0.56	NA
	04/06/11	NA	1.54	2.15	0.61	NA
	04/20/11	NA	1.49	2.12	0.63	NA
	05/04/11	NA	1.48	2.12	0.64	NA
	05/18/11	NA	1.48	2.08	0.60	NA
	06/07/11	NA	1.43	2.07	0.64	NA

Notes:
NP = no product detected with the interface probe
btc = below top of the well casing
NA = not available
NM = not measured
[1] Wells were resurveyed on January 24, 2009. Elevation data is relative to North American Vertical Datum of 1988 (NAVD 88).
[2] Product not measureable, but visible evidence of product on interface probe.

Port of Oakland
530 Water Street • Oakland, CA 94607

Appendix A
Groundwater Sampling Forms

4656016

MALCOLM PIRNIE

GROUNDWATER SAMPLING

Well No.: **MW-1**

Project No.	4656016	Recorded by: Sarah Carman	Date: 9-26-11
Project Name:	Harbor Facilities Center	Depth of well from TOC (feet):	17.65
Location:	Port of Oakland	Well diameter (inches):	2
	651 Maritime Street, Oakland, California	Screened interval from TOC (feet):	7.65-17.65
Weather:	warm, partly cloudy	TOC elevation, NAVD 88 (feet):	15.80
Precip. in past 5 days (in.):	0.08	Groundwater elevation, NAVD 88 (feet):	4.57
Source:	Oakland Fire Services Agency (ONO)	Water level from TOC (feet): 11.23	Time: 8:33
Water level instrument:	Solinst #362606	Product level from TOC (feet): Sheen	Time:

CALCULATION OF WELL VOLUME:

(17.65 ft - _____ ft x (0.083 ft)² x π x 7.48 gal/ft³ = _____ gallons in one casing volume

well depth - water level x (well radius)² x π x gal/ft³ = _____ total gallons removed

CALIBRATION: _____

FIELD MEASUREMENTS:

Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)	Depth to Water (ft btoc)	Cumulative Gallons Removed

Purge method: _____ Sample Time: _____

Duplicate/blank number: _____ Duplicate Sample Time: _____

Sampling equipment: _____ VOA attachment: _____

Sample containers: _____

Sample analyses: _____

Laboratory: _____

Decontamination method: _____ Rinsate disposal: _____

Comments: product on water level probe - well not sampled

TOC = top of casing

NAVD 88 = North American Vertical Datum of 1988.

GROUNDWATER SAMPLING

Well No.: **MW-2**

Project No.	4656016	Recorded by:	Sarah Carman / J. Lee Date: 9-26-11
Project Name:	Harbor Facilities Center	Depth of well from TOC (feet):	18.06
Location:	Port of Oakland	Well diameter (inches):	2
	651 Maritime Street, Oakland, California	Screened interval from TOC (feet):	8.06-18.06
Weather:	warm, partly cloudy	TOC elevation, NAVD 88 (feet):	16.43
Precip. in past 5 days (in.):	0.08	Groundwater elevation, NAVD 88 (feet):	4.56
Source:	Oakland Fire Services Agency (ONO)	Water level from TOC (feet): 11.87	Time: 9:00
Water level instrument:	Solinst # 362466	Product level from TOC (feet): NA	Time: —

CALCULATION OF WELL VOLUME:

(18.06 ft - 11.87 ft x (0.083 ft)² x π x 7.48 gal/ft³ = 0.99 gallons in one casing volume
well depth - water level x (well radius)² x π x gal/ft³ = 1.5 total gallons removed

CALIBRATION: See Calibration sheet (YSI-556.14)

FIELD MEASUREMENTS:

Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)	Depth to Water (ft btoc)	Cumulative Gallons Removed
10:01	20.32	7.45	1.99	168.9	879	clear	12.18	Initial
10:04	20.30	7.43	1.46	159.9	885	clear	12.24	500 mL
10:09	20.82	7.43	0.91	147.7	887	clear	12.39	1.0 L
10:10	20.80	7.43	0.88	147.0	896	"	12.44	1.5 L
10:14	20.63	7.43	0.69	138.9	902	"	12.56	2.0 L *
10:19	20.73	7.40	0.53	129.9	919	"	12.70	2.5 L
10:25	20.97	7.40	0.46	125.3	929	"	12.85	3.0 L
10:31	21.10	7.40	0.44	122.2	939	"	12.98	3.5 L
10:38	20.90	7.37	0.37	117.2	950	"	13.04	4.0 L
10:42	21.40	7.41	0.37	110.6	958	"	13.21	4.5 L
10:47	20.72	7.40	0.38	108.1	971	"	13.38	5.0 L
10:51	20.59	7.38	0.36	108.2	972	"	13.45	5.5 L
10:56	20.72	7.35	0.38	108.5	977	"	13.59	6.0 L
Fe Result: 0.00 ppm								

Purge method: Peristaltic Pump
Sample Time: 10:57
Duplicate/blank number: —
Duplicate Sample Time:
Sampling equipment: Peristaltic Pump w/dedicated tubing
VOA attachment: none
Sample containers: VOAs w/HCl & BAK; Poly 1 H/P + H2SO3 + NaOH
Sample analyses: TPHg/D; MO; TDS, Diss. Metals; Sulfide + CO2
Laboratory: CTL
Decontamination method: Liquinox, Tap, DI Rinse
Rinsate disposal: —
Comments: * Switched to slower pump head. Set intake @ 17.06'
Field Filtered Diss. Metals + TDS samples. Ending ∇ = 14.35@ 11:37

TOC = top of casing
NAVD 88 = North American Vertical Datum of 1988.

GROUNDWATER SAMPLING

Well No.: **MW-3**

Project No. 4656016
Recorded by: SC/CA/JL
Date: 9-26-11
Project Name: Harbor Facilities Center
Depth of well from TOC (feet): 17.47
Location: Port of Oakland
Well diameter (inches): 2
651 Maritime Street, Oakland, California
Screened interval from TOC (feet): 7.47-17.47
Weather: warm, partly cloudy
TOC elevation, NAVD 88 (feet): 14.15
Precip. in past 5 days (in.): 0.08
Groundwater elevation, NAVD 88 (feet): 3.6
Source: Oakland Fire Services Agency
Water level from TOC (feet): 10.55
Time: 815
Water level instrument: Solinst #3162dg
Product level from TOC (feet): 10.71
Time: 815

CALCULATION OF WELL VOLUME:

(17.47 ft - _____ ft x (0.083 ft)² x π x 7.48 gal/ft³ = _____ gallons in one casing volume
well depth - water level x (well radius)² x π x gal/ft³ = _____ total gallons removed

CALIBRATION: _____

FIELD MEASUREMENTS:

Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)	Depth to Water (ft btoc)	Cumulative Gallons Removed

Purge method: _____ Sample Time: _____
Duplicate/blank number: _____ Duplicate Sample Time: _____
Sampling equipment: _____ VOA attachment: _____
Sample containers: _____
Sample analyses: _____
Laboratory: _____
Decontamination method: _____ Rinsate disposal: _____
Comments: free product in well- well not sampled

TOC = top of casing
NAVD 88 = North American Vertical Datum of 1988.

GROUNDWATER SAMPLING

Well No.: **MW-4**

Project No. 4656016
Project Name: Harbor Facilities Center
Location: Port of Oakland
651 Maritime Street, Oakland, California
Weather: Mostly clear skies, 60's-F
Precip. in past 5 days (in.): 0.08
Source: Oakland Fire Services Agency (OM) 9/26
Water level instrument: Solinst # 36266

Recorded by: Sarah Carman / J. Lee Date: 9-27-11
Depth of well from TOC (feet): 22.05
Well diameter (inches): 2
Screened interval from TOC (feet): 11.25-22.05
TOC elevation, NAVD 88 (feet): 15.91
Groundwater elevation, NAVD 88 (feet): 4.08
Water level from TOC (feet): 11.83 Time: 08:22
Product level from TOC (feet): NA Time: -

CALCULATION OF WELL VOLUME:

(22.05 ft - 11.81 ft) x (0.083 ft)² x π x 7.48 gal/ft³ = 1.64 gallons in one casing volume
well depth - water level x (well radius)² x π x gal/ft³ = ~1.00 total gallons removed

CALIBRATION:

9/27: 7.01, 402, 10.02, 1,000 239.9, 10.34 mg/L @ 7:08

FIELD MEASUREMENTS:

Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)	Depth to Water (ft btoc)	Cumulative Gallons Removed
7:26	-	-	-	-	-	-	11.81	1.83 ~11.82 w/ tubing set
7:45	20.10	7.02	1.91	-113.1	1714	slightly cldy	12.31	Initial
7:49	20.00	7.17	0.51	-129.9	1834	" "	12.36	0.5L
7:54	20.16	7.29	0.75	-122.5	1873	clear w/ lt brown tint	12.37	1.0L
8:01	20.20	7.44	0.51	-138.5	1923	clear w/ lt brown tint	12.37	1.5L
8:07	20.24	7.52	0.42	-133.7	1929	" "	12.37	2.0L
8:13	20.43	7.56	0.43	-137.6	1927	" "	12.38	2.5L
8:22	20.43	7.55	0.42	-137.0	1949	" "	12.38 12.38	3.0L
Fe Result: 0.51 mg/L								

Purge method: Peristaltic Pump
Duplicate/blank number: MW-4-DUP + Field Blank @ 7:25 (TPHg only)
Sampling equipment: Peristaltic Pump + Dedicated Tubing
Sample containers: 8 VOAs w/ HCl or BAK; 2-500ml NP AMBERS; 3 Poly w/ HNO3, NaOH or NP per set
Sample analyses: TPHg/BTEX, MTBE, D, M.O; Anions, Sulfide, Diss. Metals, CO2
Laboratory: CTL
Decontamination method: Liquinox, Tap, DI Rinse
Comments: set intake @ 17'; set @ slowest pump speed

Sample Time: 8:23
Duplicate Sample Time: 8:23
VOA attachment:
Rinsate disposal:

TOC = top of casing
NAVD 88 = North American Vertical Datum of 1988.

GROUNDWATER SAMPLING

Well No.: **MW-5**

Project No. 4656016
Project Name: Harbor Facilities Center
Location: Port of Oakland
651 Maritime Street, Oakland, California
Weather: Sunny, clear skies, high 60's °F
Precip. in past 5 days (in.): 0.08
Source: Oakland Fire Services Agency (ONO)
Water level instrument: Solinst # 36266

Recorded by: Sarah Carman/JLee Date: 9-27-11
Depth of well from TOC (feet): 20.8
Well diameter (inches): 2
Screened interval from TOC (feet): 10.4-20.8
TOC elevation, NAVD 88 (feet): 15.39
Groundwater elevation, NAVD 88 (feet): (6.09
9/26: Water level from TOC (feet): 9.30 Time: 8:25
Product level from TOC (feet): NA Time: —

CALCULATION OF WELL VOLUME:

(20.80 ft - 9.28 ft x (0.083 ft)² x π x 7.48 gal/ft³ = 1.85 gallons in one casing volume
well depth - water level x (well radius)² x π x gal/ft³ = _____ total gallons removed

CALIBRATION:

See MW-9 Log Sheet.

FIELD MEASUREMENTS:

Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)	Depth to Water (ft btoc)	Cumulative ~~Gallons~~ Liters Removed
9:52	—	-	-	-	-	-	9.28	8=9.29 w/tube set
10:01	20.84	6.65	3.38	-72.9	1549	clear	9.56	Initial
10:05	20.78	6.74	0.55	-77.9	1575	clear w/V.H tint	9.58	0.5L
10:10	20.95	6.74	0.45	-75.5	1568	"	9.58	1.0L
10:15	20.06	6.78	0.39	-73.8	1543	"	9.58	1.5L
10:21	21.19	6.77	0.37	-70.3	1516	"	9.60	2.0L
10:27	21.00	6.75	0.37	-68.9	1564	"	9.63	2.5L
10:33	20.82	6.72	0.35	-68.5	1599	"	9.63	3.0L
10:39	20.80	6.71	0.32	-68.1	1626	"	9.66	3.5L
10:44	20.81	6.74	0.33	-68.3	1651	clear	9.66	4.0L
10:49	20.77	6.74	0.35	-68.5	1667	"	9.66	4.5L
Fe Result: 0.59mg/L								

Purge method: Peristaltic Pump
Duplicate/blank number: —
Sampling equipment: Peristaltic Pump + Dedicated Tubing
Sample containers: 8 VOAs w/HCl or BAK; 2-500ml amber NP, 3 Polys w/HNO3, NaOH or NP
Sample analyses: TPHg/BTEX, MTBE, MO, D; Anions, Diss. Metals, CO2
Laboratory: CTL + Microseeps
Decontamination method: Liquinox, Tap + DI Rinse
Comments: Set intake @ 15.8
set @ slowest pump speed

Sample Time: 10:50
Duplicate Sample Time: —
VOA attachment: _____
Rinsate disposal: _____

TOC = top of casing
NAVD 88 = North American Vertical Datum of 1988.

GROUNDWATER SAMPLING

Well No.: **MW-8A**

Project No.	4656016	Recorded by: Sarah Carman	Date: 9-26-11
Project Name:	Harbor Facilities Center	Depth of well from TOC (feet):	23.14
Location:	Port of Oakland	Well diameter (inches):	2
	651 Maritime Street, Oakland, California	Screened interval from TOC (feet):	7.54-22.54
Weather:	warm, partly cloudy	TOC elevation, NAVD 88 (feet):	14.99
Precip. in past 5 days (in.):	0.08	Groundwater elevation, NAVD 88 (feet):	3.78
Source:	Oakland Fire Services Agency (ONO)	Water level from TOC (feet): 11.21	Time: 8:37
Water level instrument:	Solinst WL meter	Product level from TOC (feet): NA	Time:

CALCULATION OF WELL VOLUME:

(23.14 ft - 11.21 ft) x (0.083 ft)² x π x 7.48 gal/ft³ = 1.9 gallons in one casing volume

well depth - water level x (well radius)² x π x gal/ft³ = 2.5 total gallons removed

CALIBRATION: See calibration sheet (YSI-556.22)

FIELD MEASUREMENTS:

	Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV)	EC (µS/cm)	Turbidity (NTU)	Depth to Water (ft btoc)	Cumulative Gallons Removed
	1011							11.25	
	1014							11.30	
250 mL/min	1015							11.34	
	1017	19.78	7.44	0.42	-133	2258		11.37	
200 mL/min	1020	19.62	7.08	0.22	-33.9	2189		11.37	
	1023	19.94	7.10	0.16	-53.0	2101		11.37	
	1026	19.95	7.12	0.18	-75.0	2242		11.37	
250 mL/min	1030	19.95	7.15	0.24	-95.0	1924		11.37	
	1033	19.94	7.15	0.21	-101.6	1844		11.37	
	1038	20.04	7.16	0.19	-108.4	1722		11.38	
200 mL/min	1041	19.94	7.16	0.18	-111.3	1674		11.37	
	1044	19.88	7.18	0.17	-108.7	1635		11.38	
	1047	19.84	7.17	0.15	-108.0	1609		11.38	
	1051	19.83	7.17	0.16	-108.5	1585		11.38	
	1055	19.79	7.17	0.16	-109.1	1569			~2.5

Purge method: Peristaltic pump — Sample Time: 1100

Duplicate/blank number: NA — Duplicate Sample Time: NA

Sampling equipment: Peristaltic pump & dedicated tubing — VOA attachment: NA

Sample containers: 8-40mL VOAs, 2-0.5 L Ambers, 2-0.5 L Polys, 1-250mL poly

Sample analyses: TPH-g, TPH-d/mo, BTEX, MTBE, TDS, alkalinity, anions, sulfide, cations, Fe, Mn, CO_2, CH_4

Laboratory: CTL, Microseeps

Decontamination method: dedicated tubing — Rinsate disposal:

Comments: Fe^{+2} = 2.57 mg/L

TOC = top of casing

NAVD 88 = North American Vertical Datum of 1988.

GROUNDWATER SAMPLING

Well No.: **MW-9**

Project No. 4656016
Project Name: Harbor Facilities Center
Location: Port of Oakland
651 Maritime Street, Oakland, California
Weather: warm, clear skies
Precip. in past 5 days (in.): 0.08
Source: Oakland Fire Services Agency (OMO)
Water level instrument: Solinst WL meter

Recorded by: Sarah Carman Date: 9-27-11
Depth of well from TOC (feet): 25
Well diameter (inches): 2
Screened interval from TOC (feet): 15 - 25
TOC elevation, NAVD 88 (feet): 16.33
Groundwater elevation, NAVD 88 (feet): 4.41
Water level from TOC (feet): 11.92 Time: 8:28
Product level from TOC (feet): — Time: —

CALCULATION OF WELL VOLUME:

(25.00 ft - 11.92 ft) x (0.083 ft)² x π x 7.48 gal/ft³ = 2.1 gallons in one casing volume
well depth - water level x (well radius)² x π x gal/ft³ = 2.25 total gallons removed

CALIBRATION: See calibration sheet (YSI-556.22)

FIELD MEASUREMENTS:

Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)	Depth to Water (ft btoc)	Cumulative Gallons Removed
0731							11.88	
0740							11.96	
0742 (300 mL/min)	20.12	6.88	1.36	-55.0	2006		12.05	
0745	19.86	6.90	0.18	-88.9	2014		12.08	
0748	19.86	6.94	0.11	-102.0	2013		12.09	
0751	19.82	6.96	0.07	-109.6	2015		12.09	
0754	19.84	6.97	0.08	-112.7	2014		12.10	1
0758	19.89	6.99	0.26	-117.1	1990		12.10	
0802	19.88	6.99	0.22	-120.4	1966		12.10	
0806	19.86	6.99	0.22	-121.7	1949		12.10	2
0809	19.87	6.99	0.22	-122.2	1934		12.10	

Purge method: Geopump
Sample Time: 0815
Duplicate/blank number: —
Duplicate Sample Time: —
Sampling equipment: Peristaltic pump and dedicated tubing
VOA attachment: NA
Sample containers: 8-40mL VOAs, 2-0.5 L ambers, 2-0.5 L polys, 1-250 mL poly
Sample analyses: TPH-g, TPHd/mo, BTEX, MTBE, TDS, alkalinity, anions, sulfide, cations, Fe, Mn, CO2, CH4
Laboratory: CTL, microseeps
Decontamination method: Dedicated tubing
Rinsate disposal:
Comments: Hydrocarbon odor
Fe^{2+} = 1.81 mg/L diluted 1:1

TOC = top of casing
NAVD 88 = North American Vertical Datum of 1988.

GROUNDWATER SAMPLING

Well No.: **MW-10**

Project No. 4656016
Project Name: Harbor Facilities Center
Location: Port of Oakland
651 Maritime Street, Oakland, California
Weather: Sunny, warm
Precip. in past 5 days (in.): 0.08
Source: Oakland Fire Services Agency (OMI)
Water level instrument: Solinst WL meter

Recorded by: Sarah Carman Date: 9-26-11
Depth of well from TOC (feet): 25
Well diameter (inches): 2
Screened interval from TOC (feet): 15 - 25
TOC elevation, NAVD 88 (feet): 15.65
Groundwater elevation, NAVD 88 (feet): 4.86
Water level from TOC (feet): 10.79 Time: 8:42
Product level from TOC (feet): — Time: —

CALCULATION OF WELL VOLUME:

(25.00 ft - 10.79 ft x (0.083 ft)² x π x 7.48 gal/ft³ = 2.3 gallons in one casing volume
well depth - water level x (well radius)² x π x gal/ft³ = 2 total gallons removed

CALIBRATION: See Calibration sheet (YSI-556.22)

FIELD MEASUREMENTS:

	Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)	Depth to Water (ft btoc)	Cumulative Gallons Removed
	1307							10.79	
120 mL/min	1310							10.93	
150 mL/min	1313							10.95	
	1317	20.40	6.79	0.15	-105.6	2804		10.97	
	1320	20.28	6.81	0.16	-114.8	2797		10.97	
	1324	20.30	6.82	0.16	-121.5	2797		10.97	
	1327	20.29	6.82	0.16	-125.6	2795		10.98	
	1330	20.21	6.82	0.15	-129.4	2790		10.98	1.5
200 mL/min	1334	20.19	6.83	0.15	-132.8	2788		10.99	
	1337	20.17	6.83	0.15	-134.5	2786		10.99	
	1340	20.09	6.83	0.15	-136.9	2784		11.00	
	1344	20.03	6.83	0.15	-138.7	2778		11.00	2

Purge method: Peristaltic pump Sample Time: 1350
Duplicate/blank number: — Duplicate Sample Time: —
Sampling equipment: Peristaltic pump & dedicated tubing VOA attachment: NA
Sample containers: 8-40 mL VOAs, 2-0.5 L ambers, 2-0.5 L polys, 1-250 mL poly
Sample analyses: TPH-g, TPH-d/mo, BTEX, MTBE, TDS, alkalinity, anions, sulfide, cations, Fe, Mn, CO_2, CH_4
Laboratory: CTL, Microseeps
Decontamination method: Dedicated tubing, liquinox Rinsate disposal:
Comments: Fe^{2+} = 1.05 mg/L diluted 1:1; undiluted was out of range.

TOC = top of casing
NAVD 88 = North American Vertical Datum of 1988.

GROUNDWATER SAMPLING

Well No.: **MW-11**

Project No. 4656016
Project Name: Harbor Facilities Center
Location: Port of Oakland
651 Maritime Street, Oakland, California
Weather: Sunny, clear skies, Warm, mid 70's°F
Precip. in past 5 days (in.): 0.08
Source: Oakland Fire Services Agency (ONO)
Water level instrument: Solinst #30266

Recorded by: Sarah Carman / J. Lee Date: 9-26-11
Depth of well from TOC (feet): 25
Well diameter (inches): 2
Screened interval from TOC (feet): 15 - 25
TOC elevation, NAVD 88 (feet): 15.47
Groundwater elevation, NAVD 88 (feet): 5.14
Water level from TOC (feet): 10.33 Time: 8:49
Product level from TOC (feet): NA Time: —

CALCULATION OF WELL VOLUME:

∇ = 10.30 @ 13:33

(25.00 ft - 10.30 ft) x (0.083 ft)² x π x 7.48 gal/ft³ = 2.36 gallons in one casing volume
well depth - water level x (well radius)² x π x gal/ft³ = ~1.5 total gallons removed

CALIBRATION: See calibration sheet (YSI-556.14)

FIELD MEASUREMENTS:

Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)	Depth to Water (ft btoc)	Cumulative ~~Gallons~~ Liters Removed
13:37	—	—	—	—	—	—	10.30	w/tube set
13:42	23.19	7.68	0.72	-196.9	5000	cloudy, light brown	10.50	Initial
13:45	23.03	7.61	0.21	-200.7	5027	" "	10.52	.5L
13:47	23.19	7.66	0.23	-195.0	5021	" "	10.53	1.0L
13:51	23.27	7.69	0.21	-193.7	5017	Light tan	10.53	1.5L
13:54	23.35	7.69	0.27	-208.1	5002	"	10.53	2.0L
13:58	23.48	7.70	0.28	-207.5	4995	"	10.53	2.5L
14:02	23.33	7.70	0.19	-207.0	4987	"	10.53	3.0L
14:05	23.06	7.73	0.19	-184.0	4994	"	10.53	3.5L
14:08	22.83	7.71	0.20	-190.6	4990	"	10.53	4.0L
14:11	22.77	7.71	0.20	-196.6	4989	"	10.53	4.5L
14:15	22.96	7.72	0.20	-205.9	4985	"	10.53	5.0L
14:18	22.82	7.69	0.21	-202.0	4985	"	10.53	5.5L
14:22	22.83	7.69	0.20	-198.9	4989	"	10.53	6.0L

Fe Result: 0.47 mg/L

Purge method: Peristaltic Pump
Sample Time: 14:23
Duplicate/blank number: —
Duplicate Sample Time: —
Sampling equipment: Peristaltic Pump
VOA attachment:
Sample containers: 8 OAs w/HCl or BAK; 2-500ml N/P; 3 Poly w/HNO3, NaOH or NP
Sample analyses: TPHg/BTEX, MTBE, MO, D; Anions, Sulfide, Diss. Metals, CO2
Laboratory: CTL
Decontamination method: Liquinox, Tap, DI Rinse
Rinsate disposal:
Comments: Set tubes ~
Field Filtered: Diss. Metals + Anions Samples. Samples reacted w/HCl slightly. Slight odor noted during collection.

TOC = top of casing
NAVD 88 = North American Vertical Datum of 1988.

GROUNDWATER SAMPLING

Well No.: **MW-12**

Project No. 4656016
Project Name: Harbor Facilities Center
Location: Port of Oakland
651 Maritime Street, Oakland, California
Weather: Sunny, warm, partly cloudy clear skies
Precip. in past 5 days (in.): 0.08
Source: Oakland Fire Services Agency (OFS)
Water level instrument: Solinst #36266

Recorded by: Sarah Carman / S. Lee Date: 9-26-11
Depth of well from TOC (feet): 25
Well diameter (inches): 2
Screened interval from TOC (feet): 15 - 25
TOC elevation, NAVD 88 (feet): 16.79
Groundwater elevation, NAVD 88 (feet): 5.02
Water level from TOC (feet): 11.77 Time: 8:52
Product level from TOC (feet): NA Time: —

CALCULATION OF WELL VOLUME:

Z = 11.78 @ 11:45

(25.00 ft - 11.78 ft) x (0.083 ft)² x π x 7.48 gal/ft³ = 1.89 gallons in one casing volume
well depth - water level x (well radius)² x π x gal/ft³ = ~1.5 total gallons removed

CALIBRATION: See calibration sheet (YSI-556.14)

FIELD MEASUREMENTS:

Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)	Depth to Water (ft btoc)	Cumulative Gallons Removed
11:47	—	—	—	—	—	—	Z = 11.79 w/tube set	
11:52	19.50	7.07	1.70	-224.0	1543	clear	11.89 11.89	Initial
11:55	19.16	6.94	0.42	-212.5	1547	v. tan tint	11.79 11.88	0.5L
12:07	19.55	7.07	1.64	-197.6	1503	"	11.80	1.0L
12:10	19.15	7.01	1.00	-228.3	1517	"	11.81	1.5L
12:14	19.09	6.97	0.56	-236.2	1489	"	11.81	2.0L
12:16	19.03	6.96	0.47	-243.2	1498	"	11.81	2.5L
12:19	19.02	6.95	0.42	-253.9	1507	more tan tint	11.81	3.0L
12:21	18.97	6.93	0.36	-263.8	1518	tan tint	11.81	3.5L
12:24	18.95	6.98	0.38	-262.1	1527	" "	11.81	4.0L
12:26	18.95	6.98	0.36	-260.9	1529	" "	11.81	4.5L

Fe Results: 0.40mg/L

Purge method: Peristaltic Pump
Duplicate/blank number: —
Sampling equipment: Peristaltic Pump + Dedicated tubing
Sample containers: 9 VOA (3 HCl or BAK); 2-500ml Amber N/P; 3 Poly's w/HNO3 or NaOH or NP
Sample analyses: TPHg/BTEX, MTBE, D, MO; Anions, Diss. Metals, CO2, Sulfide
Laboratory: CTL
Decontamination method: Liquinox, Tap, DI
Comments: Set intake @ 20'. Field Filtered: Diss. Metals + Anions Samples.

Sample Time: 12:29
Duplicate Sample Time: —
VOA attachment:
Rinsate disposal:

TOC = top of casing
NAVD 88 = North American Vertical Datum of 1988.

ARCADIS

MULTIPARAMETER INSTRUMENT CALIBRATION RECORD

Project No.: 01656016.0000 Location: Port HFC

Instrument: YSI 556 Serial Number: YSI-556.14 02D0577

Date	Calibrated by	Parameter	Standards Used	Calibration Achieved (Y/N)	Remarks
9/26/11	CO	PH	4.0, 7.0, 10.0	Y	
		Conductivity	1,000 µs/cm	Y	
		DO		Y	
9/27/11	CO	PH	4.0, 7.0, 10.0	Y	
		Conductivity	1,000 µs/cm	Y	
		DO		Y	

ARCADIS

MULTIPARAMETER INSTRUMENT CALIBRATION RECORD

Project No.: 04656016.0000 Location: Port HFC

Instrument: YSI 556 Serial Number: YSI-556.22

Date	Calibrated by	Parameter	Standards Used	Calibration Achieved (Y/N)	Remarks
9/26/11	CO	PH	4.0, 7.0, 10.0	Y	
		DO		Y	
		conductivity	1,000 µs/cm	Y	
9/27/11	Jacki Lee	pH	4.0, 7.0, 10.0	Y	
		DO		Y	
		conductivity	1,000 µs/cm	Y	

Port of Oakland
530 Water Street • Oakland, CA 94607

Appendix B
Laboratory Analytical Reports

4656016

MALCOLM PIRNIE

Data Validation Worksheet

Lab Report # 231342 DV by: SC
Project Port Harbor Facilities Complex Date: 11/15/11

Lab IDs	Sample IDs	Date Collected	Parameters								
			TPHg (8015B)	TPHd/ mo (8015B)	MTBE BTEX (8260B)	Anions (300.0)	Metals (6010B)	Diss SO_4^{-2} (SM4500P -E)	Alk (2320B)	Orth-P (SM4500 P)	TDS (2540C)
-001	MW-8A	9/26/11	X	X	X	X	X	X	X	X	X
-002	MW-10	9/26/11	X	X	X	X	X	X	X	X	X
-003	MW-2	9/26/11	X	X	X	X	X	X	X	X	X
-004	MW-11	9/26/11	X	X	X	X	X	X	X	X	X
-005	MW-12	9/26/11	X	X	X	X	X	X	X	X	X
-006	TB-092611	9/26/11	X		X						

Lab ID: C+T **NO QUALS**
Cooler Temperature: cold one cooler, 9.8 C one cooler
Chain-of-Custody: OK
Samples preservatives: -004 pH was above 2. HNO_3 added at lab to lower pH → no qual (preserved within 24 hr)

Parameter: **TPHg**

HTs: 14 days – analyzed 9/30/11 (4)
Batch IDs: 179480
Surrogates: OK
Method Blank: OK, surrogates OK
LCS: OK, surrogates OK
MS/MSD: MS OK, surrogates OK
MSD OK, surrogates OK

Parameter: **TPHd/mo**

HTs: 7 days – extracted 9/27/11 (1) analyzed 9/29/10 (3)
Batch IDs: 179376
Surrogates: OK
Method Blank: OK, surrogates OK
LCS: OK, surrogates OK
MS/MSD MS OK, surrogates OK
MSD OK, surrogates OK

Parameter: **BTEX + MTBE**

HTs: 14 days – analyzed 9/28/11 (2)
Batch IDs: 179391
Surrogates: OK
Method Blank: OK, surrogates OK
BS/BSD: BS OK, surrogates OK
BSD OK, surrogates OK

Parameter: **Anions**

HTs: 28 days – analyzed 9/29/11 (3)
Batch IDs: 179333
Method Blank: OK
LCS: OK
MS/MSD: MS OK
MSD OK

Parameter: **Metals**

HTs: 6 months – extracted 9/27/11 analyzed 9/30/11 (4)
Batch IDs: 179385
Method Blank: OK
BS/BSD: BS OK
BSD OK
MS/MSD: MS out of range (Na and Mn, sample concentration >4x spike concentration → NO QUAL
MSD out of range, sample concentration >4x spike concentration → NO QUAL

Parameter: **Alkalinity**

HTs: 14 days – analyzed 9/29/11 (2)
Batch IDs: 179453
Method Blank: OK
LCS: OK
MS/MSD: MS OK
MSD OK

Parameter: **Dissolved Sulfide**

HTs: 7 days – analyzed 9/29/11 (3)
Batch IDs: 179442
Method Blank: OK
LCS: OK
MS/MSD: MS OK
MSD OK

Parameter: **Orthophosphate**

HTs: 48 hrs – analyzed 9/26//11 (0)
Batch IDs: 179327
Method Blank: OK
LCS: OK
MS/MSD: MS OK
MSD OK

Parameter: **TDS**

HTs: 7 days – extracted 9/27/11 (1), analyzed 9/28/11 (2)
Batch IDs: 179370
Method Blank: OK
BS/BSD: BS OK
BSD OK
SDUP: OK


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 231342
ANALYTICAL REPORT

Malcolm Pirnie, Inc.	Project : 4656016
2000 Powell St.	Location : Port Of Oakland - HFC
Emeryville, CA 94608	Level : II

Sample ID	Lab ID
MW-8A	231342-001
MW-10	231342-002
MW-2	231342-003
MW-11	231342-004
MW-12	231342-005
TB-092611	231342-006

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: Desiree N. Tetrault Date: 10/18/2011
Project Manager

NELAP # 01107CA

Curtis & Tompkins, Ltd.

CASE NARRATIVE

Laboratory number:	**231342**
Client:	**Malcolm Pirnie, Inc.**
Project:	**4656016**
Location:	**Port Of Oakland - HFC**
Request Date:	**09/26/11**
Samples Received:	**09/26/11**

This data package contains sample and QC results for six water samples, requested for the above referenced project on 09/26/11. The samples were received cold and intact.

TPH-Purgeables and/or BTXE by GC (EPA 8015B):
No analytical problems were encountered.

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

Volatile Organics by GC/MS (EPA 8260B):
No analytical problems were encountered.

Metals (EPA 6010B):
No analytical problems were encountered.

Metals (EPA 200.7):
No analytical problems were encountered.

Ion Chromatography (EPA 300.0):
MW-11 (lab # 231342-004) was diluted due to high chloride concentration. No other analytical problems were encountered.

Alkalinity (SM2320B):
No analytical problems were encountered.

Dissolved Sulfide (SM4500S2-D):
No analytical problems were encountered.

Total Dissolved Solids (TDS) (SM2540C):
High RPD was observed for total dissolved solids in the BS/BSD for batch 179370. No other analytical problems were encountered.

Orthophosphate Phosphorous (SM4500P-E):
No analytical problems were encountered.

231342 Curtis & Tompkins

ARCADIS
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ID#:

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Page 1 of 1

Lab Work Order #

Send Results to:

Contact & Company Name: S. Carman / ARCADIS

Address:

City: Oakland State: CA Zip:

Telephone:

Fax:

E-mail Address:

Project Name/Location (City, State): Port of Oakland, CA

Project #: 04056016.0000.0083

Sampler's Printed Name:

Sampler's Signature:

Preservative	HCL	HCL	HCL		HNO_3	NaOH
Filtered (✓)					field	
# of Containers	3-ea	3-ea	2-ea	1-ea	1-ea	1ea
Container Information	VOAs	VOAs	Ambers	poly	poly	poly

Keys

Preservation Key:
A. H_2SO_4
B. HCL
C. HNO_3
D. NaOH
E. None
F. Other: _____
G. Other: _____
H. Other: _____

Container Information Key:
1. 40 ml Vial
2. 1 L Amber
3. 250 ml Plastic
4. 500 ml Plastic
5. Encore
6. 2 oz. Glass
7. 4 oz. Glass
8. 8 oz. Glass
9. Other: _____
10. Other: _____

Matrix Key:
SO - Soil, SE - Sediment, NL - NAPL/Oil
W - Water, SL - Sludge, SW - Sample Wipe
T - Tissue, A - Air, Other: _____

	Sample ID	Collection Date	Collection Time	Type (✓) Comp	Type (✓) Grab	Matrix	TPH-G (SW8015B)	BTEX/MTBE (SW8021B)	TPH-D (M)	TDS - Major Anions	Dis. manganese + iron/Major cations	Dis. sulfate	REMARKS
1	MW-8A	9/26/11	1100			water	X	X	X	X	X	X	
2	MW-10		1350										
3	MW-2		1057										
4	MW-11		1423										
5	MW-12		1229										
6	TB-092611												

Special Instructions/Comments:

☐ Special QA/QC Instructions(✓):

Laboratory Information and Receipt		Relinquished By	Received By	Relinquished By	Laboratory Received By
Lab Name:	Cooler Custody Seal (✓)	Printed Name: Caroline Orsi	Printed Name: Pat Gonzalez	Printed Name:	Printed Name:
☐ Cooler packed with ice (✓)	☐ Intact ☐ Not Intact	Signature:	Signature:	Signature:	Signature:
Specify Turnaround Requirements: Standard	Sample Receipt:	Firm:	Firm/Courier: CAT	Firm/Courier:	Firm:
Shipping Tracking #:	Condition/Cooler Temp: _____	Date/Time: 9/26/11 1600	Date/Time: 9/26/11 1610	Date/Time:	Date/Time:

Distribution: WHITE – Laboratory returns with results YELLOW – Lab copy PINK – Retained by ARCADIS

ARCADIS
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ID#:

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Page ___ of 1

Lab Work Order #

Send Results to:

Contact & Company Name:

Telephone:

Address:

Fax:

City State Zip

E-mail Address:

Project Name/Location (City, State):

Project #:

Sampler's Printed Name:

Sampler's Signature:

Sample ID	Collection Date	Collection Time	Type (✓) Comp	Type (✓) Grab	Matrix

Preservative							
Filtered (✓)							
# of Containers							
Container Information							

PARAMETER ANALYSIS & METHOD

Keys

Preservation Key:
A. H_2SO_4
B. HCL
C. HNO_3
D. NaOH
E. None
F. Other: _____
G. Other: _____
H. Other: _____

Container Information Key:
1. 40 ml Vial
2. 1 L Amber
3. 250 ml Plastic
4. 500 ml Plastic
5. Encore
6. 2 oz. Glass
7. 4 oz. Glass
8. 8 oz. Glass
9. Other: _____
10. Other: _____

Matrix Key:
SO - Soil
W - Water
T - Tissue
SE - Sediment
SL - Sludge
A - Air
NL - NAPL/Oil
SW - Sample Wipe
Other: _____

REMARKS

Special Instructions/Comments:

☐ **Special QA/QC Instructions(✓):**

Laboratory Information and Receipt		Relinquished By	Received By	Relinquished By	Laboratory Received By
Lab Name:	Cooler Custody Seal (✓)	Printed Name:	Printed Name:	Printed Name:	Printed Name:
☐ Cooler packed with ice (✓)	☐ Intact ☐ Not Intact	Signature:	Signature:	Signature:	Signature:
Specify Turnaround Requirements:	Sample Receipt:	Firm:	Firm/Courier:	Firm/Courier:	Firm:
Shipping Tracking #:	Condition/Cooler Temp: _____	Date/Time:	Date/Time:	Date/Time:	Date/Time:

20730826 CofC AR Form 01.12.2007

Distribution: **WHITE – Laboratory returns with results** **YELLOW – Lab copy** **PINK – Retained by ARCADIS**

COOLER RECEIPT CHECKLIST

Curtis & Tompkins, Ltd.

Login # 231342 Date Received 9/26/11 Number of coolers 2
Client ARCADIS Project 04656016.0000.00003

Date Opened 9/26/11 By (print) I. CHOY (sign)
Date Logged in ↓ By (print) ↓ (sign) ↓

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~~ ISC
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) 9.8°C

☒ Samples Received on ice & cold without a temperature blank (2 TEMP BLANK IN 1 COOLER) (1 COOLER NO TEMP BLANK)

☒ 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 samples in the appropriate containers for indicated tests? (YES) NO
11. Are sample labels present, in good condition and complete? (YES) NO
12. Do the sample labels agree with custody papers? (YES) NO
13. Was sufficient amount of sample sent for tests requested? (YES) NO
14. Are the samples appropriately preserved? YES (NO) N/A
15. Did you check preservatives for all bottles for each sample? (YES) NO N/A
16. Did you document your preservative check? (YES) NO N/A
17. Did you change the hold time in LIMS for unpreserved VOAs? YES NO (N/A)
18. Are bubbles > 6mm absent in VOA samples? (YES) NO N/A
19. Was the client contacted concerning this sample delivery? YES NO
If YES, Who was called? By Date:

COMMENTS
H)-004. PH WAS ABOVE 2. ADDED HNO3 (#K14036) ON 9/26/11 @ 1714

Rev 8, 6/11

Curtis & Tompkins Sample Preservation for 231342

Sample	pH: <2	>12	Other
-001a	[ ]	[ ]	
b	[ ]	[ ]	
c	[ ]	[ ]	
d	[ ]	[ ]	
e	[ ]	[ ]	
f	[ ]	[ ]	
g	[ ]	[X]	
h	[X]	[ ]	
i	[ ]	[ ]	
j	[ ]	[ ]	
k	[ ]	[ ]	
-002a	[ ]	[ ]	
b	[ ]	[ ]	
c	[ ]	[ ]	
d	[ ]	[ ]	
e	[ ]	[ ]	
f	[ ]	[ ]	
g	[ ]	[X]	
h	[X]	[ ]	
i	[ ]	[ ]	
j	[ ]	[ ]	
k	[ ]	[ ]	
-003a	[ ]	[ ]	
b	[ ]	[ ]	
c	[ ]	[ ]	
d	[ ]	[ ]	
e	[ ]	[ ]	
f	[ ]	[ ]	
g	[ ]	[X]	
h	[X]	[ ]	
i	[ ]	[ ]	
j	[ ]	[ ]	
k	[ ]	[ ]	
-004a	[ ]	[ ]	
b	[ ]	[ ]	
c	[ ]	[ ]	
d	[ ]	[ ]	
e	[ ]	[ ]	
f	[ ]	[ ]	
g	[ ]	[X]	
h	[X]	[ ]	
i	[ ]	[ ]	
j	[ ]	[ ]	
k	[ ]	[ ]	
-005a	[ ]	[ ]	
b	[ ]	[ ]	
c	[ ]	[ ]	
d	[ ]	[ ]	
e	[ ]	[ ]	
f	[ ]	[ ]	
g	[ ]	[X]	
h	[X]	[ ]	
i	[ ]	[ ]	
j	[ ]	[ ]	
k	[ ]	[ ]	

Analyst: _____

Date: 9/26/11

Page 1 of 1

Curtis & Tompkins, Ltd.

Total Volatile Hydrocarbons

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	09/26/11
Units:	ug/L	Received:	09/26/11
Diln Fac:	1.000	Analyzed:	09/30/11
Batch#:	179480		

Field ID: MW-8A Lab ID: 231342-001
Type: SAMPLE

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	94	78-123

Field ID: MW-10 Lab ID: 231342-002
Type: SAMPLE

Analyte	Result	RL
Gasoline C7-C12	260 Y	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	100	78-123

Field ID: MW-2 Lab ID: 231342-003
Type: SAMPLE

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	96	78-123

Field ID: MW-11 Lab ID: 231342-004
Type: SAMPLE

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	94	78-123

Field ID: MW-12 Lab ID: 231342-005
Type: SAMPLE

Analyte	Result	RL
Gasoline C7-C12	62 Y	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	91	78-123

Y= Sample exhibits chromatographic pattern which does not resemble standard
ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Total Volatile Hydrocarbons

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	09/26/11
Units:	ug/L	Received:	09/26/11
Diln Fac:	1.000	Analyzed:	09/30/11
Batch#:	179480		

Field ID: TB-092611 Lab ID: 231342-006
Type: SAMPLE

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	94	78-123

Type: BLANK Lab ID: QC611240

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	83	78-123

Y= Sample exhibits chromatographic pattern which does not resemble standard
ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Total Volatile Hydrocarbons

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC611239	Batch#:	179480
Matrix:	Water	Analyzed:	09/30/11
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	1,000	888.7	89	80-120

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	99	78-123

Curtis & Tompkins, Ltd.

Batch QC Report

Total Volatile Hydrocarbons

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8015B
Field ID:	ZZZZZZZZZZ	Batch#:	179480
MSS Lab ID:	231410-002	Sampled:	09/28/11
Matrix:	Water	Received:	09/29/11
Units:	ug/L	Analyzed:	09/30/11
Diln Fac:	1.000		

Type: MS Lab ID: QC611241

Analyte	MSS Result	Spiked	Result	%REC	Limits
Gasoline C7-C12	209.4	2,000	2,062	93	66-120

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	108	78-123

Type: MSD Lab ID: QC611242

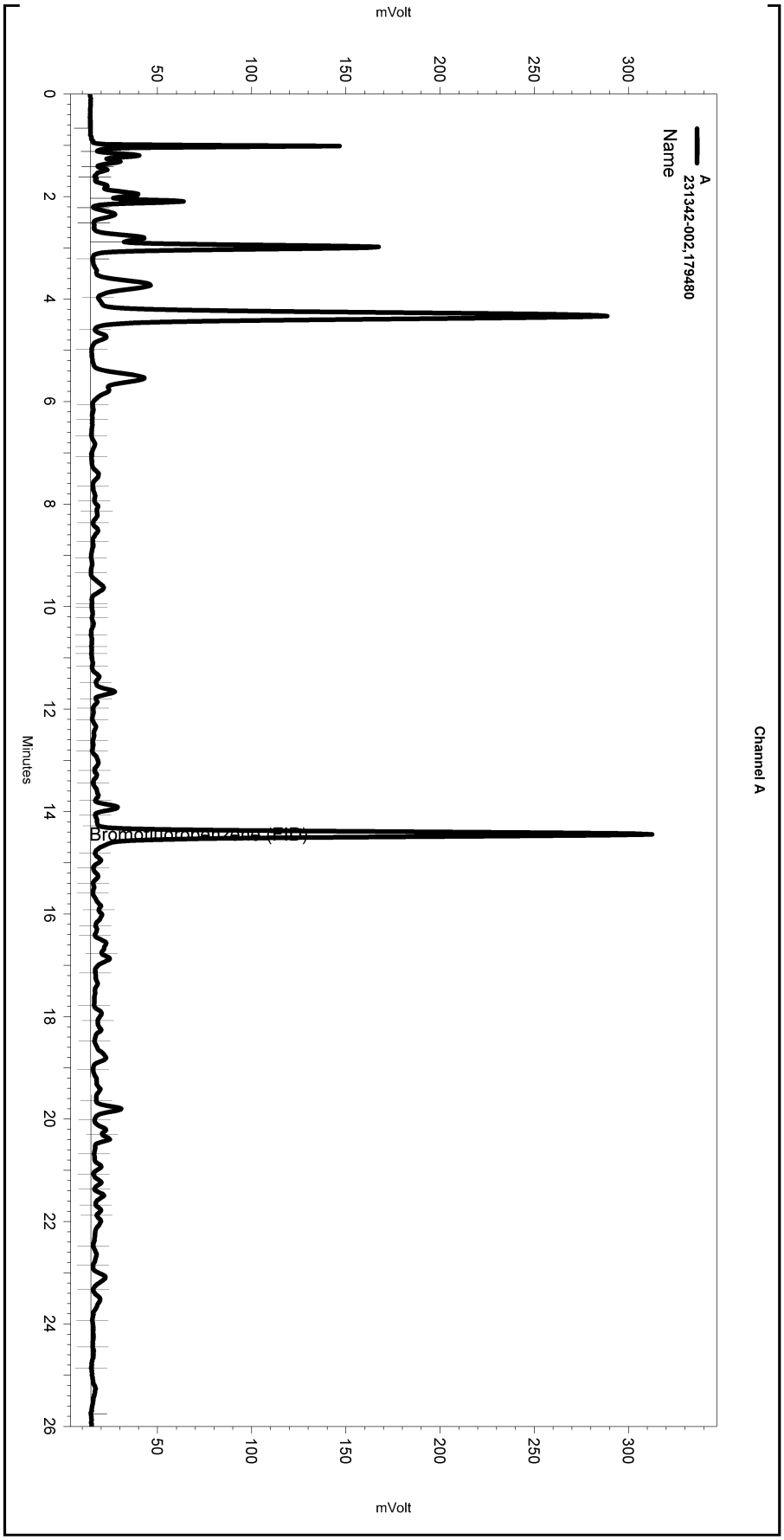
Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	2,000	2,088	94	66-120	1	25

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	109	78-123

RPD= Relative Percent Difference

Sequence File: **\\Lims\gdrive\ezchrom\Projects\GC04\Sequence\272.seq**
Sample Name: **231342-002,179480**
Data File: **\\Lims\gdrive\ezchrom\Projects\GC04\Data\272-033**
Instrument: GC04 (Offline) Vial: N/A Operator: Tvh 1. Analyst (lims2k3\tvh1)
Method Name: \\Lims\gdrive\ezchrom\Projects\GC04\Method\tvhbtxe272.met

Software Version 3.1.7
Run Date: 9/30/2011 9:31:18 AM
Analysis Date: 9/30/2011 4:12:07 PM
Sample Amount: 5 Multiplier: 5
Vial & pH or Core ID: b1.0



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Integration Events

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

Manual Integration Fixes

Data File: \\Lims\gdrive\ezchrom\Projects\GC04\Data\272-033

Enabled	Event Type	Start (Minutes)	Stop (Minutes)	Value
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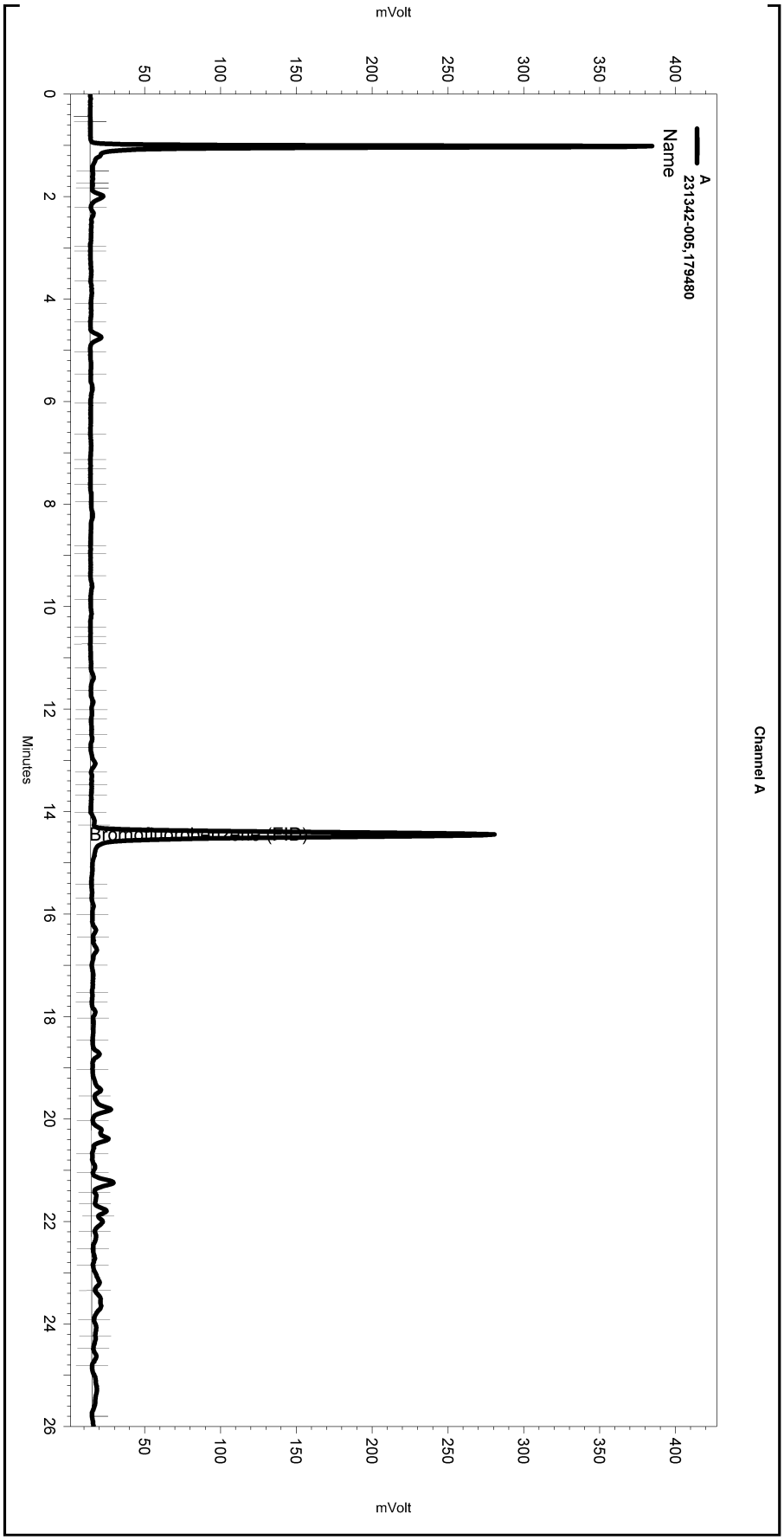
Sequence File: **\\Lims\gdrive\ezchrom\Projects\GC04\Sequence\272.seq**
Sample Name: **231342-005,179480**
Data File: **\\Lims\gdrive\ezchrom\Projects\GC04\Data\272-036**
Instrument: GC04 (Offline) Vial: N/A Operator: Tvh 1. Analyst (lims2k3\tvh1)
Method Name: \\Lims\gdrive\ezchrom\Projects\GC04\Method\tvhbtxe272.met

Software Version 3.1.7
Run Date: 9/30/2011 11:23:53 AM
Analysis Date: 9/30/2011 4:13:59 PM
Sample Amount: 5 Multiplier: 5
Vial & pH or Core ID: b1.0



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Integration Events

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

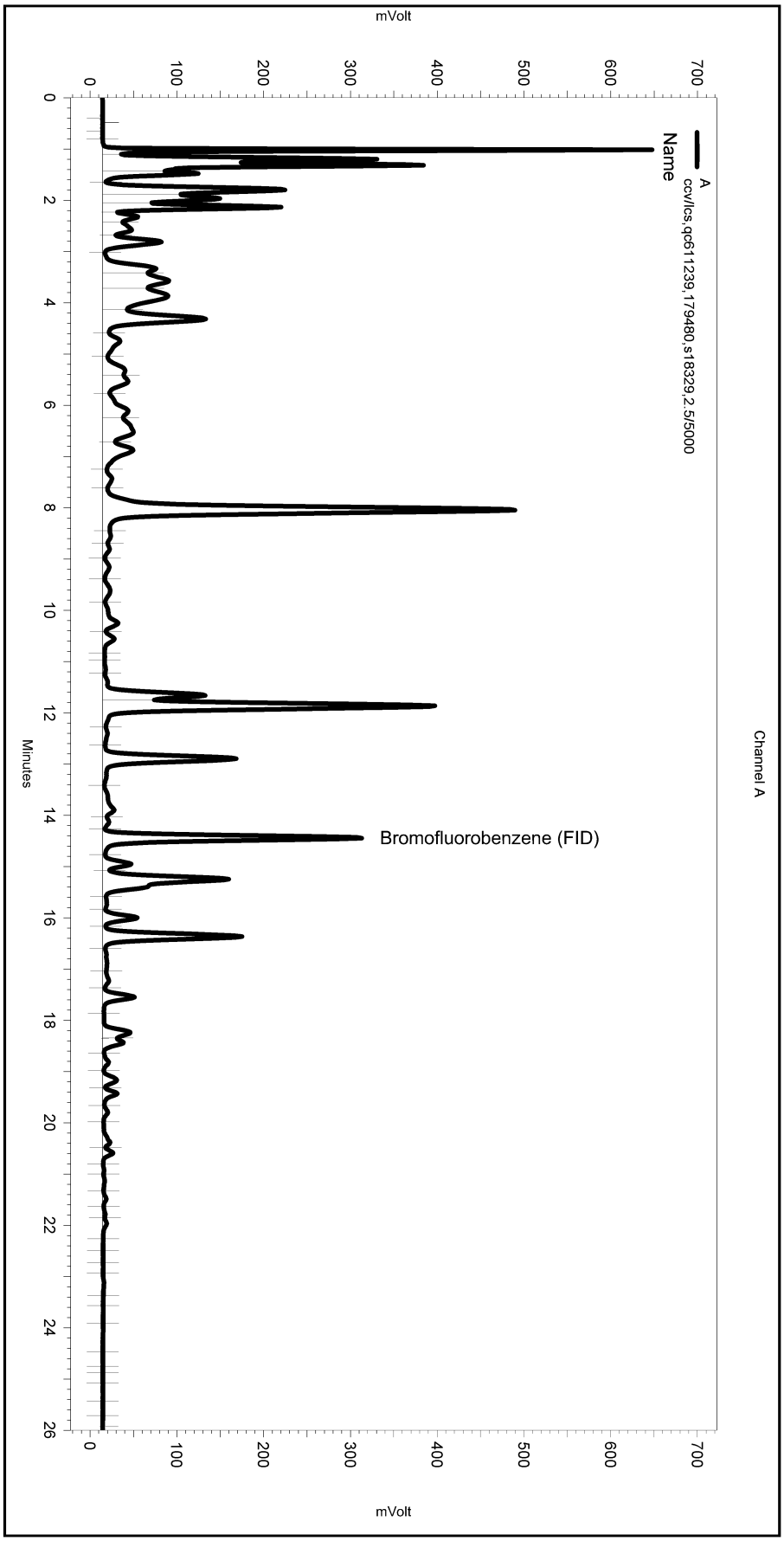
Manual Integration Fixes

Data File: \\Lims\gdrive\ezchrom\Projects\GC04\Data\272-036

Enabled	Event Type	Start (Minutes)	Stop (Minutes)	Value
Yes	Split Peak	14.274	0	0

Sequence File: **\\Lims\gdrive\ezchrom\Projects\GC04\Sequence\272.seq**
Sample Name: **ccv/lcs,qc611239,179480,s18329,2.5/5000**
Data File: **\\Lims\gdrive\ezchrom\Projects\GC04\Data\272-029**
Instrument: GC04 Vial: N/A Operator: lims2k3\tvh3
Method Name: \\Lims\gdrive\ezchrom\Projects\GC04\Method\tvhbtxe272.met

Software Version 3.1.7
Run Date: 9/30/2011 7:00:56 AM
Analysis Date: 9/30/2011 7:30:25 AM
Sample Amount: 5 Multiplier: 5
Vial & pH or Core ID: {Data Description}



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No items selected for this section

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No items selected for this section

Integration Events

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

Manual Integration Fixes

Data File: C:\Documents and Settings\All Users\Application Data\ChromatographySystem\Recovery Data\Instrument.10047\272-029_6192.tmp

Enabled	Event Type	Start (Minutes)	Stop (Minutes)	Value

None

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 3520C
Project#:	4656016	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	09/26/11
Units:	ug/L	Received:	09/26/11
Diln Fac:	1.000	Prepared:	09/27/11
Batch#:	179376		

Field ID: MW-8A
Type: SAMPLE
Lab ID: 231342-001
Analyzed: 09/29/11

Analyte	Result	RL
Diesel C10-C24	930 Y	50
Motor Oil C24-C36	870	300

Surrogate	%REC	Limits
o-Terphenyl	106	68-120

Field ID: MW-10
Type: SAMPLE
Lab ID: 231342-002
Analyzed: 09/30/11

Analyte	Result	RL
Diesel C10-C24	24,000	50
Motor Oil C24-C36	4,700	300

Surrogate	%REC	Limits
o-Terphenyl	108	68-120

Field ID: MW-2
Type: SAMPLE
Lab ID: 231342-003
Analyzed: 09/29/11

Analyte	Result	RL
Diesel C10-C24	170 Y	50
Motor Oil C24-C36	ND	300

Surrogate	%REC	Limits
o-Terphenyl	104	68-120

Y= Sample exhibits chromatographic pattern which does not resemble standard
ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 3520C
Project#:	4656016	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	09/26/11
Units:	ug/L	Received:	09/26/11
Diln Fac:	1.000	Prepared:	09/27/11
Batch#:	179376		

Field ID: MW-11 Lab ID: 231342-004
Type: SAMPLE Analyzed: 09/29/11

Analyte	Result	RL
Diesel C10-C24	5,300 Y	50
Motor Oil C24-C36	1,800	300

Surrogate	%REC	Limits
o-Terphenyl	96	68-120

Field ID: MW-12 Lab ID: 231342-005
Type: SAMPLE Analyzed: 09/29/11

Analyte	Result	RL
Diesel C10-C24	2,800	50
Motor Oil C24-C36	1,300	300

Surrogate	%REC	Limits
o-Terphenyl	108	68-120

Type: BLANK Analyzed: 09/28/11
Lab ID: QC610823

Analyte	Result	RL
Diesel C10-C24	ND	50
Motor Oil C24-C36	ND	300

Surrogate	%REC	Limits
o-Terphenyl	100	68-120

Y= Sample exhibits chromatographic pattern which does not resemble standard
ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Total Extractable Hydrocarbons

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 3520C
Project#:	4656016	Analysis:	EPA 8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC610824	Batch#:	179376
Matrix:	Water	Prepared:	09/27/11
Units:	ug/L	Analyzed:	09/28/11

Analyte	Spiked	Result	%REC	Limits
Diesel C10-C24	2,500	2,214	89	61-120

Surrogate	%REC	Limits
o-Terphenyl	95	68-120

Curtis & Tompkins, Ltd.

Batch QC Report

Total Extractable Hydrocarbons

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 3520C
Project#:	4656016	Analysis:	EPA 8015B
Field ID:	ZZZZZZZZZZ	Batch#:	179376
MSS Lab ID:	231369-001	Sampled:	09/27/11
Matrix:	Water	Received:	09/27/11
Units:	ug/L	Prepared:	09/27/11
Diln Fac:	1.000	Analyzed:	09/28/11

Type: MS Lab ID: QC610825

Analyte	MSS Result	Spiked	Result	%REC	Limits
Diesel C10-C24	287.9	2,500	1,927	66	33-140

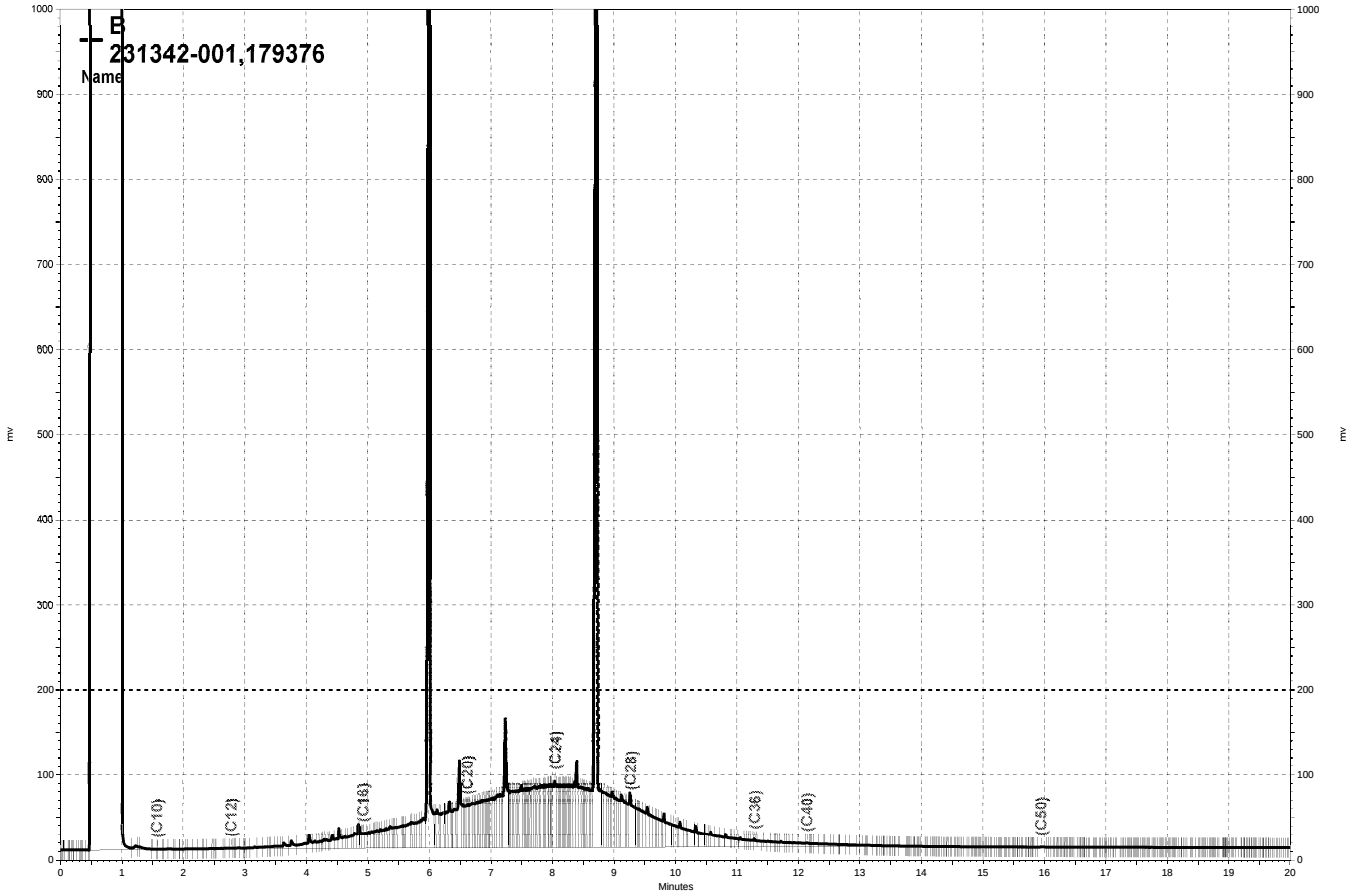
Surrogate	%REC	Limits
o-Terphenyl	85	68-120

Type: MSD Lab ID: QC610826

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Diesel C10-C24	2,500	2,359	83	33-140	20	30

Surrogate	%REC	Limits
o-Terphenyl	103	68-120

RPD= Relative Percent Difference



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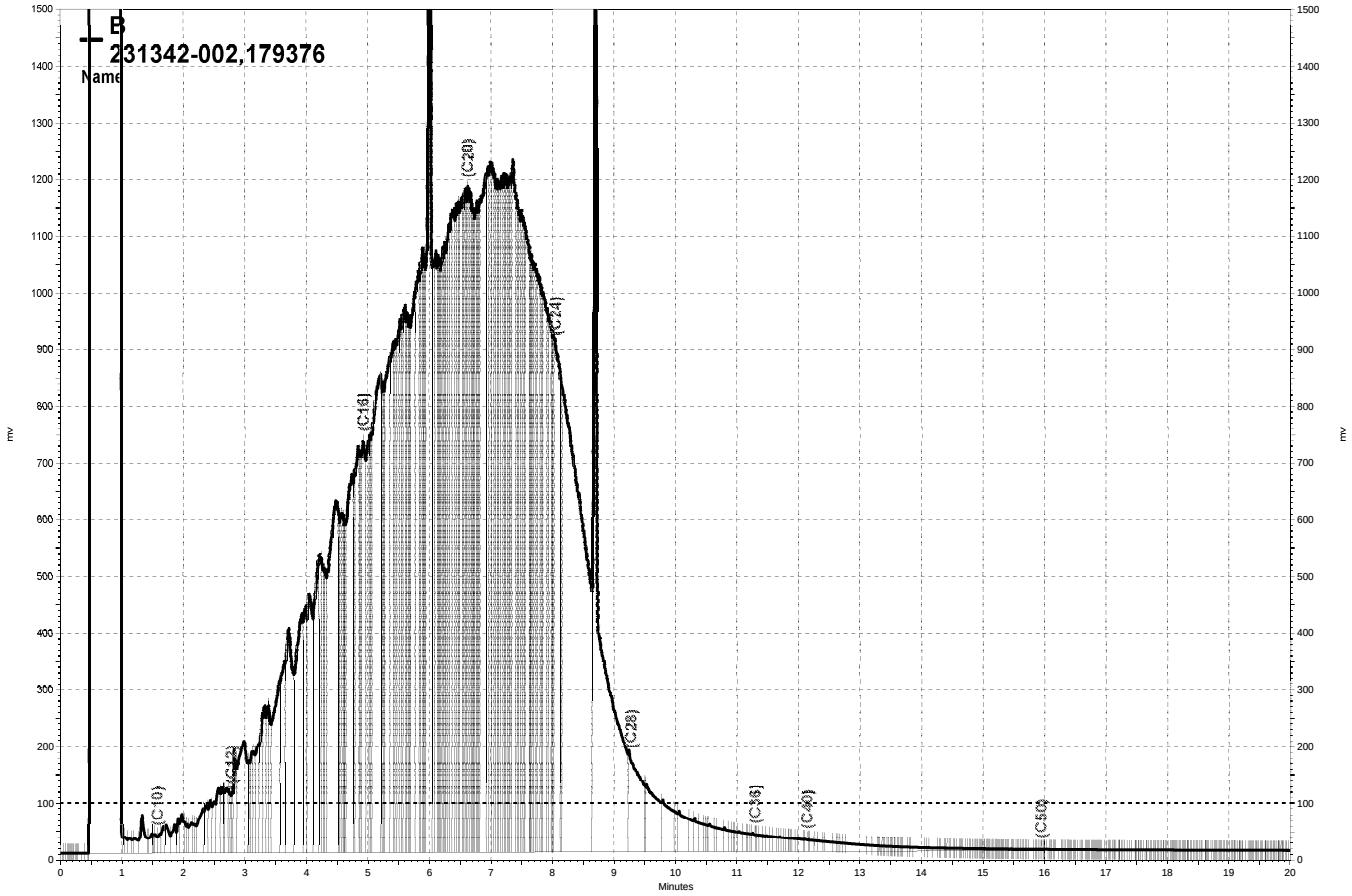

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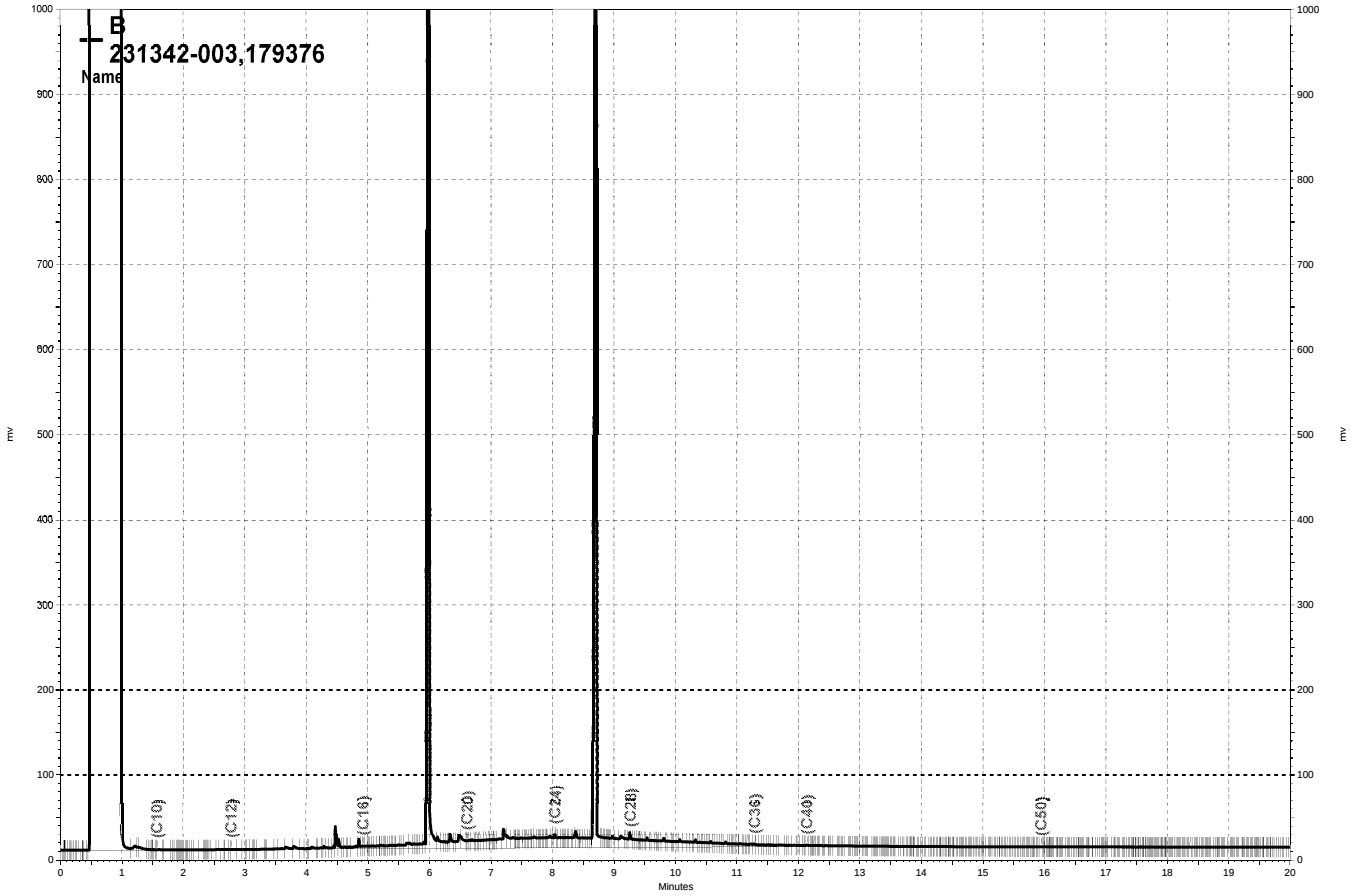

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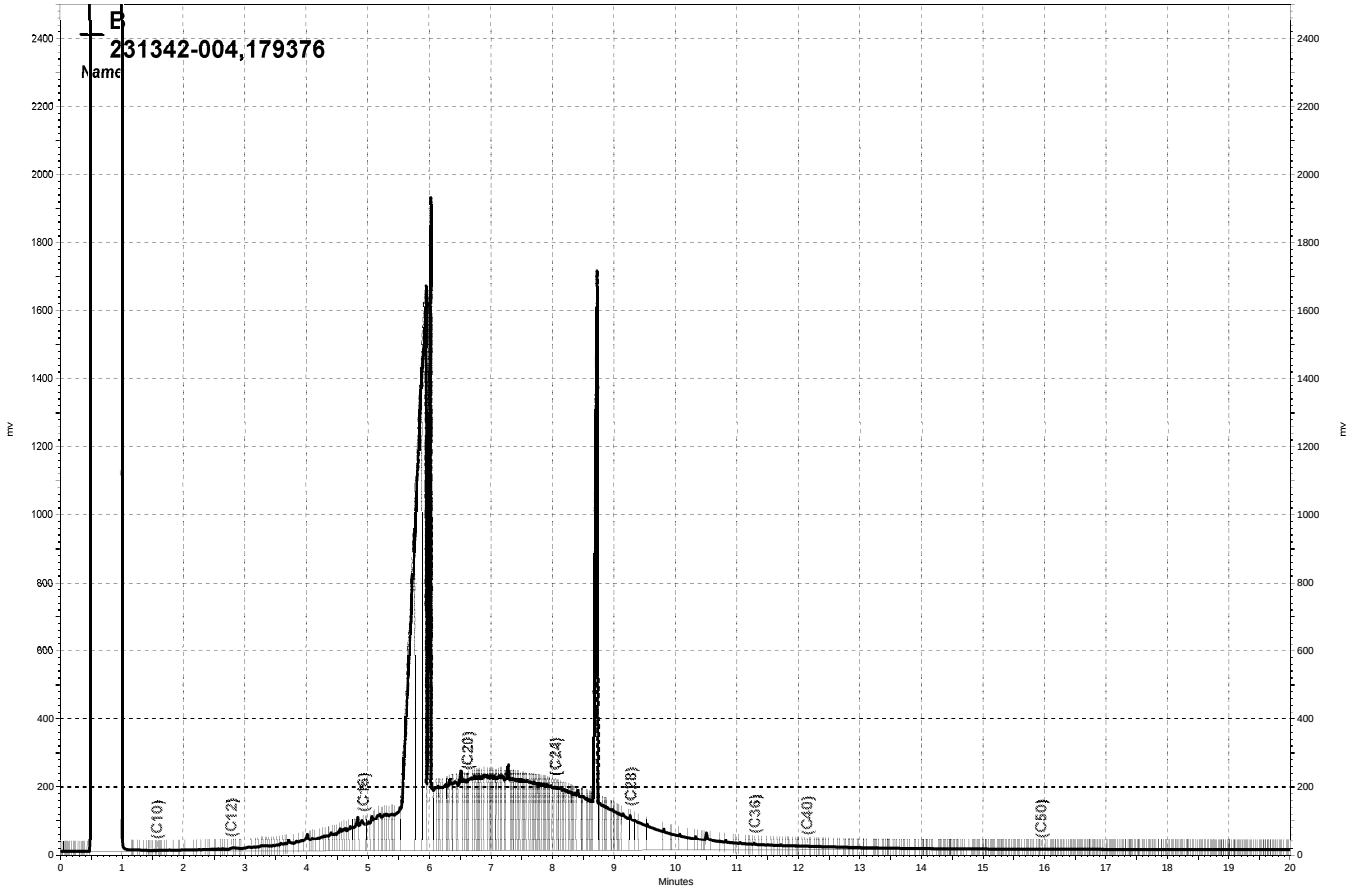

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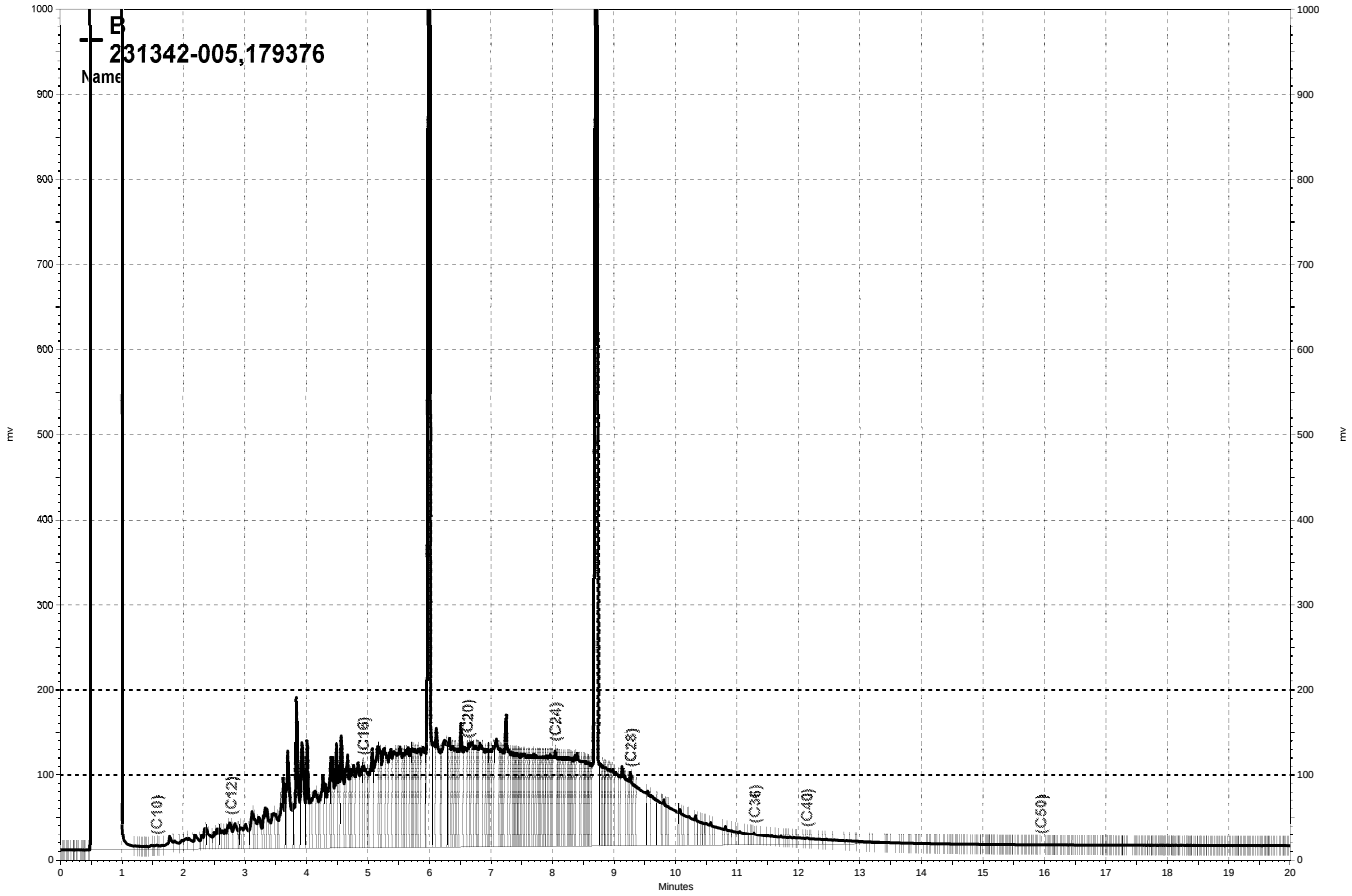

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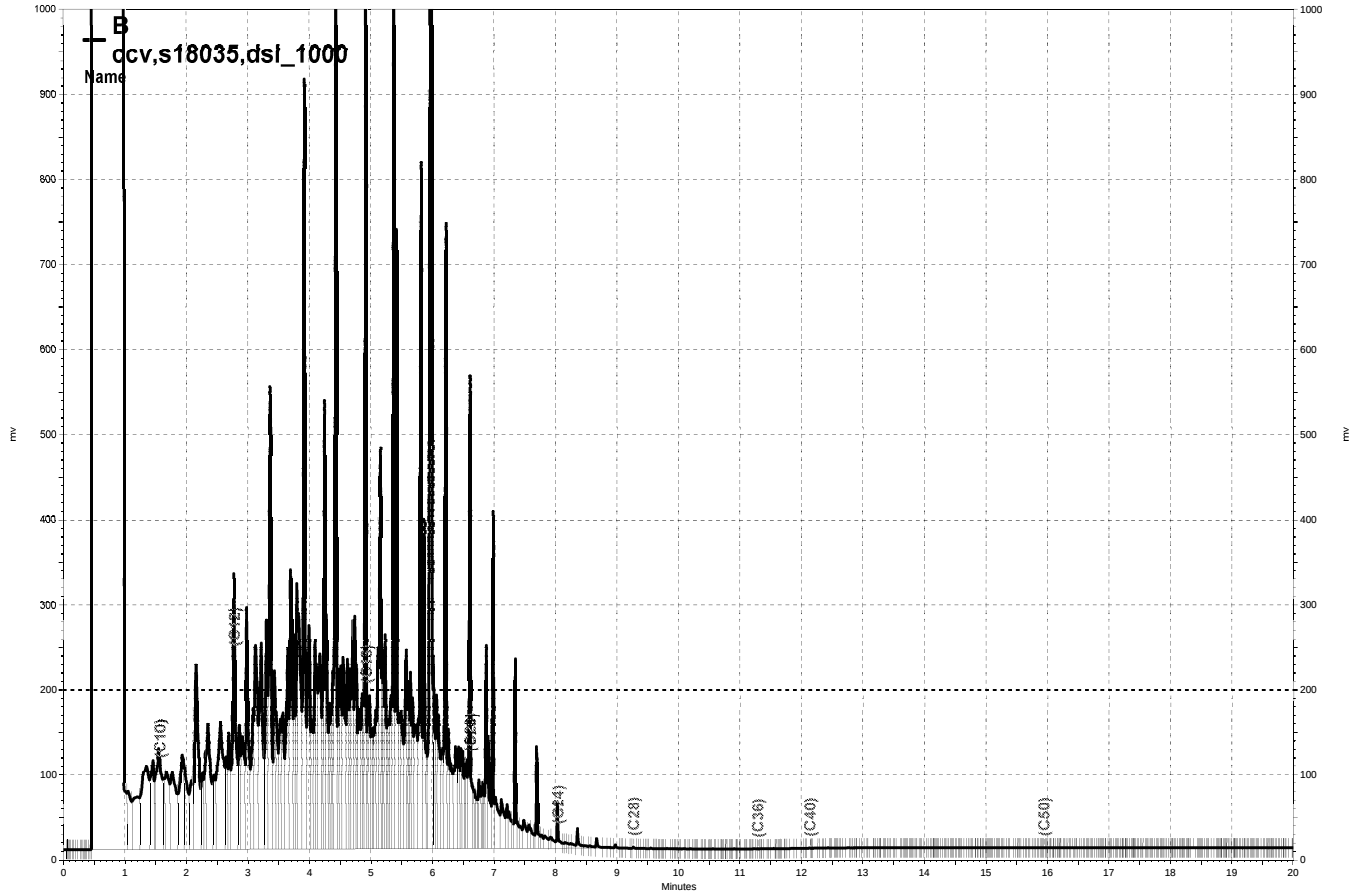

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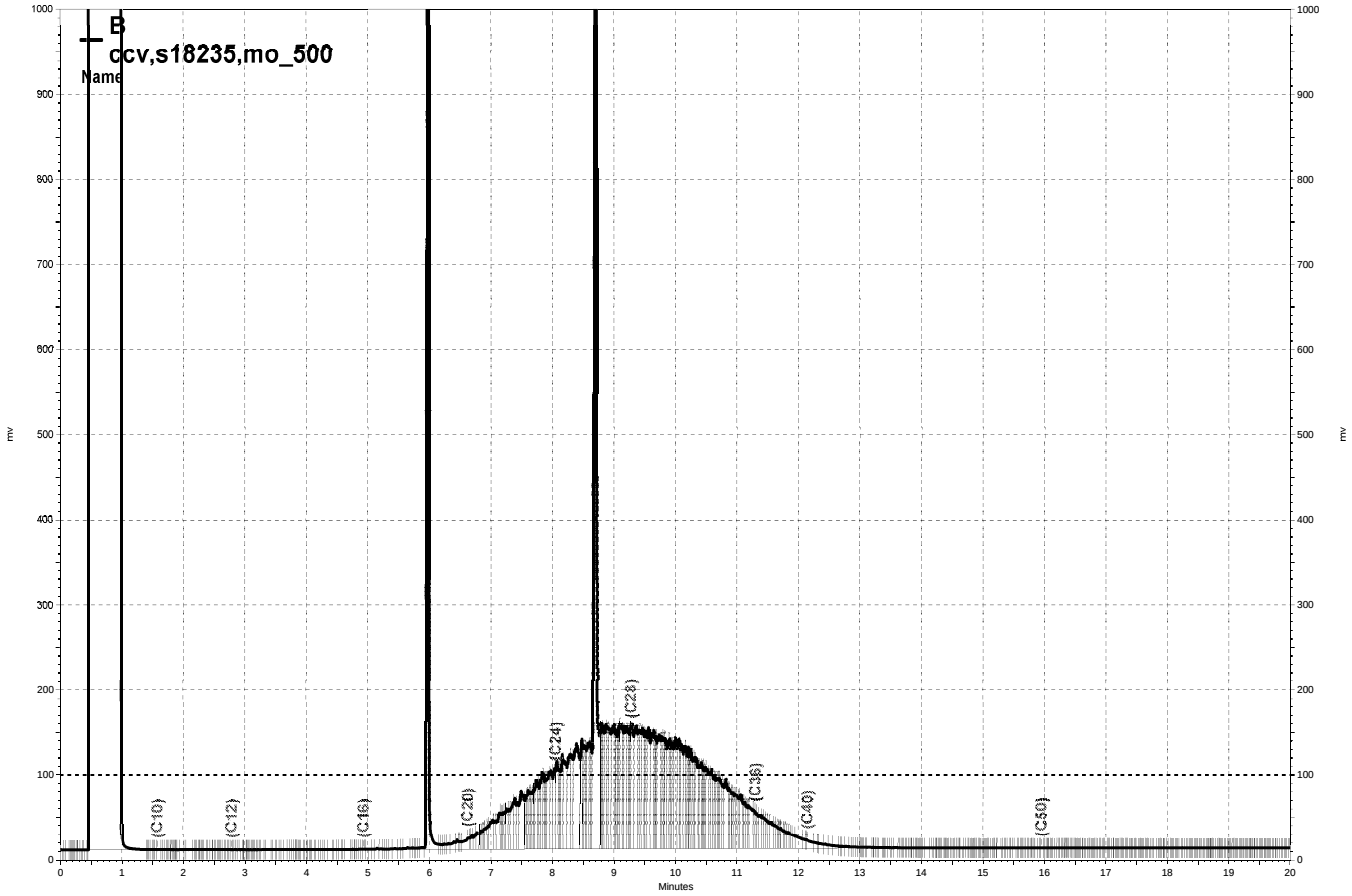

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Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-8A	Batch#:	179391
Lab ID:	231342-001	Sampled:	09/26/11
Matrix:	Water	Received:	09/26/11
Units:	ug/L	Analyzed:	09/28/11
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	ND	0.5
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5

Surrogate	%REC	Limits
Dibromofluoromethane	104	80-127
1,2-Dichloroethane-d4	102	73-145
Toluene-d8	101	80-120
Bromofluorobenzene	96	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-10	Batch#:	179391
Lab ID:	231342-002	Sampled:	09/26/11
Matrix:	Water	Received:	09/26/11
Units:	ug/L	Analyzed:	09/28/11
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	ND	0.5
Benzene	61	0.5
Toluene	0.6	0.5
Ethylbenzene	2.4	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5

Surrogate	%REC	Limits
Dibromofluoromethane	104	80-127
1,2-Dichloroethane-d4	105	73-145
Toluene-d8	101	80-120
Bromofluorobenzene	97	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-2	Batch#:	179391
Lab ID:	231342-003	Sampled:	09/26/11
Matrix:	Water	Received:	09/26/11
Units:	ug/L	Analyzed:	09/28/11
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	ND	0.5
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5

Surrogate	%REC	Limits
Dibromofluoromethane	102	80-127
1,2-Dichloroethane-d4	101	73-145
Toluene-d8	101	80-120
Bromofluorobenzene	99	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-11	Batch#:	179444
Lab ID:	231342-004	Sampled:	09/26/11
Matrix:	Water	Received:	09/26/11
Units:	ug/L	Analyzed:	09/29/11
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	ND	0.5
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5

Surrogate	%REC	Limits
Dibromofluoromethane	101	80-127
1,2-Dichloroethane-d4	97	73-145
Toluene-d8	99	80-120
Bromofluorobenzene	97	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-12	Batch#:	179444
Lab ID:	231342-005	Sampled:	09/26/11
Matrix:	Water	Received:	09/26/11
Units:	ug/L	Analyzed:	09/29/11
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	4.2	0.5
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5

Surrogate	%REC	Limits
Dibromofluoromethane	100	80-127
1,2-Dichloroethane-d4	97	73-145
Toluene-d8	99	80-120
Bromofluorobenzene	96	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	TB-092611	Batch#:	179444
Lab ID:	231342-006	Sampled:	09/26/11
Matrix:	Water	Received:	09/26/11
Units:	ug/L	Analyzed:	09/29/11
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	ND	0.5
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5

Surrogate	%REC	Limits
Dibromofluoromethane	103	80-127
1,2-Dichloroethane-d4	100	73-145
Toluene-d8	101	80-120
Bromofluorobenzene	100	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Aromatics by GC/MS

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Matrix:	Water	Batch#:	179391
Units:	ug/L	Analyzed:	09/28/11
Diln Fac:	1.000		

Type: BS Lab ID: QC610898

Analyte	Spiked	Result	%REC	Limits
MTBE	31.25	30.96	99	59-123
Benzene	31.25	34.12	109	80-122
Toluene	31.25	33.46	107	80-120
Ethylbenzene	31.25	34.15	109	80-120
m,p-Xylenes	62.50	68.37	109	80-120
o-Xylene	31.25	32.81	105	80-120

Surrogate	%REC	Limits
Dibromofluoromethane	103	80-127
1,2-Dichloroethane-d4	101	73-145
Toluene-d8	101	80-120
Bromofluorobenzene	98	80-120

Type: BSD Lab ID: QC610899

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	31.25	30.69	98	59-123	1	20
Benzene	31.25	32.48	104	80-122	5	20
Toluene	31.25	31.98	102	80-120	5	20
Ethylbenzene	31.25	32.53	104	80-120	5	20
m,p-Xylenes	62.50	65.19	104	80-120	5	20
o-Xylene	31.25	31.46	101	80-120	4	20

Surrogate	%REC	Limits
Dibromofluoromethane	103	80-127
1,2-Dichloroethane-d4	101	73-145
Toluene-d8	101	80-120
Bromofluorobenzene	99	80-120

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Aromatics by GC/MS

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC610900	Batch#:	179391
Matrix:	Water	Analyzed:	09/28/11
Units:	ug/L		

Analyte	Result	RL
MTBE	ND	0.5
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5

Surrogate	%REC	Limits
Dibromofluoromethane	101	80-127
1,2-Dichloroethane-d4	100	73-145
Toluene-d8	101	80-120
Bromofluorobenzene	101	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Aromatics by GC/MS

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Matrix:	Water	Batch#:	179444
Units:	ug/L	Analyzed:	09/29/11
Diln Fac:	1.000		

Type: BS Lab ID: QC611101

Analyte	Spiked	Result	%REC	Limits
MTBE	25.00	24.15	97	59-123
Benzene	25.00	26.22	105	80-122
Toluene	25.00	25.95	104	80-120
Ethylbenzene	25.00	26.52	106	80-120
m,p-Xylenes	50.00	53.21	106	80-120
o-Xylene	25.00	25.80	103	80-120

Surrogate	%REC	Limits
Dibromofluoromethane	104	80-127
1,2-Dichloroethane-d4	100	73-145
Toluene-d8	100	80-120
Bromofluorobenzene	98	80-120

Type: BSD Lab ID: QC611102

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	25.00	24.08	96	59-123	0	20
Benzene	25.00	25.36	101	80-122	3	20
Toluene	25.00	25.11	100	80-120	3	20
Ethylbenzene	25.00	25.53	102	80-120	4	20
m,p-Xylenes	50.00	50.72	101	80-120	5	20
o-Xylene	25.00	24.67	99	80-120	4	20

Surrogate	%REC	Limits
Dibromofluoromethane	102	80-127
1,2-Dichloroethane-d4	99	73-145
Toluene-d8	101	80-120
Bromofluorobenzene	99	80-120

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Aromatics by GC/MS

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC611103	Batch#:	179444
Matrix:	Water	Analyzed:	09/29/11
Units:	ug/L		

Analyte	Result	RL
MTBE	ND	0.5
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5

Surrogate	%REC	Limits
Dibromofluoromethane	102	80-127
1,2-Dichloroethane-d4	99	73-145
Toluene-d8	102	80-120
Bromofluorobenzene	101	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Dissolved Iron

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 6010B
Analyte:	Iron	Sampled:	09/26/11
Matrix:	Filtrate	Received:	09/26/11
Units:	ug/L	Prepared:	09/27/11
Diln Fac:	1.000	Analyzed:	09/30/11
Batch#:	179385		

Field ID	Type	Lab ID	Result	RL
MW-8A	SAMPLE	231342-001	2,900	100
MW-10	SAMPLE	231342-002	8,800	100
MW-2	SAMPLE	231342-003	ND	100
MW-11	SAMPLE	231342-004	1,500	100
MW-12	SAMPLE	231342-005	670	100
	BLANK	QC610863	ND	100

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Dissolved Manganese

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 6010B
Analyte:	Manganese	Sampled:	09/26/11
Matrix:	Filtrate	Received:	09/26/11
Units:	ug/L	Prepared:	09/27/11
Diln Fac:	1.000	Analyzed:	09/30/11
Batch#:	179385		

Field ID	Type	Lab ID	Result	RL
MW-8A	SAMPLE	231342-001	850	5.0
MW-10	SAMPLE	231342-002	4,500	5.0
MW-2	SAMPLE	231342-003	190	5.0
MW-11	SAMPLE	231342-004	380	5.0
MW-12	SAMPLE	231342-005	1,400	5.0
	BLANK	QC610863	ND	5.0

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Iron

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 6010B
Analyte:	Iron	Batch#:	179385
Field ID:	MW-8A	Sampled:	09/26/11
MSS Lab ID:	231342-001	Received:	09/26/11
Matrix:	Filtrate	Prepared:	09/27/11
Units:	ug/L	Analyzed:	09/30/11
Diln Fac:	1.000		

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
BS	QC610864		1,000	1,047	105	73-124		
BSD	QC610865		1,000	1,017	102	73-124	3	25
MS	QC610866	2,926	1,000	3,742	82	61-129		
MSD	QC610867		1,000	3,750	82	61-129	0	32

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Manganese

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 6010B
Analyte:	Manganese	Batch#:	179385
Field ID:	MW-8A	Sampled:	09/26/11
MSS Lab ID:	231342-001	Received:	09/26/11
Matrix:	Filtrate	Prepared:	09/27/11
Units:	ug/L	Analyzed:	09/30/11
Diln Fac:	1.000		

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
BS	QC610864		50.00	56.40	113	80-120		
BSD	QC610865		50.00	56.56	113	80-120	0	21
MS	QC610866	846.9	50.00	856.2	19 NM	64-128		
MSD	QC610867		50.00	874.7	56 NM	64-128	2	26

NM= Not Meaningful: Sample concentration > 4X spike concentration
RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Dissolved Metals Analytical Report

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 200.7
Analyte:	Calcium	Sampled:	09/26/11
Matrix:	Filtrate	Received:	09/26/11
Units:	ug/L	Prepared:	09/27/11
Batch#:	179385		

Field ID	Type	Lab ID	Result	RL	Diln Fac	Analyzed
MW-8A	SAMPLE	231342-001	53,000	500	1.000	09/30/11
MW-10	SAMPLE	231342-002	150,000	2,000	10.00	10/14/11
MW-2	SAMPLE	231342-003	29,000	500	1.000	09/30/11
MW-11	SAMPLE	231342-004	25,000	500	1.000	09/30/11
MW-12	SAMPLE	231342-005	96,000	500	1.000	09/30/11
	BLANK	QC610863	ND	500	1.000	09/30/11

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Dissolved Metals Analytical Report

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 200.7
Analyte:	Potassium	Sampled:	09/26/11
Matrix:	Filtrate	Received:	09/26/11
Units:	ug/L	Prepared:	09/27/11
Diln Fac:	1.000	Analyzed:	09/30/11
Batch#:	179385		

Field ID	Type	Lab ID	Result	RL
MW-8A	SAMPLE	231342-001	18,000	500
MW-10	SAMPLE	231342-002	31,000	500
MW-2	SAMPLE	231342-003	1,300	500
MW-11	SAMPLE	231342-004	49,000	500
MW-12	SAMPLE	231342-005	15,000	500
	BLANK	QC610863	ND	500

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Dissolved Metals Analytical Report

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 200.7
Analyte:	Magnesium	Sampled:	09/26/11
Matrix:	Filtrate	Received:	09/26/11
Units:	ug/L	Prepared:	09/27/11
Diln Fac:	1.000	Analyzed:	09/30/11
Batch#:	179385		

Field ID	Type	Lab ID	Result	RL
MW-8A	SAMPLE	231342-001	65,000	500
MW-10	SAMPLE	231342-002	72,000	500
MW-2	SAMPLE	231342-003	29,000	500
MW-11	SAMPLE	231342-004	51,000	500
MW-12	SAMPLE	231342-005	43,000	500
	BLANK	QC610863	ND	500

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Dissolved Metals Analytical Report

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 200.7
Analyte:	Sodium	Sampled:	09/26/11
Matrix:	Filtrate	Received:	09/26/11
Units:	ug/L	Prepared:	09/27/11
Batch#:	179385		

Field ID	Type	Lab ID	Result	RL	Diln Fac	Analyzed
MW-8A	SAMPLE	231342-001	280,000	5,000	10.00	10/05/11
MW-10	SAMPLE	231342-002	450,000	5,000	10.00	10/14/11
MW-2	SAMPLE	231342-003	180,000	5,000	10.00	10/14/11
MW-11	SAMPLE	231342-004	1,100,000	50,000	100.0	10/14/11
MW-12	SAMPLE	231342-005	180,000	5,000	10.00	10/14/11
	BLANK	QC610863	ND	500	1.000	09/30/11

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Metals Analytical Report

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 200.7
Analyte:	Calcium	Batch#:	179385
Field ID:	MW-8A	Sampled:	09/26/11
MSS Lab ID:	231342-001	Received:	09/26/11
Matrix:	Filtrate	Prepared:	09/27/11
Units:	ug/L	Analyzed:	09/30/11
Diln Fac:	1.000		

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
BS	QC610864		20,000	19,880	99	78-120		
BSD	QC610865		20,000	20,150	101	78-120	1	20
MS	QC610866	53,360	20,000	70,260	85	53-134		
MSD	QC610867		20,000	69,470	81	53-134	1	20

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Metals Analytical Report

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 200.7
Analyte:	Potassium	Batch#:	179385
Field ID:	MW-8A	Sampled:	09/26/11
MSS Lab ID:	231342-001	Received:	09/26/11
Matrix:	Filtrate	Prepared:	09/27/11
Units:	ug/L	Analyzed:	09/30/11
Diln Fac:	1.000		

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
BS	QC610864		10,000	9,291	93	69-120		
BSD	QC610865		10,000	9,425	94	69-120	1	20
MS	QC610866	18,060	10,000	26,700	86	62-129		
MSD	QC610867		10,000	26,500	84	62-129	1	24

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Metals Analytical Report

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 200.7
Analyte:	Magnesium	Batch#:	179385
Field ID:	MW-8A	Sampled:	09/26/11
MSS Lab ID:	231342-001	Received:	09/26/11
Matrix:	Filtrate	Prepared:	09/27/11
Units:	ug/L	Analyzed:	09/30/11
Diln Fac:	1.000		

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
BS	QC610864		20,000	19,410	97	76-120		
BSD	QC610865		20,000	19,450	97	76-120	0	20
MS	QC610866	64,850	20,000	80,710	79	62-127		
MSD	QC610867		20,000	80,270	77	62-127	1	23

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Metals Analytical Report

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 200.7
Analyte:	Sodium	Batch#:	179385
Field ID:	MW-8A	Sampled:	09/26/11
MSS Lab ID:	231342-001	Received:	09/26/11
Matrix:	Filtrate	Prepared:	09/27/11
Units:	ug/L	Analyzed:	09/30/11
Diln Fac:	1.000		

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
BS	QC610864		20,000	19,210	96	75-120		
BSD	QC610865		20,000	19,480	97	75-120	1	20
MS	QC610866	284,600	20,000	262,500 >LR	-110 NM	55-132		
MSD	QC610867		20,000	260,400 >LR	-121 NM	55-132	NC	29

NC= Not Calculated
NM= Not Meaningful: Sample concentration > 4X spike concentration
>LR= Response exceeds instrument's linear range
RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 300.0
Matrix:	Water	Batch#:	179333
Units:	mg/L	Received:	09/26/11

Field ID: MW-8A
Type: SAMPLE
Lab ID: 231342-001
Sampled: 09/26/11 11:00

Analyte	Result	RL	Diln Fac	Analyzed
Chloride	160	10	50.00	09/27/11 04:56
Nitrogen, Nitrite	ND	0.05	1.000	09/27/11 05:23
Nitrogen, Nitrate	ND	0.05	1.000	09/27/11 05:23
Sulfate	47	0.50	1.000	09/27/11 05:23

Field ID: MW-10
Type: SAMPLE
Lab ID: 231342-002
Sampled: 09/26/11 13:50

Analyte	Result	RL	Diln Fac	Analyzed
Chloride	520	10	50.00	09/27/11 07:13
Nitrogen, Nitrite	ND	0.05	1.000	09/27/11 07:41
Nitrogen, Nitrate	ND	0.05	1.000	09/27/11 07:41
Sulfate	28	0.50	1.000	09/27/11 07:41

Field ID: MW-2
Type: SAMPLE
Lab ID: 231342-003
Sampled: 09/26/11 10:57

Analyte	Result	RL	Diln Fac	Analyzed
Chloride	23	1.0	5.000	09/27/11 02:38
Nitrogen, Nitrite	ND	0.05	1.000	09/27/11 02:11
Nitrogen, Nitrate	ND	0.05	1.000	09/27/11 02:11
Sulfate	29	0.50	1.000	09/27/11 02:11

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 300.0
Matrix:	Water	Batch#:	179333
Units:	mg/L	Received:	09/26/11

Field ID: MW-11 Lab ID: 231342-004
Type: SAMPLE Sampled: 09/26/11 14:23

Analyte	Result	RL	Diln Fac	Analyzed
Chloride	1,000	20	100.0	09/27/11 03:06
Nitrogen, Nitrite	ND	0.10	2.000	09/27/11 03:33
Nitrogen, Nitrate	ND	0.10	2.000	09/27/11 03:33
Sulfate	ND	1.0	2.000	09/27/11 03:33

Field ID: MW-12 Lab ID: 231342-005
Type: SAMPLE Sampled: 09/26/11 12:29

Analyte	Result	RL	Diln Fac	Analyzed
Chloride	180	5.0	25.00	09/27/11 04:28
Nitrogen, Nitrite	ND	0.05	1.000	09/27/11 08:36
Nitrogen, Nitrate	ND	0.05	1.000	09/27/11 08:36
Sulfate	1.5	0.50	1.000	09/27/11 08:36

Type: BLANK Diln Fac: 1.000
Lab ID: QC610653 Analyzed: 09/26/11 17:31

Analyte	Result	RL
Chloride	ND	0.20
Nitrogen, Nitrite	ND	0.05
Nitrogen, Nitrate	ND	0.05
Sulfate	ND	0.50

ND= Not Detected
RL= Reporting Limit

Batch QC Report

Curtis & Tompkins Laboratories Analytical Report

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 300.0
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC610654	Batch#:	179333
Matrix:	Water	Analyzed:	09/26/11 17:59
Units:	mg/L		

Analyte	Spiked	Result	%REC	Limits
Chloride	4.000	4.071	102	80-120
Nitrogen, Nitrite	1.000	1.009	101	80-120
Nitrogen, Nitrate	1.000	1.052	105	80-120
Sulfate	10.00	10.38	104	80-120

Curtis & Tompkins, Ltd.

Batch QC Report

Curtis & Tompkins Laboratories Analytical Report

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 300.0
Field ID:	ZZZZZZZZZZ	Diln Fac:	50.00
MSS Lab ID:	231348-004	Batch#:	179333
Matrix:	Water	Sampled:	09/26/11 14:05
Units:	mg/L	Received:	09/26/11

Type: MS Analyzed: 09/27/11 17:21
Lab ID: QC610655

Analyte	MSS Result	Spiked	Result	%REC	Limits
Chloride	178.5	100.0	281.5	103	80-120
Nitrogen, Nitrite	<0.006397	25.00	26.54	106	80-121
Nitrogen, Nitrate	<0.005240	25.00	25.80	103	80-120
Sulfate	1,491	250.0	1,761	108 NM	80-120

Type: MSD Analyzed: 09/27/11 17:48
Lab ID: QC610656

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Chloride	100.0	279.5	101	80-120	1	20
Nitrogen, Nitrite	25.00	25.14	101	80-121	5	20
Nitrogen, Nitrate	25.00	24.25	97	80-120	6	20
Sulfate	250.0	1,753	105 NM	80-120	0	20

NM= Not Meaningful: Sample concentration > 4X spike concentration
RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Alkalinity

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM2320B
Matrix:	Water	Sampled:	09/26/11
Units:	mg/L	Received:	09/26/11
Batch#:	179453	Analyzed:	09/29/11

Field ID: MW-8A
Type: SAMPLE
Lab ID: 231342-001
Diln Fac: 10.00

Analyte	Result	RL
Alkalinity, Bicarbonate	810	10
Alkalinity, Carbonate	ND	10
Alkalinity, Hydroxide	ND	10
Alkalinity, Total as CaCO3	810	10

Field ID: MW-10
Type: SAMPLE
Lab ID: 231342-002
Diln Fac: 10.00

Analyte	Result	RL
Alkalinity, Bicarbonate	1,100	10
Alkalinity, Carbonate	ND	10
Alkalinity, Hydroxide	ND	10
Alkalinity, Total as CaCO3	1,100	10

Field ID: MW-2
Type: SAMPLE
Lab ID: 231342-003
Diln Fac: 10.00

Analyte	Result	RL
Alkalinity, Bicarbonate	560	10
Alkalinity, Carbonate	ND	10
Alkalinity, Hydroxide	ND	10
Alkalinity, Total as CaCO3	560	10

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Alkalinity

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM2320B
Matrix:	Water	Sampled:	09/26/11
Units:	mg/L	Received:	09/26/11
Batch#:	179453	Analyzed:	09/29/11

Field ID: MW-11 Lab ID: 231342-004
Type: SAMPLE Diln Fac: 10.00

Analyte	Result	RL
Alkalinity, Bicarbonate	1,500	10
Alkalinity, Carbonate	ND	10
Alkalinity, Hydroxide	ND	10
Alkalinity, Total as CaCO3	1,500	10

Field ID: MW-12 Lab ID: 231342-005
Type: SAMPLE Diln Fac: 10.00

Analyte	Result	RL
Alkalinity, Bicarbonate	640	10
Alkalinity, Carbonate	ND	10
Alkalinity, Hydroxide	ND	10
Alkalinity, Total as CaCO3	640	10

Type: BLANK Diln Fac: 1.000
Lab ID: QC611132

Analyte	Result	RL
Alkalinity, Bicarbonate	ND	1.0
Alkalinity, Carbonate	ND	1.0
Alkalinity, Hydroxide	ND	1.0
Alkalinity, Total as CaCO3	ND	1.0

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Alkalinity

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM2320B
Analyte:	Alkalinity, Total as CaCO3	Units:	mg/L
Type:	LCS	Diln Fac:	4.000
Lab ID:	QC611133	Batch#:	179453
Matrix:	Water	Analyzed:	09/29/11

Spiked	Result	%REC	Limits
200.0	190.4	95	90-110

Curtis & Tompkins, Ltd.

Batch QC Report

Alkalinity

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM2320B
Analyte:	Alkalinity, Total as CaCO3	Diln Fac:	10.00
Field ID:	MW-4DUP	Batch#:	179453
MSS Lab ID:	231358-005	Sampled:	09/27/11
Matrix:	Water	Received:	09/27/11
Units:	mg/L	Analyzed:	09/29/11

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
MS	QC611134	812.7	500.0	1,300	97	80-120		
MSD	QC611135		500.0	1,299	97	80-120	0	25

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Dissolved Sulfide

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM4500S2-D
Analyte:	Dissolved Sulfide	Sampled:	09/26/11
Matrix:	Water	Received:	09/26/11
Units:	mg/L	Analyzed:	09/29/11
Batch#:	179442		

Field ID	Type	Lab ID	Result	RL	Diln Fac
MW-8A	SAMPLE	231342-001	ND	0.04	1.000
MW-10	SAMPLE	231342-002	0.11	0.04	1.000
MW-2	SAMPLE	231342-003	ND	0.04	1.000
MW-11	SAMPLE	231342-004	ND	0.04	1.000
MW-12	SAMPLE	231342-005	3.3	0.40	10.00
	BLANK	QC611093	ND	0.04	1.000

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Sulfide

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM4500S2-D
Analyte:	Dissolved Sulfide	Diln Fac:	1.000
Field ID:	MW-8A	Batch#:	179442
MSS Lab ID:	231342-001	Sampled:	09/26/11
Matrix:	Water	Received:	09/26/11
Units:	mg/L	Analyzed:	09/29/11

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
MS	QC611094	<0.04000	0.4000	0.3901	98	64-123		
MSD	QC611095		0.4000	0.4123	103	64-123	6	20
LCS	QC611096		0.4000	0.3953	99	80-120		

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Orthophosphate Phosphorous

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM4500P-E
Analyte:	Orthophosphate (as P)	Batch#:	179327
Matrix:	Water	Received:	09/26/11
Units:	mg/L	Analyzed:	09/26/11 17:18

Field ID	Type	Lab ID	Result	RL	Diln Fac	Sampled
MW-8A	SAMPLE	231342-001	1.3	0.15	5.000	09/26/11 11:00
MW-10	SAMPLE	231342-002	0.60	0.030	1.000	09/26/11 13:50
MW-2	SAMPLE	231342-003	0.15	0.030	1.000	09/26/11 10:57
MW-11	SAMPLE	231342-004	7.7	0.30	10.00	09/26/11 14:23
MW-12	SAMPLE	231342-005	0.73	0.030	1.000	09/26/11 12:29
	BLANK	QC610623	ND	0.030	1.000	

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Orthophosphate Phosphorous

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM4500P-E
Analyte:	Orthophosphate (as P)	Diln Fac:	1.000
Field ID:	MW-2	Batch#:	179327
MSS Lab ID:	231342-003	Sampled:	09/26/11 10:57
Matrix:	Water	Received:	09/26/11
Units:	mg/L	Analyzed:	09/26/11 17:18

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
LCS	QC610624		0.4000	0.4106	103	80-120		
MS	QC610707	0.1463	0.4000	0.5555	102	76-120		
MSD	QC610708		0.4000	0.5568	103	76-120	0	20

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Total Dissolved Solids (TDS)

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM2540C
Analyte:	Total Dissolved Solids	Sampled:	09/26/11
Matrix:	Water	Received:	09/26/11
Units:	mg/L	Prepared:	09/27/11
Batch#:	179370	Analyzed:	09/28/11

Field ID	Type	Lab ID	Result	RL	Diln Fac
MW-8A	SAMPLE	231342-001	360	10	1.000
MW-10	SAMPLE	231342-002	680	14	1.429
MW-2	SAMPLE	231342-003	660	10	1.000
MW-11	SAMPLE	231342-004	3,180	20	2.000
MW-12	SAMPLE	231342-005	1,000	10	1.000
	BLANK	QC610793	ND	10	1.000

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Total Dissolved Solids (TDS)

Lab #:	231342	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM2540C
Analyte:	Total Dissolved Solids	Batch#:	179370
Field ID:	MW-4DUP	Sampled:	09/27/11
MSS Lab ID:	231358-005	Received:	09/27/11
Matrix:	Water	Prepared:	09/27/11
Units:	mg/L	Analyzed:	09/28/11
Diln Fac:	1.000		

Type	Lab ID	MSS Result	Spiked	Result	RL	%REC	Limits	RPD	Lim
BS	QC610794		104.0	92.00		88	75-120		
BSD	QC610795		104.0	84.00		81	75-120	9 *	5
SDUP	QC610796	1,152		1,146	10.00			1	5

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

Data Validation Worksheet

Lab Report # 231358 DV by: SC
Project Port Harbor Facilities Complex Date: 11/15/11

Lab IDs	Sample IDs	Date Collected	Parameters								
			TPHg (8015B)	TPHd/ mo (8015B)	MTBE BTEX (8260B)	Anions (300.0)	Metals (6010B)	Diss SO_4^{-2} (SM4500P-E)	Alk (2320B)	Orth-P (SM4500 P)	TDS (2540C)
-001	MW-9	9/27/11	X	X	X	X	X	X	X	X	X
-002	MW-4	9/27/11	X	X	X	X	X	X	X	X	X
-003	MW-5	9/27/11	X	X	X	X	X	X	X	X	X
-004	TB-092711	9/27/11	X		X						
-005	MW-4DUP	9/27/11	X	X	X	X	X	X	X	X	X

Lab ID: C+T **TDS QUALIFIED**
Cooler Temperature: 5.4 C
Chain-of-Custody: 3 voas labeled "Field Blank" submitted. Not on COC; -005 and -004 received incorrect number of voas, but had sufficient sample volume for analyses.
Samples preservatives: OK

Parameter: **TPHg**

HTs: 14 days – analyzed 9/30/11 (3)
Batch IDs: 179527
Surrogates: OK
Method Blank: OK, surrogates OK
LCS: OK, surrogates OK
MS/MSD: MS OK, surrogates OK
MSD OK, surrogates OK

Parameter: **TPHd/mo**

HTs: 7 days – extracted 9/27/11 (0) analyzed 9/29/10 (2)
Batch IDs: 179376
Surrogates: OK
Method Blank: OK, surrogates OK
LCS: OK, surrogates OK
MS/MSD MS OK, surrogates OK
MSD OK, surrogates OK

Parameter: **BTEX + MTBE**

HTs: 14 days – analyzed 10/03/11 (8)
Batch IDs: 179555, 179564
Surrogates: OK
Method Blank: OK, surrogates OK
BS/BSD: BS OK, surrogates OK
BSD OK, surrogates OK
MS/MSD (179555): MS OK, surrogates OK
MSD OK, surrogates OK

Parameter: **Anions**

HTs: 28 days – analyzed 9/29/11 (2)
Batch IDs: 179364
Method Blank: OK
LCS: OK
MS/MSD: MS OK
MSD OK

Parameter: **Metals**

HTs: 6 months – extracted 9/27/11 analyzed 9/30/11 (4) and 10/05/11 (10)
Batch IDs: 179385
Method Blank: OK
BS/BSD: BS OK
BSD OK
MS/MSD: MS out of range (Na and Mn), sample concentration >4x spike concentration → NO QUAL
MSD out of range (Na and Mn), sample concentration >4x spike concentration → NO QUAL

Parameter: **Alkalinity**

HTs: 14 days – analyzed 9/29/11 (2)
Batch IDs: 179453
Method Blank: OK
LCS: OK
MS/MSD: MS OK
MSD OK

Parameter: **Dissolved Sulfide**

HTs: 7 days – analyzed 9/29/11 (2)
Batch IDs: 179442
Method Blank: OK
LCS: OK
MS/MSD: MS OK
MSD OK

Parameter: **Orthophosphate**

HTs: 48 hrs – analyzed 9/27//11 (0)
Batch IDs: 179381
Method Blank: OK
LCS: OK
MS/MSD: MS OK
MSD OK

Parameter: **TDS**

HTs: 7 days – extracted 9/27/11 (0), analyzed 9/28/11 (1)
Batch IDs: 179370
Method Blank: OK
BS/BSD: BS OK

BSD out of range (high) → ALL TDS IN THIS BATCH QUALIFIED

SDUP: OK


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Analytical Laboratories, Since 1878

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

Laboratory Job Number 231358
ANALYTICAL REPORT

Malcolm Pirnie, Inc.	Project : 4656016
2000 Powell St.	Location : Port Of Oakland - HFC
Emeryville, CA 94608	Level : II

Sample ID	Lab ID
MW-9	231358-001
MW-4	231358-002
MW-5	231358-003
TB-092711	231358-004
MW-4DUP	231358-005
FIELD BLANK	231358-006

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: Desiree N. Tetrault Date: 10/18/2011
Project Manager

NELAP # 01107CA

Curtis & Tompkins, Ltd.

CASE NARRATIVE

Laboratory number:	**231358**
Client:	**Malcolm Pirnie, Inc.**
Project:	**4656016**
Location:	**Port Of Oakland - HFC**
Request Date:	**09/27/11**
Samples Received:	**09/27/11**

This data package contains sample and QC results for five water samples, requested for the above referenced project on 09/27/11. The samples were received cold and intact.

TPH-Purgeables and/or BTXE by GC (EPA 8015B):
No analytical problems were encountered.

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

Volatile Organics by GC/MS (EPA 8260B):
No analytical problems were encountered.

Metals (EPA 200.7):
No analytical problems were encountered.

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

Alkalinity (SM2320B):
No analytical problems were encountered.

Dissolved Sulfide (SM4500S2-D):
No analytical problems were encountered.

Total Dissolved Solids (TDS) (SM2540C):
High RPD was observed for total dissolved solids in the BS/BSD for batch 179370. No other analytical problems were encountered.

Orthophosphate Phosphorous (SM4500P-E):
No analytical problems were encountered.

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Infrastructure · Water · Environment · Buildings

ID#: 231358

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Page 1 of 1

Lab Work Order #

Send Results to:

Contact & Company Name: ARCADIS - S. Carman
Telephone:
Address:
Fax:
City / State / Zip
E-mail Address:
on file

Project Name/Location (City, State): Port of Oakland, CA
Project #: 04656046.0000.00083
Sampler's Printed Name: Caroline Orsi
Sampler's Signature:

Preservative	HCL	HCL	HCL		HNO_3 field	NaOH
Filtered (✓)						
# of Containers	3-ea	3-ea	2-ea	1-ea	1-ea	1-ea
Container Information	VOAs	VOAs	500mL Amber	Poly	Poly	Poly

PARAMETER ANALYSIS & METHOD

Sample ID	Collection Date	Collection Time	Type (✓) Comp	Type (✓) Grab	Matrix	TPH-G (8015B)	BTEX/MTBE (8260B)	TPH-D/mo	TDS/Major anions, (bicarbonate carbonate, sulfate, chloride, nitrate)	Dis. Mn + Fe	Major cations Na, K, Ca, Mg	Dis. sulfide
1 MW-9	9/27/11	0815			water	X	X	X	X	X	X	
2 MW-4		0823										
3 MW-5		1050										
4 TB-092711												
5 MW-4DUP	9/27/11	0823			X	X	X	X	X	X	X	

Keys

Preservation Key:
A. H_2SO_4
B. HCL
C. HNO_3
D. NaOH
E. None
F. Other: _____
G. Other: _____
H. Other: _____

Container Information Key:
1. 40 ml Vial
2. 1 L Amber
3. 250 ml Plastic
4. 500 ml Plastic
5. Encore
6. 2 oz. Glass
7. 4 oz. Glass
8. 8 oz. Glass
9. Other: _____
10. Other: _____

Matrix Key:
SO - Soil
W - Water
T - Tissue
SE - Sediment
SL - Sludge
A - Air
NL - NAPL/Oil
SW - Sample Wipe
Other: _____

REMARKS

Special Instructions/Comments:

☐ Special QA/QC Instructions(✓):

Laboratory Information and Receipt		Relinquished By	Received By	Relinquished By	Laboratory Received By
Lab Name:	Cooler Custody Seal (✓)	Printed Name: Caroline Orsi	Printed Name: Gonzalez	Printed Name:	Printed Name:
☐ Cooler packed with ice (✓)	☐ Intact ☐ Not Intact	Signature:	Signature: Pat Haugh	Signature:	Signature:
Specify Turnaround Requirements: Standard	Sample Receipt:	Firm: ARCADIS	Firm/Courier: CET	Firm/Courier:	Firm:
Shipping Tracking #:	Condition/Cooler Temp: _____	Date/Time: 9/27/11 1305	Date/Time: 9/27/11 1305	Date/Time:	Date/Time:

Distribution: WHITE – Laboratory returns with results YELLOW – Lab copy PINK – Retained by ARCADIS

COOLER RECEIPT CHECKLIST

Curtis & Tompkins, Ltd.

Login # 231358 Date Received 9/27/11 Number of coolers 2
Client Arcadis Project Port Of Oakland

Date Opened 9/27/11 By (print) Vidia Qarshi (sign)
Date Logged in ↓ By (print) ↓ (sign) ↓

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) 5.4

☐ Samples Received on ice & cold without a temperature blank

☐ 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 samples in the appropriate containers for indicated tests? (YES) NO
11. Are sample labels present, in good condition and complete? (YES) NO
12. Do the sample labels agree with custody papers? YES (NO)
13. Was sufficient amount of sample sent for tests requested? (YES) NO
14. Are the samples appropriately preserved? (YES) NO N/A
15. Did you check preservatives for all bottles for each sample? (YES) NO N/A
16. Did you document your preservative check? (YES) NO N/A
17. Did you change the hold time in LIMS for unpreserved VOAs? YES NO (N/A)
18. Are bubbles > 6mm absent in VOA samples? (YES) NO N/A
19. Was the client contacted concerning this sample delivery? YES (NO)
If YES, Who was called? By Date:

COMMENTS
12. Rec'd 3 VOAs labeled "Field Blank" 09/27/11 0725 that are not listed on COC.
-005 Rec'd 5 VOAs filled w/ sample and 1 empty VOA
-004 Rec'd 5 VOAs instead of Three.

Rev 8, 6/11

Curtis & Tompkins Sample Preservation for 231358

Sample	pH: <2	>12	Other
-001a	[ ]	[ ]	_____
b	[ ]	[ ]	_____
c	[ ]	[ ]	_____
d	[ ]	[ ]	_____
e	[ ]	[ ]	_____
f	[ ]	[ ]	_____
g	[ ]	[X]	_____
h	[X]	[ ]	_____
i	[ ]	[ ]	_____
j	[ ]	[ ]	_____
k	[ ]	[ ]	_____
-002a	[ ]	[ ]	_____
b	[ ]	[ ]	_____
c	[ ]	[ ]	_____
d	[ ]	[ ]	_____
e	[ ]	[ ]	_____
f	[ ]	[ ]	_____
g	[ ]	[X]	_____
h	[X]	[ ]	_____
i	[ ]	[ ]	_____
j	[ ]	[ ]	_____
k	[ ]	[ ]	_____
-003a	[ ]	[ ]	_____
b	[ ]	[ ]	_____
c	[ ]	[ ]	_____
d	[ ]	[ ]	_____
e	[ ]	[ ]	_____
f	[ ]	[ ]	_____
g	[ ]	[X]	_____
h	[X]	[ ]	_____
i	[ ]	[ ]	_____
j	[ ]	[ ]	_____
k	[ ]	[ ]	_____
-005a	[ ]	[ ]	_____
b	[ ]	[ ]	_____
c	[ ]	[ ]	_____
d	[ ]	[ ]	_____
e	[ ]	[ ]	_____
f	[ ]	[X]	_____
g	[X]	[ ]	_____
h	[ ]	[ ]	_____
i	[ ]	[ ]	_____
j	[ ]	[ ]	_____

Analyst: VO

Date: 7/27/11

Curtis & Tompkins, Ltd.

Total Volatile Hydrocarbons

Lab #:	231358	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8015B
Matrix:	Water	Batch#:	179527
Units:	ug/L	Sampled:	09/27/11
Diln Fac:	1.000	Received:	09/27/11

Field ID: MW-9 Lab ID: 231358-001
Type: SAMPLE Analyzed: 09/30/11

Analyte	Result	RL
Gasoline C7-C12	190 Y	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	92	78-123

Field ID: MW-4 Lab ID: 231358-002
Type: SAMPLE Analyzed: 09/30/11

Analyte	Result	RL
Gasoline C7-C12	130 Y	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	95	78-123

Field ID: MW-5 Lab ID: 231358-003
Type: SAMPLE Analyzed: 10/01/11

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	86	78-123

Y= Sample exhibits chromatographic pattern which does not resemble standard
ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Total Volatile Hydrocarbons

Lab #:	231358	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8015B
Matrix:	Water	Batch#:	179527
Units:	ug/L	Sampled:	09/27/11
Diln Fac:	1.000	Received:	09/27/11

Field ID: TB-092711 Lab ID: 231358-004
Type: SAMPLE Analyzed: 10/01/11

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	104	78-123

Field ID: MW-4DUP Lab ID: 231358-005
Type: SAMPLE Analyzed: 10/01/11

Analyte	Result	RL
Gasoline C7-C12	130 Y	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	95	78-123

Type: BLANK Analyzed: 09/30/11
Lab ID: QC611427

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	89	78-123

Y= Sample exhibits chromatographic pattern which does not resemble standard
ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Total Volatile Hydrocarbons

Lab #:	231358	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC611426	Batch#:	179527
Matrix:	Water	Analyzed:	09/30/11
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	1,000	973.5	97	80-120

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	93	78-123

Curtis & Tompkins, Ltd.

Batch QC Report

Total Volatile Hydrocarbons

Lab #:	231358	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8015B
Field ID:	MW-9	Batch#:	179527
MSS Lab ID:	231358-001	Sampled:	09/27/11
Matrix:	Water	Received:	09/27/11
Units:	ug/L	Analyzed:	09/30/11
Diln Fac:	1.000		

Type: MS Lab ID: QC611428

Analyte	MSS Result	Spiked	Result	%REC	Limits
Gasoline C7-C12	185.3	2,000	2,021	92	66-120

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	103	78-123

Type: MSD Lab ID: QC611429

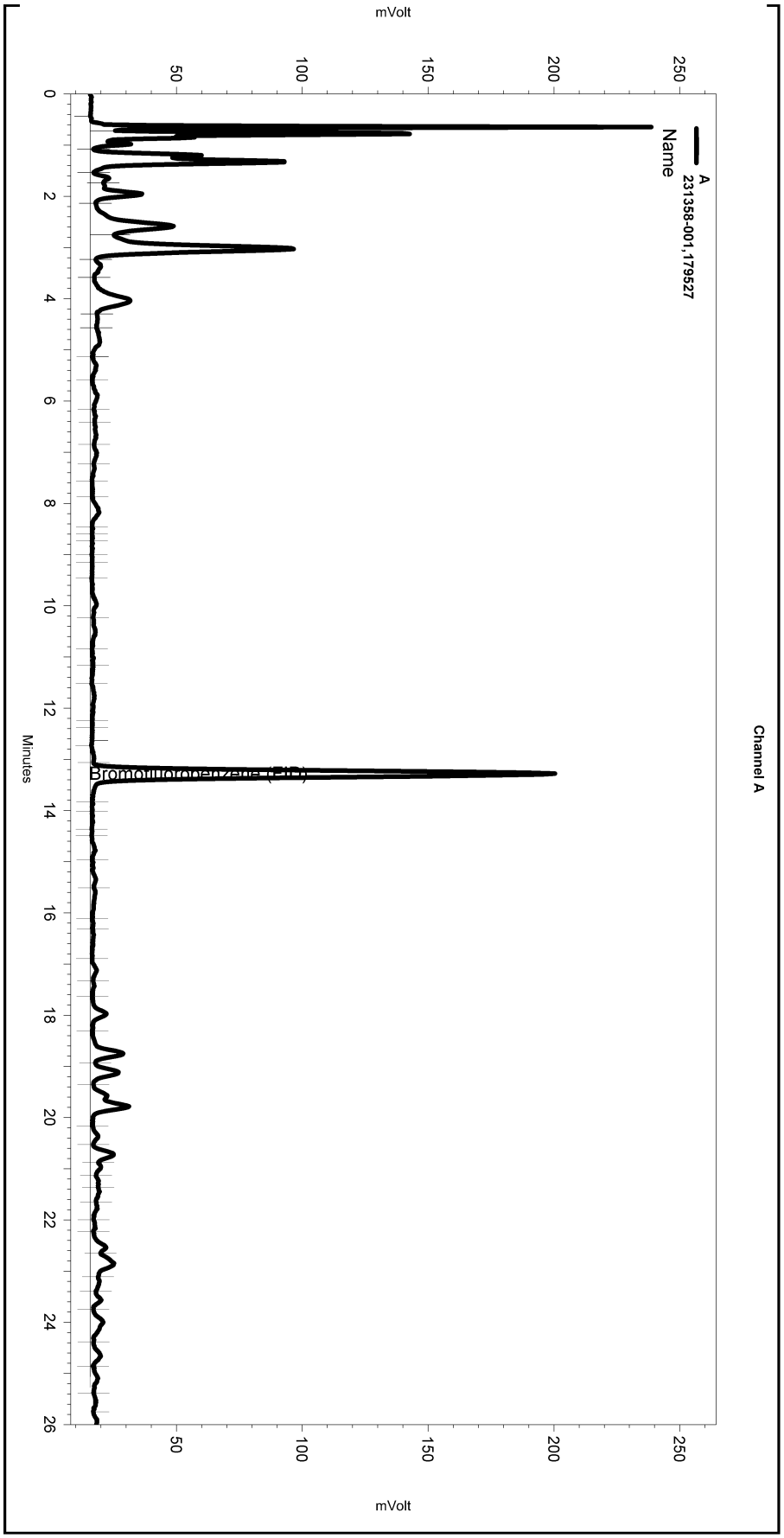
Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	2,000	2,042	93	66-120	1	25

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	95	78-123

RPD= Relative Percent Difference

Sequence File: **\\Lims\gdrive\ezchrom\Projects\GC05\Sequence\273.seq**
Sample Name: **231358-001,179527**
Data File: **\\Lims\gdrive\ezchrom\Projects\GC05\Data\273-009**
Instrument: GC05 (Offline) Vial: N/A Operator: Tvh 1. Analyst (lims2k3\tvh1)
Method Name: \\Lims\gdrive\ezchrom\Projects\GC05\Method\tvhbtxe272.met

Software Version 3.1.7
Run Date: 9/30/2011 9:49:12 PM
Analysis Date: 10/3/2011 3:00:04 PM
Sample Amount: 5 Multiplier: 5
Vial & pH or Core ID: a1.0



---< General Method Parameters >---

No items selected for this section

---< A >---

No items selected for this section

Integration Events

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

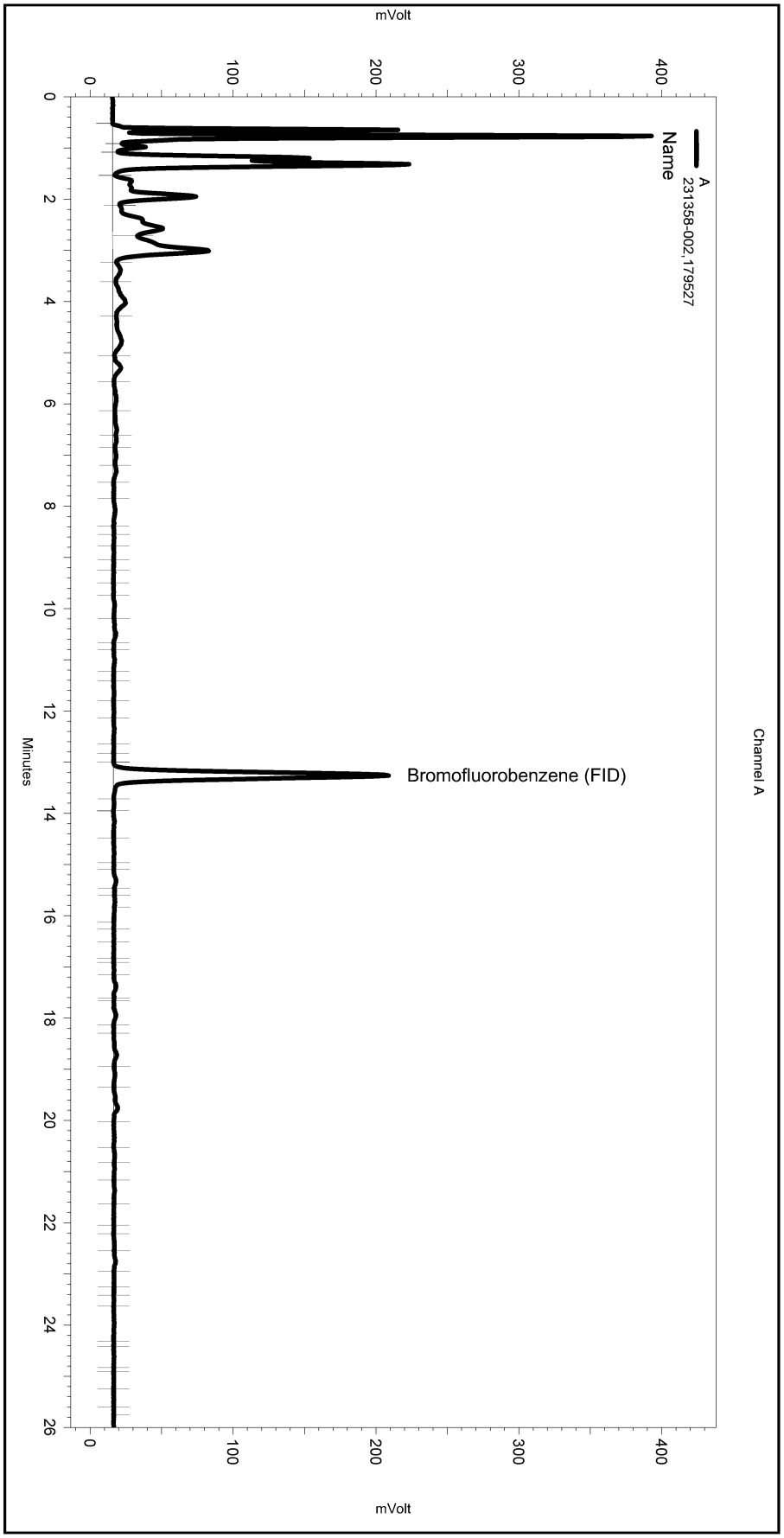
Manual Integration Fixes

Data File: \\Lims\gdrive\ezchrom\Projects\GC05\Data\273-009

Enabled	Event Type	Start (Minutes)	Stop (Minutes)	Value
Yes	Lowest Point Horizontal Baseli	0	25.286	0

Sequence File: **\\Lims\gdrive\ezchrom\Projects\GC05\Sequence\273.seq**
Sample Name: **231358-002,179527**
Data File: **\\Lims\gdrive\ezchrom\Projects\GC05\Data\273-012**
Instrument: GC05 Vial: N/A Operator: lims2k3\tvh3
Method Name: \\Lims\gdrive\ezchrom\Projects\GC05\Method\tvhbtxe272.met

Software Version 3.1.7
Run Date: 9/30/2011 11:39:05 PM
Analysis Date: 10/1/2011 12:07:48 AM
Sample Amount: 5 Multiplier: 5
Vial & pH or Core ID: a1.0



---< General Method Parameters >---

No items selected for this section

---< A >---

No items selected for this section

Integration Events

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

Manual Integration Fixes

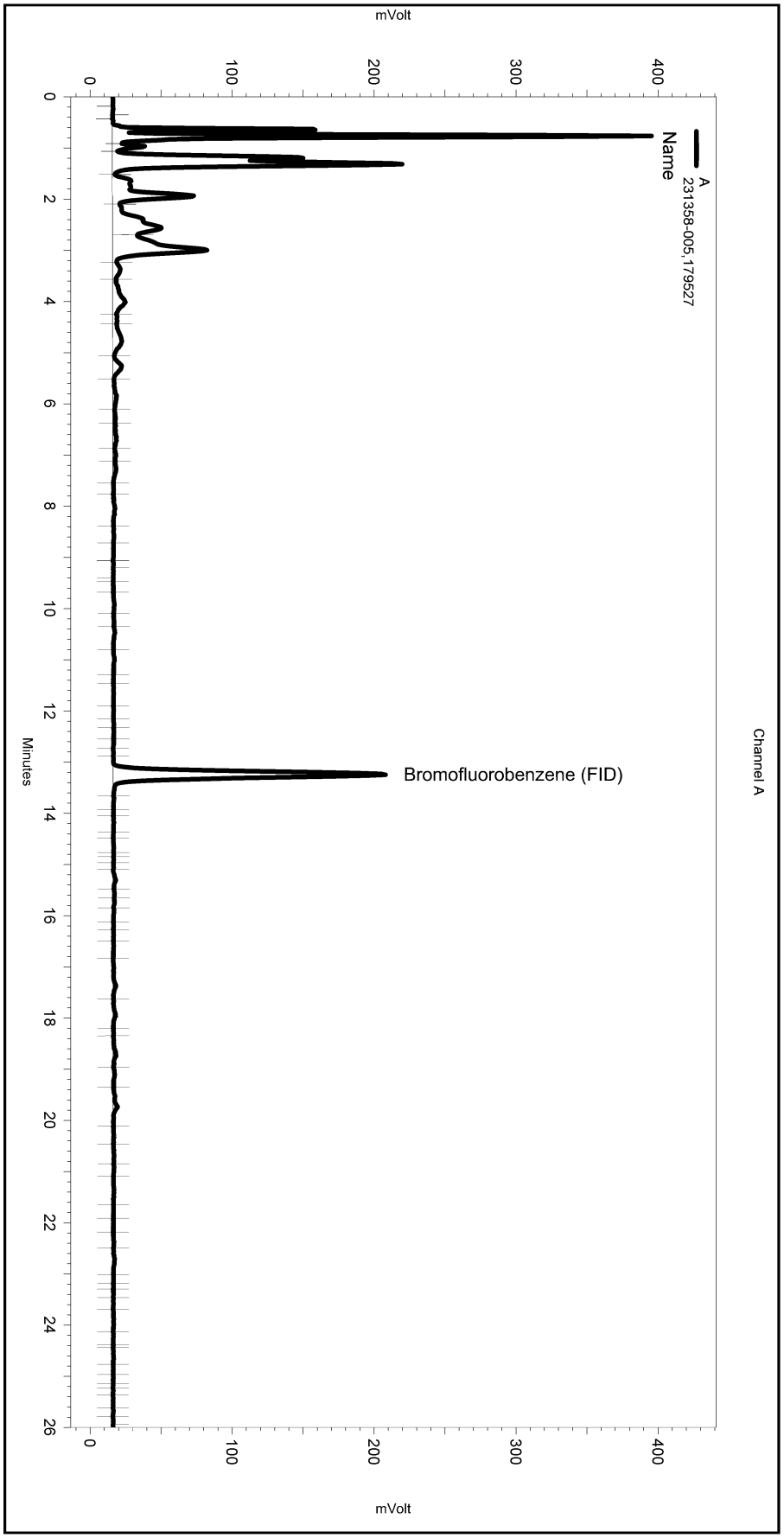
Data File: C:\Documents and Settings\All Users\Application Data\ChromatographySystem\Recovery Data\Instrument.10048\273-012_BEB8.tmp

Enabled	Event Type	Start (Minutes)	Stop (Minutes)	Value

None

Sequence File: **\\Lims\gdrive\ezchrom\Projects\GC05\Sequence\273.seq**
Sample Name: **231358-005,179527**
Data File: **\\Lims\gdrive\ezchrom\Projects\GC05\Data\273-015**
Instrument: GC05 Vial: N/A Operator: lims2k3\tvh3
Method Name: \\Lims\gdrive\ezchrom\Projects\GC05\Method\tvhbtxe272.met

Software Version 3.1.7
Run Date: 10/1/2011 1:28:50 AM
Analysis Date: 10/1/2011 1:57:34 AM
Sample Amount: 5 Multiplier: 5
Vial & pH or Core ID: a1.0



---< General Method Parameters >---

No items selected for this section

---< A >---

No items selected for this section

Integration Events

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

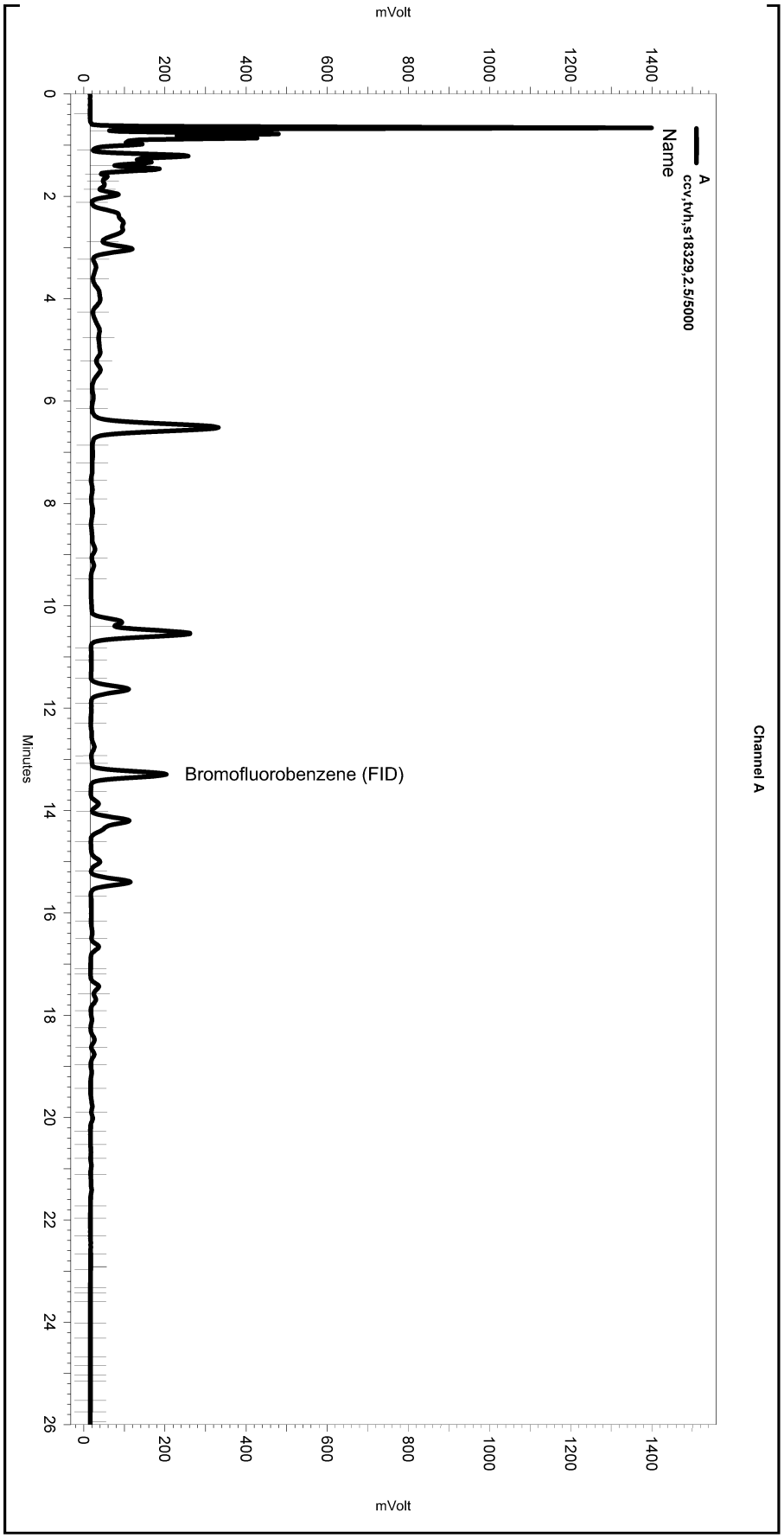
Manual Integration Fixes

Data File: C:\Documents and Settings\All Users\Application Data\ChromatographySystem\Recovery Data\Instrument.10048\273-015_BEBB.tmp

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

Sequence File: **\\Lims\gdrive\ezchrom\Projects\GC05\Sequence\273.seq**
Sample Name: **ccv,tvh,s18329,2.5/5000**
Data File: **\\Lims\gdrive\ezchrom\Projects\GC05\Data\273-003**
Instrument: GC05 (Offline) Vial: N/A Operator: Tvh 1. Analyst (lims2k3\tvh1)
Method Name: \\Lims\gdrive\ezchrom\Projects\GC05\Method\tvhbtxe272.met

Software Version 3.1.7
Run Date: 9/30/2011 2:01:49 PM
Analysis Date: 10/3/2011 2:58:54 PM
Sample Amount: 5 Multiplier: 5
Vial & pH or Core ID: {Data Description}



---< General Method Parameters >---

No items selected for this section

---< A >---

No items selected for this section

Integration Events

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

Manual Integration Fixes

Data File: \\Lims\gdrive\ezchrom\Projects\GC05\Data\273-003

Enabled	Event Type	Start (Minutes)	Stop (Minutes)	Value
Yes	Split Peak	13.082	0	0

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	231358	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 3520C
Project#:	4656016	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	09/27/11
Units:	ug/L	Received:	09/27/11
Diln Fac:	1.000	Prepared:	09/27/11
Batch#:	179376		

Field ID: MW-9 Lab ID: 231358-001
Type: SAMPLE Analyzed: 09/29/11

Analyte	Result	RL
Diesel C10-C24	2,100	50
Motor Oil C24-C36	1,600	300

Surrogate	%REC	Limits
o-Terphenyl	92	68-120

Field ID: MW-4 Lab ID: 231358-002
Type: SAMPLE Analyzed: 09/30/11

Analyte	Result	RL
Diesel C10-C24	1,200	50
Motor Oil C24-C36	500	300

Surrogate	%REC	Limits
o-Terphenyl	96	68-120

Field ID: MW-5 Lab ID: 231358-003
Type: SAMPLE Analyzed: 09/30/11

Analyte	Result	RL
Diesel C10-C24	1,200 Y	50
Motor Oil C24-C36	810	300

Surrogate	%REC	Limits
o-Terphenyl	96	68-120

Y= Sample exhibits chromatographic pattern which does not resemble standard
ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	231358	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 3520C
Project#:	4656016	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	09/27/11
Units:	ug/L	Received:	09/27/11
Diln Fac:	1.000	Prepared:	09/27/11
Batch#:	179376		

Field ID:	MW-4DUP	Lab ID:	231358-005
Type:	SAMPLE	Analyzed:	09/30/11

Analyte	Result	RL
Diesel C10-C24	1,200	50
Motor Oil C24-C36	590	300

Surrogate	%REC	Limits
o-Terphenyl	99	68-120

Type:	BLANK	Analyzed:	09/28/11
Lab ID:	QC610823		

Analyte	Result	RL
Diesel C10-C24	ND	50
Motor Oil C24-C36	ND	300

Surrogate	%REC	Limits
o-Terphenyl	100	68-120

Y= Sample exhibits chromatographic pattern which does not resemble standard
ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Total Extractable Hydrocarbons

Lab #:	231358	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 3520C
Project#:	4656016	Analysis:	EPA 8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC610824	Batch#:	179376
Matrix:	Water	Prepared:	09/27/11
Units:	ug/L	Analyzed:	09/28/11

Analyte	Spiked	Result	%REC	Limits
Diesel C10-C24	2,500	2,214	89	61-120

Surrogate	%REC	Limits
o-Terphenyl	95	68-120

Curtis & Tompkins, Ltd.

Batch QC Report

Total Extractable Hydrocarbons

Lab #:	231358	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 3520C
Project#:	4656016	Analysis:	EPA 8015B
Field ID:	ZZZZZZZZZZ	Batch#:	179376
MSS Lab ID:	231369-001	Sampled:	09/27/11
Matrix:	Water	Received:	09/27/11
Units:	ug/L	Prepared:	09/27/11
Diln Fac:	1.000	Analyzed:	09/28/11

Type: MS Lab ID: QC610825

Analyte	MSS Result	Spiked	Result	%REC	Limits
Diesel C10-C24	287.9	2,500	1,927	66	33-140

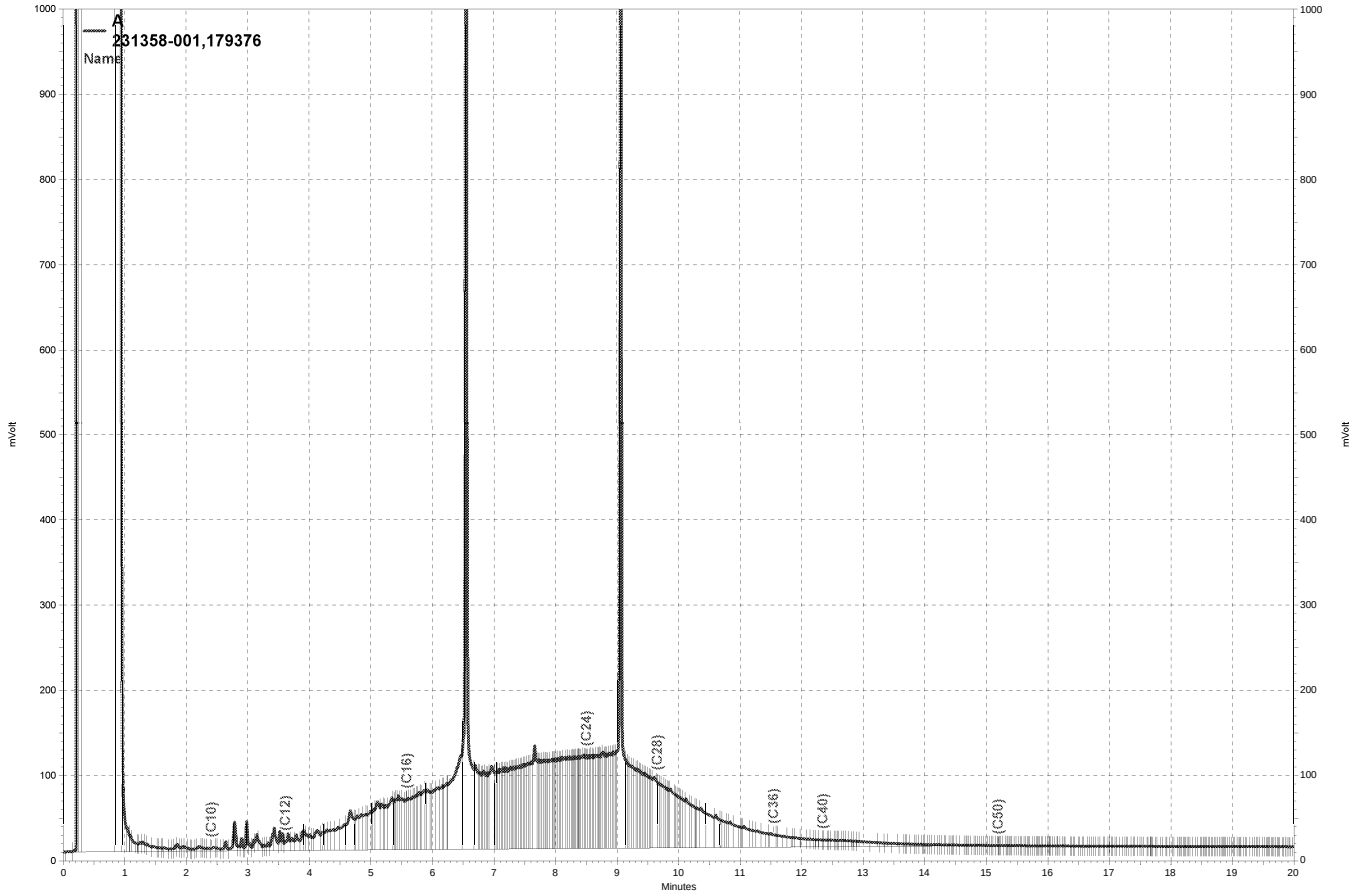
Surrogate	%REC	Limits
o-Terphenyl	85	68-120

Type: MSD Lab ID: QC610826

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Diesel C10-C24	2,500	2,359	83	33-140	20	30

Surrogate	%REC	Limits
o-Terphenyl	103	68-120

RPD= Relative Percent Difference



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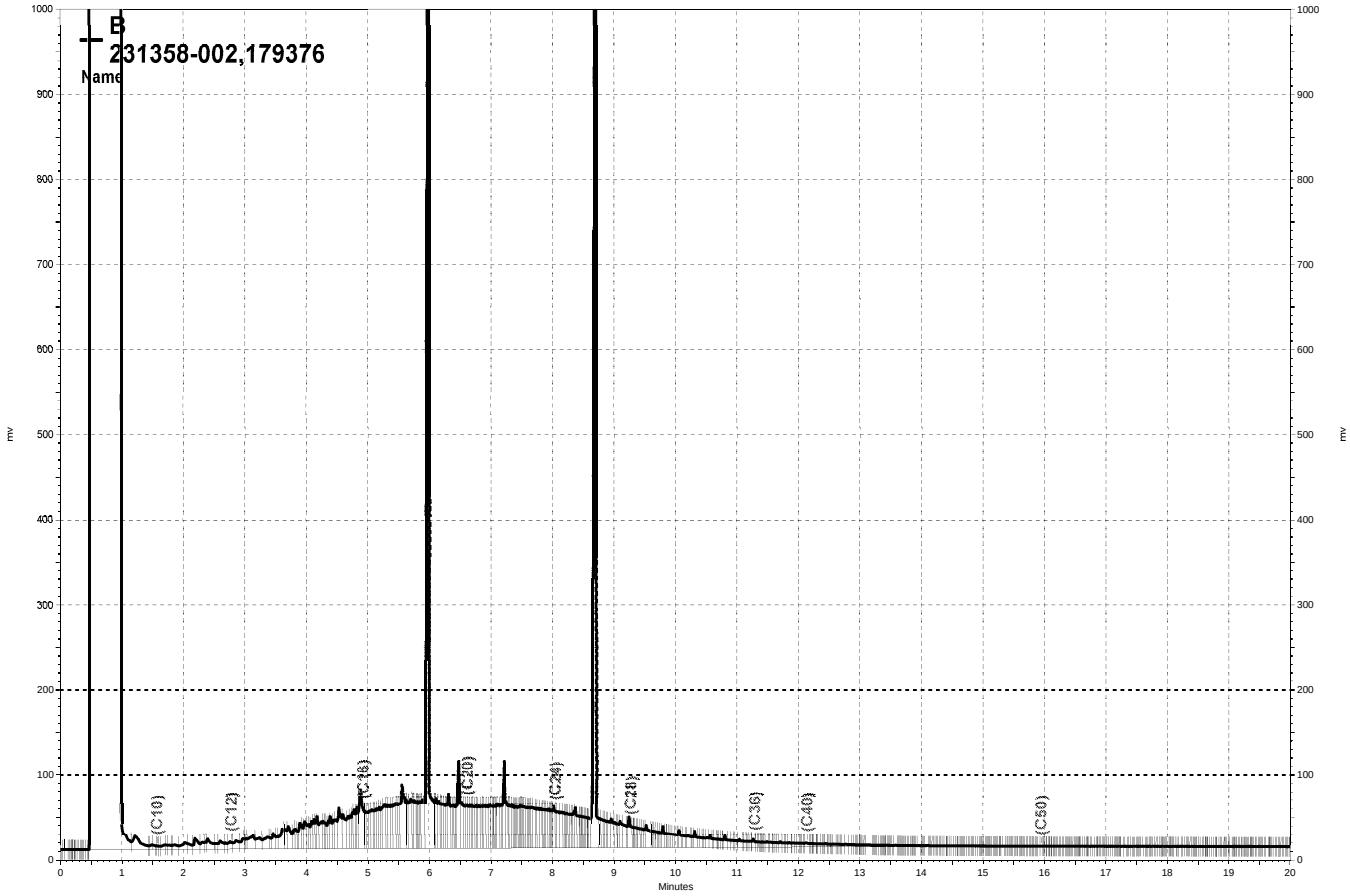

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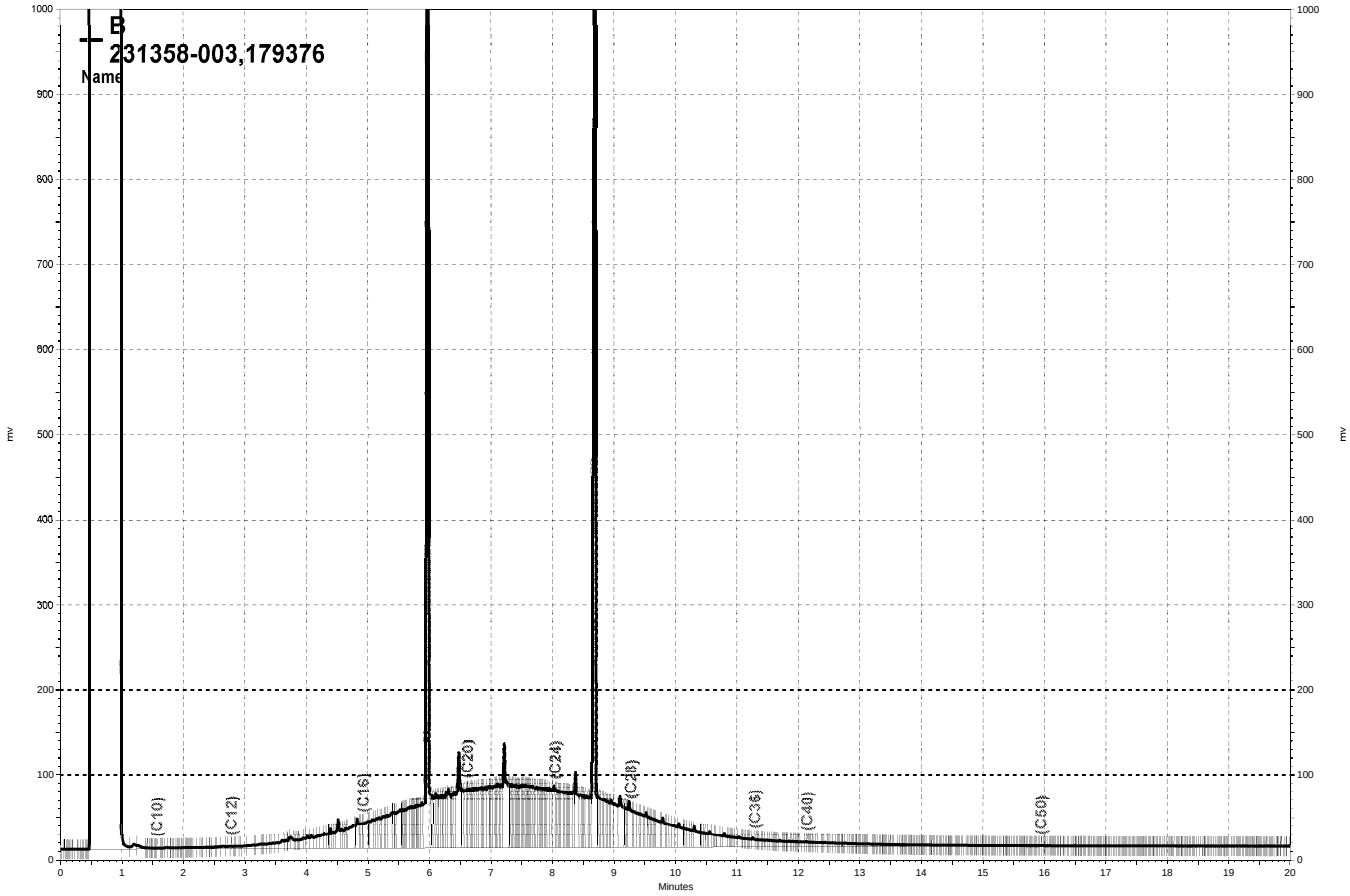

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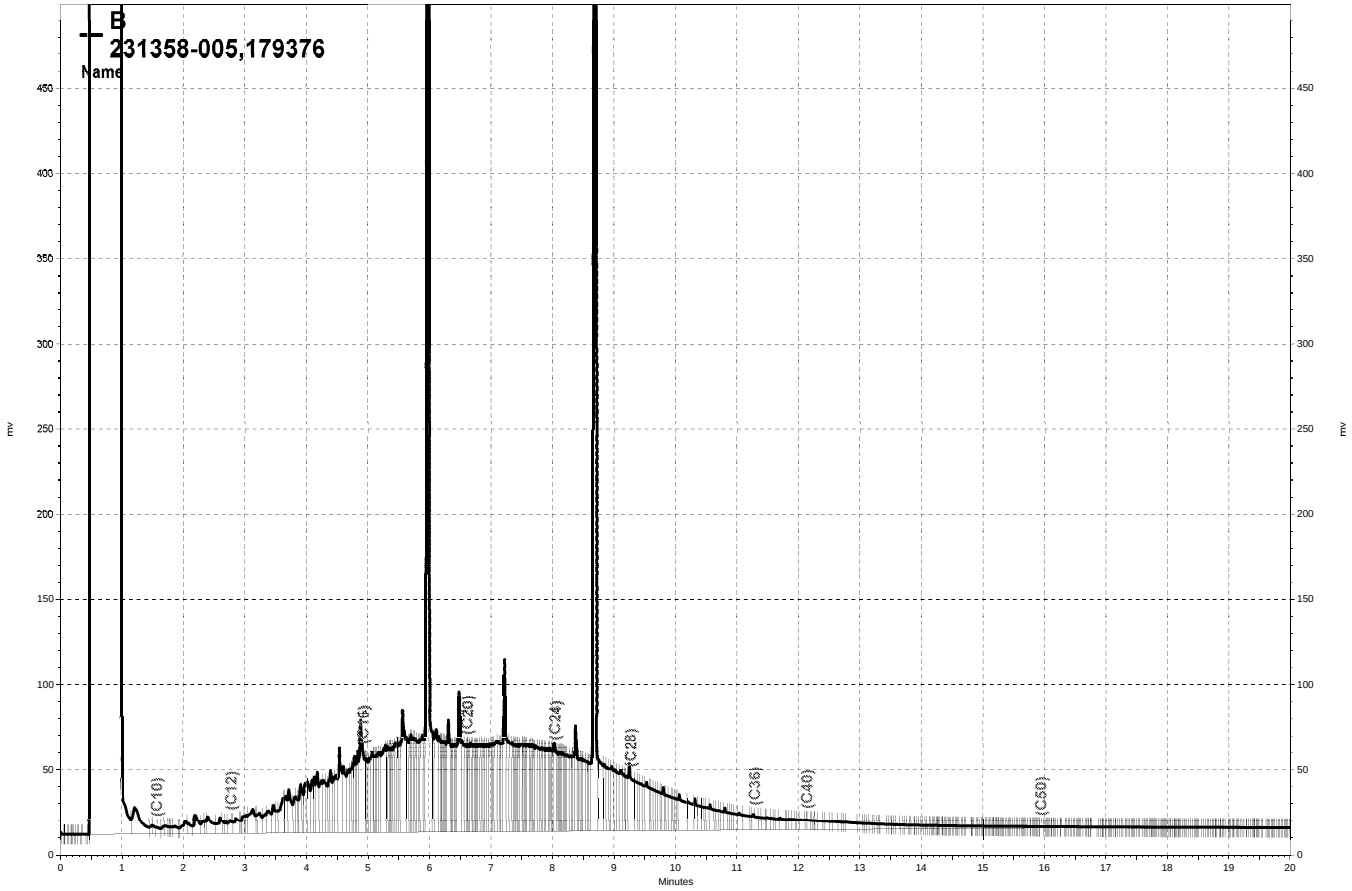

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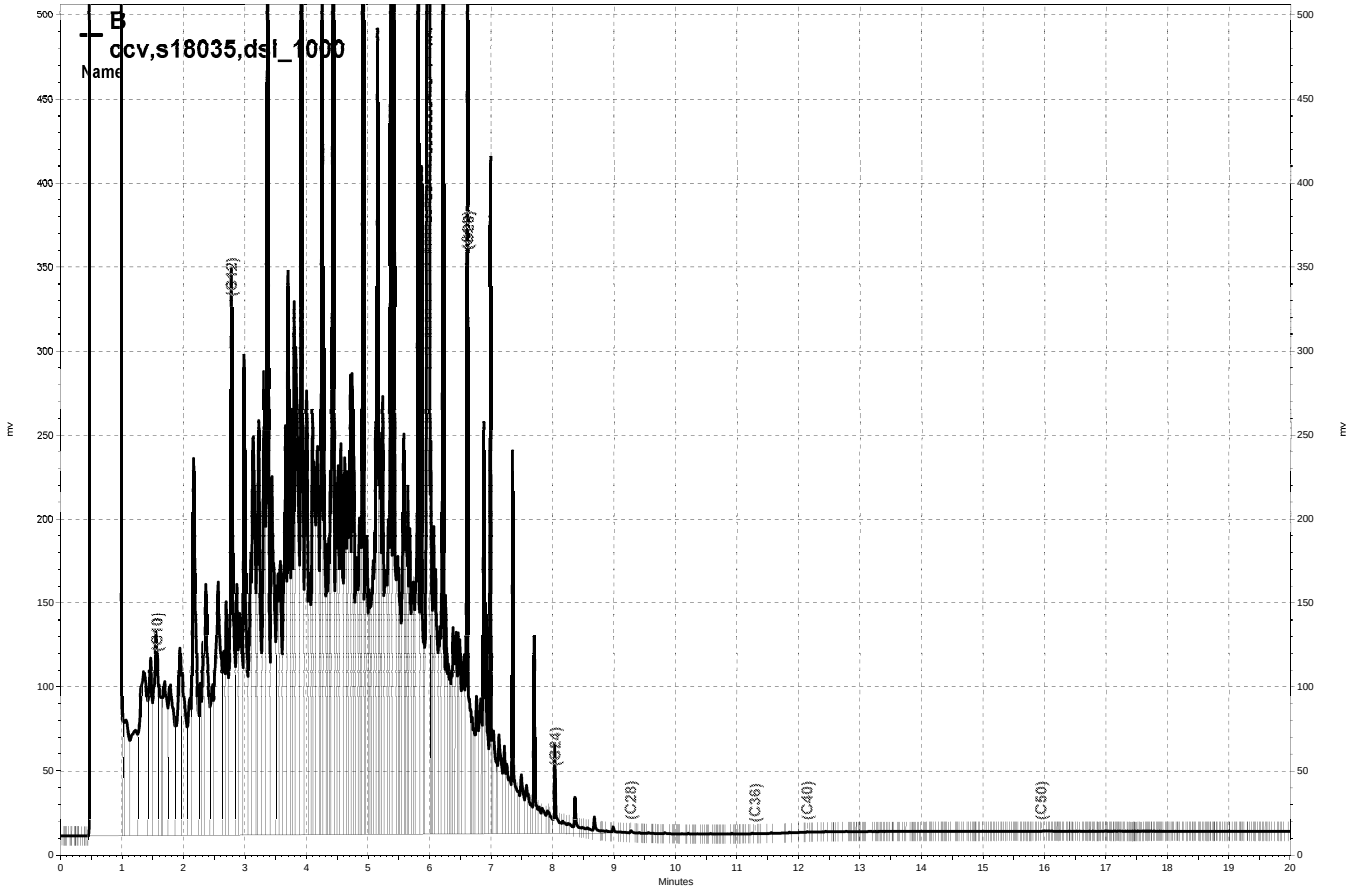

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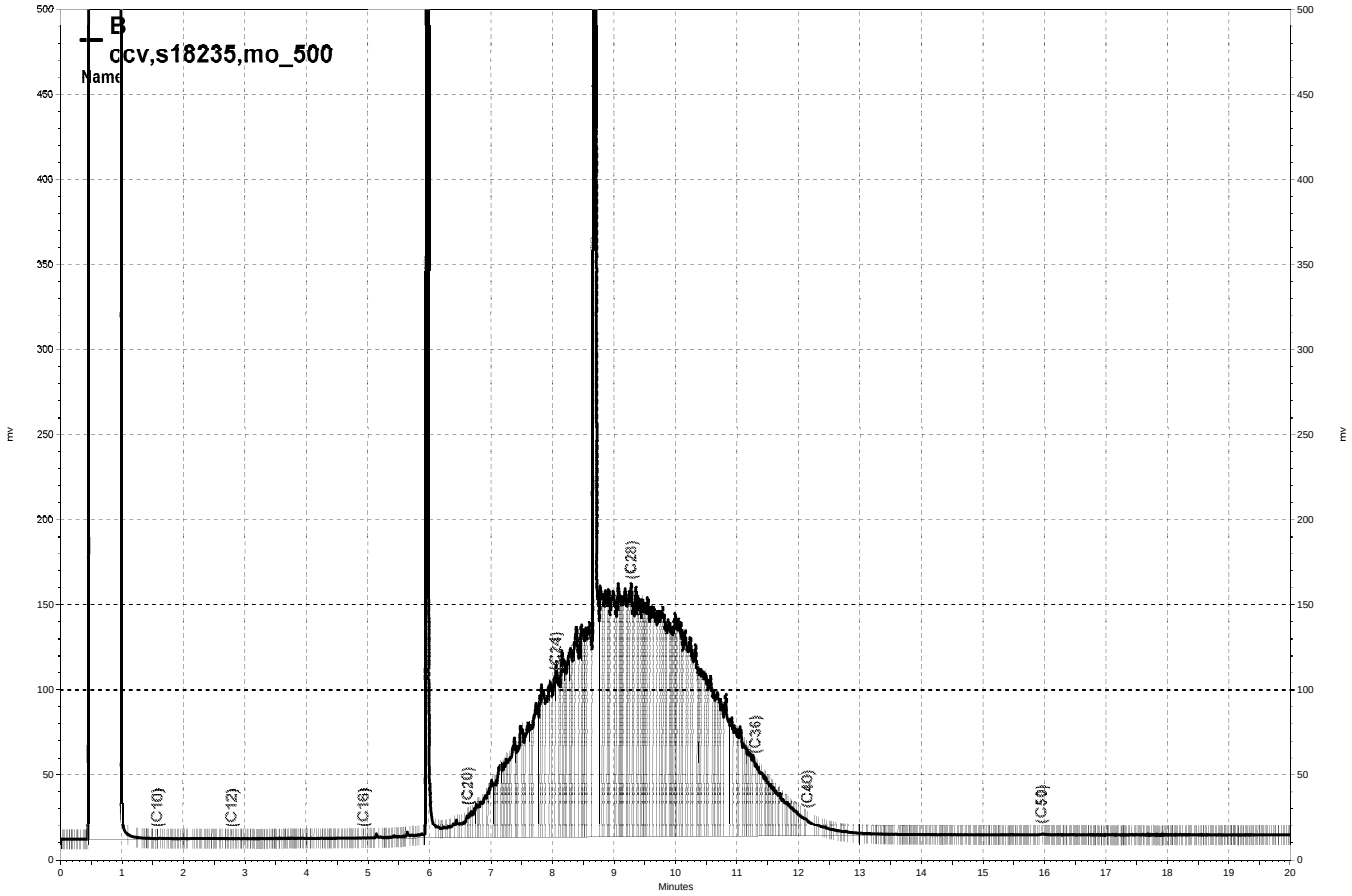

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Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	231358	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-9	Batch#:	179555
Lab ID:	231358-001	Sampled:	09/27/11
Matrix:	Water	Received:	09/27/11
Units:	ug/L	Analyzed:	10/03/11
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	ND	0.5
Benzene	21	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5

Surrogate	%REC	Limits
Dibromofluoromethane	103	80-127
1,2-Dichloroethane-d4	100	73-145
Toluene-d8	102	80-120
Bromofluorobenzene	97	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	231358	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-4	Batch#:	179564
Lab ID:	231358-002	Sampled:	09/27/11
Matrix:	Water	Received:	09/27/11
Units:	ug/L	Analyzed:	10/03/11
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	ND	0.5
Benzene	13	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5

Surrogate	%REC	Limits
Dibromofluoromethane	93	80-127
1,2-Dichloroethane-d4	101	73-145
Toluene-d8	107	80-120
Bromofluorobenzene	101	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	231358	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-5	Batch#:	179564
Lab ID:	231358-003	Sampled:	09/27/11
Matrix:	Water	Received:	09/27/11
Units:	ug/L	Analyzed:	10/03/11
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	ND	0.5
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5

Surrogate	%REC	Limits
Dibromofluoromethane	93	80-127
1,2-Dichloroethane-d4	103	73-145
Toluene-d8	106	80-120
Bromofluorobenzene	100	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	231358	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-4DUP	Batch#:	179564
Lab ID:	231358-005	Sampled:	09/27/11
Matrix:	Water	Received:	09/27/11
Units:	ug/L	Analyzed:	10/03/11
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	ND	0.5
Benzene	12	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5

Surrogate	%REC	Limits
Dibromofluoromethane	93	80-127
1,2-Dichloroethane-d4	103	73-145
Toluene-d8	106	80-120
Bromofluorobenzene	101	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Aromatics by GC/MS

Lab #:	231358	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Matrix:	Water	Batch#:	179555
Units:	ug/L	Analyzed:	10/03/11
Diln Fac:	1.000		

Type: BS Lab ID: QC611550

Analyte	Spiked	Result	%REC	Limits
MTBE	25.00	22.69	91	59-123
Benzene	25.00	27.60	110	80-122
Toluene	25.00	26.81	107	80-120
Ethylbenzene	25.00	27.46	110	80-120
m,p-Xylenes	50.00	54.61	109	80-120
o-Xylene	25.00	26.14	105	80-120

Surrogate	%REC	Limits
Dibromofluoromethane	104	80-127
1,2-Dichloroethane-d4	99	73-145
Toluene-d8	101	80-120
Bromofluorobenzene	99	80-120

Type: BSD Lab ID: QC611551

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	25.00	23.06	92	59-123	2	20
Benzene	25.00	26.40	106	80-122	4	20
Toluene	25.00	26.00	104	80-120	3	20
Ethylbenzene	25.00	26.27	105	80-120	4	20
m,p-Xylenes	50.00	52.23	104	80-120	4	20
o-Xylene	25.00	25.29	101	80-120	3	20

Surrogate	%REC	Limits
Dibromofluoromethane	104	80-127
1,2-Dichloroethane-d4	99	73-145
Toluene-d8	102	80-120
Bromofluorobenzene	98	80-120

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Aromatics by GC/MS

Lab #:	231358	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC611552	Batch#:	179555
Matrix:	Water	Analyzed:	10/03/11
Units:	ug/L		

Analyte	Result	RL
MTBE	ND	0.5
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5

Surrogate	%REC	Limits
Dibromofluoromethane	102	80-127
1,2-Dichloroethane-d4	99	73-145
Toluene-d8	102	80-120
Bromofluorobenzene	99	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Aromatics by GC/MS

Lab #:	231358	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Matrix:	Water	Batch#:	179564
Units:	ug/L	Analyzed:	10/03/11
Diln Fac:	1.000		

Type: BS Lab ID: QC611583

Analyte	Spiked	Result	%REC	Limits
MTBE	31.25	23.59	75	59-123
Benzene	31.25	27.23	87	80-122
Toluene	31.25	30.49	98	80-120
Ethylbenzene	31.25	30.93	99	80-120
m,p-Xylenes	62.50	63.62	102	80-120
o-Xylene	31.25	31.81	102	80-120

Surrogate	%REC	Limits
Dibromofluoromethane	91	80-127
1,2-Dichloroethane-d4	103	73-145
Toluene-d8	105	80-120
Bromofluorobenzene	101	80-120

Type: BSD Lab ID: QC611584

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	31.25	26.10	84	59-123	10	20
Benzene	31.25	28.45	91	80-122	4	20
Toluene	31.25	31.89	102	80-120	4	20
Ethylbenzene	31.25	32.29	103	80-120	4	20
m,p-Xylenes	62.50	66.34	106	80-120	4	20
o-Xylene	31.25	33.39	107	80-120	5	20

Surrogate	%REC	Limits
Dibromofluoromethane	91	80-127
1,2-Dichloroethane-d4	103	73-145
Toluene-d8	106	80-120
Bromofluorobenzene	101	80-120

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Aromatics by GC/MS

Lab #:	231358	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC611585	Batch#:	179564
Matrix:	Water	Analyzed:	10/03/11
Units:	ug/L		

Analyte	Result	RL
MTBE	ND	0.5
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5

Surrogate	%REC	Limits
Dibromofluoromethane	93	80-127
1,2-Dichloroethane-d4	102	73-145
Toluene-d8	106	80-120
Bromofluorobenzene	101	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Aromatics by GC/MS

Lab #:	231358	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	ZZZZZZZZZZ	Batch#:	179555
MSS Lab ID:	231482-001	Sampled:	09/30/11
Matrix:	Water	Received:	09/30/11
Units:	ug/L	Analyzed:	10/03/11
Diln Fac:	1.000		

Type: MS Lab ID: QC611602

Analyte	MSS Result	Spiked	Result	%REC	Limits
MTBE	<0.1000	25.00	23.57	94	73-120
Benzene	<0.1000	25.00	28.15	113	80-120
Toluene	2.452	25.00	29.52	108	80-120
Ethylbenzene	<0.1124	25.00	27.95	112	80-120
m,p-Xylenes	<0.1000	50.00	55.89	112	80-120
o-Xylene	<0.1000	25.00	26.56	106	80-120

Surrogate	%REC	Limits
Dibromofluoromethane	105	80-127
1,2-Dichloroethane-d4	101	73-145
Toluene-d8	101	80-120
Bromofluorobenzene	97	80-120

Type: MSD Lab ID: QC611603

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	25.00	23.42	94	73-120	1	20
Benzene	25.00	27.20	109	80-120	3	20
Toluene	25.00	28.60	105	80-120	3	20
Ethylbenzene	25.00	26.79	107	80-120	4	20
m,p-Xylenes	50.00	53.46	107	80-120	4	20
o-Xylene	25.00	25.75	103	80-120	3	20

Surrogate	%REC	Limits
Dibromofluoromethane	104	80-127
1,2-Dichloroethane-d4	100	73-145
Toluene-d8	101	80-120
Bromofluorobenzene	98	80-120

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Dissolved Metals Analytical Report

Lab #:	231358	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 200.7
Matrix:	Filtrate	Sampled:	09/27/11
Units:	ug/L	Received:	09/27/11
Batch#:	179385	Prepared:	09/27/11

Field ID: MW-9 Lab ID: 231358-001
Type: SAMPLE

Analyte	Result	RL	Diln Fac	Analyzed
Calcium	71,000	500	1.000	09/30/11
Iron	6,600	100	1.000	09/30/11
Magnesium	46,000	500	1.000	09/30/11
Manganese	930	5.0	1.000	09/30/11
Potassium	15,000	500	1.000	09/30/11
Sodium	350,000	5,000	10.00	10/05/11

Field ID: MW-4 Lab ID: 231358-002
Type: SAMPLE

Analyte	Result	RL	Diln Fac	Analyzed
Calcium	41,000	500	1.000	09/30/11
Iron	460	100	1.000	09/30/11
Magnesium	68,000	500	1.000	09/30/11
Manganese	310	5.0	1.000	09/30/11
Potassium	9,800	500	1.000	09/30/11
Sodium	250,000	5,000	10.00	10/05/11

Field ID: MW-5 Lab ID: 231358-003
Type: SAMPLE

Analyte	Result	RL	Diln Fac	Analyzed
Calcium	54,000	500	1.000	09/30/11
Iron	590	100	1.000	09/30/11
Magnesium	22,000	500	1.000	09/30/11
Manganese	770	5.0	1.000	09/30/11
Potassium	17,000	500	1.000	09/30/11
Sodium	260,000	5,000	10.00	10/05/11

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Dissolved Metals Analytical Report

Lab #:	231358	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 200.7
Matrix:	Filtrate	Sampled:	09/27/11
Units:	ug/L	Received:	09/27/11
Batch#:	179385	Prepared:	09/27/11

Field ID: MW-4DUP
Type: SAMPLE
Lab ID: 231358-005

Analyte	Result	RL	Diln Fac	Analyzed
Calcium	36,000	500	1.000	09/30/11
Iron	270	100	1.000	09/30/11
Magnesium	65,000	500	1.000	09/30/11
Manganese	250	5.0	1.000	09/30/11
Potassium	9,200	500	1.000	09/30/11
Sodium	240,000	5,000	10.00	10/05/11

Type: BLANK
Lab ID: QC610863
Diln Fac: 1.000

Analyte	Result	RL	Analyzed
Calcium	ND	500	09/30/11
Iron	ND	100	10/14/11
Magnesium	ND	500	09/30/11
Manganese	ND	5.0	09/30/11
Potassium	ND	500	09/30/11
Sodium	ND	500	09/30/11

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Metals Analytical Report

Lab #:	231358	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 200.7
Matrix:	Filtrate	Batch#:	179385
Units:	ug/L	Prepared:	09/27/11
Diln Fac:	1.000	Analyzed:	09/30/11

Type: BS Lab ID: QC610864

Analyte	Spiked	Result	%REC	Limits
Calcium	20,000	19,880	99	78-120
Iron	1,000	1,047	105	73-124
Magnesium	20,000	19,410	97	76-120
Manganese	50.00	56.40	113	80-120
Potassium	10,000	9,291	93	69-120
Sodium	20,000	19,210	96	75-120

Type: BSD Lab ID: QC610865

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Calcium	20,000	20,150	101	78-120	1	20
Iron	1,000	1,017	102	73-124	3	25
Magnesium	20,000	19,450	97	76-120	0	20
Manganese	50.00	56.56	113	80-120	0	21
Potassium	10,000	9,425	94	69-120	1	20
Sodium	20,000	19,480	97	75-120	1	20

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Metals Analytical Report

Lab #:	231358	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 200.7
Field ID:	MW-8A	Batch#:	179385
MSS Lab ID:	231342-001	Sampled:	09/26/11
Matrix:	Filtrate	Received:	09/26/11
Units:	ug/L	Prepared:	09/27/11
Diln Fac:	1.000	Analyzed:	09/30/11

Type: MS Lab ID: QC610866

Analyte	MSS Result	Spiked	Result	%REC	Limits
Calcium	53,360	20,000	70,260	85	53-134
Iron	2,926	1,000	3,742	82	61-129
Magnesium	64,850	20,000	80,710	79	62-127
Manganese	846.9	50.00	856.2	19 NM	64-128
Potassium	18,060	10,000	26,700	86	62-129
Sodium	284,600	20,000	262,500 >LR	-110 NM	55-132

Type: MSD Lab ID: QC610867

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Calcium	20,000	69,470	81	53-134	1	20
Iron	1,000	3,750	82	61-129	0	32
Magnesium	20,000	80,270	77	62-127	1	23
Manganese	50.00	874.7	56 NM	64-128	2	26
Potassium	10,000	26,500	84	62-129	1	24
Sodium	20,000	260,400 >LR	-121 NM	55-132	NC	29

NC= Not Calculated
NM= Not Meaningful: Sample concentration > 4X spike concentration
>LR= Response exceeds instrument's linear range
RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	231358	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 300.0
Matrix:	Water	Batch#:	179364
Units:	mg/L	Received:	09/27/11

Field ID: MW-9 Lab ID: 231358-001
Type: SAMPLE Sampled: 09/27/11 08:15

Analyte	Result	RL	Diln Fac	Analyzed
Chloride	270	5.0	25.00	09/27/11 20:27
Nitrogen, Nitrite	ND	0.05	1.000	09/27/11 16:06
Nitrogen, Nitrate	ND	0.05	1.000	09/27/11 16:06
Sulfate	0.69	0.50	1.000	09/27/11 16:06

Field ID: MW-4 Lab ID: 231358-002
Type: SAMPLE Sampled: 09/27/11 08:23

Analyte	Result	RL	Diln Fac	Analyzed
Chloride	170	5.0	25.00	09/27/11 20:45
Nitrogen, Nitrite	ND	0.05	1.000	09/27/11 16:41
Nitrogen, Nitrate	ND	0.05	1.000	09/27/11 16:41
Sulfate	1.9	0.50	1.000	09/27/11 16:41

Field ID: MW-5 Lab ID: 231358-003
Type: SAMPLE Sampled: 09/27/11 10:50

Analyte	Result	RL	Diln Fac	Analyzed
Chloride	290	5.0	25.00	09/27/11 21:02
Nitrogen, Nitrite	ND	0.05	1.000	09/27/11 17:16
Nitrogen, Nitrate	ND	0.05	1.000	09/27/11 17:16
Sulfate	74	13	25.00	09/27/11 21:02

Field ID: MW-4DUP Lab ID: 231358-005
Type: SAMPLE Sampled: 09/27/11 08:23

Analyte	Result	RL	Diln Fac	Analyzed
Chloride	150	5.0	25.00	09/27/11 21:19
Nitrogen, Nitrite	ND	0.05	1.000	09/27/11 19:52
Nitrogen, Nitrate	ND	0.05	1.000	09/27/11 19:52
Sulfate	2.0	0.50	1.000	09/27/11 19:52

Type: BLANK Diln Fac: 1.000
Lab ID: QC610771 Analyzed: 09/27/11 14:56

Analyte	Result	RL
Chloride	ND	0.20
Nitrogen, Nitrite	ND	0.05
Nitrogen, Nitrate	ND	0.05
Sulfate	ND	0.50

ND= Not Detected
RL= Reporting Limit

Batch QC Report

Curtis & Tompkins Laboratories Analytical Report

Lab #:	231358	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 300.0
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC610772	Batch#:	179364
Matrix:	Water	Analyzed:	09/27/11 15:14
Units:	mg/L		

Analyte	Spiked	Result	%REC	Limits
Chloride	4.000	4.012	100	80-120
Nitrogen, Nitrite	1.000	1.032	103	80-120
Nitrogen, Nitrate	1.000	0.9936	99	80-120
Sulfate	10.00	9.601	96	80-120

Curtis & Tompkins, Ltd.

Batch QC Report

Curtis & Tompkins Laboratories Analytical Report

Lab #:	231358	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 300.0
Field ID:	MW-9	Diln Fac:	25.00
MSS Lab ID:	231358-001	Batch#:	179364
Matrix:	Water	Sampled:	09/27/11 08:15
Units:	mg/L	Received:	09/27/11

Type: MS Analyzed: 09/27/11 21:37
Lab ID: QC610773

Analyte	MSS Result	Spiked	Result	%REC	Limits
Chloride	271.2	50.00	314.6	87 NM	80-120
Nitrogen, Nitrite	<0.01287	12.50	13.79	110	80-121
Nitrogen, Nitrate	<0.01127	12.50	12.74	102	80-120
Sulfate	0.6853	125.0	122.6	98	80-120

Type: MSD Analyzed: 09/27/11 21:54
Lab ID: QC610774

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Chloride	50.00	314.2	86 NM	80-120	0	20
Nitrogen, Nitrite	12.50	13.85	111	80-121	0	20
Nitrogen, Nitrate	12.50	12.53	100	80-120	2	20
Sulfate	125.0	122.9	98	80-120	0	20

NM= Not Meaningful: Sample concentration > 4X spike concentration
RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Alkalinity

Lab #:	231358	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM2320B
Matrix:	Water	Sampled:	09/27/11
Units:	mg/L	Received:	09/27/11
Batch#:	179453	Analyzed:	09/29/11

Field ID: MW-9 Lab ID: 231358-001
Type: SAMPLE Diln Fac: 10.00

Analyte	Result	RL
Alkalinity, Bicarbonate	770	10
Alkalinity, Carbonate	ND	10
Alkalinity, Hydroxide	ND	10
Alkalinity, Total as CaCO3	770	10

Field ID: MW-4 Lab ID: 231358-002
Type: SAMPLE Diln Fac: 10.00

Analyte	Result	RL
Alkalinity, Bicarbonate	860	10
Alkalinity, Carbonate	ND	10
Alkalinity, Hydroxide	ND	10
Alkalinity, Total as CaCO3	860	10

Field ID: MW-5 Lab ID: 231358-003
Type: SAMPLE Diln Fac: 10.00

Analyte	Result	RL
Alkalinity, Bicarbonate	350	10
Alkalinity, Carbonate	ND	10
Alkalinity, Hydroxide	ND	10
Alkalinity, Total as CaCO3	350	10

Field ID: MW-4DUP Lab ID: 231358-005
Type: SAMPLE Diln Fac: 6.670

Analyte	Result	RL
Alkalinity, Bicarbonate	810	6.7
Alkalinity, Carbonate	ND	6.7
Alkalinity, Hydroxide	ND	6.7
Alkalinity, Total as CaCO3	810	6.7

Type: BLANK Diln Fac: 1.000
Lab ID: QC611132

Analyte	Result	RL
Alkalinity, Bicarbonate	ND	1.0
Alkalinity, Carbonate	ND	1.0
Alkalinity, Hydroxide	ND	1.0
Alkalinity, Total as CaCO3	ND	1.0

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Alkalinity

Lab #:	231358	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM2320B
Analyte:	Alkalinity, Total as CaCO3	Units:	mg/L
Type:	LCS	Diln Fac:	4.000
Lab ID:	QC611133	Batch#:	179453
Matrix:	Water	Analyzed:	09/29/11

Spiked	Result	%REC	Limits
200.0	190.4	95	90-110

Curtis & Tompkins, Ltd.

Batch QC Report

Alkalinity

Lab #:	231358	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM2320B
Analyte:	Alkalinity, Total as CaCO3	Diln Fac:	10.00
Field ID:	MW-4DUP	Batch#:	179453
MSS Lab ID:	231358-005	Sampled:	09/27/11
Matrix:	Water	Received:	09/27/11
Units:	mg/L	Analyzed:	09/29/11

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
MS	QC611134	812.7	500.0	1,300	97	80-120		
MSD	QC611135		500.0	1,299	97	80-120	0	25

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Dissolved Sulfide

Lab #:	231358	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM4500S2-D
Analyte:	Dissolved Sulfide	Batch#:	179442
Matrix:	Water	Sampled:	09/27/11
Units:	mg/L	Received:	09/27/11
Diln Fac:	1.000	Analyzed:	09/29/11

Field ID	Type	Lab ID	Result	RL
MW-9	SAMPLE	231358-001	0.08	0.04
MW-4	SAMPLE	231358-002	ND	0.04
MW-5	SAMPLE	231358-003	ND	0.04
MW-4DUP	SAMPLE	231358-005	ND	0.04
	BLANK	QC611093	ND	0.04

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Sulfide

Lab #:	231358	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM4500S2-D
Analyte:	Dissolved Sulfide	Diln Fac:	1.000
Field ID:	MW-8A	Batch#:	179442
MSS Lab ID:	231342-001	Sampled:	09/26/11
Matrix:	Water	Received:	09/26/11
Units:	mg/L	Analyzed:	09/29/11

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
MS	QC611094	0.1081	0.4000	0.3901	98	64-123		
MSD	QC611095		0.4000	0.4123	103	64-123	6	20
LCS	QC611096		0.4000	0.3953	99	80-120		

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Orthophosphate Phosphorous

Lab #:	231358	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM4500P-E
Analyte:	Orthophosphate (as P)	Batch#:	179381
Matrix:	Water	Received:	09/27/11
Units:	mg/L	Analyzed:	09/27/11 19:00

Field ID	Type	Lab ID	Result	RL	Diln Fac	Sampled
MW-9	SAMPLE	231358-001	1.3	0.060	2.000	09/27/11 08:15
MW-4	SAMPLE	231358-002	0.53	0.030	1.000	09/27/11 08:23
MW-5	SAMPLE	231358-003	0.33	0.030	1.000	09/27/11 10:50
MW-4DUP	SAMPLE	231358-005	0.51	0.030	1.000	09/27/11 08:23
	BLANK	QC610842	ND	0.030	1.000	

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Orthophosphate Phosphorous

Lab #:	231358	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM4500P-E
Analyte:	Orthophosphate (as P)	Diln Fac:	1.000
Field ID:	MW-4	Batch#:	179381
MSS Lab ID:	231358-002	Sampled:	09/27/11 08:23
Matrix:	Water	Received:	09/27/11
Units:	mg/L	Analyzed:	09/27/11 19:00

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
LCS	QC610843		0.4000	0.3602	90	80-120		
MS	QC610844	0.5267	0.4000	0.8876	90	76-120		
MSD	QC610845		0.4000	0.8944	92	76-120	1	20

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Total Dissolved Solids (TDS)

Lab #:	231358	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM2540C
Analyte:	Total Dissolved Solids	Sampled:	09/27/11
Matrix:	Water	Received:	09/27/11
Units:	mg/L	Prepared:	09/27/11
Batch#:	179370	Analyzed:	09/28/11

Field ID	Type	Lab ID	Result	RL	Diln Fac
MW-9	SAMPLE	231358-001	1,360	11	1.111
MW-4	SAMPLE	231358-002	1,150	10	1.000
MW-5	SAMPLE	231358-003	1,010	10	1.000
MW-4DUP	SAMPLE	231358-005	1,150	10	1.000
	BLANK	QC610793	ND	10	1.000

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Total Dissolved Solids (TDS)

Lab #:	231358	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM2540C
Analyte:	Total Dissolved Solids	Batch#:	179370
Field ID:	MW-4DUP	Sampled:	09/27/11
MSS Lab ID:	231358-005	Received:	09/27/11
Matrix:	Water	Prepared:	09/27/11
Units:	mg/L	Analyzed:	09/28/11
Diln Fac:	1.000		

Type	Lab ID	MSS Result	Spiked	Result	RL	%REC	Limits	RPD	Lim
BS	QC610794		104.0	92.00		88	75-120		
BSD	QC610795		104.0	84.00		81	75-120	9 *	5
SDUP	QC610796	1,152		1,146	10.00			1	5

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

Data Validation Worksheet

Lab Report # 232028 DV by: SC
Project Port Harbor Facilities Complex Date: 11/15/11

Lab IDs	Sample IDs	Date Collected	Parameters							
			TPHd/mo (8015B) with SG cleanup							
-001	MW-8A	9/26/11	X							
-002	MW-10	9/26/11	X							
-003	MW-2	9/26/11	X							
-004	MW-11	9/26/11	X							
-005	MW-12	9/26/11	X							
-006	MW-9	9/27/11	X							
-007	MW-4	9/27/11	X							
-008	MW-5	9/27/11	X							
-009	MW-6	9/27/11	X							

Lab ID: C+T **NO QUALS**
Cooler Temperature: cold one cooler, 9.8 C one cooler
Chain-of-Custody: received 3 voas labeled "Field Blank" not on COC; Received incorrect number of voas for MW-4DUP, but had enough sample to run analyses
Samples preservatives: -004 pH was above 2. HNO_3 added at lab to lower pH

Parameter: **TPHg**

HTs: 14 days – prepped 9/27/11 (0-1) analyzed 10/19/11 (23-24) met HT for prep → No qual
Batch IDs: 1793760
Surrogates: OK
Method Blank: OK, surrogates OK
LCS: OK, surrogates OK
MS/MSD: MS OK, surrogates OK
MSD OK, surrogates OK


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 232028
ANALYTICAL REPORT

Malcolm Pirnie, Inc.	Project : 4656016
2000 Powell St.	Location : Port Of Oakland - HFC
Emeryville, CA 94608	Level : II

Sample ID	Lab ID
MW-8A	232028-001
MW-10	232028-002
MW-2	232028-003
MW-11	232028-004
MW-12	232028-005
MW-9	232028-006
MW-4	232028-007
MW-5	232028-008
MW-4DUP	232028-009

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: Desiree N. Tetreault
Project Manager

Date: 10/31/2011

NELAP # 01107CA

Curtis & Tompkins, Ltd.

CASE NARRATIVE

Laboratory number:	**232028**
Client:	**Malcolm Pirnie, Inc.**
Project:	**4656016**
Location:	**Port Of Oakland - HFC**
Request Date:	**10/18/11**
Samples Received:	**09/26/11, 09/27/11**

This data package contains sample and QC results for nine water samples, requested for the above referenced project on 10/18/11. The samples were received cold and intact.

TPH-Extractables by GC (EPA 8015B):

No analytical problems were encountered.

231342 Curtis & Tompkins

Needs silica gel & reanalysis

ARCADIS
Infrastructure · Water · Environment · Buildings

ID#:

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Page 1 of 1

Lab Work Order #

Send Results to:
Contact & Company Name: S. Carman ARCADIS
Address:
City / State / Zip
Telephone:
Fax:
E-mail Address:
cc: Gil

Project Name/Location (City, State): Port of Oakland, CA
Sampler's Printed Name:
Project #: E44056016.2000.00083
Sampler's Signature:

Sample ID	Collection Date	Collection Time	Type (✓) Comp	Type (✓) Grab	Matrix	Preservative	Filtered (Y)	# of Containers	Container Information	TPH-GS (5015B)	BTEX/MTBE (8260B)	TPH-D/MO	TDS - major anions	Dis. manganese + iron/major cations	Dis. sulfate	REMARKS
						HCL	HCL	HCL		HNO3	NaOH					
										Field						
						3-ea	3-ea	2-ea	1-ea	1-ea	1 ea					
						VOAs	VOAs	Ambers	poly	poly	poly					
1 MW-8A	9/26/11	1100			water					X	X	X	X	X	X	
2 MW-10		1350														
3 MW-2		1057														
4 MW-11		1423														
5 MW-12		1229														
6 TB-092611																

Keys

Preservation Key: A. H_2SO_4 B. HCL C. HNO_3 D. NaOH E. None F. Other: G. Other: H. Other:

Container Information Key: 1. 40 ml Vial 2. 1 L Amber 3. 250 ml Plastic 4. 500 ml Plastic 5. Encore 6. 2 oz. Glass 7. 4 oz. Glass 8. 8 oz. Glass 9. Other: 10. Other:

Matrix Key: SO - Soil W - Water T - Tissue SE - Sediment SL - Sludge A - Air NL - NAPL/Oil SW - Sample Wipe Other:

Special Instructions/Comments:

☐ Special QA/QC Instructions(✓):

Laboratory Information and Receipt

Lab Name:
☐ Cooler packed with ice (✓)
Specify Turnaround Requirements: Standard
Shipping Tracking #:
Cooler Custody Seal (✓) ☐ Intact ☐ Not Intact
Sample Receipt: Condition/Cooler Temp:

Relinquished By	Received By	Relinquished By	Laboratory Received By
Printed Name: Caroline Orsi	Printed Name: Pat Gonzalez	Printed Name:	Printed Name:
Signature:	Signature:	Signature:	Signature:
Firm:	Firm/Courier: CAT	Firm/Courier:	Firm:
Date/Time: 9/26/11 1600	Date/Time: 9/27/11 1610	Date/Time:	Date/Time:

20730826 CofC AR Form 01.12.2007

Distribution: WHITE – Laboratory returns with results YELLOW – Lab copy PINK – Retained by ARCADIS

Needs silica gel and reanalysis

ARCADIS
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ID#:

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Page ___ of 1

Lab Work Order #

Send Results to:

Contact & Company Name:

Telephone:

Address:

Fax:

City State Zip

E-mail Address:

Project Name/Location (City, State):

Project #:

Sampler's Printed Name:

Sampler's Signature:

Sample ID	Collection Date	Collection Time	Type (✓) Comp	Type (✓) Grab	Matrix
1-A					
1-11					
12					
11					

Preservative							
Filtered (✓)							
# of Containers							1
Container Information							

PARAMETER ANALYSIS & METHOD

F1

Keys

Preservation Key:
A. H_2SO_4
B. HCL
C. HNO_3
D. NaOH
E. None
F. Other: _____
G. Other: _____
H. Other: _____

Container Information Key:
1. 40 ml Vial
2. 1 L Amber
3. 250 ml Plastic
4. 500 ml Plastic
5. Encore
6. 2 oz. Glass
7. 4 oz. Glass
8. 8 oz. Glass
9. Other: _____
10. Other: _____

Matrix Key:
SO - Soil
W - Water
T - Tissue
SE - Sediment
SL - Sludge
A - Air
NL - NAPL/Oil
SW - Sample Wipe
Other:

REMARKS

Special Instructions/Comments:

☐ Special QA/QC Instructions(✓):

Laboratory Information and Receipt

Lab Name:

☐ Cooler packed with ice (✓)

Specify Turnaround Requirements:

Shipping Tracking #:

Cooler Custody Seal (✓) ☐ Intact ☐ Not Intact

Sample Receipt:

Constituent/Cooler Temp:

Relinquished By	Received By	Relinquished By	Laboratory Received By
Printed Name:	Printed Name:	Printed Name:	Printed Name:
Signature:	Signature:	Signature:	Signature:
Firm:	Firm/Courier:	Firm/Courier:	Firm:
Date/Time:	Date/Time:	Date/Time:	Date/Time:

20730826 CofC AR Form 01.12.2007

Distribution: **WHITE – Laboratory returns with results** **YELLOW – Lab copy** **PINK – Retained by ARCADIS**

COOLER RECEIPT CHECKLIST

Curtis & Tompkins, Ltd.

Login # 231342 Date Received 9/26/11 Number of coolers 2
Client ARCADIS Project 04605601G.0000.00003

Date Opened 9/26/11 By (print) I.CHOY (sign)
Date Logged in ↓ By (print) ↓ (sign) ↓

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~~ ISC
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) 9.8°C

☒ Samples Received on ice & cold without a temperature blank (2 TEMP BLANK IN 1 COOLER / 1 COOLER NO TEMP BLANK)

☒ 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 samples in the appropriate containers for indicated tests? _____ (YES) NO
11. Are sample labels present, in good condition and complete? _____ (YES) NO
12. Do the sample labels agree with custody papers? _____ (YES) NO
13. Was sufficient amount of sample sent for tests requested? _____ (YES) NO
14. Are the samples appropriately preserved? _____ YES (NO) N/A
15. Did you check preservatives for all bottles for each sample? _____ (YES) NO N/A
16. Did you document your preservative check? _____ (YES) NO N/A
17. Did you change the hold time in LIMS for unpreserved VOAs? _____ YES NO (N/A)
18. Are bubbles > 6mm absent in VOA samples? _____ (YES) NO N/A
19. Was the client contacted concerning this sample delivery? _____ YES NO
If YES, Who was called?_____ By_____ Date:_____

COMMENTS
H)-004. PH WAS ABOVE 2. ADDED HNO3 (#K14036) ON 9/26/11 @ 1714

Rev 8, 6/11

Curtis & Tompkins Sample Preservation for 231342

Sample	pH: <2	>12	Other
-001a	[ ]	[ ]	
b	[ ]	[ ]	
c	[ ]	[ ]	
d	[ ]	[ ]	
e	[ ]	[ ]	
f	[ ]	[ ]	
g	[ ]	[X]	
h	[X]	[ ]	
i	[ ]	[ ]	
j	[ ]	[ ]	
k	[ ]	[ ]	
-002a	[ ]	[ ]	
b	[ ]	[ ]	
c	[ ]	[ ]	
d	[ ]	[ ]	
e	[ ]	[ ]	
f	[ ]	[ ]	
g	[ ]	[X]	
h	[X]	[ ]	
i	[ ]	[ ]	
j	[ ]	[ ]	
k	[ ]	[ ]	
-003a	[ ]	[ ]	
b	[ ]	[ ]	
c	[ ]	[ ]	
d	[ ]	[ ]	
e	[ ]	[ ]	
f	[ ]	[ ]	

Sample	pH: <2	>12	Other
g	[ ]	[X]	
h	[X]	[ ]	
i	[ ]	[ ]	
j	[ ]	[ ]	
k	[ ]	[ ]	
-004a	[ ]	[ ]	
b	[ ]	[ ]	
c	[ ]	[ ]	
d	[ ]	[ ]	
e	[ ]	[ ]	
f	[ ]	[ ]	
g	[ ]	[X]	
h	[X]	[ ]	
i	[ ]	[ ]	
j	[ ]	[ ]	
k	[ ]	[ ]	
-005a	[ ]	[ ]	
b	[ ]	[ ]	
c	[ ]	[ ]	
d	[ ]	[ ]	
e	[ ]	[ ]	
f	[ ]	[ ]	
g	[ ]	[X]	
h	[X]	[ ]	
i	[ ]	[ ]	
j	[ ]	[ ]	
k	[ ]	[ ]	

Analyst: _____

Date: 9/26/11

Page 1 of 1

Needs silica gel and reanalysis

ARCADIS
Infrastructure Water Environment Buildings

ID#: 231358

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Page 1 of 1

Lab Work Order #:

Send Results to:
Contact & Company Name: ARCADIS - S. Carman
Address:
City / State / Zip
Telephone:
Fax:
E-mail Address: on file

Project Name/Location (City, State): Port of Oakland, CA
Project #: 04656016.0000.00083
Sampler's Printed Name: Caroline Orsi
Sampler's Signature:

Preservative	HCL	HCL	HCL		HNO_3	NaOH	
Filtered (Y)					field		
# of Containers	3-ea	3-ea	2-ea	1-ea	1-ea	1-ea	
Container Information	VOAs	VOAs	500mL Amber	Poly	Poly	Poly	

PARAMETER ANALYSIS & METHOD

	Sample ID	Collection Date	Collection Time	Type (Y) Comp	Type (Y) Grab	Matrix	TPH-G (8015B)	BTEX/MTBE (8260B)	TPH-D/mo	TDS/Major anions (carbonate, carbonate, sulfate, chloride, nitrate)	Dis. Mn + Fe	Major cations Na, K, Ca, Mg	Dis. sulfide	
1	MW-9	9/27/11	0815			water	X	X	X	X	X	X		
2	MW-4		0823											
3	MW-5		1050											
4	TB-092711													
5	MW-4DUP	9/27/11	0823				X	X	X	X	X	X	X	

Keys

Preservation Key: A. H_2SO_4 B. HCl C. HNO_3 D. NaOH E. None F. Other: G. Other: H. Other:

Container Information Key: 1. 40 ml Vial 2. 1 L Amber 3. 250 ml Plastic 4. 500 ml Plastic 5. Encore 6. 2 oz. Glass 7. 4 oz. Glass 8. 8 oz. Glass 9. Other: 10. Other:

Matrix Key: SO - Soil SE - Sediment NL - NAPL/Oil W - Water SL - Sludge SW - Sample Wipe T - Tissue A - Air Other:

REMARKS

Special Instructions/Comments:

☐ Special QA/QC Instructions(✓):

Laboratory Information and Receipt	Relinquished By	Received By	Relinquished By	Laboratory Received By
Lab Name:	Printed Name: Caroline Orsi	Printed Name: [illegible] Gonzalez	Printed Name:	Printed Name:
☐ Cooler packed with ice (✓)	Signature:	Signature: For Haugh	Signature:	Signature:
Specify Turnaround Requirements: Standard	Firm: ARCADIS	Firm/Courier: CET	Firm/Courier:	Firm:
Shipping Tracking #:	Date/Time: 9/27/11 1305	Date/Time: 9/27/11 1305	Date/Time:	Date/Time:
Cooler Custody Seal (✓) ☐ Intact ☐ Not Intact; Sample Receipt Condition/Cooler Temp:				

20730826 CofC AR Form 01.12.2007

Distribution: WHITE – Laboratory returns with results YELLOW – Lab copy PINK – Retained by ARCADIS

COOLER RECEIPT CHECKLIST Curtis & Tompkins, Ltd.

Login # 231358 Date Received 9/27/11 Number of coolers 2
Client Arcadis Project Port Of Oakland

Date Opened 9/27/11 By (print) Vidia Qarshi (sign)
Date Logged in ↓ By (print) ↓ (sign) ↓

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) 5.4

☐ Samples Received on ice & cold without a temperature blank

☐ 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 samples in the appropriate containers for indicated tests? (YES) NO
11. Are sample labels present, in good condition and complete? (YES) NO
12. Do the sample labels agree with custody papers? YES (NO)
13. Was sufficient amount of sample sent for tests requested? (YES) NO
14. Are the samples appropriately preserved? (YES) NO N/A
15. Did you check preservatives for all bottles for each sample? (YES) NO N/A
16. Did you document your preservative check? (YES) NO N/A
17. Did you change the hold time in LIMS for unpreserved VOAs? YES NO (N/A)
18. Are bubbles > 6mm absent in VOA samples? (YES) NO N/A
19. Was the client contacted concerning this sample delivery? YES (NO)
If YES, Who was called? By Date:

COMMENTS
12. Rec'd 3 VOAs labeled "Field Blank" 09/27/11 0725 that are not listed on COC.
-005 Rec'd 5 VOAs filled w/ sample and 1 empty VOA
-004 Rec'd 5 VOAs instead of Three.

Rev 8, 6/11

Curtis & Tompkins Sample Preservation for 231358

Sample	pH: <2	>12	Other
-001a	[ ]	[ ]	
b	[ ]	[ ]	
c	[ ]	[ ]	
d	[ ]	[ ]	
e	[ ]	[ ]	
f	[ ]	[ ]	
g	[ ]	[X]	
h	[X]	[ ]	
i	[ ]	[ ]	
j	[ ]	[ ]	
k	[ ]	[ ]	
-002a	[ ]	[ ]	
b	[ ]	[ ]	
c	[ ]	[ ]	
d	[ ]	[ ]	
e	[ ]	[ ]	
f	[ ]	[ ]	
g	[ ]	[X]	
h	[X]	[ ]	
i	[ ]	[ ]	
j	[ ]	[ ]	
k	[ ]	[ ]	
-003a	[ ]	[ ]	
b	[ ]	[ ]	
c	[ ]	[ ]	
d	[ ]	[ ]	
e	[ ]	[ ]	
f	[ ]	[ ]	
g	[ ]	[X]	
h	[X]	[ ]	
i	[ ]	[ ]	
j	[ ]	[ ]	
k	[ ]	[ ]	
-005a	[ ]	[ ]	
b	[ ]	[ ]	
c	[ ]	[ ]	
d	[ ]	[ ]	
e	[ ]	[ ]	
f	[ ]	[X]	
g	[X]	[ ]	
h	[ ]	[ ]	
i	[ ]	[ ]	
j	[ ]	[ ]	

Analyst: VO

Date: 7/27/11

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	232028	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 3520C
Project#:	4656016	Analysis:	EPA 8015B
Matrix:	Water	Batch#:	179376
Units:	ug/L	Prepared:	09/27/11
Diln Fac:	1.000		

Field ID:	MW-8A	Received:	09/26/11
Type:	SAMPLE	Analyzed:	10/19/11
Lab ID:	232028-001	Cleanup Method:	EPA 3630C
Sampled:	09/26/11		

Analyte	Result	RL
Diesel C10-C24	ND	50
Motor Oil C24-C36	ND	300

Surrogate	%REC	Limits
o-Terphenyl	103	68-120

Field ID:	MW-10	Received:	09/26/11
Type:	SAMPLE	Analyzed:	10/20/11
Lab ID:	232028-002	Cleanup Method:	EPA 3630C
Sampled:	09/26/11		

Analyte	Result	RL
Diesel C10-C24	780	50
Motor Oil C24-C36	ND	300

Surrogate	%REC	Limits
o-Terphenyl	114	68-120

Field ID:	MW-2	Received:	09/26/11
Type:	SAMPLE	Analyzed:	10/19/11
Lab ID:	232028-003	Cleanup Method:	EPA 3630C
Sampled:	09/26/11		

Analyte	Result	RL
Diesel C10-C24	ND	50
Motor Oil C24-C36	ND	300

Surrogate	%REC	Limits
o-Terphenyl	119	68-120

Field ID:	MW-11	Received:	09/26/11
Type:	SAMPLE	Analyzed:	10/19/11
Lab ID:	232028-004	Cleanup Method:	EPA 3630C
Sampled:	09/26/11		

Analyte	Result	RL
Diesel C10-C24	ND	50
Motor Oil C24-C36	ND	300

Surrogate	%REC	Limits
o-Terphenyl	110	68-120

Y= Sample exhibits chromatographic pattern which does not resemble standard
ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	232028	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 3520C
Project#:	4656016	Analysis:	EPA 8015B
Matrix:	Water	Batch#:	179376
Units:	ug/L	Prepared:	09/27/11
Diln Fac:	1.000		

Field ID:	MW-12	Received:	09/26/11
Type:	SAMPLE	Analyzed:	10/19/11
Lab ID:	232028-005	Cleanup Method:	EPA 3630C
Sampled:	09/26/11		

Analyte	Result	RL
Diesel C10-C24	500	50
Motor Oil C24-C36	ND	300

Surrogate	%REC	Limits
o-Terphenyl	111	68-120

Field ID:	MW-9	Received:	09/27/11
Type:	SAMPLE	Analyzed:	10/19/11
Lab ID:	232028-006	Cleanup Method:	EPA 3630C
Sampled:	09/27/11		

Analyte	Result	RL
Diesel C10-C24	180	50
Motor Oil C24-C36	ND	300

Surrogate	%REC	Limits
o-Terphenyl	111	68-120

Field ID:	MW-4	Received:	09/27/11
Type:	SAMPLE	Analyzed:	10/19/11
Lab ID:	232028-007	Cleanup Method:	EPA 3630C
Sampled:	09/27/11		

Analyte	Result	RL
Diesel C10-C24	72	50
Motor Oil C24-C36	ND	300

Surrogate	%REC	Limits
o-Terphenyl	119	68-120

Field ID:	MW-5	Received:	09/27/11
Type:	SAMPLE	Analyzed:	10/19/11
Lab ID:	232028-008	Cleanup Method:	EPA 3630C
Sampled:	09/27/11		

Analyte	Result	RL
Diesel C10-C24	ND	50
Motor Oil C24-C36	ND	300

Surrogate	%REC	Limits
o-Terphenyl	115	68-120

Y= Sample exhibits chromatographic pattern which does not resemble standard
ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	232028	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 3520C
Project#:	4656016	Analysis:	EPA 8015B
Matrix:	Water	Batch#:	179376
Units:	ug/L	Prepared:	09/27/11
Diln Fac:	1.000		

Field ID:	MW-4DUP	Received:	09/27/11
Type:	SAMPLE	Analyzed:	10/19/11
Lab ID:	232028-009	Cleanup Method:	EPA 3630C
Sampled:	09/27/11		

Analyte	Result	RL
Diesel C10-C24	57 Y	50
Motor Oil C24-C36	ND	300

Surrogate	%REC	Limits
o-Terphenyl	116	68-120

Type:	BLANK	Analyzed:	09/29/11
Lab ID:	QC610823	Cleanup Method:	EPA 3630C

Analyte	Result	RL
Diesel C10-C24	ND	50
Motor Oil C24-C36	ND	300

Surrogate	%REC	Limits
o-Terphenyl	94	68-120

Y= Sample exhibits chromatographic pattern which does not resemble standard
ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Total Extractable Hydrocarbons

Lab #:	232028	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 3520C
Project#:	4656016	Analysis:	EPA 8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC610824	Batch#:	179376
Matrix:	Water	Prepared:	09/27/11
Units:	ug/L	Analyzed:	09/29/11

Cleanup Method: EPA 3630C

Analyte	Spiked	Result	%REC	Limits
Diesel C10-C24	2,500	1,986	79	61-120

Surrogate	%REC	Limits
o-Terphenyl	82	68-120

Curtis & Tompkins, Ltd.

Batch QC Report

Total Extractable Hydrocarbons

Lab #:	232028	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 3520C
Project#:	4656016	Analysis:	EPA 8015B
Field ID:	ZZZZZZZZZZ	Batch#:	179376
MSS Lab ID:	231369-001	Sampled:	09/27/11
Matrix:	Water	Received:	09/27/11
Units:	ug/L	Prepared:	09/27/11
Diln Fac:	1.000	Analyzed:	09/28/11

Type: MS Lab ID: QC610825

Analyte	MSS Result	Spiked	Result	%REC	Limits
Diesel C10-C24	287.9	2,500	1,927	66	33-140

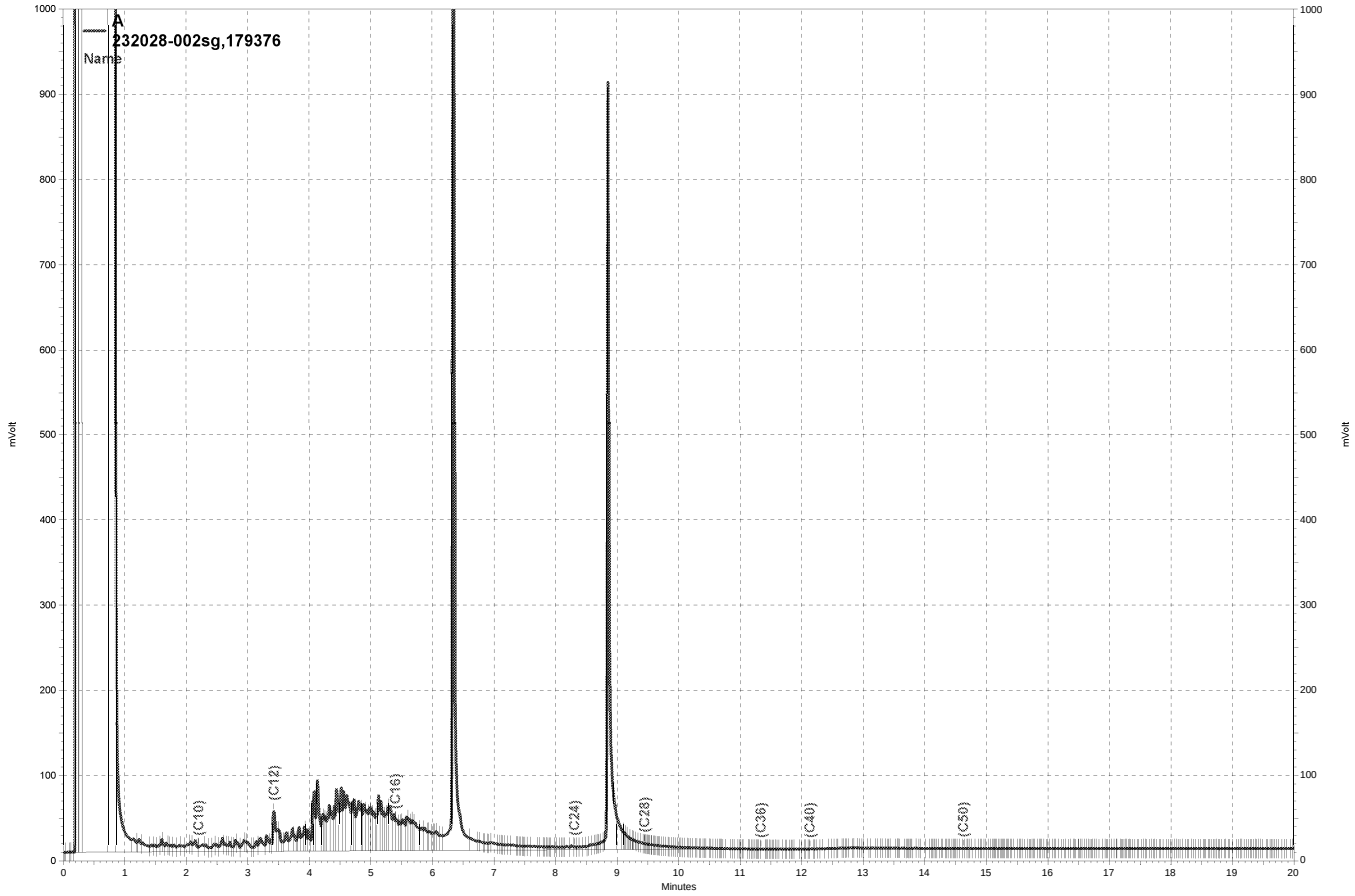
Surrogate	%REC	Limits
o-Terphenyl	85	68-120

Type: MSD Lab ID: QC610826

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Diesel C10-C24	2,500	2,359	83	33-140	20	30

Surrogate	%REC	Limits
o-Terphenyl	103	68-120

RPD= Relative Percent Difference



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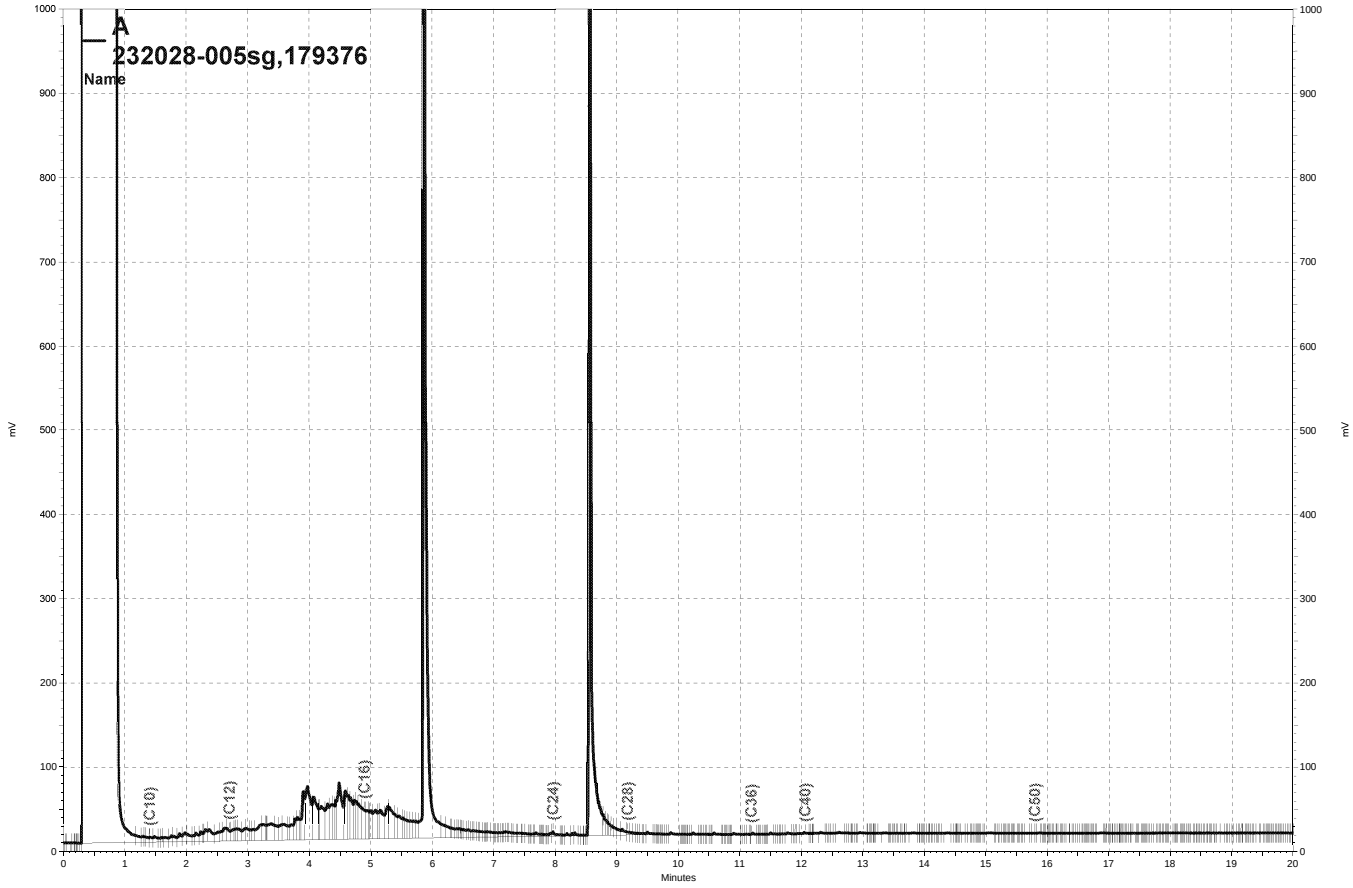

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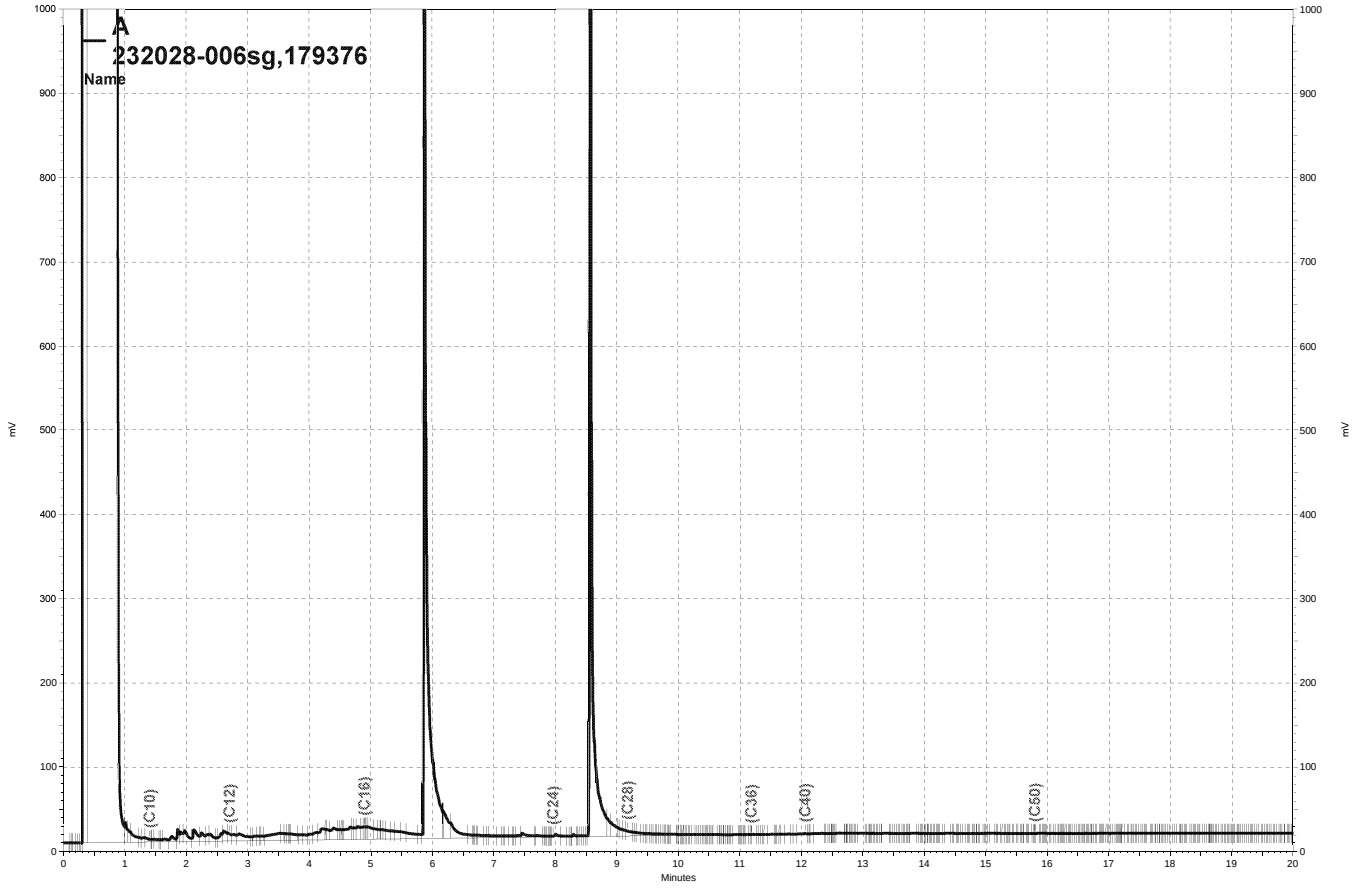

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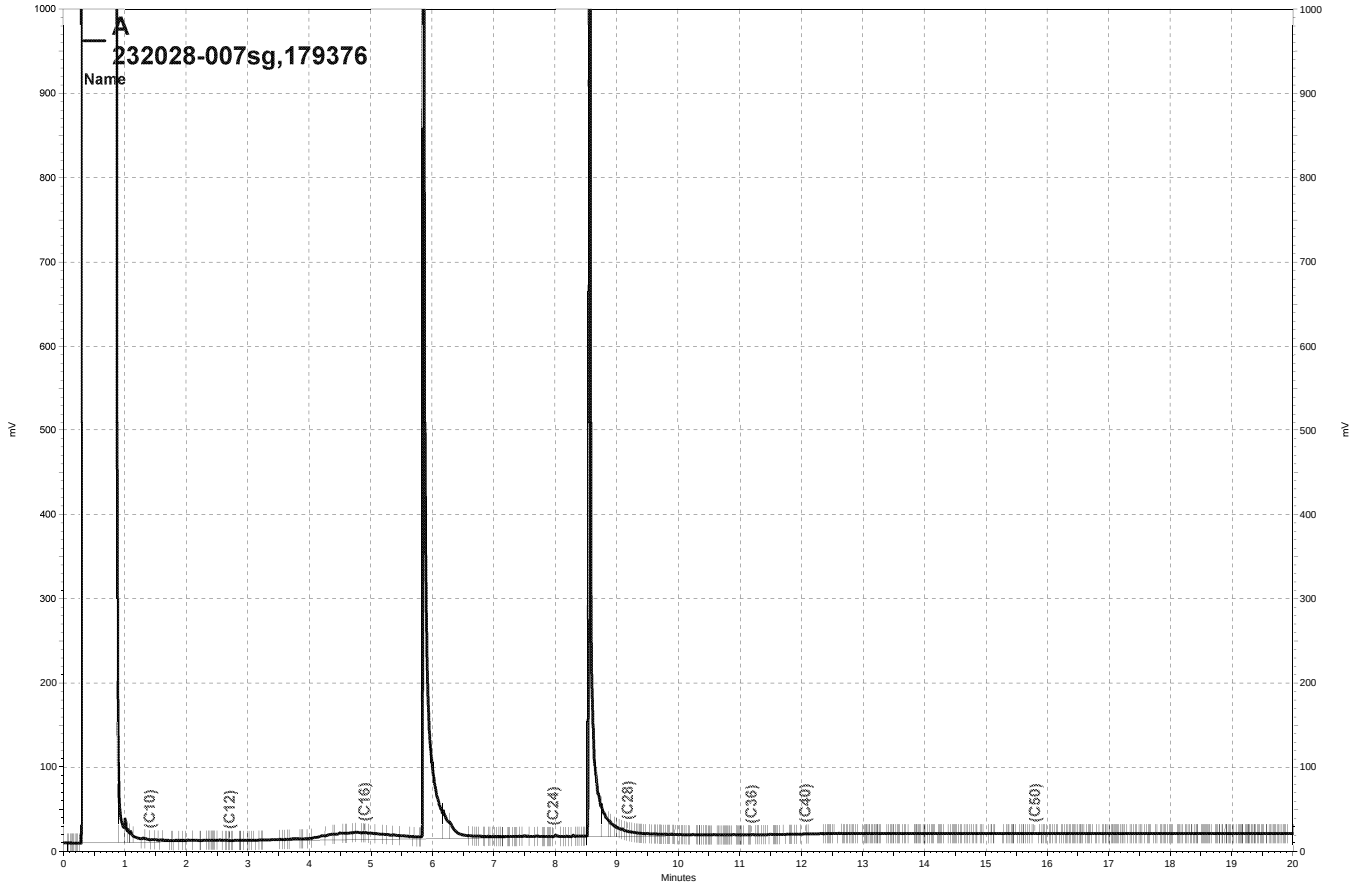

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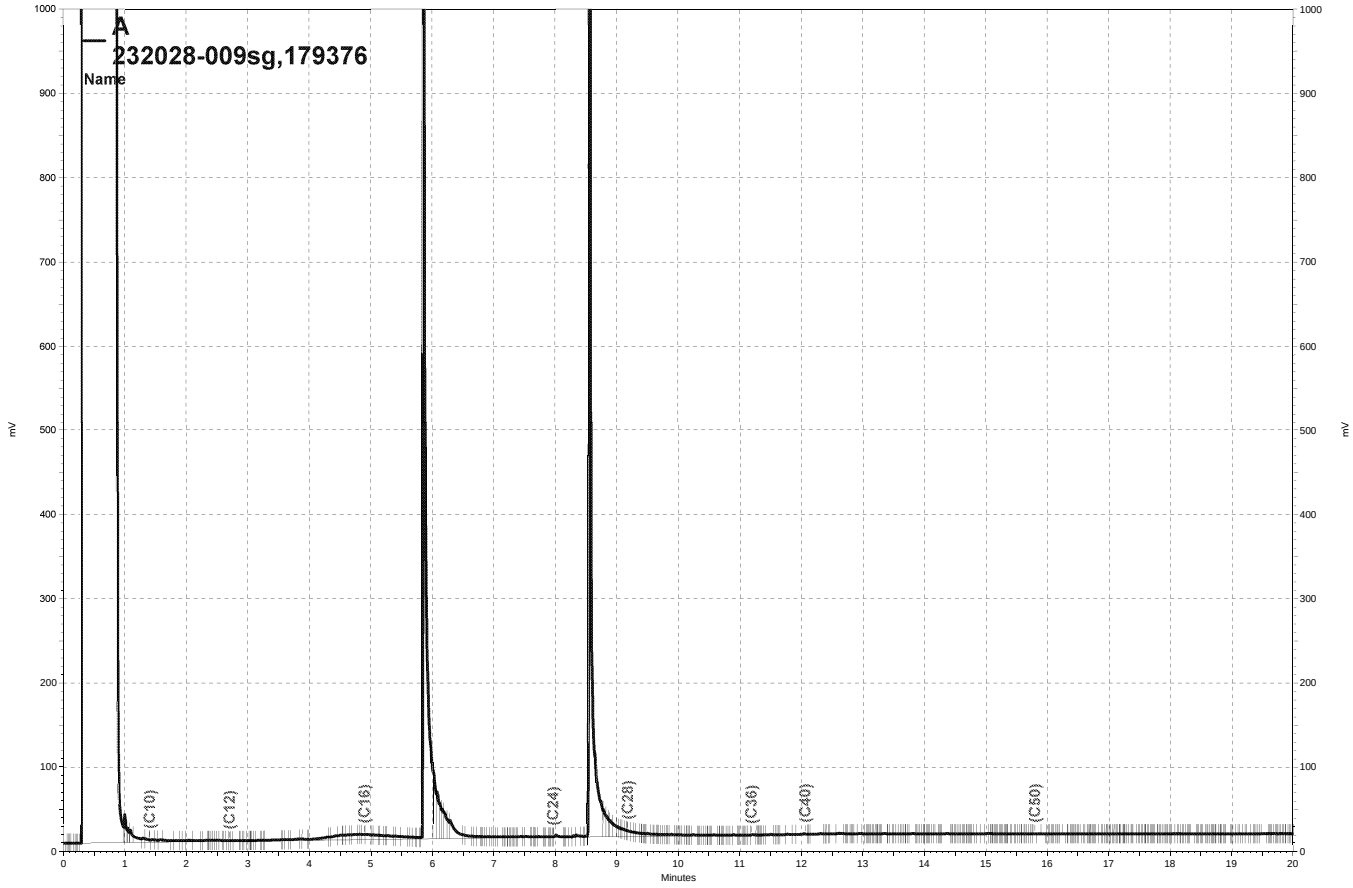

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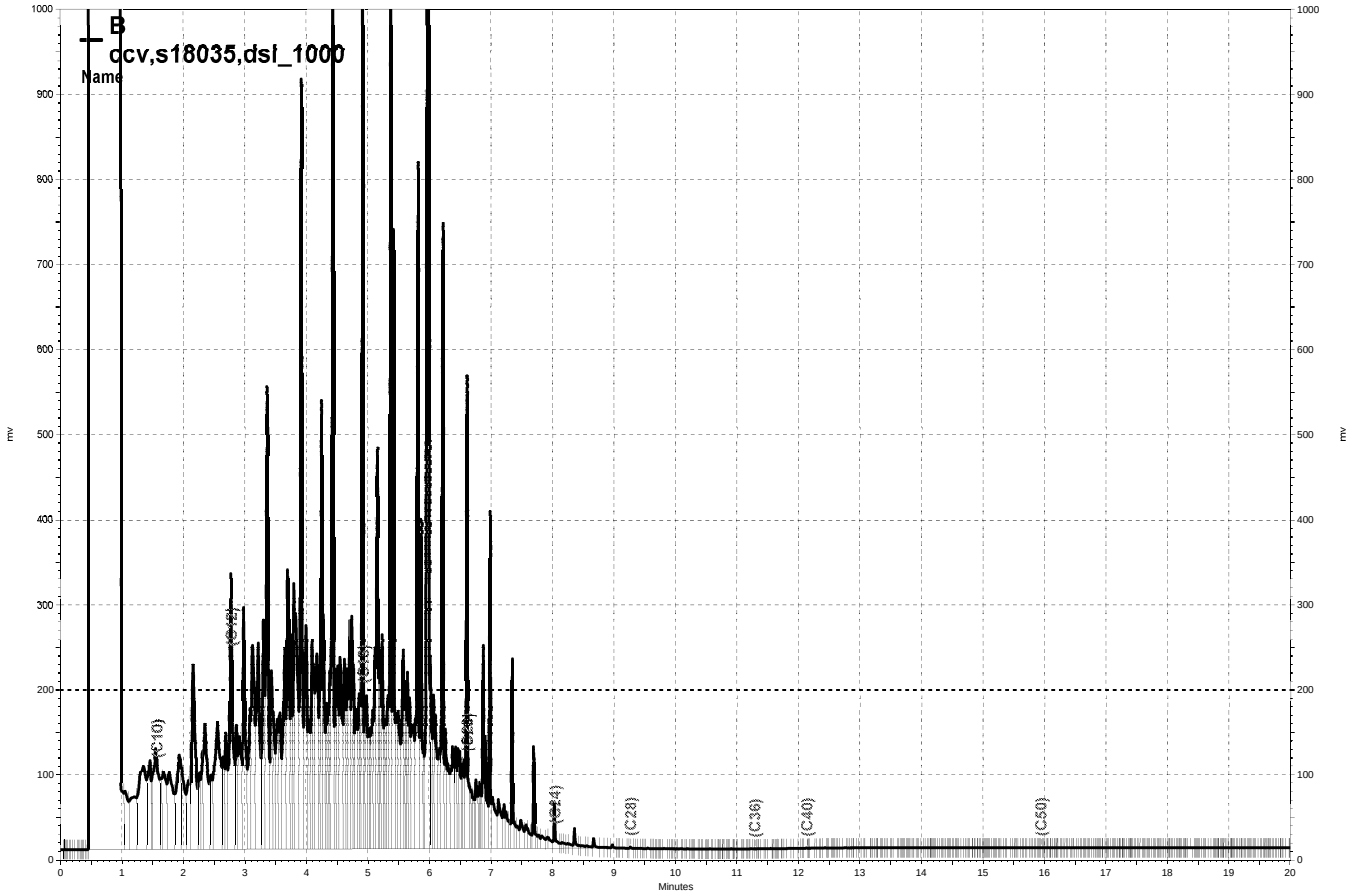

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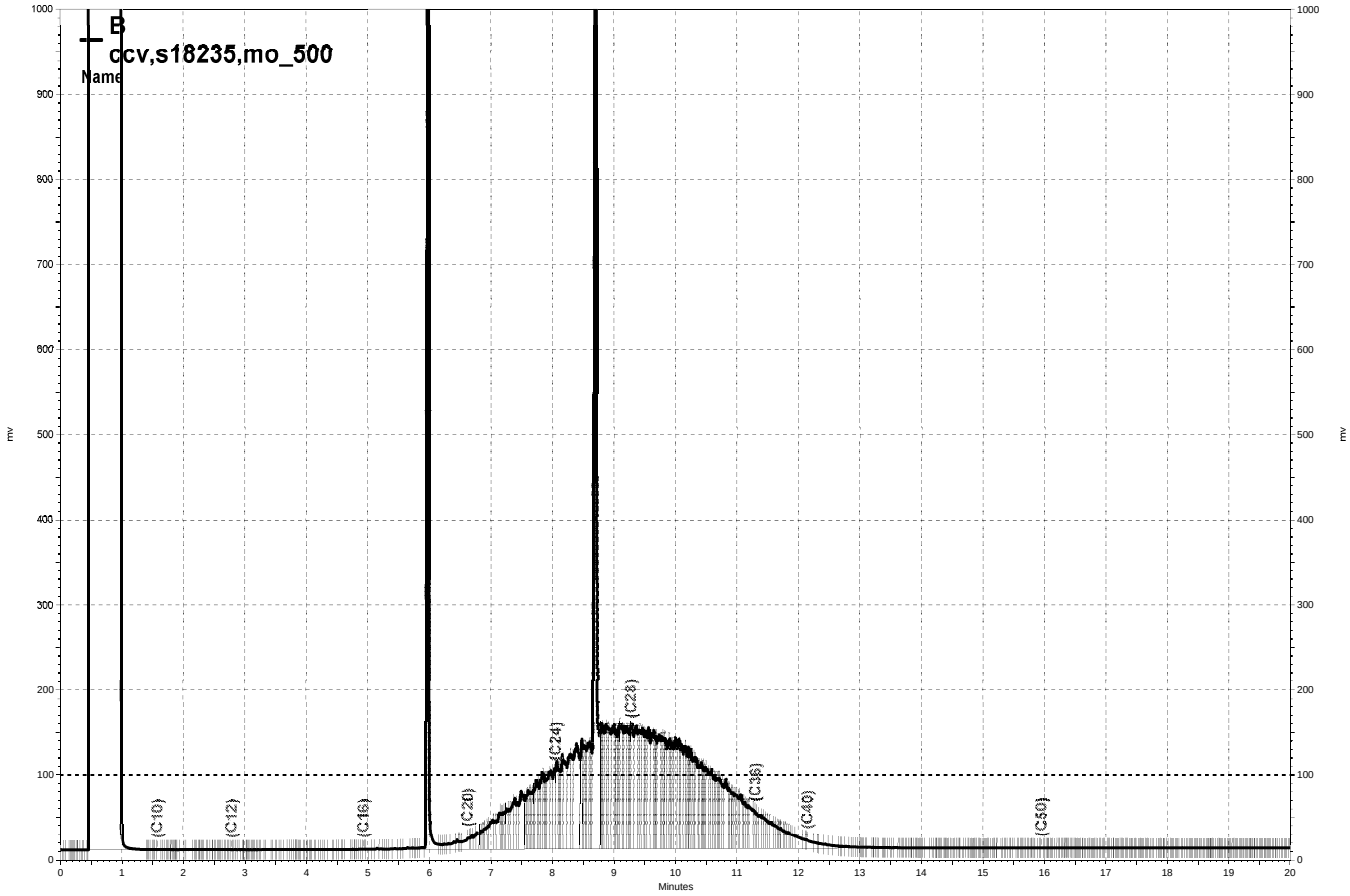

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Microseeps, Inc
220 William Pitt Way
Pittsburgh, PA 15238
Phone: (412) 826-5245
Fax: (412) 826-3433

October 14, 2011

Teresa OReilly
Arcadis
2000 Powell Street
7th Floor
Emeryville, CA 94608
USA

RE: **PORT OF OAK / 04656016.00083**

Microseeps Workorder: 2683

Dear Teresa OReilly:

Enclosed are the analytical results for sample(s) received by the laboratory on Wednesday, September 28, 2011. Results reported herein conform to the most current NELAC standards, where applicable, unless otherwise narrated in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Heather Hauser 10/18/11

Heather Hauser 10/14/2011
hhauser@microseeps.com

Enclosures

Total Number of Pages 15

CERTIFICATE OF ANALYSIS

Microseeps, Inc
220 William Pitt Way
Pittsburgh, PA 15238
Phone: (412) 826-5245
Fax: (412) 826-3433

LABORATORY ACCREDITATIONS & CERTIFICATIONS

Accreditor:	Pennsylvania Department of Environmental Protection, Bureau of Laboratories
Accreditation ID:	02-00538
Scope:	NELAP Non-Potable Water and Solid & Hazardous Waste
Accreditor:	NELAP: State of Florida, Department of Health, Bureau of Laboratories
Accreditation ID:	E87832
Scope:	Clean Water Act (CWA) Resource Conservation and Recovery Act (RCRA)
Accreditor:	South Carolina Department of Health and Environmental Control, Office of Environmental Laboratory Certification
Accreditation ID:	89009003
Scope:	Clean Water Act (CWA); Resource Conservation and Recovery Act (RCRA)
Accreditor:	NELAP: State of Louisiana, Department of Environmental Quality
Accreditation ID:	04104
Scope:	Solid and Chemical Materials; Non-Potable Water
Accreditor:	NELAP: New Jersey, Department of Environmental Protection
Accreditation ID:	PA026
Scope:	Non-Potable Water; Solid and Chemical Materials
Accreditor:	NELAP: New York, Department of Health Wadsworth Center
Accreditation ID:	11815
Scope:	Non-Potable Water; Solid and Hazardous Waste
Accreditor:	State of Connecticut, Department of Public Health, Division of Environmental Health
Accreditation ID:	PH-0263
Scope:	Clean Water Act (CWA) Resource Conservation and Recovery Act (RCRA)
Accreditor:	NELAP: Texas, Commission on Environmental Quality
Accreditation ID:	T104704453-09-TX
Scope:	Non-Potable Water
Accreditor:	State of New Hampshire
Accreditation ID:	299409
Scope:	Non-potable water
Accreditor:	State of Georgia
Accreditation ID:	Chapter 391-3-26
Scope:	As per the Georgia EPD Rules and Regulations for Commercial Laboratories, Microseeps is accredited by the Pennsylvania Department of Environmental Protection Bureau of Laboratories under the National Environmental Laboratory Approval Program (NELAC).

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SAMPLE SUMMARY

Workorder: 2683 PORT OF OAK / 04656016.00083

Lab ID	Sample ID	Matrix	Date Collected	Date Received
26830001	MW-8A	Water	9/26/2011 11:00	9/28/2011 16:45
26830002	MW-10	Water	9/26/2011 13:50	9/28/2011 16:45
26830003	MW-2	Water	9/26/2011 10:57	9/28/2011 16:45
26830004	MW-11	Water	9/26/2011 14:23	9/28/2011 16:45
26830005	MW-12	Water	9/26/2011 12:29	9/28/2011 16:45
26830006	MW-9	Water	9/27/2011 08:15	9/28/2011 16:45
26830007	MW-4	Water	9/27/2011 08:23	9/28/2011 16:45
26830008	MW-5	Water	9/27/2011 10:50	9/28/2011 16:45
26830009	MW-4 DUP	Water	9/27/2011 08:23	9/28/2011 16:45

Microseeps, Inc
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ANALYTICAL RESULTS

Workorder: 2683 PORT OF OAK / 04656016.00083

Lab ID: **26830001** Date Received: 9/28/2011 16:45 Matrix: Water
Sample ID: **MW-8A** Date Collected: 9/26/2011 11:00

Parameters	Results	Units	RDL	MDL	DF	Prepared	By	Analyzed	By	Qual	RegLmt
RISK											
Analysis Desc: AM20GAX			Analytical Method: AM20GAX								
Methane	310	ug/l	0.10	0.023	1			10/4/2011 11:12	GT		
Carbon Dioxide	52	mg/l	5.0	0.12	1			10/4/2011 11:12	GT		

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ANALYTICAL RESULTS

Workorder: 2683 PORT OF OAK / 04656016.00083

Lab ID: **26830002** Date Received: 9/28/2011 16:45 Matrix: Water
Sample ID: **MW-10** Date Collected: 9/26/2011 13:50

Parameters	Results	Units	RDL	MDL	DF	Prepared	By	Analyzed	By	Qual	RegLmt
RISK											
Analysis Desc: AM20GAX			Analytical Method: AM20GAX								
Methane	7300	ug/l	0.10	0.023	1			10/4/2011 11:25	GT		
Carbon Dioxide	170	mg/l	5.0	0.12	1			10/4/2011 11:25	GT		

CERTIFICATE OF ANALYSIS

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ANALYTICAL RESULTS

Workorder: 2683 PORT OF OAK / 04656016.00083

Lab ID: **26830003** Date Received: 9/28/2011 16:45 Matrix: Water
Sample ID: **MW-2** Date Collected: 9/26/2011 10:57

Parameters	Results	Units	RDL	MDL	DF	Prepared	By	Analyzed	By	Qual	RegLmt
RISK											
Analysis Desc: AM20GAX			Analytical Method: AM20GAX								
Methane	18	ug/l	0.10	0.023	1			10/4/2011 11:39	GT		
Carbon Dioxide	31	mg/l	5.0	0.12	1			10/4/2011 11:39	GT		

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ANALYTICAL RESULTS

Workorder: 2683 PORT OF OAK / 04656016.00083

Lab ID: **26830004** Date Received: 9/28/2011 16:45 Matrix: Water
Sample ID: **MW-11** Date Collected: 9/26/2011 14:23

Parameters	Results	Units	RDL	MDL	DF	Prepared	By	Analyzed	By	Qual	RegLmt
RISK											
Analysis Desc: AM20GAX			Analytical Method: AM20GAX								
Methane	8300	ug/l	0.10	0.023	1			10/4/2011 11:52	GT		
Carbon Dioxide	46	mg/l	5.0	0.12	1			10/4/2011 11:52	GT		

CERTIFICATE OF ANALYSIS

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ANALYTICAL RESULTS

Workorder: 2683 PORT OF OAK / 04656016.00083

Lab ID: **26830005** Date Received: 9/28/2011 16:45 Matrix: Water
Sample ID: **MW-12** Date Collected: 9/26/2011 12:29

Parameters	Results	Units	RDL	MDL	DF	Prepared	By	Analyzed	By	Qual	RegLmt
RISK											
Analysis Desc: AM20GAX			Analytical Method: AM20GAX								
Methane	4900	ug/l	0.10	0.023	1			10/4/2011 12:07	GT		
Carbon Dioxide	88	mg/l	5.0	0.12	1			10/4/2011 12:07	GT		

CERTIFICATE OF ANALYSIS

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ANALYTICAL RESULTS

Workorder: 2683 PORT OF OAK / 04656016.00083

Lab ID: **26830006** Date Received: 9/28/2011 16:45 Matrix: Water
Sample ID: **MW-9** Date Collected: 9/27/2011 08:15

Parameters	Results	Units	RDL	MDL	DF	Prepared	By	Analyzed	By	Qual	RegLmt
RISK											
Analysis Desc: AM20GAX			Analytical Method: AM20GAX								
Methane	9500	ug/l	0.10	0.023	1			10/4/2011 12:20	GT		
Carbon Dioxide	71	mg/l	5.0	0.12	1			10/4/2011 12:20	GT		

CERTIFICATE OF ANALYSIS

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Phone: (412) 826-5245
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ANALYTICAL RESULTS

Workorder: 2683 PORT OF OAK / 04656016.00083

Lab ID: **26830007** Date Received: 9/28/2011 16:45 Matrix: Water
Sample ID: **MW-4** Date Collected: 9/27/2011 08:23

Parameters	Results	Units	RDL	MDL	DF	Prepared	By	Analyzed	By	Qual	RegLmt
RISK											
Analysis Desc: AM20GAX			Analytical Method: AM20GAX								
Methane	4100	ug/l	0.10	0.023	1			10/4/2011 12:33	GT		
Carbon Dioxide	15	mg/l	5.0	0.12	1			10/4/2011 12:33	GT		

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ANALYTICAL RESULTS

Workorder: 2683 PORT OF OAK / 04656016.00083

Lab ID: **26830008** Date Received: 9/28/2011 16:45 Matrix: Water
Sample ID: **MW-5** Date Collected: 9/27/2011 10:50

Parameters	Results	Units	RDL	MDL	DF	Prepared	By	Analyzed	By	Qual	RegLmt
RISK											
Analysis Desc: AM20GAX			Analytical Method: AM20GAX								
Methane	78	ug/l	0.10	0.023	1			10/4/2011 12:47	GT		
Carbon Dioxide	30	mg/l	5.0	0.12	1			10/4/2011 12:47	GT		

CERTIFICATE OF ANALYSIS

Microseeps, Inc
220 William Pitt Way
Pittsburgh, PA 15238
Phone: (412) 826-5245
Fax: (412) 826-3433

ANALYTICAL RESULTS

Workorder: 2683 PORT OF OAK / 04656016.00083

Lab ID: **26830009** Date Received: 9/28/2011 16:45 Matrix: Water
Sample ID: **MW-4 DUP** Date Collected: 9/27/2011 08:23

Parameters	Results	Units	RDL	MDL	DF	Prepared	By	Analyzed	By	Qual	RegLmt
RISK											
Analysis Desc: AM20GAX			Analytical Method: AM20GAX								
Methane	4100	ug/l	0.10	0.023	1			10/4/2011 13:03	GT		
Carbon Dioxide	16	mg/l	5.0	0.12	1			10/4/2011 13:03	GT		

CERTIFICATE OF ANALYSIS

Microseeps, Inc
220 William Pitt Way
Pittsburgh, PA 15238
Phone: (412) 826-5245
Fax: (412) 826-3433

ANALYTICAL RESULTS QUALIFIERS

Workorder: 2683 PORT OF OAK / 04656016.00083

PARAMETER QUALIFIERS

U	Indicates the compound was analyzed for, but not detected.
J	Estimated concentration greater than the set method detection limit (MDL) and less than the set reporting limit (RDL).

2685 Microseeps

ARCADIS
Infrastructure · Water · Environment · Buildings

ID#:

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Page 1 of 1

Lab Work Order #

Send Results to:
Contact & Company Name: S. Carmen ARCADIS
Address: on file
City / State / Zip:
Telephone:
Fax:
E-mail Address:

Project Name/Location (City, State): Port of Oakland, CA
Project #: OH635DV6.0000.00083
Sampler's Printed Name: Caroline Orsi
Sampler's Signature:

Preservative	RAK						
Filtered (✓)							
# of Containers	2-ea						
Container Information	VOAs						

PARAMETER ANALYSIS & METHOD

Keys

Preservation Key:
A. H_2SO_4
B. HCL
C. HNO_3
D. NaOH
E. None
F. Other: _____
G. Other: _____
H. Other: _____

Container Information Key:
1. 40 ml Vial
2. 1 L Amber
3. 250 ml Plastic
4. 500 ml Plastic
5. Encore
6. 2 oz. Glass
7. 4 oz. Glass
8. 8 oz. Glass
9. Other: _____
10. Other: _____

Matrix Key:
SO - Soil | SE - Sediment | NL - NAPL/Oil
W - Water | SL - Sludge | SW - Sample Wipe
T - Tissue | A - Air | Other: _____

	Sample ID	Collection Date	Collection Time	Type (✓) Comp	Type (✓) Grab	Matrix	methane carbon dioxide	REMARKS
1	MW-8A	9/26/11	1100			water	X	
2	MW-10		1350					
3	MW-2		1057					
4	MW-11		1423					
5	MW-12		1229					
6	MW-7	9/27/11	0815			water	X	
7	MW-4		0823					
8	MW-5		1050					
9	MW-4DUP	9/27/11	0823					

Special Instructions/Comments: 20°C

☐ **Special QA/QC Instructions(✓):**

Laboratory Information and Receipt		Relinquished By	Received By	Relinquished By	Laboratory Received By
Lab Name:	Cooler Custody Seal (✓)	Printed Name: Caroline Orsi	Printed Name: T. O'Reilly to Lab	Printed Name:	Printed Name: Huong Lan Young
☐ Cooler packed with ice (✓)	☐ Intact ☐ Not Intact	Signature:	Signature:	Signature:	Signature:
Specify Turnaround Requirements: standard	Sample Receipt:	Firm: ARCADIS	Firm/Courier:	Firm/Courier:	Firm: MS
Shipping Tracking #:	Condition/Cooler Temp: _____	Date/Time: 9/27/11 1400	Date/Time:	Date/Time:	Date/Time: 9/28/11 11 00

Distribution: WHITE – Laboratory returns with results YELLOW – Lab copy PINK – Retained by ARCADIS

Cooler Receipt Form

Client Name: Arcadis **Project:** Port of Oakland, CA **Lab Work Order:** 2683

A. **Shipping/Container Information** (circle appropriate response)

Courier: (FedEx) UPS USPS Client Other:_____ **Air bill Present:** (Yes) No

Tracking Number: 7975 6373 9179

Custody Seal on Cooler/Box Present: Yes (No) **Seals Intact:** Yes No

Cooler/Box Packing Material: (Bubble Wrap) Absorbent Foam Other:_____

Type of Ice: (Wet) Blue None **Ice Intact:** (Yes) Melted

Cooler Temperature: 2°C **Radiation Screened:** Yes (No) **Chain of Custody Present:** (Yes) No

Comments:_____

B. **Laboratory Assignment/Log-in** (check appropriate response)

	YES	NO	N/A	Comment Reference non-Conformance
Chain of Custody properly filled out	✓			
Chain of Custody relinquished	✓			
Sampler Name & Signature on COC	✓			
Containers intact	✓			
Were samples in separate bags	✓			
Sample container labels match COC Sample name/date and time collected	✓			
Sufficient volume provided	✓			
Microseeps containers used	✓			
Are containers properly preserved for the requested testing? (as labeled)	✓			
If an unknown preservation state, were containers checked? Exception: VOA's coliform			✓	
Was volume for dissolved testing field filtered, as noted on the COC? Was volume received in a preserved container?			✓	

Comments:_____

_____

Cooler contents examined/received by : HLY **Date:** 9/28/11

Project Manager Review :_____ **Date:**_____

Port of Oakland
530 Water Street • Oakland, CA 94607

Appendix C
Comparison of Pre and Post Silica Gel Clean-up on Groundwater Samples

4656016

MALCOLM PIRNIE

APPENDIX C

COMPARISON OF PRE AND POST SILICA GEL CLEAN-UP ON GROUNDWATER SAMPLES

The following presents an assessment of the pre- and post- silica gel clean-up laboratory results for total petroleum hydrocarbons as diesel fuel (TPHd) collected from the Port of Oakland's Harbor Facilities Complex in September 2011

Background

USEPA Method 3630C (silica gel clean-up) was developed to separate analytes with interfering compounds of a different polarity (polar versus non-polar) when analyzing samples using column chromatography (e.g., USEPA Method 8015 Modified). Prior to the acceptance of USEPA Method 8015M, total petroleum hydrocarbon assessment was completed using USEPA Method 418.1 , which includes a silica gel clean-up step to remove natural organics and isolate the petroleum hydrocarbons. USEPA Method 8015 M does not include the silica gel cleanup step. Therefore, the results obtained by using the newer method represent a "total hydrocarbon" measurement rather than a "petroleum hydrocarbon" measurement.

Microbial degradation byproducts of petroleum hydrocarbons (e.g., alcohols, organic acids, phenols, aldehydes, ketones) contain oxygen in their molecular structures and are therefore "polar" molecules. These polar compounds are highly soluble in water and are generally present in groundwater at petroleum release sites where biodegradation is actively occurring. Because these polar compounds are also hydrocarbons (carbon chain compound with hydrogen and oxygen molecules attached) they are measured and reported as part of the hydrocarbon analysis, resulting in artificially elevated results, because they are extracted and quantified together with the non-polar petroleum hydrocarbons.

Site-specific Laboratory Results

Malcolm Pirnie collected groundwater samples in September 2011 that were prepared for analysis using Method 5030, then analyzed by USEPA Method 8015M. Because the laboratory did not use silica gel clean-up method on the initial samples, as was done with historical samples, Malcolm Pirnie requested the laboratory process the sample extract remaining after analysis using the silica gel clean-up method and analyzed the resulting extract by USEPA Method 8015M. The results are summarized in the attached table and chromatograms are attached for review. Malcolm Pirnie's assessment of the data indicates:

a. There is a difference in the resulting concentration of TPH-D based on the preparation method used (with or without silica gel clean-up).
b. A review of the chromatograms indicates that the complex mixture does not resemble the diesel or motor oil standards (also attached) used by the laboratory. Most of the chromatograms for samples analyzed pre silica gel cleanup are

without discernable peaks in the C10 to C24 hydrocarbon range, which is unusual even for weathered diesel.

c. The "hump" exhibited in each of the chromatograms for samples analyzed pre silica gel cleanup is centered around the C18 to C20 hydrocarbon range, and typically ranges up to the C36 range. The "hump" for the diesel standard centers around the C14 to C16 range. However, studies indicate that petroleum hydrocarbon compounds larger than C14 are not expected to be soluble. However, because the organic hydrocarbon compounds are polar, the larger compounds readily dissolve in water and are mobile in the environment.

Saturated soils and shallow groundwater beneath the Site likely contain a significant amount of natural organic matter (NOM), due to the organic nature of the shallow soils (dredge spoils). In addition, the Site soils and groundwater likely contain a large biomass, due to the age of the release and the long-term intrinsic biodegradation of the petroleum hydrocarbons. Comparison of the samples analyzed before and after silica gel cleanup indicates that the shallow groundwater likely contains detectable concentrations of NOM, likely organic acids from the degrading petroleum hydrocarbons, and microbial biomass. The NOM is interfering with the laboratory analysis and affecting the TPHd results reported by the laboratory. The use of silica gel to remove these organic polar compounds provides a more representative result of the dissolved TPHd concentration beneath the Site.

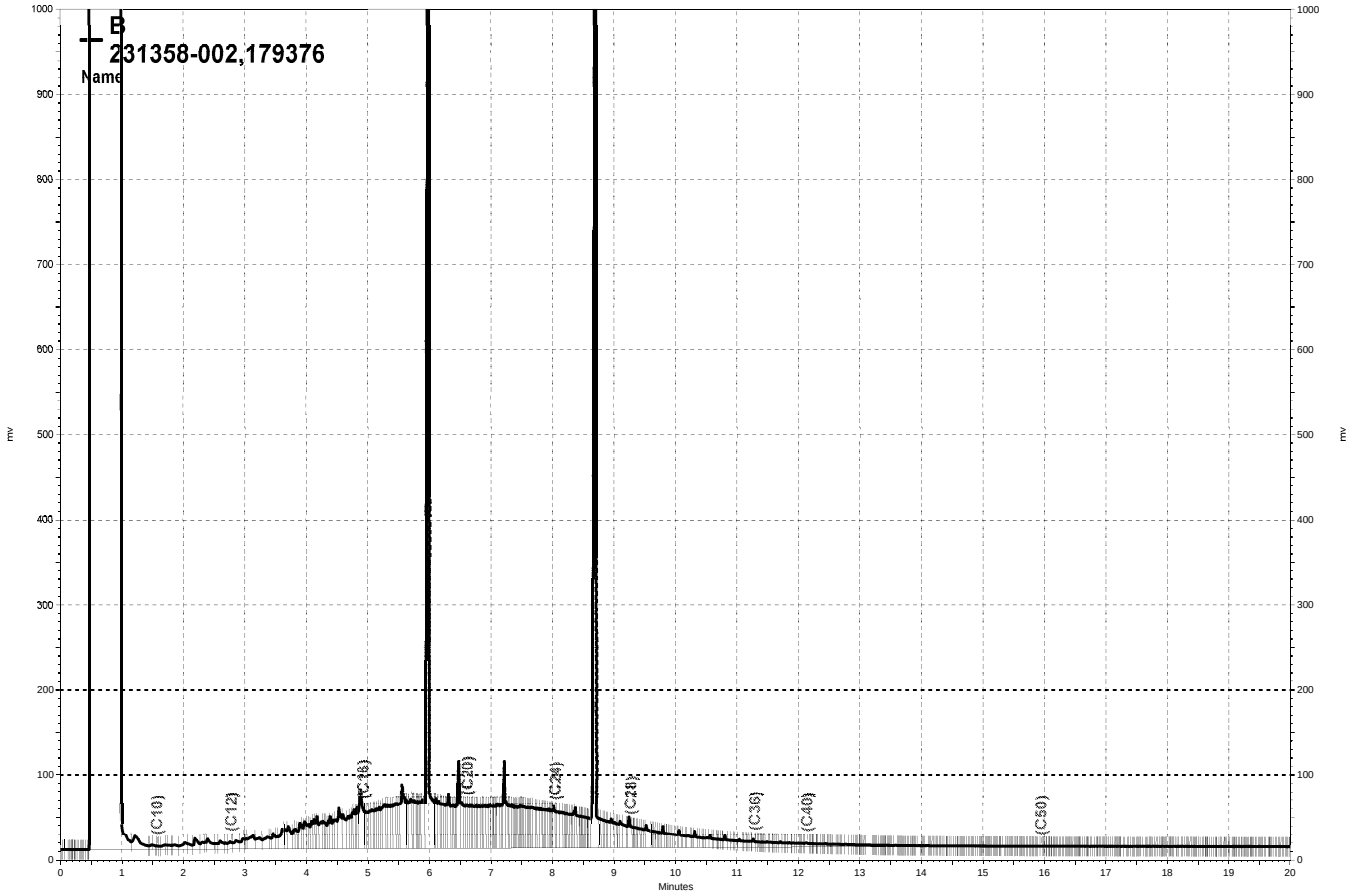
Comparison of Pre and Post Silica Gel Cleanup on Shallow Groundwater Samples
Port of Oakland's Harbor Facility Complex
651 Maritime Street, Oakland, California

Well ID	Sample Date	Concentration (µg/L)	
		TPH (C10-C24) pre-silica gel[1]	TPH (C10-C24) post-silica gel[2]
MW-2	9/26/2011	170	<50
MW-4	9/27/2011	1,200	72
MW-4 (dup)	9/27/2011	1,200	57
MW-5	9/27/2011	1,200	<50
MW-8A	9/26/2011	930	<50
MW-9	9/27/2011	2,100	180
MW-10	9/26/2011	24,000	780
MW-11	9/26/2011	5,300	<50
MW-12	9/26/2011	2,800	500

[1] Results reported by laboratory prior to filtering the sample through silica gel media (USEPA 3630C)

[2] Results reported by laboratory after filtering the sample through silica gel media (USEPA 3630C)

MW-4 Pre Silica Gel



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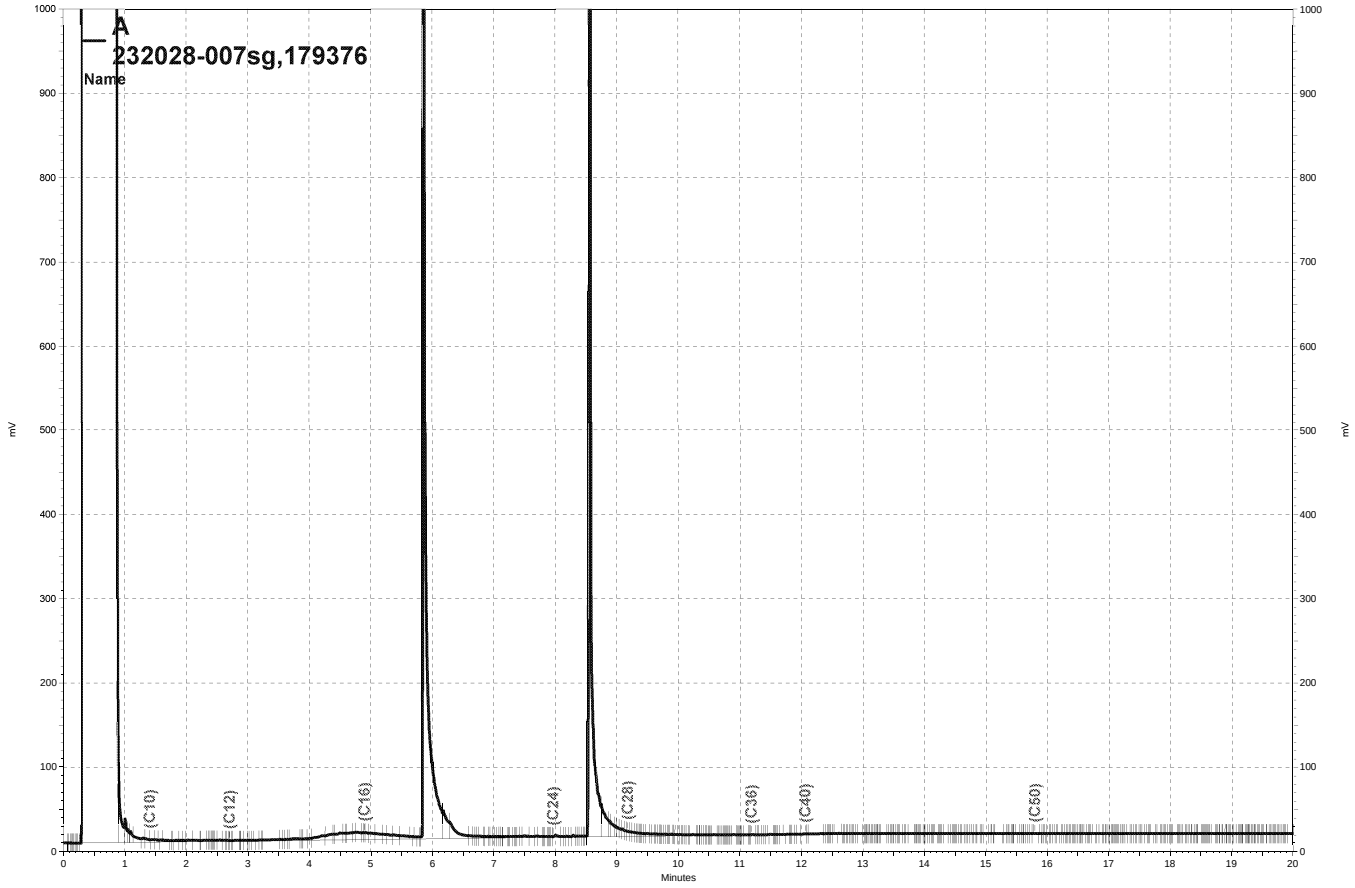
MW-4 Post Silica Gel



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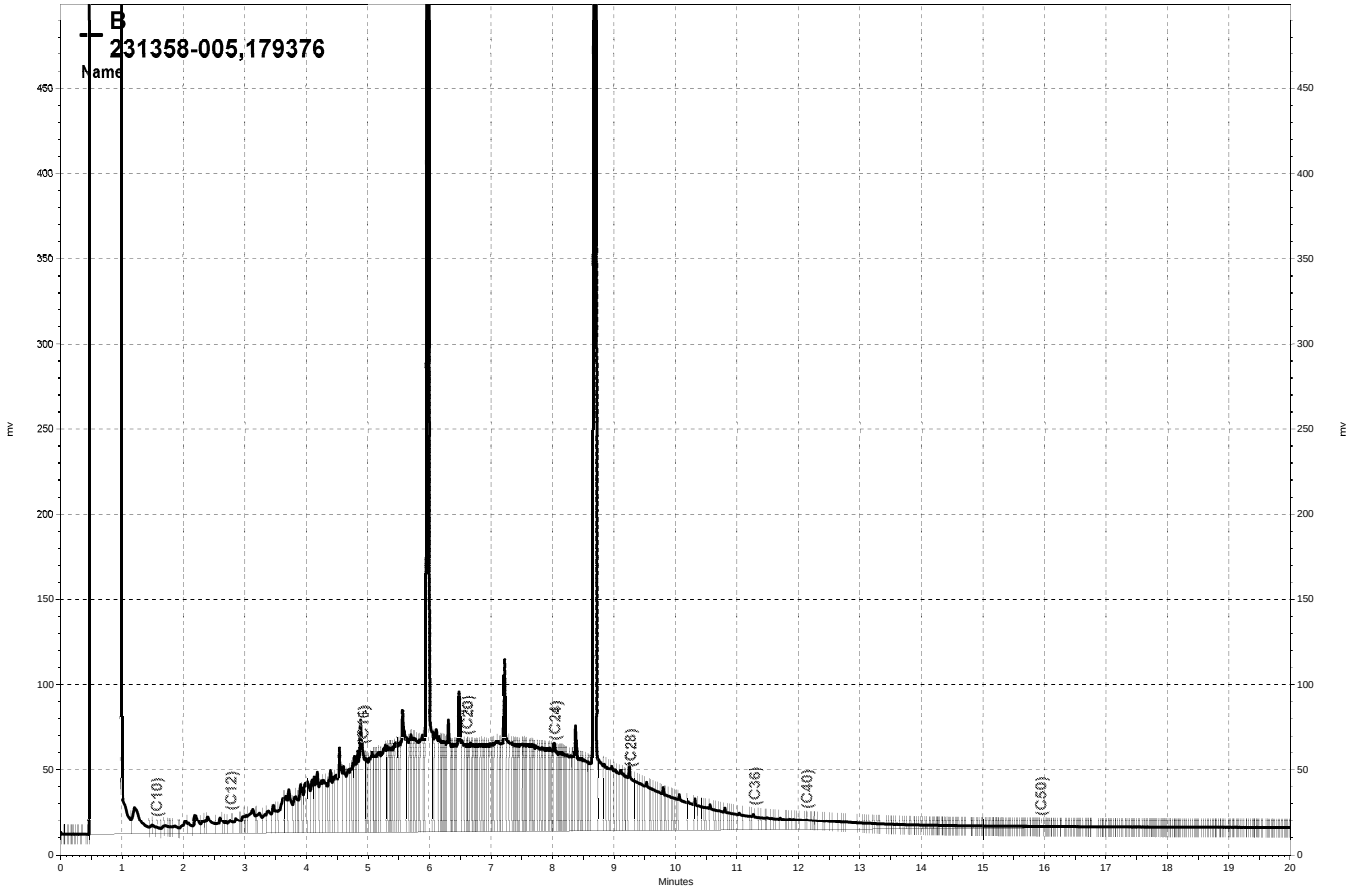
MW-4 (dup) Pre Silica Gel



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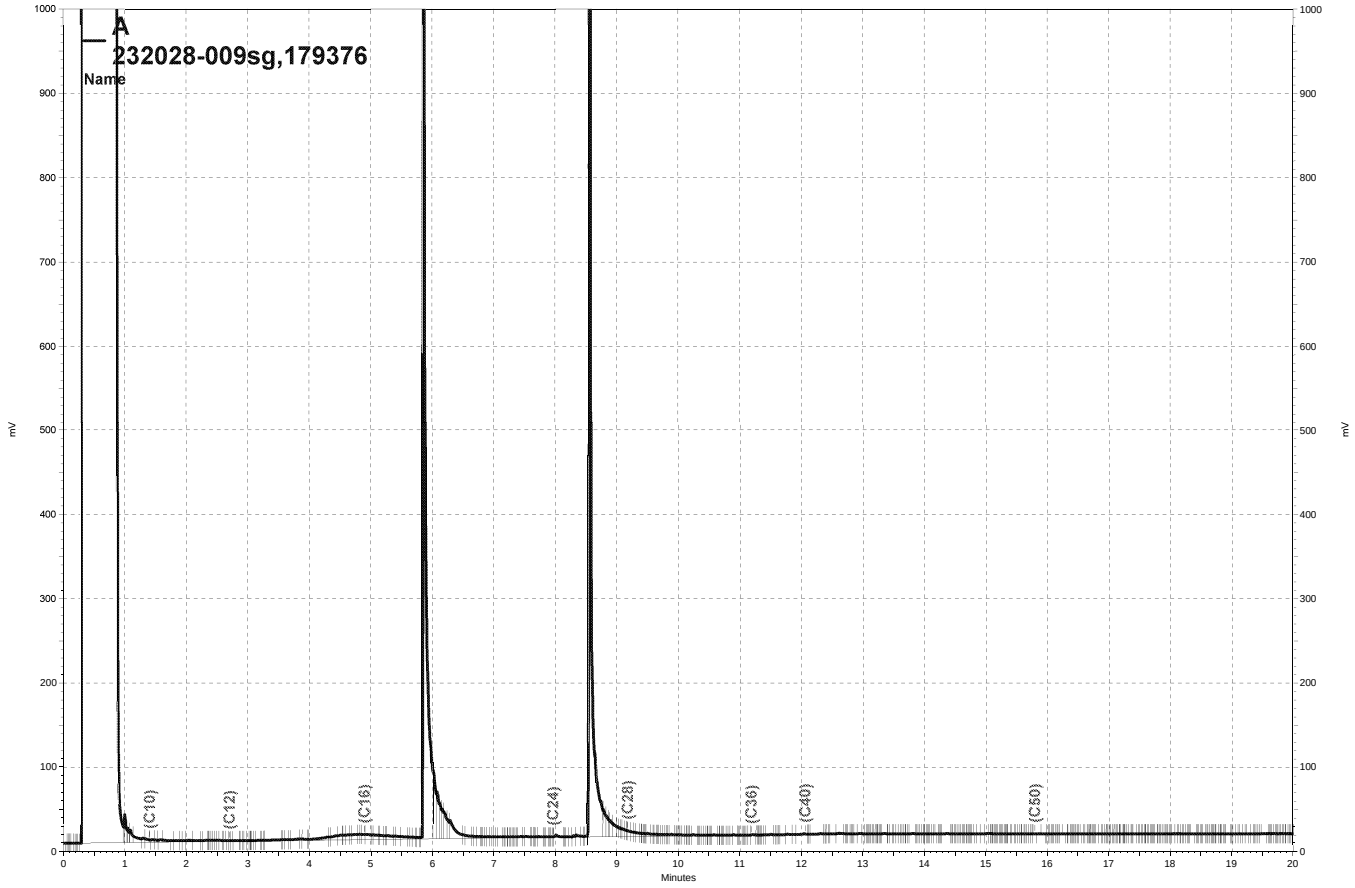
MW-4 (dup) Post Silica Gel



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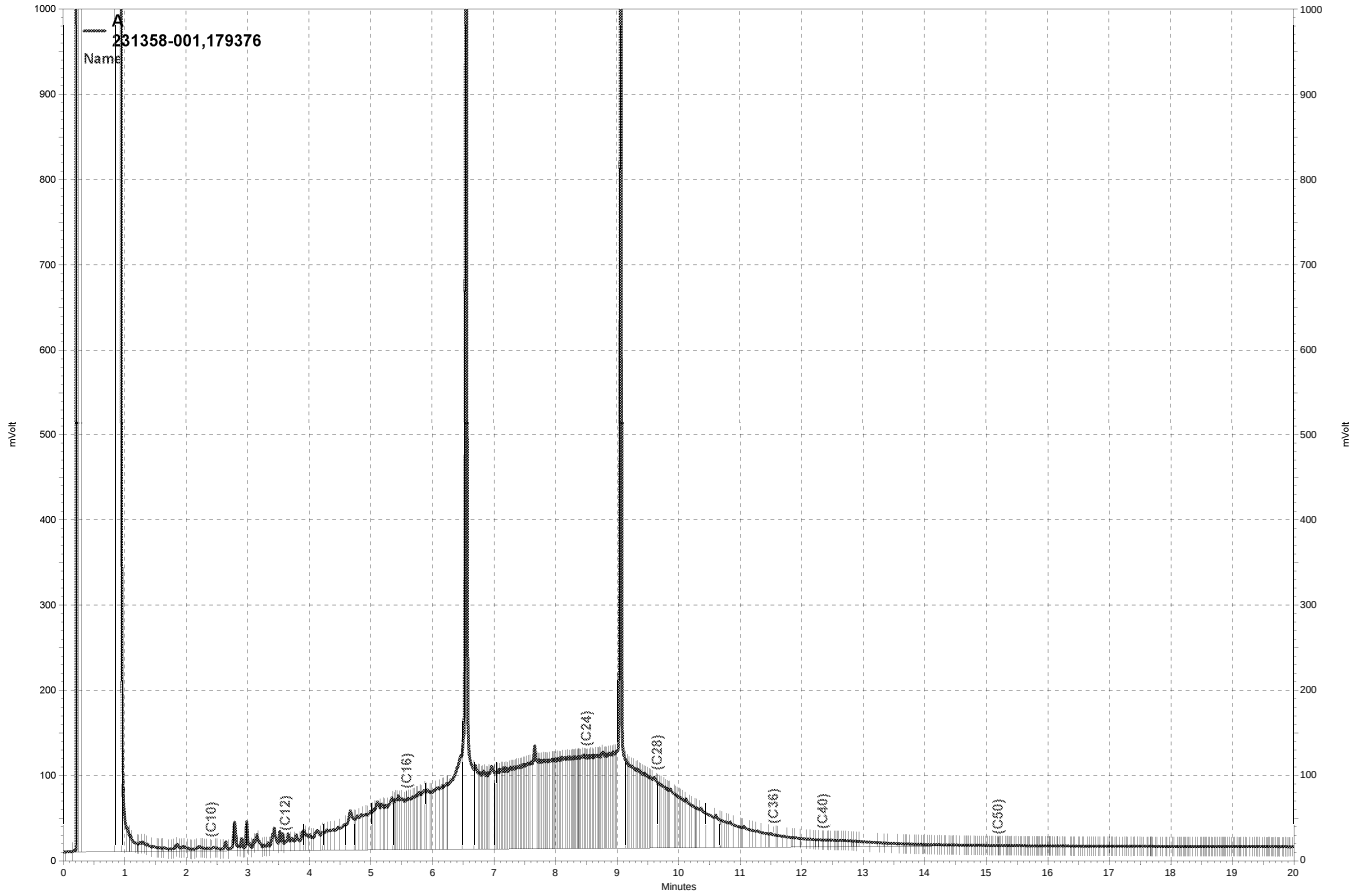
MW-9 Pre Silica Gel



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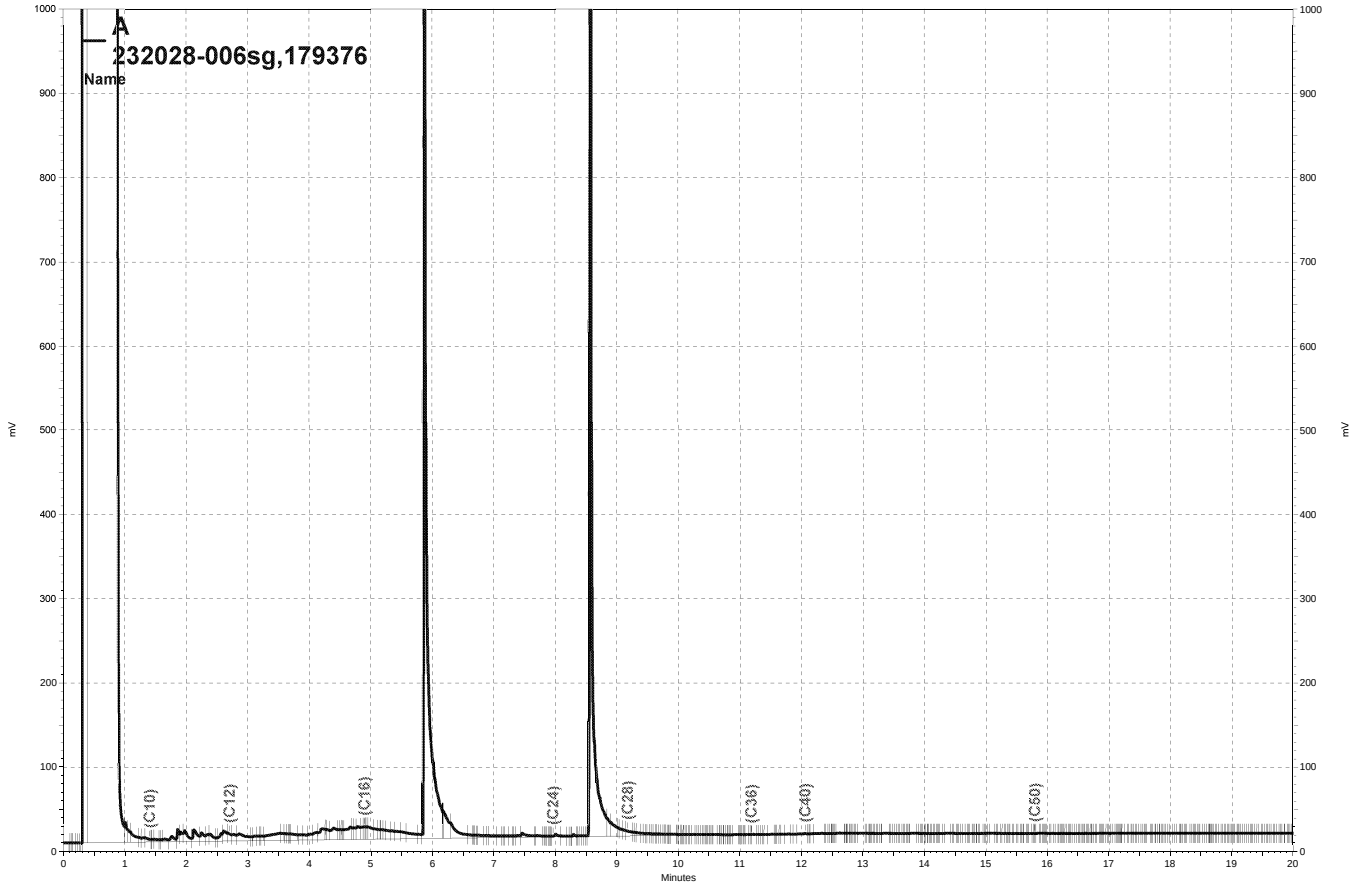
MW-9 Post Silica Gel



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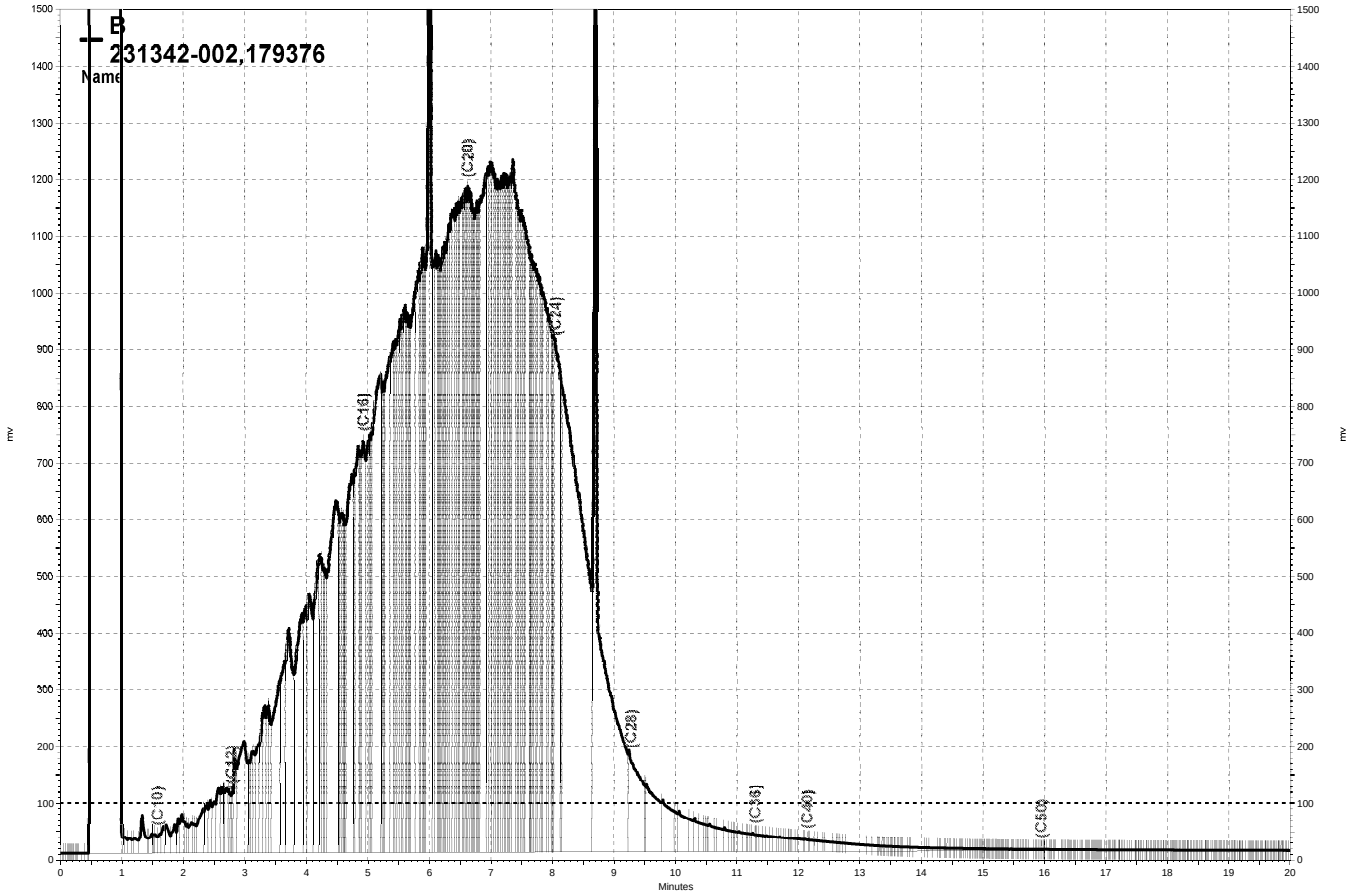
MW-10 Pre Silica Gel



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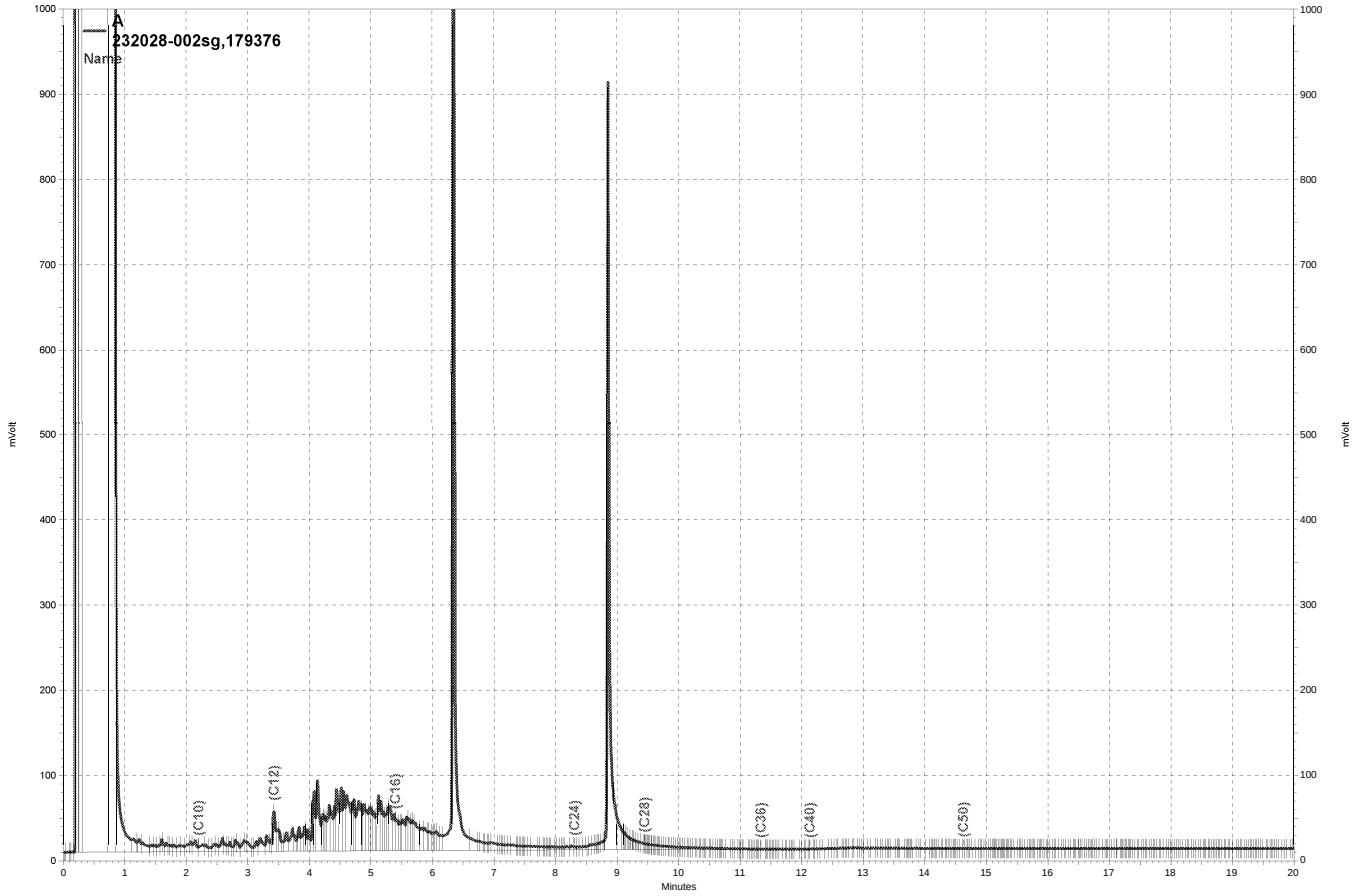
MW-10 Post Silica Gel



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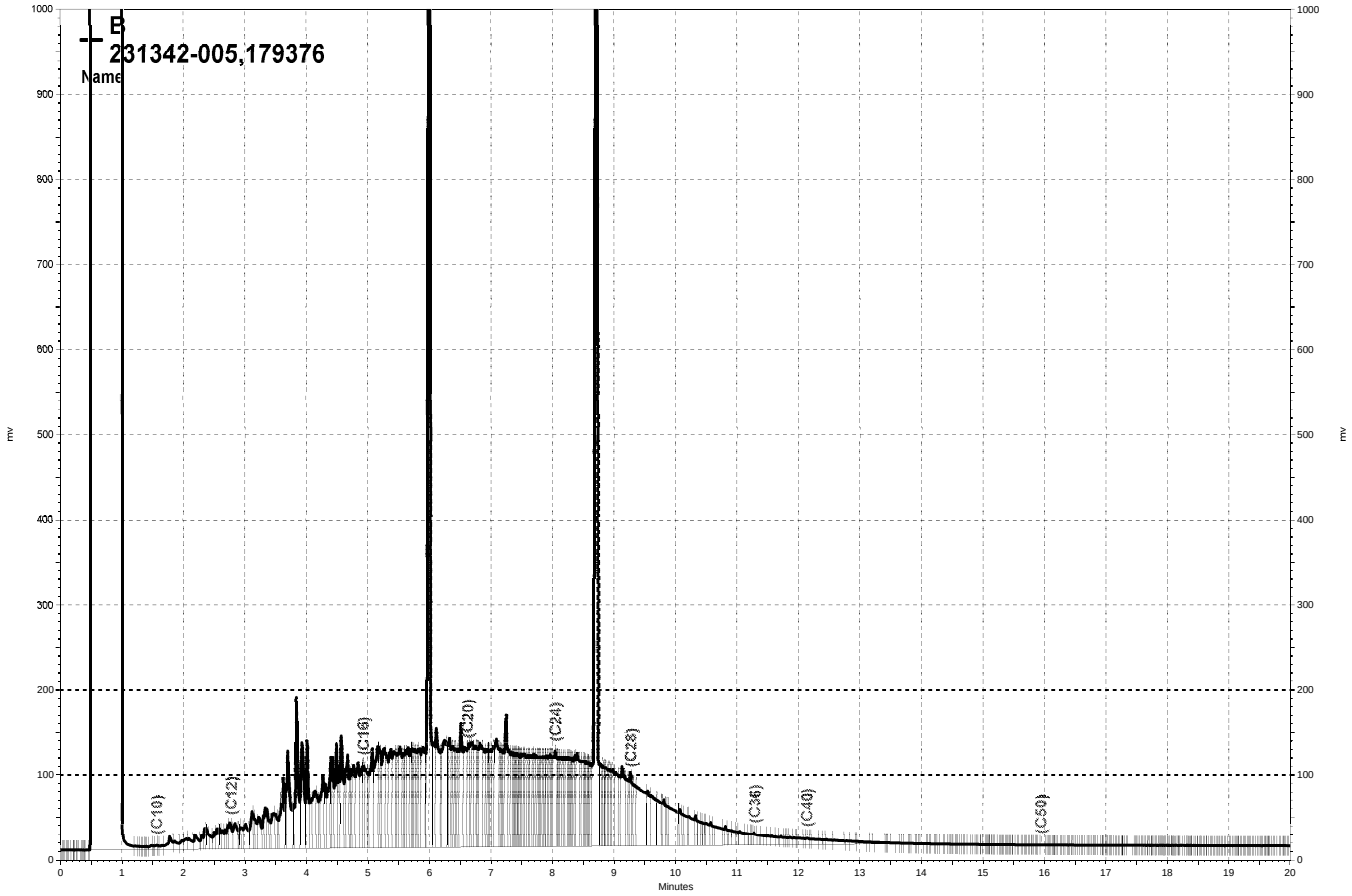
MW-12 Pre Silica Gel



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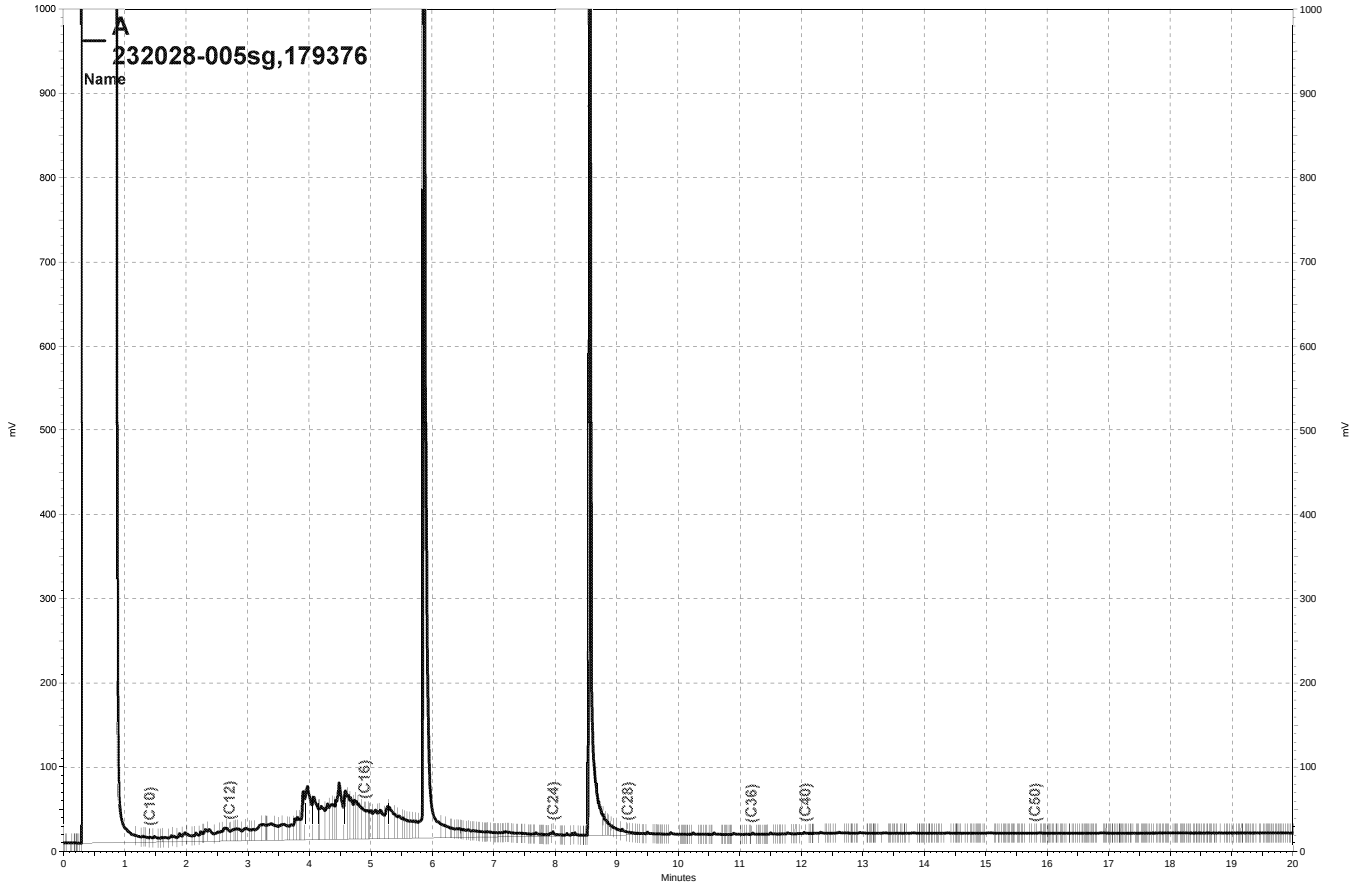
MW-12 Post Silica Gel



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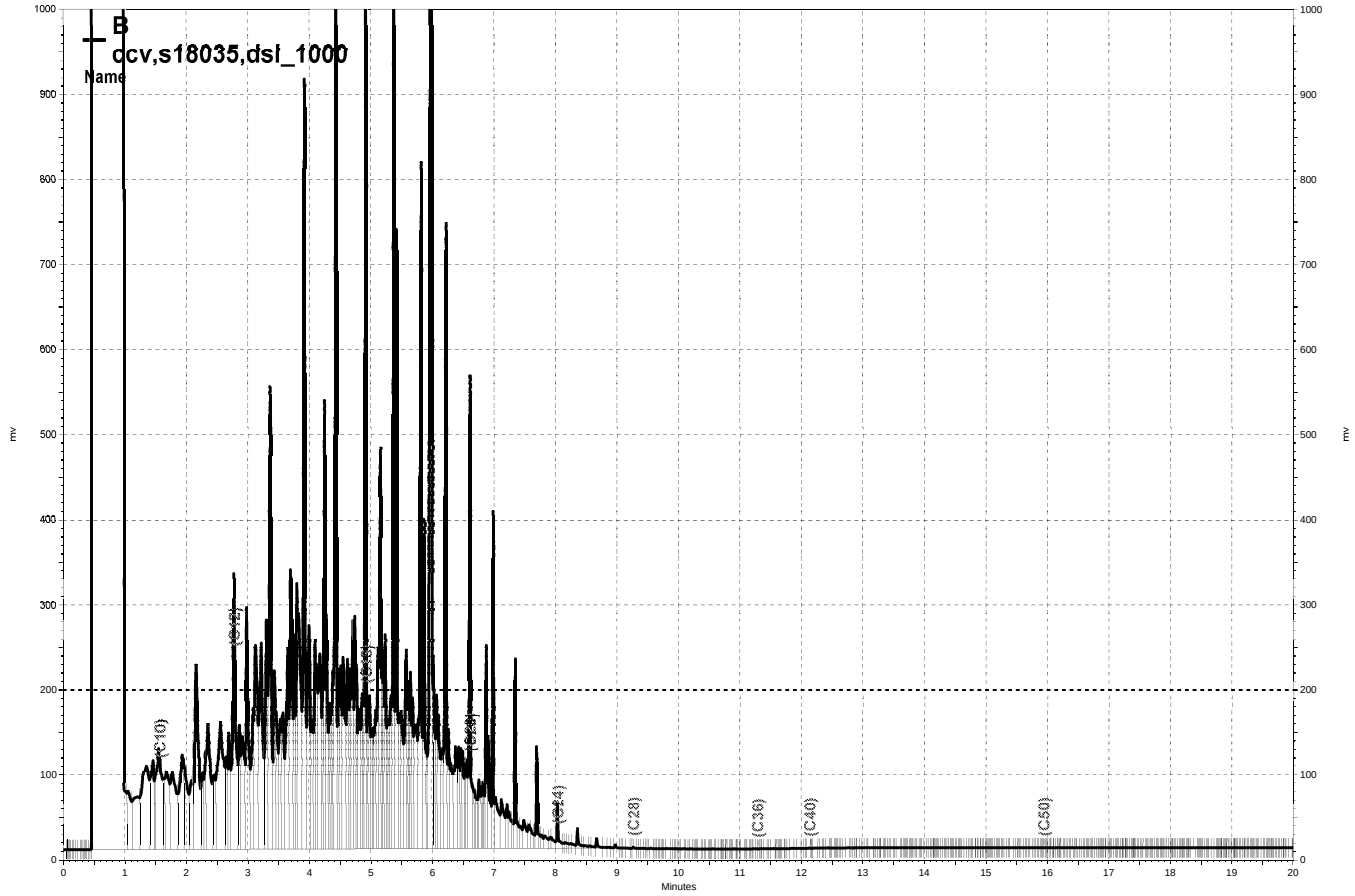

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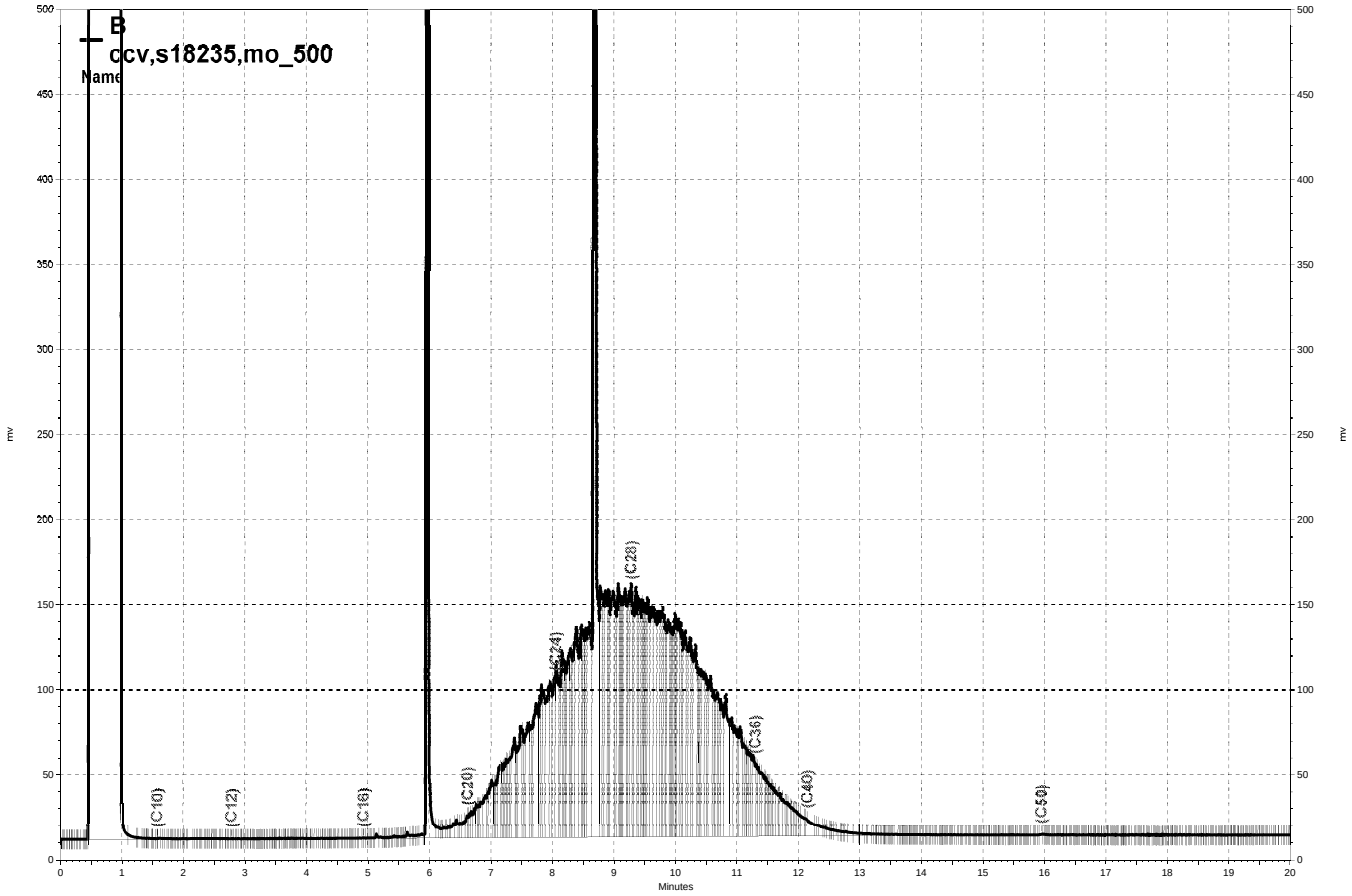

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Port of Oakland
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Appendix D
Free Product Recovery System Operation and Maintenance Field Sheets

4656016

MALCOLM PIRNIE

Site Visit Date: 9/26/11 **Recorded By:** E. Shev

Recovery Well		Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Depth to Pump (feet)	Cycles or Period Duration	Vacuum (in H20)	Total Run Time (hr:mm)	Product removed (gal)	Comments
RW-1					Pump inactive					
RW-2		—	10.05	—	Pump inactive				—	
RW-3	Pre-run	10.63	12.66	2.03					~4	
	Post-run	—	12.24	—						
RW-4	Pre-run	9.82	10.41	0.59					~2	
	Post-run	~~8.95~~ (EX) 10.49	~~9.75~~ (EX) 10.50	~~0.80~~ (EX) 0.01						
RW-5		8.95 11.75	9.75 11.80	0.80 0.05					~2.5	
RW-6	Pre-run	8.86	10.20	1.34					~3	
	Post-run	—	9.45	—						
RW-7	Pre-run	8.29	8.90	0.61					~3	
	Post-run	8.93	9.02	0.09						
RW-8	Pre-run	9.23	9.62	0.39					~4.8	
	Post-run	10.00	10.07	0.07						
RW-9	Pre-run	9.67	9.85	0.18					~1	
	Post-run	10.35	10.50	0.15						
MW-3	Pre-run	10.71	12.55	1.84					~1.5	
	Post-run	11.32	11.41	0.09						

Elapsed Time @ Blower (hrs):

Sight Column Water Level: empty 1/4 1/2 3/4 full (empty @ 1/2 or more)

Depth of product in convault (feet): 1.35

Compressor condensate emptied?

Depth to interface (feet): 2.00

Site Visit Date: **Recorded By:**

Recovery Well		Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Depth to Pump (feet)	Cycles or Period Duration	Vacuum (in H20)	Total Run Time (hr:mm)	Product removed (gal)	Comments
RW-1					Pump inactive					
RW-2					Pump inactive					
RW-3	Pre-run	10.48	10.98	0.50						
	Post-run									
RW-4	Pre-run	9.68	10.17	0.49						
	Post-run									
RW-5		8.66	9.09	0.43	Pump inactive					
RW-6	Pre-run	9.05	9.72	0.65						
	Post-run									
RW-7	Pre-run	8.19	8.45	0.26						
	Post-run									
RW-8	Pre-run	9.28	9.40	0.12						
	Post-run									
RW-9	Pre-run	9.70	9.81	0.11						
	Post-run									
MW-3	Pre-run	10.21	11.73	1.51						
	Post-run									

Elapsed Time @ Blower (hrs):

Sight Column Water Level: empty 1/4 1/2 3/4 full (empty @ 1/2 or more)

Depth of product in convault (feet):

Compressor condensate emptied?

Depth to interface (feet):

Site Visit Date:			Recorded By:							
Recovery Well		Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Depth to Pump (feet)	Cycles or Period Duration	Vacuum (in H20)	Total Run Time (hr:mm)	Product removed (gal)	Comments
RW-1					Pump inactive					
RW-2					Pump inactive					
RW-3	Pre-run	10.64	11.91	1.27						
	Post-run	—	—	—						
RW-4	Pre-run	9.60 ~~10.64~~	10.26 ~~11.91~~	0.66 ~~1.27~~						
	Post-run	—	—	—						
RW-5		N/A	N/A	N/A	Pump inactive					Inaccessible
RW-6	Pre-run	8.99	10.16	1.17						
	Post-run	—	—	—						
RW-7	Pre-run	8.24	8.90	0.64						
	Post-run	—	—	—						
RW-8	Pre-run	9.54	9.77	0.23						
	Post-run	—	—	—						
RW-9	Pre-run	9.67	9.78	0.11						
	Post-run	—	—	—						
MW-3	Pre-run	10.65	12.11	1.46						
	Post-run	—	—	—						

Elapsed Time @ Blower (hrs):

Sight Column Water Level: empty 1/4 1/2 3/4 full (empty @ 1/2 or more)

Compressor condensate emptied?

Depth of product in convault (feet):

Depth to interface (feet):