PORT OF OAKLAND

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By Alameda County Environmental Health at 9:03 am, Mar 11, 2013

January 7, 2013

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_2012 Second Semi-Annual Groundwater Monitoring Report - Port of Oakland, 651 Maritime Street, Oakland, CA_2013-01-07

Dear Mr. Khatri:

Please find enclosed the report entitled *2012 Second Semi-Annual Groundwater Monitoring Report - Port of Oakland, 651 Maritime Street, Oakland, CA ("Report")* dated January 2013, 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]

The Port has retained Malcolm Pirnie to perform groundwater monitoring and maintenance of the remediation system. Results of the second 2012 semi-annual

[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.

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Telephone: (510) 627-1100 ■ Facsimile: (510) 627-1826 ■ Web Page: www.portofoakland.com

sampling event are contained in the enclosed report. The next monitoring event will be performed during the June 2013 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
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

2012 Second Semi-Annual Groundwater Monitoring Report

Port of Oakland
651 Maritime Street
Oakland, California

January 2013

Report Prepared By:

Malcolm Pirnie, Inc.

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4656016

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January 7, 2012

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

Subject: 2012 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 2012 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 June 2012 by Malcolm Pirnie and presents free product measurements collected since July 1, 2011.

Please call me at (510) 596-9695 or email me at tmiller@pirnie.com if you have questions.

Sincerely,

MALCOLM PIRNIE, INC.

Todd Miller

Todd Miller, PG, CHG
Associate Hydrogeologist

Enclosure

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Acronyms Used in the Report

ACHCS	Alameda County Health Care Services
amsl	Above mean sea level
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
MNA	Monitored natural attenuation
MSE	MSE Group
MTBE	Methyl tert-butyl ether
NESCO	National Environmental Service Company
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 2012 Second Semi-Annual Groundwater Monitoring 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 July through December 2012. 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

[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.

groundwater samples from the excavation. Analytical results indicated the presence of 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]

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[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.*

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 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 2012 second semi-annual groundwater monitoring event at the Site on December 4, 2012. The December 2012 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. Measurements of both depth to water and depth to free-phase product were collected just prior to purging to allow sufficient time for groundwater to equilibrate with ambient barometric pressure[7]. 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 December 2012 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 December 2012 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-

[7] Although measurements were also collected immediately after removing the wellcap, they were used only to assess the impact of equilibration at this site and were not otherwise used for the purposes of this report.

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.

Prior to analyzing the water samples for TPHd and TPHmo, 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 had historically been outfitted with ORC socks to increase the DO concentration in groundwater and stimulate aerobic biodegradation of the petroleum hydrocarbons. The ORC socks had 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, 2011 and not replaced.

Approximately 20 gallons of purge and decontamination water were generated during the December 2012 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 last six months of 2012.

3.1. Groundwater Flow Direction

Based on the depth-to-water measurements collected, groundwater levels beneath the Site in December 2012 were slightly higher than those observed in June 2012. In June 2012, groundwater elevations ranged from 3.95 feet amsl to 6.23 feet amsl. In December 2012, groundwater elevations ranged from 4.96 feet amsl to 6.75 feet amsl. A groundwater mound was present in the vicinity of MW-1 and MW-2, resulting in groundwater flow direction ranging from south to west to northeast beneath the Site. Groundwater gradients at the Site ranged from 0.0014 to 0.0075 feet per foot. A shallow groundwater elevation contour map for December 2012 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 December 2012 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-measureable to 1.30 feet (Table 1). The product thickness in well MW-3 was measured to be 1.01 feet. Product thickness in this well has ranged from not-measurable to 2.70 feet since April 2000.

3.3. Analytical Results

Analytical results for the groundwater samples collected during the December 2012 monitoring event are illustrated on Figure 5 and summarized in Table 2. 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 76 micrograms per liter (µg/L) to 250 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 in well MW-10 appear to be stable over the past four monitoring events. TPHg concentrations reported during this sampling event are below the Site remedial goal of 3,700 µg/L.[8]

3.3.2. BTEX and MTBE

The laboratory reported benzene in the groundwater samples collected from wells MW-4 (1.7 µg/L), MW-9 (14 µg/L), and MW-10 (59 µg/L). Ethylbenzene was reported in the samples collected from wells MW-9 (1.8 µg/L) and MW-10 (0.9 µg/L). Xylenes were reported in the sample collected from MW-9 at 1.5 µg/L. MTBE was detected in the sample collected from MW-12 at 3.9 µg/L. Toluene was 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 since 2010, benzene concentrations beneath the Site are stable and/or decreasing. The reported concentration in MW-10 is above the Site remedial goal of 46 µg/L.[8] This concentration may be related to the proximity of the well to the free-phase product plume. The remaining reported benzene concentrations are below the Site remedial goal. Figure 8 shows MTBE concentrations beneath the site are decreasing, with reported concentrations below the Site remedial goal of 1,800 µg/L[8] and the California MCL of 13 µg/L.

3.3.3. TPHd and TPHmo

The laboratory reported TPHd in the groundwater samples collected from wells MW-9, MW-10, and MW-12 at concentrations ranging from 390 µg/L to 1,100 µg/L. The

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

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). TPHd concentrations in most of the Site monitoring wells are stable or decreasing and remain below the Site remedial goal of 640 µg/L.[8] The graph illustrates increasing TPHd concentrations reported in well MW-10. Detected concentrations in samples collected from MW-10 during the December sampling event were also above the Site remedial goal of 640 µg/L.[8] The exceedance may be related to groundwater mounding resulting in flow towards MW-10 from the area of the free-phase product plume, which is adjacent to MW-10.

3.3.4. Monitored Natural Attenuation Parameters

In accordance with the *Feasibility Study/Corrective Action Plan* (FS/CAP),[8] samples were not analyzed for monitored natural attenuation (MNA) parameters during the December 2012 sampling event. Monitoring for MNA parameters will be conducted during the June monitoring events in 2013 and 2016.

3.4. 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 1.7 µg/L and 1.3 µg/L. The relative percent difference (RPD) between the two samples is calculated below:

Benzene RPD |1.7-1.3|/ [(1.7+1.3)/2] = 27%

The RPD for benzene exceeds the analytical laboratory's maximum allowable RPD for matrix spike duplicates, 20%. However, the detected concentrations are relatively small and near the method reporting limit for that compound. As a result, small deviations result in relatively large RPD. Based on the low concentrations, although the allowable RPD has been exceeded, Malcolm Pirnie considers that the field sampling procedures produced 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). 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 December 2012 monitoring event reliable for its intended use.

4. Free Product Measurements

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 from the Site. Free product and water level measurements were collected from monitoring and recovery wells on October 5, 2011, October 19, 2011, December 5, 2011, February 6, 2012, June 20, 2012, September 19, 2012, and December 4, 2012 to confirm stability of the free-phase product.

Free product and water level measurements for these dates are included in Table 3. Based on the measurements collected, the free-phase product plume appears stable. The observed area of free-phase product as assessed in December 2012 is illustrated on Figure 5. Field sheets documenting these measurements are provided in Appendix C.

5. Conclusions

The December 2012 sampling event was conducting two days after a significant rain event in which approximately 5.3 inches of rain fell over a 3 day period. The observed groundwater mound in the vicinity of wells MW-1 and MW-2 is likely associated with the heavy rainfall and differential infiltration into the subsurface (these two wells are located near the only unpaved portion of the site).

Free product measurements indicate that the free-phase product plume appears stable even though the recovery system has been off for nearly 18 months. Water quality results from the December 2012 monitoring event support the assessment that groundwater concentrations are generally stable or decreasing (except for well MW-10) and below their respective site-specific risk-based target levels. Risk-based target levels 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; (2) groundwater beneath the Site is considered non-potable (TDS in well MW-11 exceeds 3,000 ppm); and (3) risks are managed through implementation of institutional controls and deed restrictions.

Based on the results of the December 2012 monitoring event, as well as previous events, Malcolm Pirnie recommends that future groundwater monitoring events focus on TPHd analysis; and that the TPHg, BTEX, and MTBE analyses be removed from the program, except for the BTEX analyses on samples collected from well MW-10.

Port of Oakland
530 Water Street • Oakland, CA 94607

Figures

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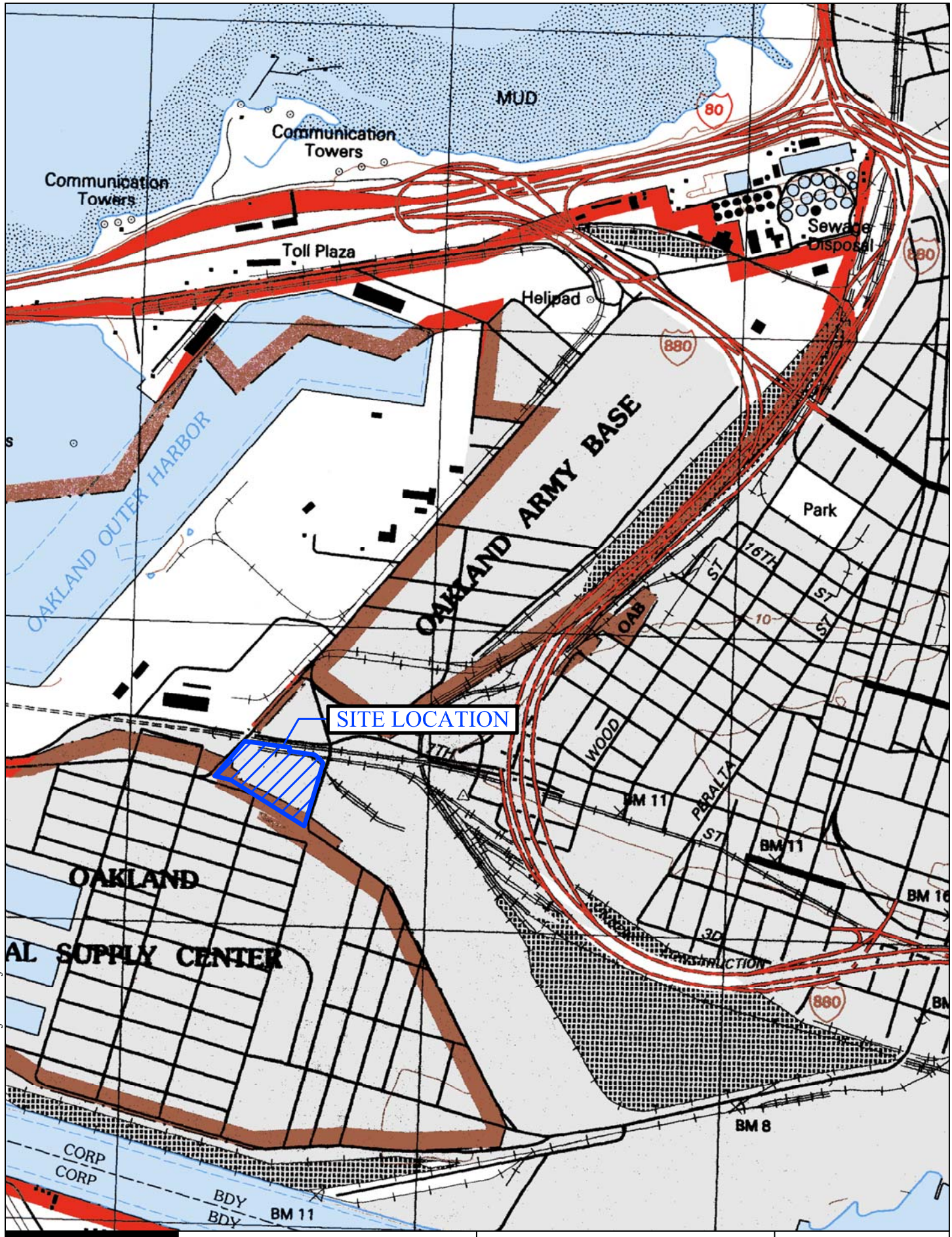
MALCOLM PIRNIE



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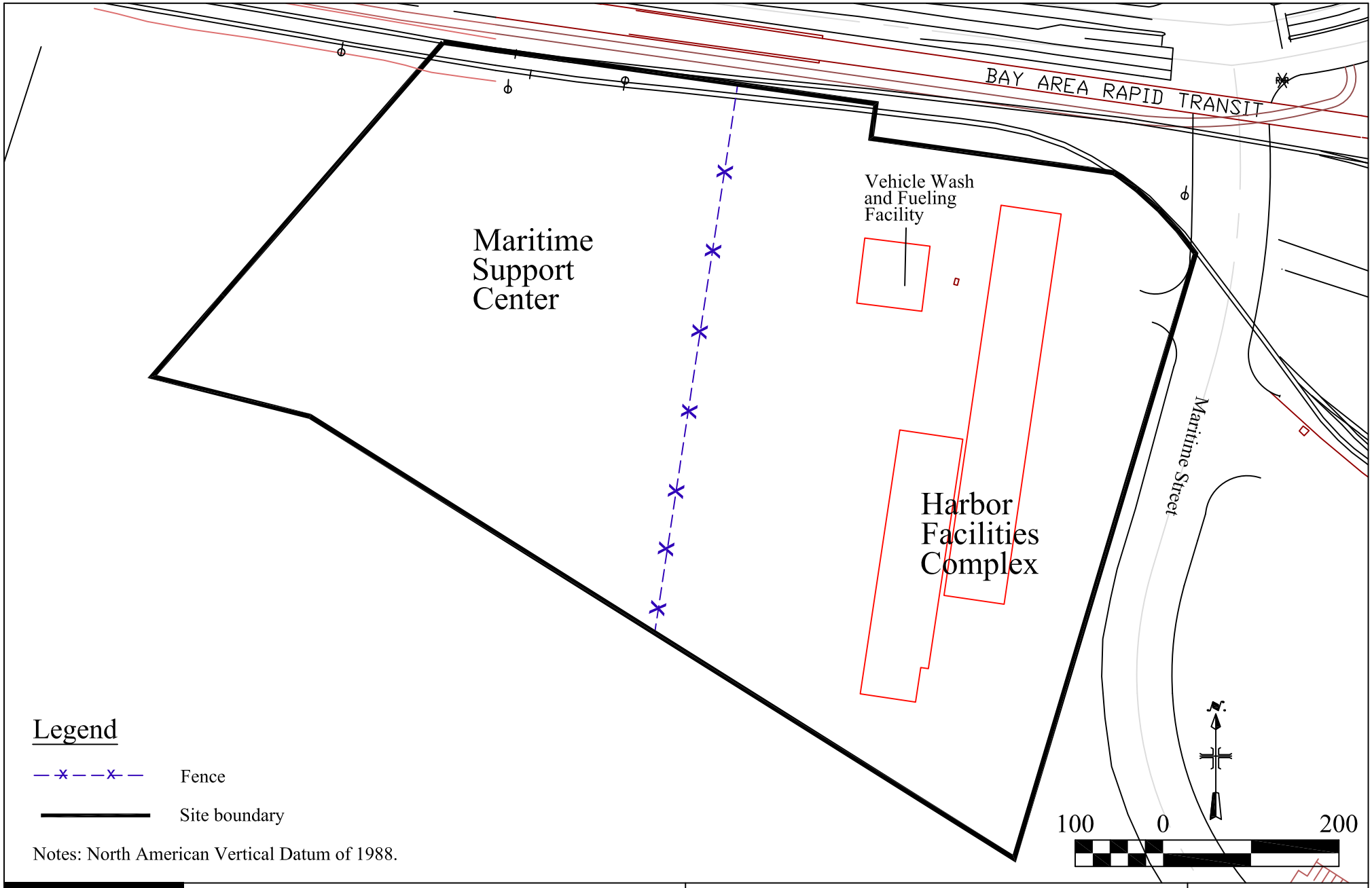
PORT OF OAKLAND
HARBOR FACILITIES
COMPLEX
651 MARITIME STREET

SITE LOCATION MAP

MALCOLM PIRNIE, INC.

JANUARY 2013

FIGURE 1



MALCOLM PIRNIE

PORT OF OAKLAND

HARBOR FACILITIES COMPLEX
651 MARITIME STREET

HARBOR FACILITIES COMPLEX LAYOUT

MALCOLM PIRNIE, INC.

JANUARY 2013

FIGURE 2

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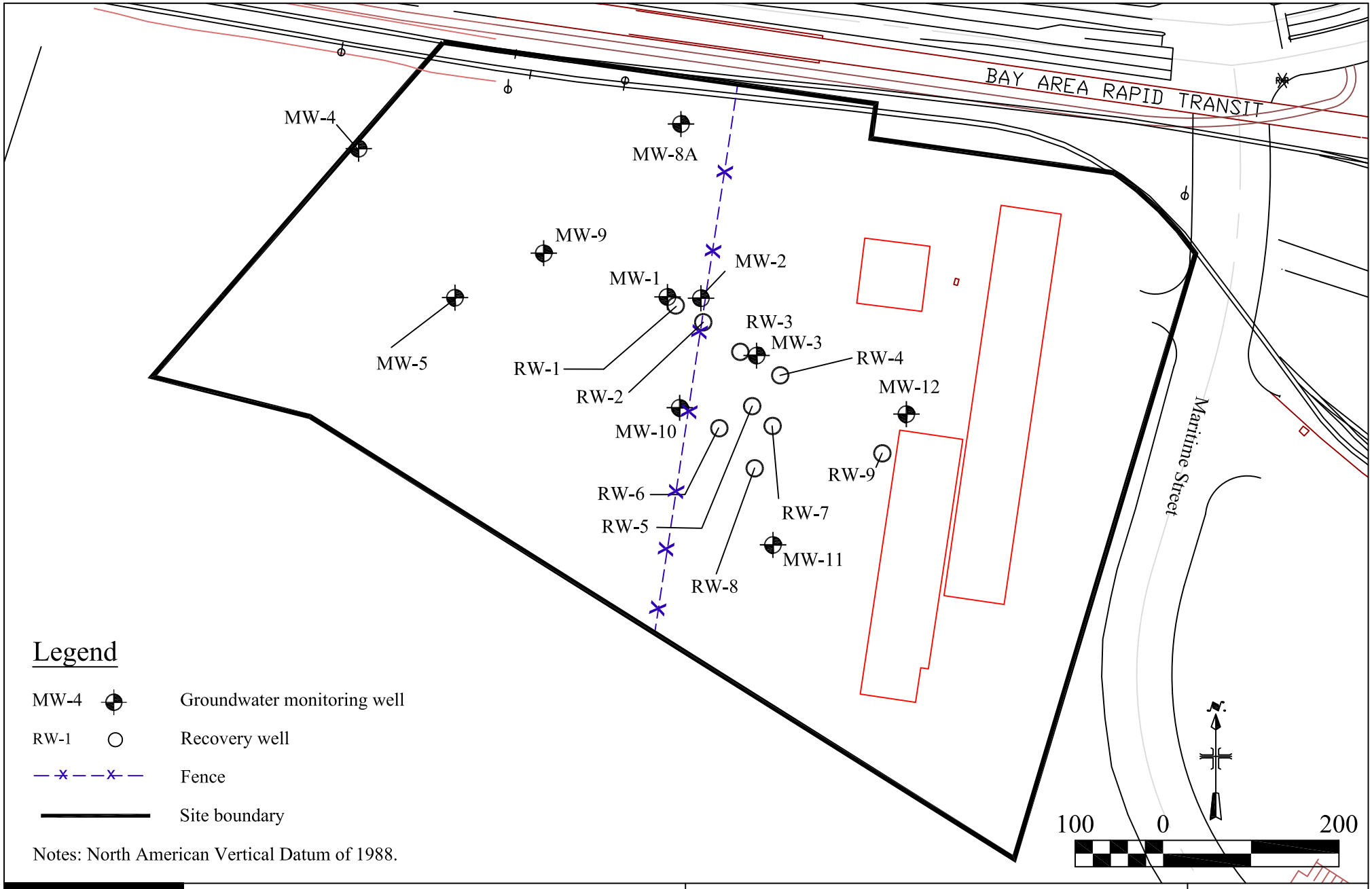

MALCOLM PIRNIE

PORT OF OAKLAND

HARBOR FACILITIES COMPLEX
651 MARITIME STREET

SITE PLAN

MALCOLM PIRNIE, INC.

JANUARY 2013

FIGURE 3

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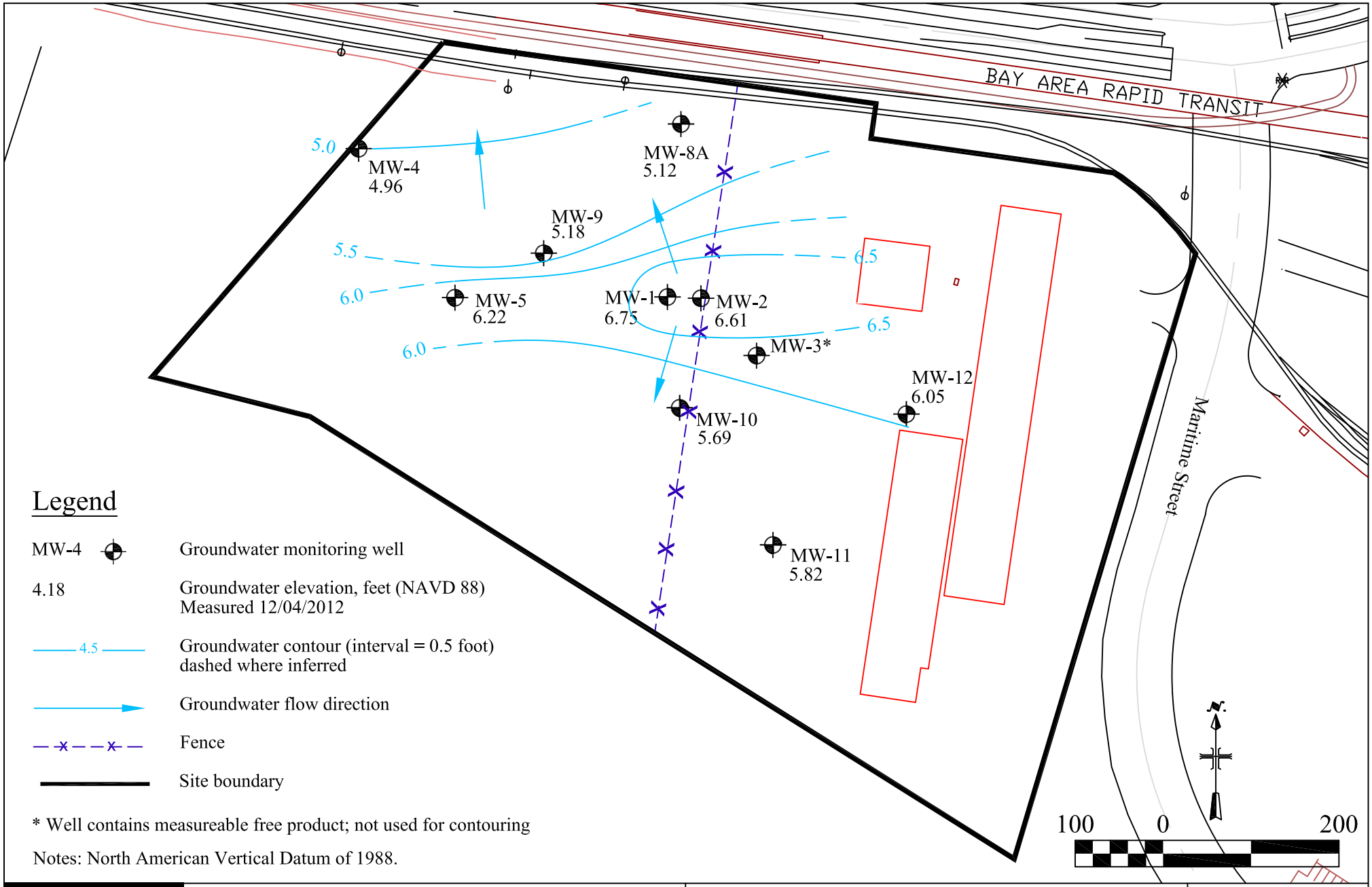

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PORT OF OAKLAND

HARBOR FACILITIES COMPLEX
651 MARITIME STREET

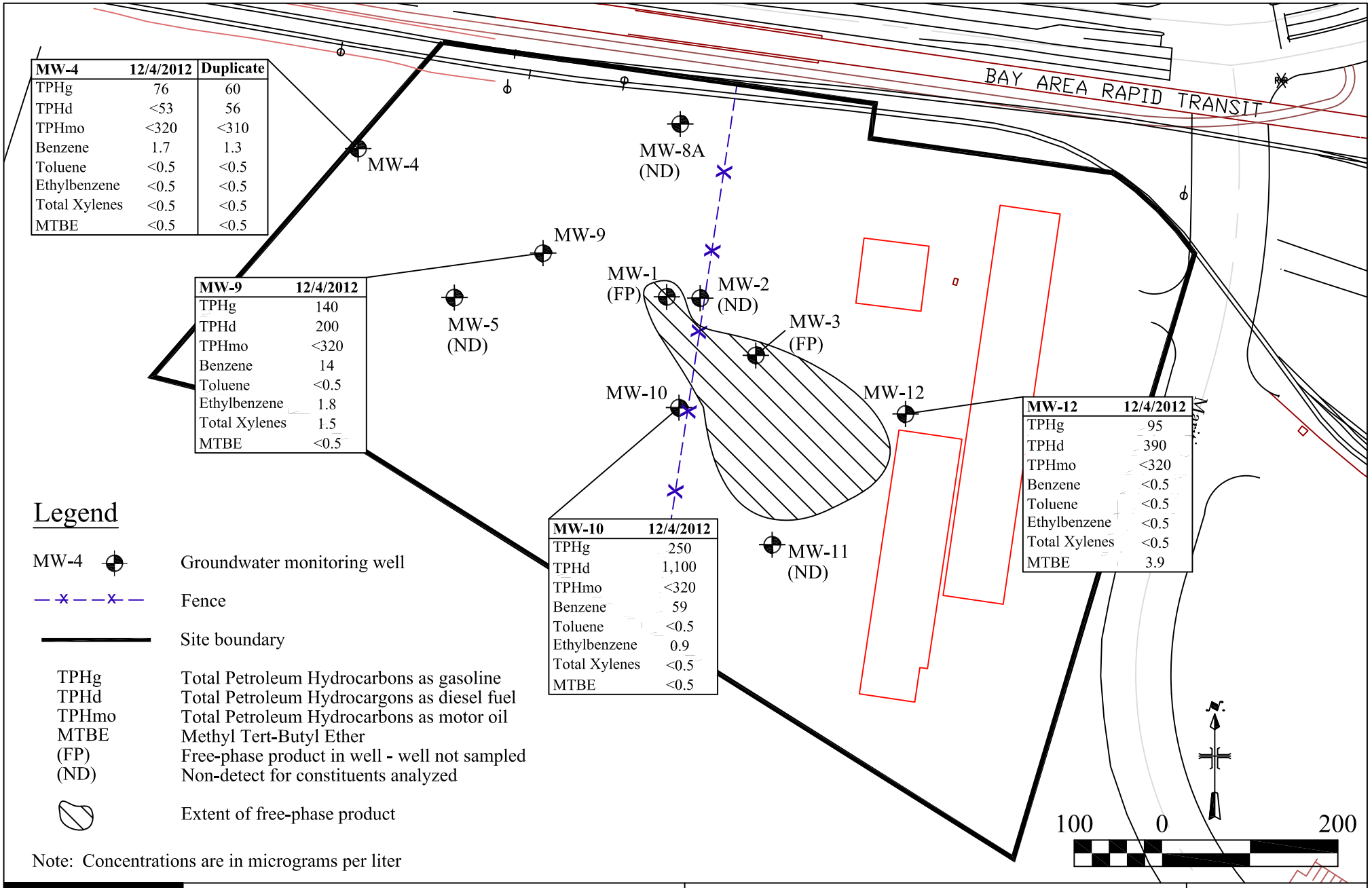
GROUNDWATER ELEVATION
ISOCONTOUR MAP - DECEMBER 2012

MALCOLM PIRNIE, INC.

JANUARY 2013

FIGURE 4

User:Orsi Spec:PIRNIE STANDARD File:G:\Projects\Projects\4656\016\acad\2nd Semi 2012\FIGURES.DWG



MW-4	12/4/2012	Duplicate
TPHg	76	60
TPHd	<53	56
TPHmo	<320	<310
Benzene	1.7	1.3
Toluene	<0.5	<0.5
Ethylbenzene	<0.5	<0.5
Total Xylenes	<0.5	<0.5
MTBE	<0.5	<0.5

MW-9	12/4/2012
TPHg	140
TPHd	200
TPHmo	<320
Benzene	14
Toluene	<0.5
Ethylbenzene	1.8
Total Xylenes	1.5
MTBE	<0.5

MW-10	12/4/2012
TPHg	250
TPHd	1,100
TPHmo	<320
Benzene	59
Toluene	<0.5
Ethylbenzene	0.9
Total Xylenes	<0.5
MTBE	<0.5

MW-12	12/4/2012
TPHg	95
TPHd	390
TPHmo	<320
Benzene	<0.5
Toluene	<0.5
Ethylbenzene	<0.5
Total Xylenes	<0.5
MTBE	3.9

Legend

MW-4 — Groundwater monitoring well

Fence

Site boundary

TPHg — Total Petroleum Hydrocarbons as gasoline
TPHd — Total Petroleum Hydrocargons as diesel fuel
TPHmo — Total Petroleum Hydrocarbons as motor oil
MTBE — Methyl Tert-Butyl Ether
(FP) — Free-phase product in well - well not sampled
(ND) — Non-detect for constituents analyzed

Extent of free-phase product

Note: Concentrations are in micrograms per liter

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PORT OF OAKLAND

HARBOR FACILITIES COMPLEX
651 MARITIME STREET

SHALLOW GROUNDWATER
SAMPLE RESULTS - DECEMBER 2012

MALCOLM PIRNIE, INC.

JANUARY 2013

FIGURE 5

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Figure 6
TPHg Concentration versus Time

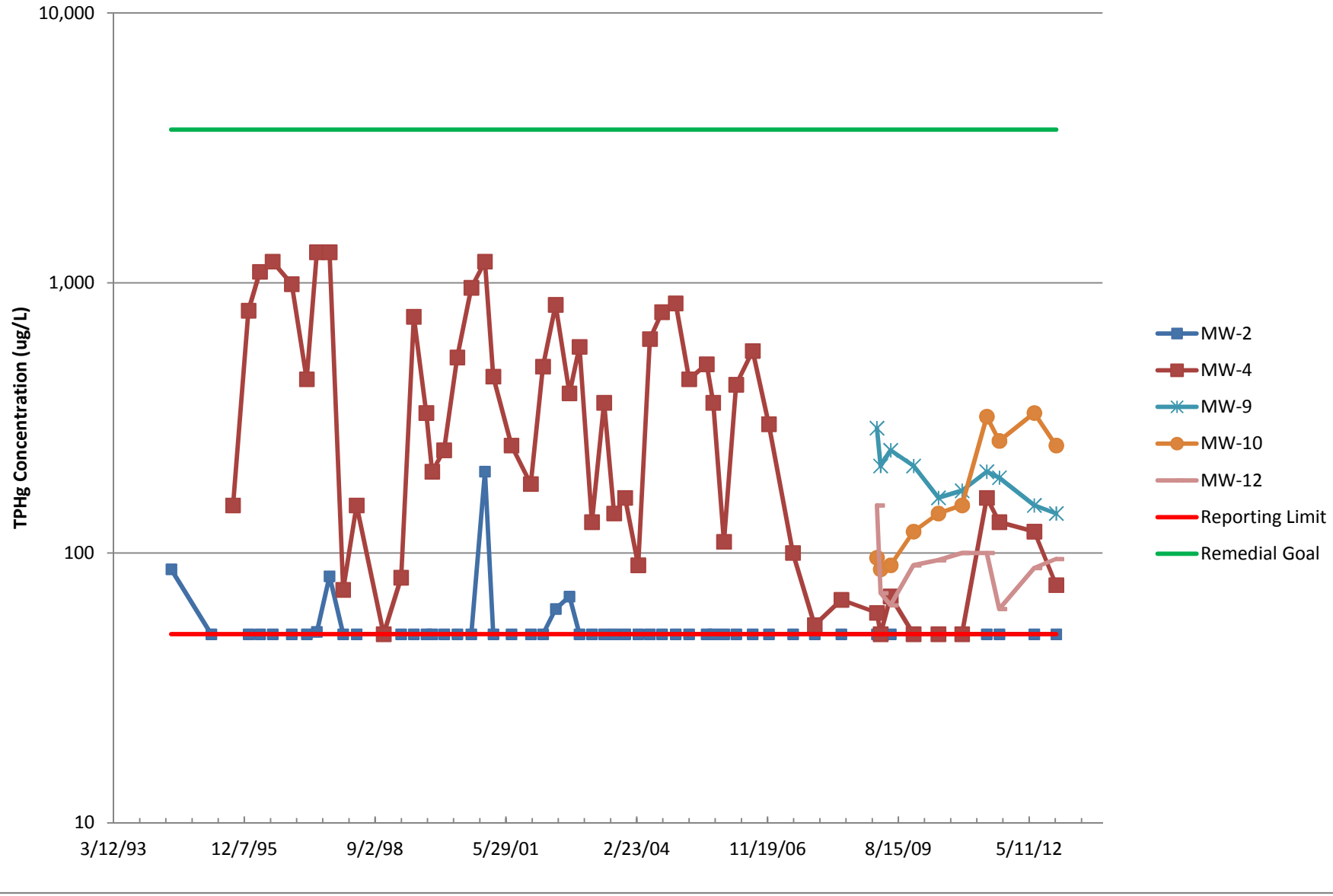


Figure 7
Benzene Concentration versus Time

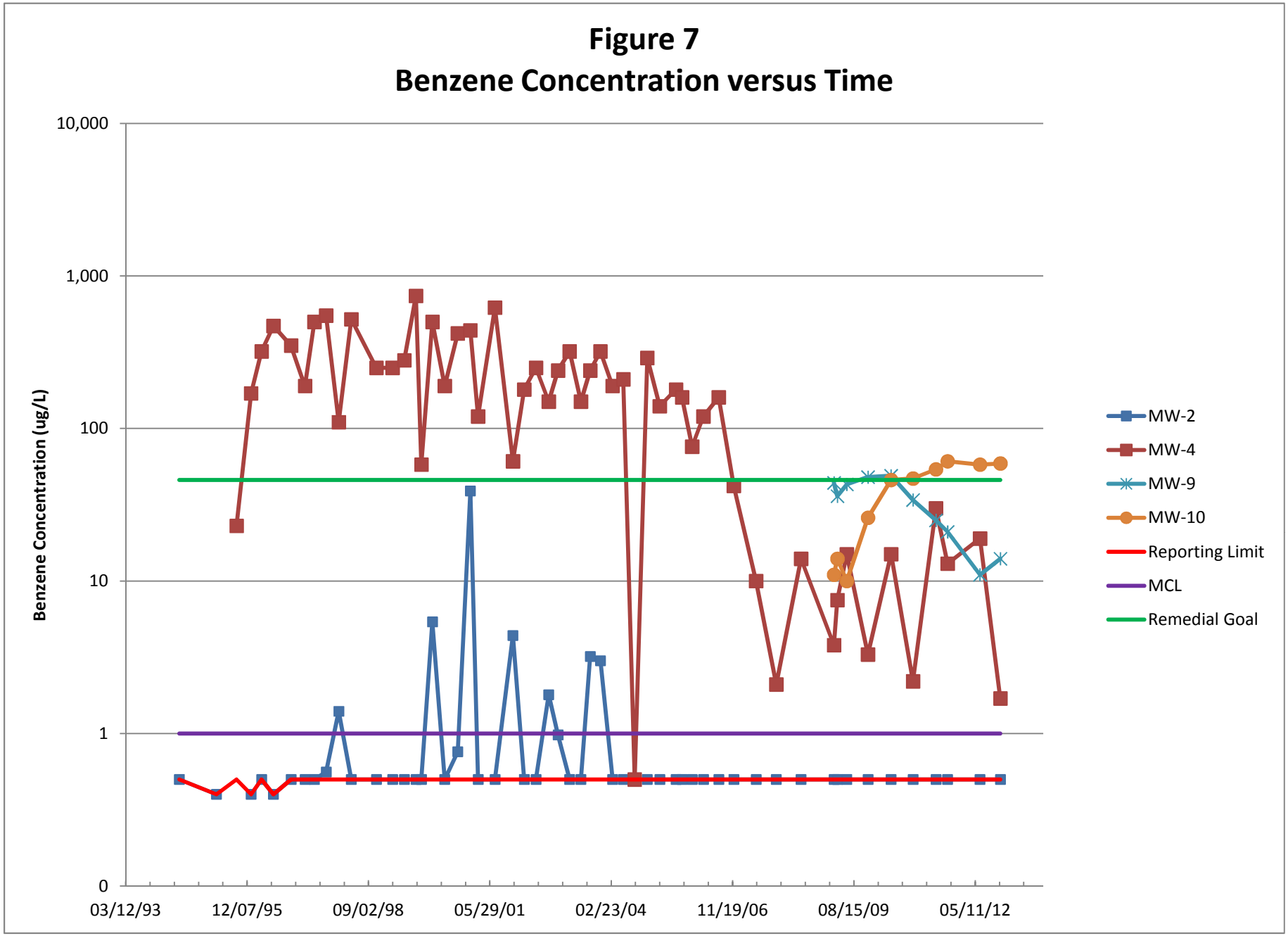


Figure 8
MTBE Concentration versus Time

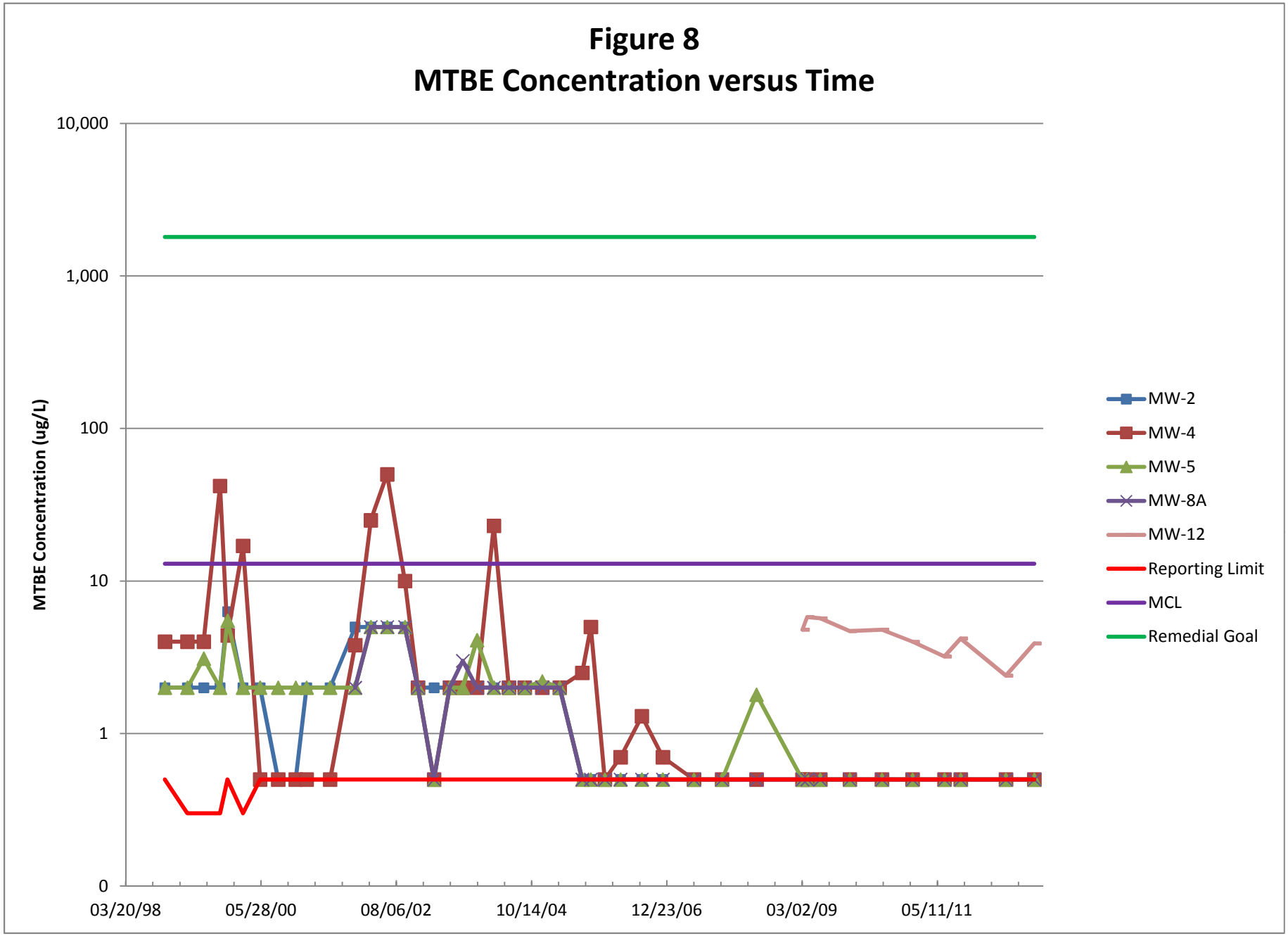
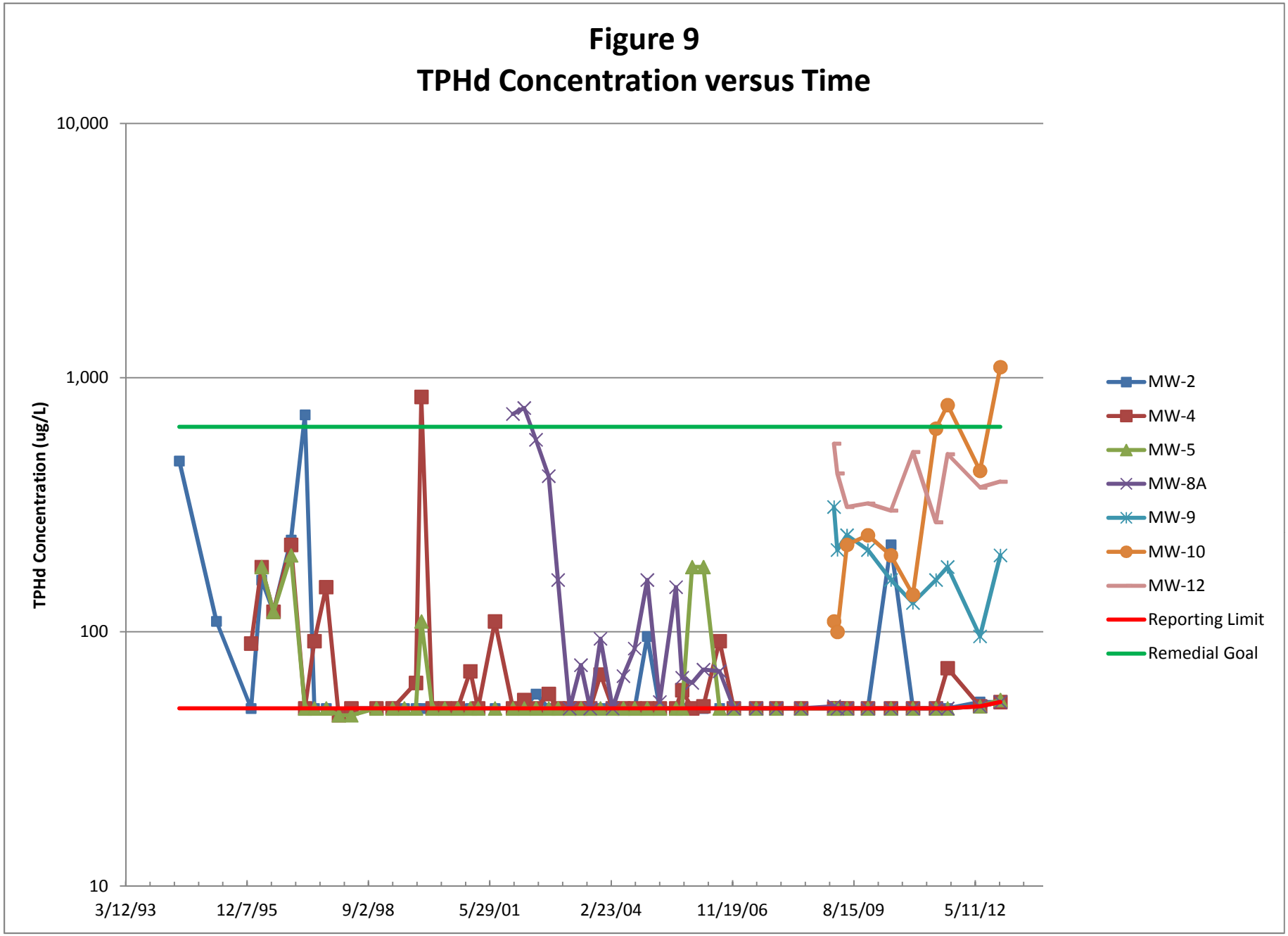


Figure 9
TPHd Concentration versus Time



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Tables

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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
	02/06/12	15.80	10.89 [4]	10.89	0.0	4.91
	06/19/12	15.80	11.01 [4]	11.01	0.0	4.79
	09/19/12	15.80	11.40	11.41	0.01	4.39
	12/04/12	15.80	NP	9.05	0.00	6.75
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

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)	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
	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
	02/06/12	16.43	NP	11.50	0.0	4.93
	06/19/12	16.43	NP	11.65	0.0	4.78
	09/19/12	16.43	NP	12.03	0.0	4.40
	12/04/12	16.43	NP	9.82	0.0	6.61
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

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)	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
	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	4.51
	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

TABLE 1. Historical Groundwater Elevation and Free Product Data
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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)	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
	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
	02/06/12	15.66	10.60	11.42	0.82	4.24
	06/19/12	15.66	10.52	12.04	1.52	3.62
	09/19/12	15.66	10.90	13.01	2.11	2.65
	12/04/12	15.66	9.64	10.65	1.01	5.01
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

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)	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
	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
	02/06/12	15.91	NP	11.71	0.0	4.20
	06/19/12	15.91	NP	11.73	0.0	4.18
	09/19/12	15.91	NP	11.90	0.0	4.01
	12/04/12	15.91	NP	10.95	0.0	4.96
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

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-5 (cont)	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
	02/06/12	15.39	NP	9.32	0.0	6.07
	06/19/12	15.39	NP	9.16	0.0	6.23
	09/19/12	15.39	NP	9.39	0.0	6.00
	12/04/12	15.39	NP	9.17	0.0	6.22
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				

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-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				
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
	02/06/12	14.99	NP	10.75	0.0	4.24
	06/19/12	14.99	NP	11.04	0.0	3.95
	09/19/12	14.99	NP	11.38	0.0	3.61
	12/04/12	14.99	NP	9.87	0.0	5.12

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-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
	02/06/12	16.33	NP	11.70	0.0	4.63
	06/19/12	16.33	NP	11.76	0.0	4.57
	09/19/12	16.33	NP	12.03	0.0	4.30
	12/04/12	16.33	NP	11.15	0.0	5.18
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
	02/06/12	15.65	NP	10.51	0.0	5.14
	06/19/12	15.65	NP	10.61	0.0	5.04
	09/19/12	15.65	NP	10.57	0.0	5.08
	12/04/12	15.65	NP	9.96	0.0	5.69
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
	02/06/12	15.47	NP	10.59	0.0	4.88
	06/19/12	15.47	NP	10.12	0.0	5.35
	09/19/12	15.47	NP	10.54	0.0	4.93
	12/04/12	15.47	NP	9.65	0.0	5.82

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-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
	2/6/2012	16.79	NP	11.60	0.0	5.19
	6/19/2012	16.79	NP	11.49	0.0	5.30
	9/19/2012	16.79	NP	12.04	0.0	4.75
	12/4/2012	16.79	NP	10.74	0.0	6.05

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

[1] Wells were resurveyed on January 24, 2009. Elevation data is relative to North American Vertical Datum of 1988 (NAVD 88). Groundwater elevation for well MW-3, when calculated, assumes the density of the free product is 0.70.

[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
	06/19/12	<50	<53	<320	<0.5	<0.5	<0.5	<0.5	<0.5
	12/04/12	<50	<53	<320	<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]

TABLE 2. Groundwater Analytical Results Summary
Port of Oakland's Harbor Facilities Complex Site
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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)	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]
	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

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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)	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
	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
	06/19/12	120 [2]	<51	<310	19	<0.5	<0.5	<0.5	<0.5
Dup.	06/19/12	120 [2]	<52	<310	20	<0.5	<0.5	<0.5	<0.5
	12/04/12	76 [2]	<53	<320	1.7	<0.5	<0.5	<0.5	<0.5
Dup.	12/04/12	60 [2]	56 [2]	<310	1.3	<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

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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-5 (cont)	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
	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
	06/19/12	<50	<51	<310	<0.5	<0.5	<0.5	<0.5	<0.5
	12/04/12	<50	<54	<330	<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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Monitoring Well	Date Sampled	Concentration (µg/L)							
		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

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-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
	06/19/12	<50	<51	<310	<0.5	<0.5	<0.5	<0.5	<0.5
	12/04/12	<50	<53	<320	<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
	06/19/12	150 [2]	96 [2]	<320	11	<0.5	<0.5	<0.5	<0.5
	12/04/12	140 [2]	200 [2]	<320	14	<0.5	1.8	1.5	<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	1	2.4	<0.5	<0.5
	06/19/12	330 [2]	430 [2]	<310	58	<0.5	2.9	<0.5	<0.5
	12/04/12	250 [2]	1,100	<320	59	<0.5	0.9	<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
	06/19/12	<50	<53	<320	<0.5	<0.5	<0.5	<0.5	<0.5
	12/04/12	<50	<53	<320	<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
	06/19/12	88	370 [2]	<310	<0.5	<0.5	<0.5	<0.5	2.4
	12/04/12	95 [2]	390 [2]	<320	<0.5	<0.5	<0.5	<0.5	3.9

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. Free Product Recovery System Groundwater Elevation and Free Product Data
January 1, 2011 Through June 20, 2012
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
	02/06/12	15.56	NP	9.22	0.00	6.34
	06/20/12	15.56	NP	9.80	0.00	5.76
	09/19/12	15.56	NP	10.35	0.00	5.21
	12/04/12	15.56	NP	6.89	0.00	8.67
RW-3						
	01/12/11	15.56	9.87	11.04	1.17	5.34
	01/26/11	15.56	10.28	10.43	0.15	5.24
	02/10/11	15.56	10.45	10.90	0.45	4.98
	02/24/11	15.56	9.42	12.13	2.71	5.33
	03/09/11	15.56	9.45	13.04	3.60	5.04
	03/23/11	15.56	8.63	12.18	3.55	5.87
	04/06/11	15.56	9.10	11.49	2.39	5.74
	04/20/11	15.56	9.70	10.88	1.18	5.51
	05/04/11	15.56	10.05	10.47	0.42	5.38
	05/18/11	15.56	9.95	10.17	0.22	5.54
	06/07/11	15.56	9.73	13.52	3.79	4.69
	06/21/11	15.56	10.10	11.20	1.10	5.13
	09/26/11	15.56	10.63	12.66	2.03	4.32
	10/05/11	15.56	10.48	10.98	0.50	4.93
	10/19/11	15.56	10.64	11.91	1.27	4.54
	12/05/11	15.56	10.75	12.67	1.92	4.23
	02/06/12	15.56	10.32	12.54	2.22	4.57
	06/20/12	15.56	10.38	12.56	2.18	4.53
	09/19/12	15.56	10.87	13.07	2.20	4.03
	12/04/12	15.56	9.35	13.54	4.19	4.95
RW-4						
	01/12/11	14.92	9.12	9.20	0.08	5.78
	01/26/11	14.92	9.39	9.89	0.50	5.38
	02/10/11	14.92	9.52	10.54	1.02	5.09
	02/24/11	14.92	8.80	9.10	0.30	6.03
	03/09/11	14.92	8.93	8.96	0.03	5.98
	03/23/11	14.92	8.39	8.43	0.04	6.52
	04/06/11	14.92	8.46	8.50	0.04	6.45
	04/14/11	14.92	8.88	8.91	0.03	6.03
	05/04/11	14.92	9.13	9.17	0.04	5.78
	05/18/11	14.92	9.18	9.20	0.02	5.73
	06/07/11	14.92	NP	8.95	0.00	5.97

TABLE 3. Free Product Recovery System Groundwater Elevation and Free Product Data
January 1, 2011 Through June 20, 2012
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-4 (cont)	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	4.92
	10/05/11	14.92	9.68	10.17	0.49	5.09
	10/19/11	14.92	9.60	10.26	0.66	5.12
	12/05/11	14.92	9.70	10.00	0.30	5.13
	02/06/12	14.92	9.10	10.66	1.56	5.35
	06/20/12	14.92	9.20	9.27	0.07	5.70
	09/19/12	14.92	9.62	14.21	4.59	3.92
	12/04/12	14.92	8.37	11.69	3.32	5.55
RW-5						
	04/14/11	14.79	6.74	9.72	2.98	7.16
	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	7.38
	09/26/11	14.79	8.95	9.75	0.80	5.60
	10/05/11	14.79	8.66	9.09	0.43	6.00
	02/06/12	14.79	8.47	12.01	3.54	5.26
	06/20/12	Well not accessible				
	09/19/12	Well not accessible				
	12/04/12	Well not accessible				
RW-6						
	01/12/11	15.75	8.51	9.68	1.17	6.89
	01/26/11	15.75	8.65	9.55	0.90	6.83
	02/10/11	15.75	8.44	9.74	1.30	6.92
	02/24/11	15.75	8.15	9.82	1.67	7.10
	03/09/11	15.75	8.25	9.37	1.12	7.16
	03/23/11	15.75	8.18	8.96	0.78	7.34
	04/06/11	15.75	8.19	8.95	0.76	7.33
	04/20/11	15.75	8.43	8.54	0.11	7.29
	05/04/11	15.75	8.51	8.62	0.11	7.21
	05/18/11	15.75	8.53	8.70	0.17	7.17
	06/07/11	15.75	8.82	9.05	0.23	6.86
	06/21/11	15.75	8.89	9.20	0.31	6.77
	09/26/11	15.75	8.86	10.20	1.34	6.49
	10/05/11	15.75	9.05	9.72	0.67	6.50
	10/19/11	15.75	8.99	10.16	1.17	6.41
	12/05/12	15.75	9.05	10.62	1.57	6.23
	02/06/12	15.75	8.95	10.82	1.87	6.24
	06/20/12	15.75	8.92	9.99	1.07	6.51
	09/19/12	15.75	9.10	10.83	1.73	6.13
	12/04/12	15.75	8.83	10.79	1.96	6.33

TABLE 3. Free Product Recovery System Groundwater Elevation and Free Product Data
January 1, 2011 Through June 20, 2012
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	7.15
	01/26/11	15.02	7.55	7.64	0.09	7.44
	02/10/11	15.02	7.50	7.68	0.18	7.47
	02/24/11	15.02	7.82	8.92	1.10	6.87
	03/09/11	15.02	7.42	7.53	0.11	7.57
	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	7.47
	05/04/11	15.02	7.68	7.74	0.06	7.32
	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	6.55
	10/05/11	15.02	8.19	8.45	0.26	6.75
	10/19/11	15.02	8.24	8.90	0.66	6.58
	12/05/11	15.02	8.26	9.77	1.51	6.31
	02/06/12	15.02	8.18	9.86	1.68	6.34
	06/20/12	15.02	8.35	8.41	0.06	6.65
	09/19/12	15.02	8.45	11.44	2.99	5.67
	12/04/12	15.02	8.25	8.33	0.08	6.75
RW-8						
	01/12/11	15.91	9.07	9.21	0.14	6.80
	01/26/11	15.91	9.23	9.31	0.08	6.66
	02/10/11	15.91	9.13	9.33	0.20	6.72
	02/24/11	15.91	8.86	9.23	0.37	6.94
	03/09/11	15.91	8.78	9.01	0.23	7.06
	03/23/11	15.91	8.42	8.70	0.28	7.41
	04/06/11	15.91	8.55	8.80	0.25	7.29
	04/20/11	15.91	8.92	9.14	0.22	6.92
	05/04/11	15.91	9.04	9.20	0.16	6.82
	05/18/11	15.91	8.85	9.10	0.25	6.99
	06/07/11	15.91	10.23	10.34	0.11	5.65
	06/21/11	15.91	9.27	9.41	0.14	6.60
	09/26/11	15.91	9.23	9.62	0.39	6.56
	10/05/11	15.91	9.28	9.40	0.12	6.59
	10/19/11	15.91	9.54	9.77	0.23	6.30
	12/05/11	15.91	9.62	10.19	0.57	6.12
	02/06/12	15.91	9.21	10.22	1.01	6.40
	06/20/12	15.91	9.36	10.28	0.92	6.27
	09/19/12	15.91	10.55	11.45	0.90	5.09
	12/04/12	15.91	9.29	11.32	2.03	6.01

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Port of Oakland's Harbor Facilities Complex Site
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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	7.25
	01/26/11	16.57	9.32	9.53	0.21	7.19
	02/10/11	16.57	9.42	9.63	0.21	7.09
	02/24/11	16.57	9.24	9.43	0.19	7.27
	03/09/11	16.57	9.16	9.35	0.19	7.35
	03/23/11	16.57	9.07	9.23	0.16	7.45
	04/06/11	16.57	9.00	9.16	0.16	7.52
	04/20/11	16.57	9.10	9.29	0.19	7.41
	05/04/11	16.57	9.19	9.40	0.21	7.32
	05/18/11	16.57	9.26	9.46	0.20	7.25
	06/07/11	16.57	9.35	9.56	0.21	7.16
	06/21/11	16.57	9.30	9.50	0.20	7.21
	09/26/11	16.57	9.67	9.85	0.18	6.85
	10/05/11	16.57	9.70	9.81	0.11	6.84
	10/19/11	16.57	9.67	9.78	0.11	6.87
	12/05/11	16.57	9.75	10.14	0.39	6.70
	02/06/12	16.57	9.88	10.37	0.49	6.54
	06/20/12	16.57	9.49	10.40	0.91	6.81
	09/19/12	16.57	9.81	11.04	1.23	6.39
	12/04/12	16.57	9.50	11.06	1.56	6.60
MW-3						
	01/05/11	15.66	9.58	9.67	0.09	6.05
	01/12/11	15.66	9.85	10.39	0.54	5.65
	01/21/11	15.66	10.03	10.97	0.94	5.35
	01/26/11	15.66	9.32	9.53	0.21	6.28
	02/02/11	15.66	10.28	11.43	1.15	5.04
	02/10/11	15.66	10.35	11.50	1.15	4.97
	02/24/11	15.66	9.53	10.74	1.21	5.77
	03/09/11	15.66	9.63	10.79	1.16	5.68
	03/16/11	15.66	9.26	10.43	1.17	6.05
	03/23/11	15.66	8.71	9.07	0.36	6.84
	03/30/11	15.66	8.87	9.54	0.67	6.59
	04/06/11	15.66	9.16	10.42	1.26	6.12
	04/14/11	15.66	9.65	10.53	0.88	5.75
	04/20/11	15.66	9.69	10.61	0.92	5.69
	04/27/11	15.66	9.88	11.07	1.19	5.42
	05/04/11	15.66	9.95	11.14	1.19	5.35
	05/13/11	15.66	10.16	11.45	1.29	5.11
	05/18/11	15.66	9.78	11.60	1.82	5.33
	06/07/11	15.66	9.91	10.95	1.04	5.44
	06/21/11	15.66	10.74	11.20	0.46	4.78
	09/26/11	15.66	10.71	12.55	1.84	4.40

TABLE 3. Free Product Recovery System Groundwater Elevation and Free Product Data
January 1, 2011 Through June 20, 2012
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)
MW-3 (cont)	10/05/11	15.66	10.21	11.73	1.52	4.99
	10/19/11	15.66	10.65	12.11	1.46	4.57
	12/05/11	15.66	10.83	12.20	1.37	4.42
	02/06/12	15.66	10.60	11.43	0.83	4.81
	06/19/12	15.66	10.52	12.04	1.52	4.68
	09/19/12	15.66	10.90	13.01	2.11	4.13
	12/04/12	15.66	9.64	10.65	1.01	5.72

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). Groundwater elevation for well MW-3, when calculated, assumes the density of the free product is 0.70.

[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
Project Name: Harbor Facilities Center
Location: Port of Oakland
651 Maritime Street, Oakland, California
Weather: overcast, 50s
Precip. in past 5 days (in.): 5.28
Source: Oakland Fire Services Agency
Water level instrument: Heron Interface Probe

Recorded by: SC/CO Date: 12/4/12
Depth of well from TOC (feet): 17.65
Well diameter (inches): 2
Screened interval from TOC (feet): 7.65-17.65
TOC elevation, NAVD 88 (feet): 15.80
Groundwater elevation, NAVD 88 (feet): 6.75
Water level from TOC (feet): 9.05 Time: 10:15
Product level from TOC (feet): - see comments Time: 10:15

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 detected on probe after measurement. Well not sampled

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

GROUNDWATER SAMPLING

Well No.: **MW-2**

Project No. 4656016
Project Name: Harbor Facilities Center
Location: Port of Oakland
651 Maritime Street, Oakland, California
Weather: Overcast, 50's
Precip. in past 5 days (in.): 5.28
Source: Oakland Fire Services Agency (OFD)
Water level instrument: Solinst water Meter

Recorded by: SC/CO
Date: 12/4/12
Depth of well from TOC (feet): 18.06
Well diameter (inches): 2
Screened interval from TOC (feet): 8.06-18.06
TOC elevation, NAVD 88 (feet): 16.43
Groundwater elevation, NAVD 88 (feet): 6.73
Water level from TOC (feet): 9.70 Time: 0745
Product level from TOC (feet): — Time: —

CALCULATION OF WELL VOLUME:

(18.06 ft - 9.70 ft x (0.083 ft)² x π x 7.48 gal/ft³ = 1.4 gallons in one casing volume
well depth - water level x (well radius)² x π x gal/ft³ = 0.7 total gallons removed

CALIBRATION:

See cal sheets for YSI-556.24

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
1255							9.82	
1304	18.64	7.36	9.22	8.4	0.527		9.94	
1307	19.10	7.40	252	16.8	0.873		10.08	0.1
1310	19.26	7.45	2.16	11.7	0.912		10.25	0.2
1314	19.34	7.44	2.37	9.1	0.910		10.40	0.25
1318	19.36	7.43	2.70	11.4	0.923		10.52	0.3
1322	19.34	7.45	2.45	15.8	0.925		10.67	0.4
1327	19.35	7.45	2.50	19.1	0.928		10.72	0.5
1330	Collected Sample							

Purge method: peristaltic pump
Duplicate/blank number: ~~peri pump~~
Sampling equipment: peri pump + dedicated tubing
Sample containers: voas-HCl ambers-unpreserved
Sample analyses: voas-MTBE/BTEX by 8260, TPHg by 8015M ambers-TPHd/mo by 8015M + SGCU
Laboratory: C+T
Decontamination method: dedicated tubing, liquinox

Sample Time:
Duplicate Sample Time:
VOA attachment: none
Rinsate disposal: —
Comments:

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

GROUNDWATER SAMPLING

Well No.: **MW-3**

Project No. 4656016
Project Name: Harbor Facilities Center
Location: Port of Oakland
651 Maritime Street, Oakland, California
Weather: overcast, 50s
Precip. in past 5 days (in.): 5.28
Source: Oakland Fire Services Agency (OFD)
Water level instrument: Heron interface probe

Recorded by: SC/CO Date: 12/4/12
Depth of well from TOC (feet): 17.47
Well diameter (inches): 2
Screened interval from TOC (feet): 7.47-17.47
TOC elevation, NAVD 88 (feet): _____
Groundwater elevation, NAVD 88 (feet): _____
Water level from TOC (feet): 10.65 Time: 15:30
Product level from TOC (feet): 9.64 Time: 15:30

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: Not sampled due to presence of free product

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: overcast, 50s
Precip. in past 5 days (in.): 5.28
Source: Oakland Fire Services Agency (OND)
Water level instrument: Solinst WL meter

Recorded by: CO/SC Date: 12/4/12
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): 5.01
Water level from TOC (feet): 10.90 Time: 0830
Product level from TOC (feet): — Time: —

CALCULATION OF WELL VOLUME:

(22.05 ft - 10.90 ft x (0.083 ft)² x π x 7.48 gal/ft³ = 1.8 gallons in one casing volume
well depth - water level x (well radius)² x π x gal/ft³ = 3.0 total gallons removed

CALIBRATION: see Cal sheets for YSI 556.14

FIELD MEASUREMENTS:

Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV)	EC (~~µmho/cm~~ mS/cm)	Turbidity (NTU)	Depth to Water (ft btoc)	Cumulative Gallons Removed
1109	began purging						10.95	
1112	18.89	7.39	1.62	-135.8	1.628	NM	11.61	
1115	19.12	7.35	0.41	-138.8	1.752		11.80	
1118	19.27	7.40	0.29	-142.4	1.850		11.89	0.5
1121	19.35	7.44	0.23	-142.0	1.957		11.93	
1124	19.37	7.48	0.20	-140.7	2.034		11.96	1.0
1127	19.38	7.49	0.18	-138.8	2.060		11.97	
1130	19.34	7.48	0.18	-136.8	2.093		11.99	1.5
1133	19.40	7.46	0.16	-134.6	2.110		12.01	
1136	sample collected							
1139	dup collected							

Purge method: peristaltic pump
Duplicate/blank number: ~~peri pump + dedicated tubing~~ —
Sampling equipment: peri pump + dedicated tubing
Sample containers: voas- HCl ambers unpreserved
Sample analyses: voas - BTEX/MTBE by 8260, TPHg by 8015M ambers - TPHd/mo by 8015M + SGCU
Laboratory C+T
Decontamination method: dedicated tubing, liquinox
Comments: hydrocarbon odor

Sample Time: 11:36
Duplicate Sample Time: 11:39
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: overcast, 50s
Precip. in past 5 days (in.): 5.28
Source: Oakland Fire Services Agency (CONO)
Water level instrument: Solinst WL meter

Recorded by: SC / CO
Date: 12/4/12
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): 6.24
Water level from TOC (feet): 9.15 Time: 0835
Product level from TOC (feet): — Time: —

CALCULATION OF WELL VOLUME:

(20.80 ft - 9.15 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 total gallons removed

CALIBRATION:

See cal sheet for YSI-556.14

FIELD MEASUREMENTS:

Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV)	EC ~~(µmho/cm)~~ mS/cm	Turbidity (NTU)	Depth to Water (ft btoc)	Cumulative Gallons Removed
9:18	Attempted to purge - modified pump settings to get it to						9.17	
9:22	Began purging					fix	9.17	
9:25	18.55	6.78	0.46	-9.7	1.539	NM	10.41	
9:28	18.67	6.80	0.33	-3.4	1.531		10.30	1.0
9:31	[redacted]SC 18.65	6.81	0.30	-2.4	1.525		10.25	
9:34	[redacted]SC 18.63	6.82	0.29	-2.7	1.523		10.22	1.5
9:37	sample	Collected						

Purge method: peristaltic pump
Duplicate/blank number: peri pump + dedicated tubing
Sampling equipment: ~~voas - HCl ambers - unpreserved~~
Sample containers: voas - ~~BTEX/MTBE~~ HCl ambers - unpreserved
Sample analyses: voas - BTEX/MTBE by 8260, TPHg by 8015M ambers - TPHd/mo by 8015M + SGCU
Laboratory: CT
Decontamination method: dedicated tubing, liquinox

Sample Time: 9:37
Duplicate Sample Time: —
VOA attachment: —
Rinsate disposal: —

Comments:

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

GROUNDWATER SAMPLING

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

Project No. 4656016
ect Name: Harbor Facilities Center
Location: Port of Oakland
651 Maritime Street, Oakland, California
Weather: Overcast, 50's
Precip. in past 5 days (in.): 5.28
Source: Oakland Fire Services Agency (ONO)
Water level instrument: Solinst WL meter

Recorded by: CO
Date: 12/4/12
Depth of well from TOC (feet): 23.14
Well diameter (inches): 2
Screened interval from TOC (feet): 7.54-22.54
TOC elevation, NAVD 88 (feet): 14.99
Groundwater elevation, NAVD 88 (feet): 5.12
Water level from TOC (feet): 9.87 Time: 0915
Product level from TOC (feet): – Time: –

CALCULATION OF WELL VOLUME:

(23.14 ft - 9.87 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 total gallons removed

CALIBRATION:

See Cal sheet for YSI-556.21

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
0930							9.87	
0942	18.67	6.85	0.85	-109.3	1.776		10.03	
0945	19.08	6.96	0.43	-116.1	1.712		10.09	0.2
0946	19.26	7.00	0.31	-116.3	1.660		10.11	0.5
0951	19.30	7.00	0.26	-118.5	1.666		10.12	0.7
0954	19.30	7.01	0.21	-122.7	1.679		10.12	1.0
0957	19.32	7.01	0.19	-126.1	1.695		10.13	1.2
1000	19.33	7.01	0.16	-128.7	1.713		10.14	1.5
1005	Collected	sample						

Purge method: peristaltic pump
Duplicate/blank number: –
Sampling equipment: peri pump + dedicated tubing
Sample containers: voas - HCl ambers - unpreserved
Sample analyses: voas - BTEX/MTBE by 8260, TPHg by 8015M ambers - TPHd/mo by 8015M + SGCU
Laboratory: C+T
Decontamination method: dedicated tubing; liquinox
Comments:

Sample Time: 1005
Duplicate Sample Time: –
VOA attachment:
Rinsate disposal: –

TOC = top of casing
VD 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: overcast, 50's
Precip. in past 5 days (in.): 5.28
Source: Oakland Fire Services Agency (ONO)
Water level instrument: Solinst WL meter

Recorded by: SC/CO
Date: 12/4/12
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): 4.99
Water level from TOC (feet): 11.34 Time: 1005
Product level from TOC (feet): — Time: —

CALCULATION OF WELL VOLUME:

(25.00 ft - 11.34 ft x (0.083 ft)² x π x 7.48 gal/ft³ =
well depth - water level x (well radius)² x π x gal/ft³ =

2.2 gallons in one casing volume
2 total gallons removed

CALIBRATION: See cal sheets for YSI-556.14

FIELD MEASUREMENTS:

Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV)	EC (~~µmho/cm~~ mS/cm)	Turbidity (NTU)	Depth to Water (ft btoc)	Cumulative Gallons Removed
1016	Began purging						11.15	
1019	19.22	7.04	0.66	-119.4	1.842	NM	11.31	
1022	19.47	6.99	0.30	-120.5	1.803		11.35	0.5
1025	19.57	6.96	0.23	-124.9	1.781		11.33	
1028	19.61	6.96	0.22	-127.2	1.770		11.33	1.0
1031	19.67	6.96	0.22	-128.2	1.765		11.35	
1034	Sample collected							

Purge method: peristaltic pump
Sample Time: 1034
Duplicate/blank number: —
Duplicate Sample Time: —
Sampling equipment: pen pump + dedicated tubing
VOA attachment:
Sample containers: VOAs - HCl ambers - unpreserved
Sample analyses: VOAs - BTEX/MTBE by 8260, TPHg by 8015M ambers - TPHd/mo by 8015M + SGCU
Laboratory: C+T
Decontamination method: dedicated tubing, liquinox
Rinsate disposal: —
Comments: hydrocarbon odor

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

GROUNDWATER SAMPLING

Well No.: **MW-10**

Project No. 4656016 | Recorded by: SC/CO | Date: 12/4/12

ject Name: Harbor Facilities Center | Depth of well from TOC (feet): 25

Location: Port of Oakland | Well diameter (inches): 2

651 Maritime Street, Oakland, California | Screened interval from TOC (feet): 15 - 25

Weather: overcast, 50s | TOC elevation, NAVD 88 (feet): 15.65

Precip. in past 5 days (in.): 5.28 | Groundwater elevation, NAVD 88 (feet): 5.69

Source: Oakland Fire Services Agency (OFSA) | Water level from TOC (feet): 9.96 | Time: 1630

Water level instrument: Solinst WL meter | Product level from TOC (feet): – | Time: –

CALCULATION OF WELL VOLUME:

(25.00 ft - 9.96 ft x (0.083 ft)² x π x 7.48 gal/ft³ = 2.4 gallons in one casing volume

well depth - water level x (well radius)² x π x gal/ft³ = 1.0 total gallons removed

CALIBRATION: see cal sheets for YSI-556-21

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
							9.96	
1045	17.98	6.65	0.54	-110.1	2940		10.28	–
1050	18.29	6.64	0.33	-112.9	2.965		10.37	0.1
1053	18.38	6.64	0.25	-114.4	2.972		10.40	0.2
1058	18.42	6.63	0.17	-115.4	2.977		10.42	0.4
1102	18.46	6.63	0.15	-116.0	2.979		10.43	0.5
1105	18.47	6.62	0.13	-117.1	2.979		10.43	0.6
1108	18.49	6.61	0.11	-117.9	2.979		10.43	0.7
1111	18.52	6.60	0.10	-118.8	2.980		10.43	0.8
1115	18.52	6.59	0.10	-119.7	2.980		10.43	0.9
1120	Collected sample							

Rate ≈100 mL/min

Purge method: peristaltic pump | Sample Time: 11:20

Duplicate/blank number: ~~peristaltic pump~~ – | Duplicate Sample Time: –

Sampling equipment: peristaltic pump w/ dedicated tubing | VOA attachment: –

Sample containers: VOAs - HCl ambers - unpreserved

Sample analyses: VOAs - MTBE/BTEX by 8260, TPHg by 8015M ambers - 8015M TPHd/mo + SGCU

Laboratory: CT

Decontamination method: dedicated tubing, liquinox | Rinsate disposal: –

Comments:

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: overcast, 50s
Precip. in past 5 days (in.): 5.28
Source: Oakland Fire Services Agency (OFD)
Water level instrument: Solinst WL meter

Recorded by: SC/CO
Date: 12/4/12
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): 5.56
Water level from TOC (feet): 9.91 Time: 0800
Product level from TOC (feet): — Time: —

CALCULATION OF WELL VOLUME:

(25.00 ft - 9.91 ft x (0.083 ft)² x π x 7.48 gal/ft³ = 2.4 gallons in one casing volume
well depth - water level x (well radius)² x π x gal/ft³ = 2.0 total gallons removed

CALIBRATION:

see cal sheets for YSI-556.14

FIELD MEASUREMENTS:

Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV)	EC ~~(µmho/cm)~~ mS/cm	Turbidity (NTU)	Depth to Water (ft btoc)	Cumulative Gallons Removed
1307	Began	purging					9.65	
1310	21.25	7.66	0.21	-175.2	4.615	NM	10.02	
1313	21.39	7.63	0.16	-175.3	4.581		10.04	
1316	21.53	7.64	0.15	-176.8	4.544		10.07	1.0
1319	21.61	7.64	0.11	-176.0	4.539		10.08	
1322	21.63	7.65	0.13	-174.6	4.542		10.09	
1325	Sample collected - unpreserved							2.0

Purge method: Peristaltic Pump
Sample Time: 1325
Duplicate/blank number: —
Duplicate Sample Time: —
Sampling equipment: peristaltic pump w/ dedicated tubing
VOA attachment: —
Sample containers: VOAs - unpreserved 8ambers - unpreserved
Sample analyses: VOAs - MTBE/BTEX by 8260, TPHg by 8015M ambers - TPHd/mo by 8015M + SGCU
Laboratory: C+T
Decontamination method: Dedicated tubing, liquinox
Rinsate disposal: —
Comments: hydrocarbon odor, turbid purgewater during sample collection, sample treating w/ preserved. As a result, sample collected unpreserved.

TOC = top of casing
VD 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: overcast, 50s
Precip. in past 5 days (in.): 5.28
Source: Oakland Fire Services Agency (ONO)
Water level instrument: Solinst WL meter

Recorded by: CDSC
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): 6.00
Water level from TOC (feet): 10.79 Time: 0750
Product level from TOC (feet): — Time: —
Date: 12/4/12

CALCULATION OF WELL VOLUME:

(25.00 ft - 10.79 ft) x (0.083 ft)² x π x 7.48 gal/ft³ =
well depth - water level x (well radius)² x π x gal/ft³ =

2.3 gallons in one casing volume
1.5 total gallons removed

CALIBRATION: see cal sheets for 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
1423	Began purging						10.74	
1426	18.12	7.40	1.41	-18.2	1.295	NM	10.89	
1429	18.39	6.74	0.29	-33.0	1.280		10.89	
1432	18.43	6.67	0.21	-38.0	1.271		10.89	0.5
1435	18.44	6.65	0.19	-40.6	1.265		10.90	
1438	18.42	6.64	0.20	-41.6	1.261		10.90	1.0
1441	sample collected							

Purge method: peristaltic pump
Duplicate/blank number: —
Sampling equipment: peristaltic pump w/ dedicated tubing
Sample containers: VOAs - HCl ambers unpreserved
Sample analyses: VOAs - MTBE/BTEX by 8260, TPHg by 8015M ambers - TPHd/mo by 8015 + SGCU
Laboratory: C+T
Decontamination method: Dedicated tubing, liquinox
Comments: hydrocarbon odor

Sample Time: 1441
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.: 04656016.0000 Location: HFC

Instrument: YSI-556.14 Serial Number: YSI-556.14

Date	Calibrated by	Parameter	Standards Used	Calibration Achieved (Y/N)	Remarks
12/4/12	CO	pH	4.0	Y	
		pH	7.0	Y	
		pH	10.0	Y	
		Conductivity	1.0 ms/cm	Y	
		ORP	250	Y	
12/04/12 1500	check @ end of sampling		Reading		
			pH 4.0	3.54	
			pH 7.0	6.62	
			pH 10.0	10.06	
			Conductivity	0.984	

ARCADIS

MULTIPARAMETER INSTRUMENT CALIBRATION RECORD

Project No.: 04636016.0000 Location: HFC

Instrument: YSI 556 Serial Number: YSI-556.21

Date	Calibrated by	Parameter	Standards Used	Calibration Achieved (Y/N)	Remarks
12/4/12	CB	PH	4.0	Y	
		pH	7.0	Y	
		pH	10.0	Y	
		Conductivity	1.0 ms/cm	Y	
		ORP	250	Y	
12/4/12 1500	Check following sampling				
		pH 4.0	3.83		
		pH 7.0	6.55		
		pH 10.0	9.88		
		Conductivity	0.969		

EQUIPCO RENTALS

YSI 556MPS RENTAL
CALIBRATION CERTIFICATE

SERVICE TECHNICIAN: NN DATE: 12-03-12

INSTRUMENT INFORMATION

RENTAL I.D. NUMBER: YSI-556. 14
SERIAL#:
CUSTOMER.

CALIBRATION INFORMATION

PARAMETERS:	STANDARDS:	PASS ( )	LOT#
1. CONDUCTIVITY	1000 µMhos	✓	9507
2. pH ZERO	pH 7	✓	9580
3. pH SLOPE	pH 4	✓	9589
pH SLOPE	pH 10	✓	9582
4. DISSOLVED OXYGEN	Air Calibration Barometric pressure = 760mmHg	✓	N/A
5. REDOX (ORP)	231 mV (YSI Zobell solution)	✓	083012

2100 Meridian Park Boulevard, Concord, CA. 94520 Phone (925) 609-1088 Fax (925) 609-1080

EQUIPCO RENTALS

YSI 556MPS RENTAL
CALIBRATION CERTIFICATE

SERVICE TECHNICIAN: NN DATE: 12-03-12

INSTRUMENT INFORMATION

RENTAL I.D. NUMBER: YSI-556. 21
SERIAL#:
CUSTOMER.

CALIBRATION INFORMATION

PARAMETERS:	STANDARDS:	PASS ( )	LOT#
1. CONDUCTIVITY	1000 µMhos	/	9507
2. pH ZERO	pH 7	/	9580
3. pH SLOPE	pH 4	/	9569
pH SLOPE	pH 10	/	9582
4. DISSOLVED OXYGEN	Air Calibration Barometric pressure = 760mmHg	/	N/A
5. REDOX (ORP)	231 mV (YSI Zobell solution)	/	083012

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Port of Oakland
530 Water Street • Oakland, CA 94607

Appendix B
Laboratory Analytical Reports

4656016

MALCOLM PIRNIE

Data Validation Worksheet

Lab Report # 241690 DV by: SC
Project Port Harbor Facilities Complex Date: 01/04/2013

Lab IDs	Sample IDs	Date Collected	Parameters		
			TPHg (8015B)	TPHd/mo (8015B)	MTBE BTEX (8260B)
-001	MW-5	12/04/12	X	X	X
-002	MW-8A	12/04/12	X	X	X
-003	MW-9	12/04/12	X	X	X
-004	MW-10	12/04/12	X	X	X
-005	MW-4	12/04/12	X	X	X
-006	MW-4DUP	12/04/12	X	X	X
-007	MW-2	12/04/12	X	X	X
-008	MW-11	12/04/12	X	X	X
-009	MW-12	12/04/12	X	X	X
-010	TB-120412	12/04/12	X		X

Lab ID: C+T **NO QUALS**
Cooler Temperature: 4.2 C one cooler, 6.9 C one cooler
Chain-of-Custody: OK
Samples preservatives: OK, sample MW-11 unpreserved for TPHg and MTBE/BTEX

Parameter: **TPHg**

HTs: 14 days preserved, 7 days unpreserved – analyzed 12/05/12
Batch IDs: 193481
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: 14 days – analyzed 12/06/12
Batch IDs: 193525
Surrogates: OK
Method Blank: OK, surrogates OK
BS/BSD: BS OK, surrogate o-terphenyl recovery above acceptable limits, QC sample → NO QUAL
BSD OK, surrogates OK

Parameter: **BTEX + MTBE**

HTs: 14 days – analyzed 12/04/12
Batch IDs: 193440
Surrogates: OK
Method Blank: OK, surrogates OK
LCS: OK, surrogates OK
MS/MSD: MS OK, surrogates OK
MSD OK, surrogates 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 241690
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-5	241690-001
MW-8A	241690-002
MW-9	241690-003
MW-10	241690-004
MW-4	241690-005
MW-4DUP	241690-006
MW-2	241690-007
MW-11	241690-008
MW-12	241690-009
TB-120412	241690-010

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: 12/11/2012

Desiree N. Tetrault
Project Manager
(510) 486-0900

NELAP # 01107CA

Curtis & Tompkins, Ltd.

CASE NARRATIVE

Laboratory number:	**241690**
Client:	**Malcolm Pirnie, Inc.**
Project:	**4656016**
Location:	**Port Of Oakland - HFC**
Request Date:	**12/04/12**
Samples Received:	**12/04/12**

This data package contains sample and QC results for ten water samples, requested for the above referenced project on 12/04/12. The samples were received cold and intact.

TPH-Purgeables and/or BTXE by GC (EPA 8015B):
MW-11 (lab # 241690-008) had pH greater than 2. No other analytical problems were encountered.

TPH-Extractables by GC (EPA 8015B):
High surrogate recovery was observed for o-terphenyl in the BS for batch 193525. No other analytical problems were encountered.

Volatile Organics by GC/MS (EPA 8260B):
MW-11 (lab # 241690-008) had pH greater than 2. No other analytical problems were encountered.

CHAIN OF CUSTODY

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Page 1 of 1

Chain of Custody #

C&T LOGIN # 241690

Project No: 046560116.0000
Project Name: Port of Oakland HFC
Project P. O. No:
EDD Format: Report Level ☐ II ☐ III ☐ IV
Turnaround Time: ☐ RUSH ☒ Standard

Sampler: Carolina Orsi
Report To: Todd Miller
Company: ARCADIS
Telephone: 925-296-7856
Email: todd.miller@arcadis-US.com

Lab No.	Sample ID.	SAMPLING		MATRIX		# of Containers	CHEMICAL PRESERVATIVE					ANALYTICAL REQUEST			
		Date Collected	Time Collected	Water	Solid		HCl	H2SO4	HNO3	NaOH	None	TPHg (8015M)	BTEX + MTBE (8260)	TPHd/mo w/ Silica Gel cleanup (8015M)	
1	MW-5	12/04/12	0937	X		8	X					X	X	X	
2	MW-8A		1005				X					X	X	X	
3	MW-9		1034				X					X	X	X	
4	MW-10		1120				X					X	X	X	
5	MW-4		1136				X					X	X	X	
6	MW-4DUP		1139				X					X	X	X	
7	MW-2		1330				X					X	X	X	
8	MW-11		1325				X					X	X	X	
9	MW-12		1441				X				X	X	X	X	→ Samples Unpreserved
	[redacted]						X					X	X	X	
10	TB-120412	12/04/12		X			X					X	X		

Notes:
- EDF Needed
- Bill to Port of Oakland

SAMPLE RECEIPT
☐ Intact
☐ Cold
☐ On Ice
☐ Ambient

RELINQUISHED BY:
DATE: 12/4/12 TIME: 1640
DATE: TIME:
DATE: TIME:

RECEIVED BY:
DATE: 12/4 TIME: 1640
DATE: TIME:
DATE: TIME:

COOLER RECEIPT CHECKLIST

Curtis & Tompkins, Ltd.

Login # 241690 Date Received 12/4/12 Number of coolers 2
Client ARCADIS Project PORT OF OAKLAND HFC

Date Opened 12/4 By (print) P.S. (sign) P.S.
Date Logged in ↓ By (print) SL (sign) S. Lee

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) 4.2 ; 6.9

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

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

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

COMMENTS
18) -008: unpreserved VOAs

Rev 10, 11/11

Curtis & Tompkins, Ltd.

Total Volatile Hydrocarbons

Lab #:	241690	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8015B
Matrix:	Water	Batch#:	193481
Units:	ug/L	Sampled:	12/04/12
Diln Fac:	1.000	Received:	12/04/12

Field ID: MW-5 Lab ID: 241690-001
Type: SAMPLE Analyzed: 12/04/12

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	105	75-124

Field ID: MW-8A Lab ID: 241690-002
Type: SAMPLE Analyzed: 12/04/12

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	108	75-124

Field ID: MW-9 Lab ID: 241690-003
Type: SAMPLE Analyzed: 12/05/12

Analyte	Result	RL
Gasoline C7-C12	140 Y	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	95	75-124

Field ID: MW-10 Lab ID: 241690-004
Type: SAMPLE Analyzed: 12/05/12

Analyte	Result	RL
Gasoline C7-C12	250 Y	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	109	75-124

Field ID: MW-4 Lab ID: 241690-005
Type: SAMPLE Analyzed: 12/05/12

Analyte	Result	RL
Gasoline C7-C12	76 Y	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	97	75-124

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

Curtis & Tompkins, Ltd.

Total Volatile Hydrocarbons

Lab #:	241690	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8015B
Matrix:	Water	Batch#:	193481
Units:	ug/L	Sampled:	12/04/12
Diln Fac:	1.000	Received:	12/04/12

Field ID: MW-4DUP
Type: SAMPLE
Lab ID: 241690-006
Analyzed: 12/05/12

Analyte	Result	RL
Gasoline C7-C12	60 Y	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	90	75-124

Field ID: MW-2
Type: SAMPLE
Lab ID: 241690-007
Analyzed: 12/05/12

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	109	75-124

Field ID: MW-11
Type: SAMPLE
Lab ID: 241690-008
Analyzed: 12/05/12

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	89	75-124

Field ID: MW-12
Type: SAMPLE
Lab ID: 241690-009
Analyzed: 12/05/12

Analyte	Result	RL
Gasoline C7-C12	95 Y	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	107	75-124

Field ID: TB-120412
Type: SAMPLE
Lab ID: 241690-010
Analyzed: 12/05/12

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	97	75-124

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

Curtis & Tompkins, Ltd.

Total Volatile Hydrocarbons

Lab #:	241690	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8015B
Matrix:	Water	Batch#:	193481
Units:	ug/L	Sampled:	12/04/12
Diln Fac:	1.000	Received:	12/04/12

Type: BLANK
Lab ID: QC668623

Analyzed: 12/04/12

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	102	75-124

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 #:	241690	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:	QC668622	Batch#:	193481
Matrix:	Water	Analyzed:	12/04/12
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	1,000	955.0	95	80-120

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	115	75-124

Curtis & Tompkins, Ltd.

Batch QC Report

Total Volatile Hydrocarbons

Lab #:	241690	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8015B
Field ID:	ZZZZZZZZZZ	Batch#:	193481
MSS Lab ID:	241682-001	Sampled:	12/03/12
Matrix:	Water	Received:	12/04/12
Units:	ug/L	Analyzed:	12/04/12
Diln Fac:	1.000		

Type: MS Lab ID: QC668624

Analyte	MSS Result	Spiked	Result	%REC	Limits
Gasoline C7-C12	29.18	2,000	1,787	88	71-120

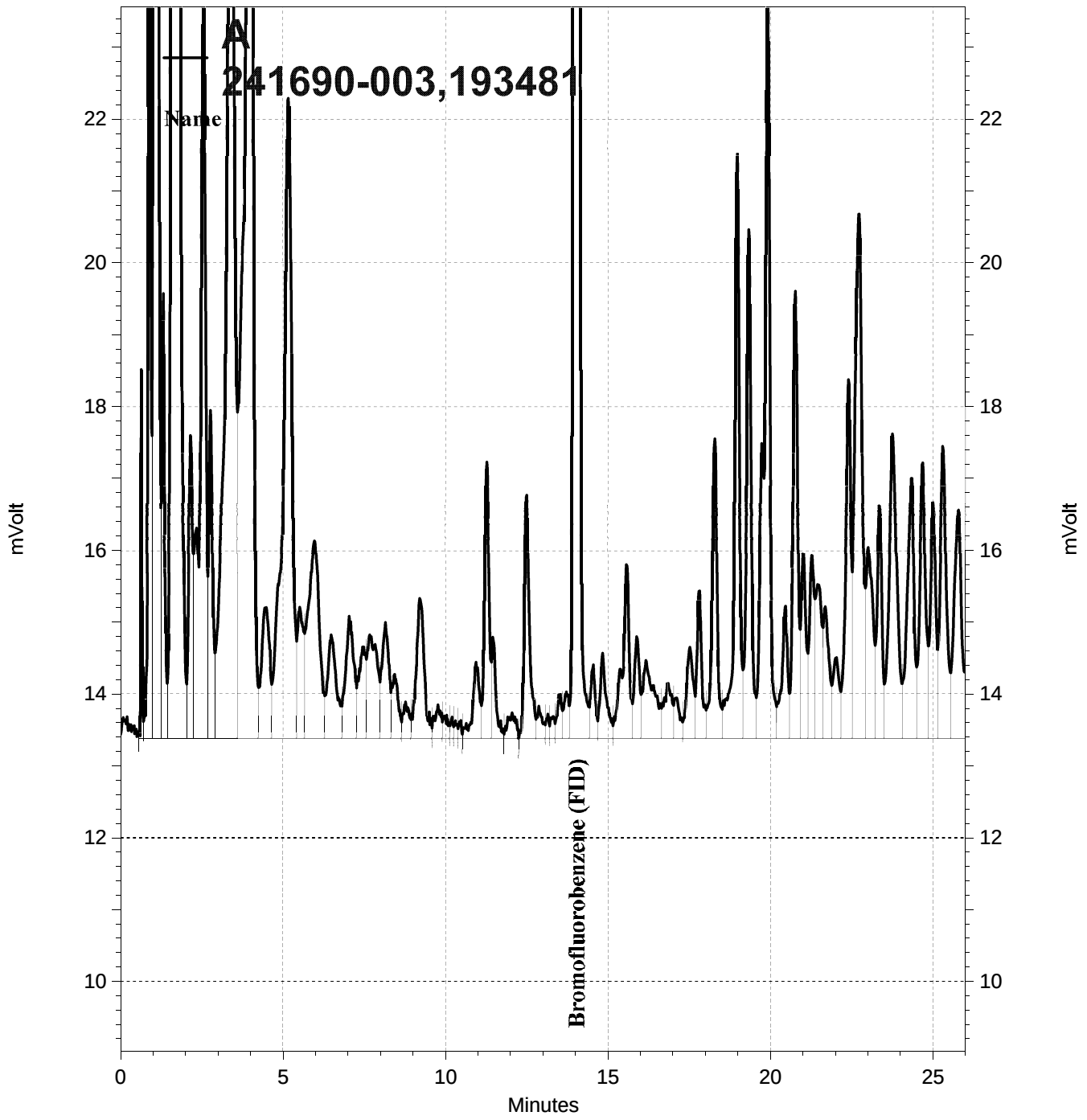
Surrogate	%REC	Limits
Bromofluorobenzene (FID)	116	75-124

Type: MSD Lab ID: QC668625

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	2,000	1,806	89	71-120	1	22

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	113	75-124

RPD= Relative Percent Difference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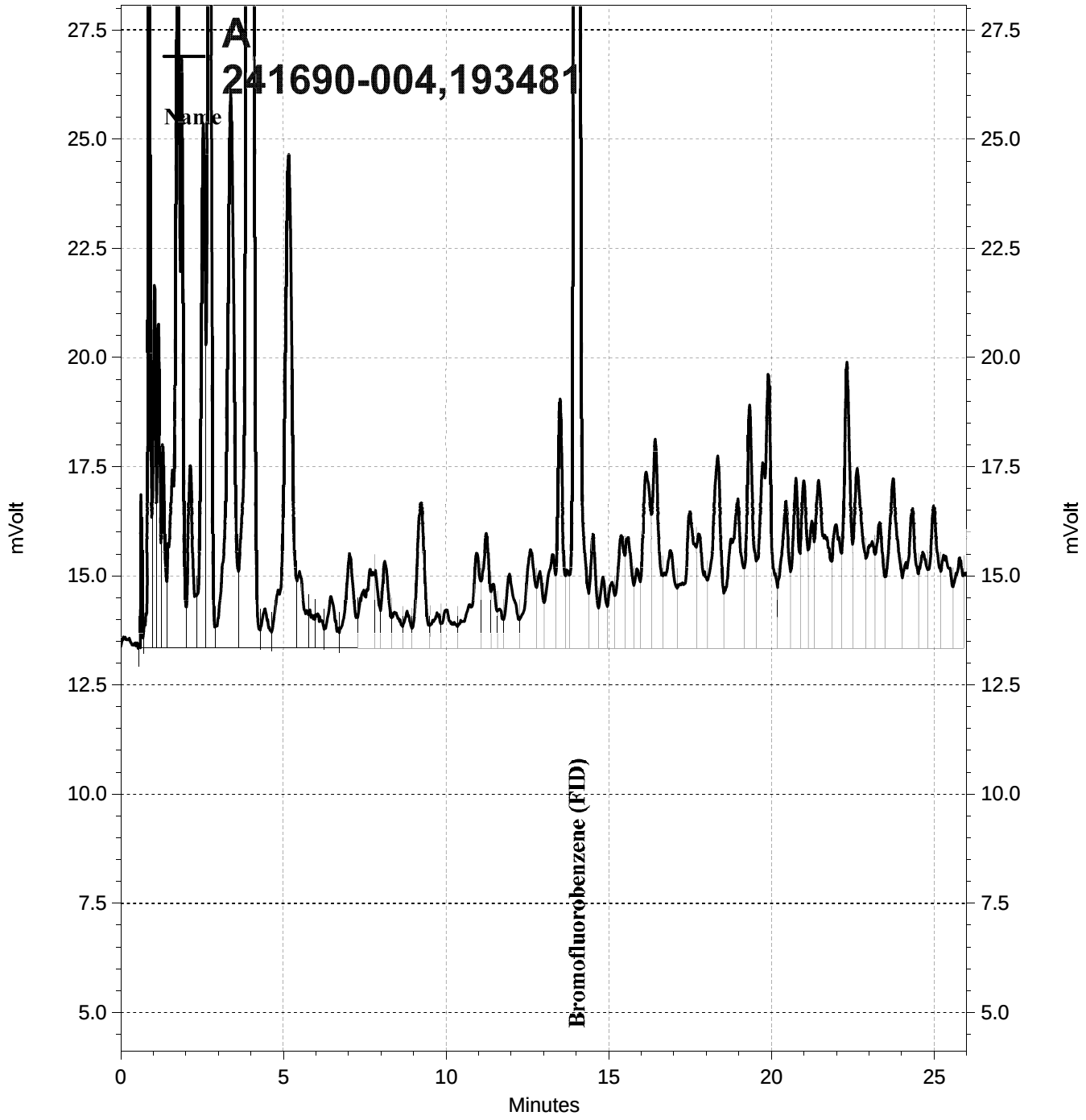

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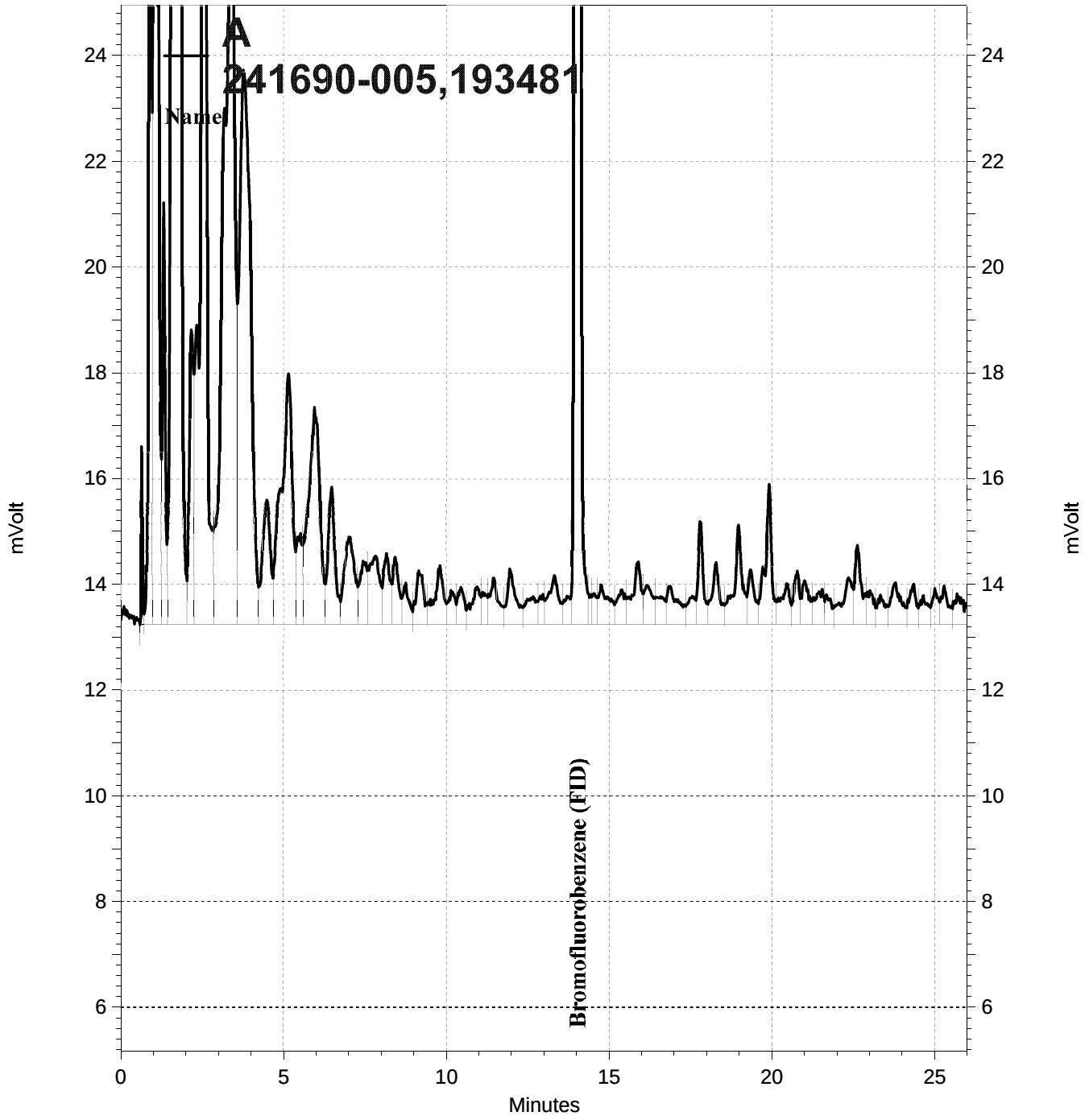

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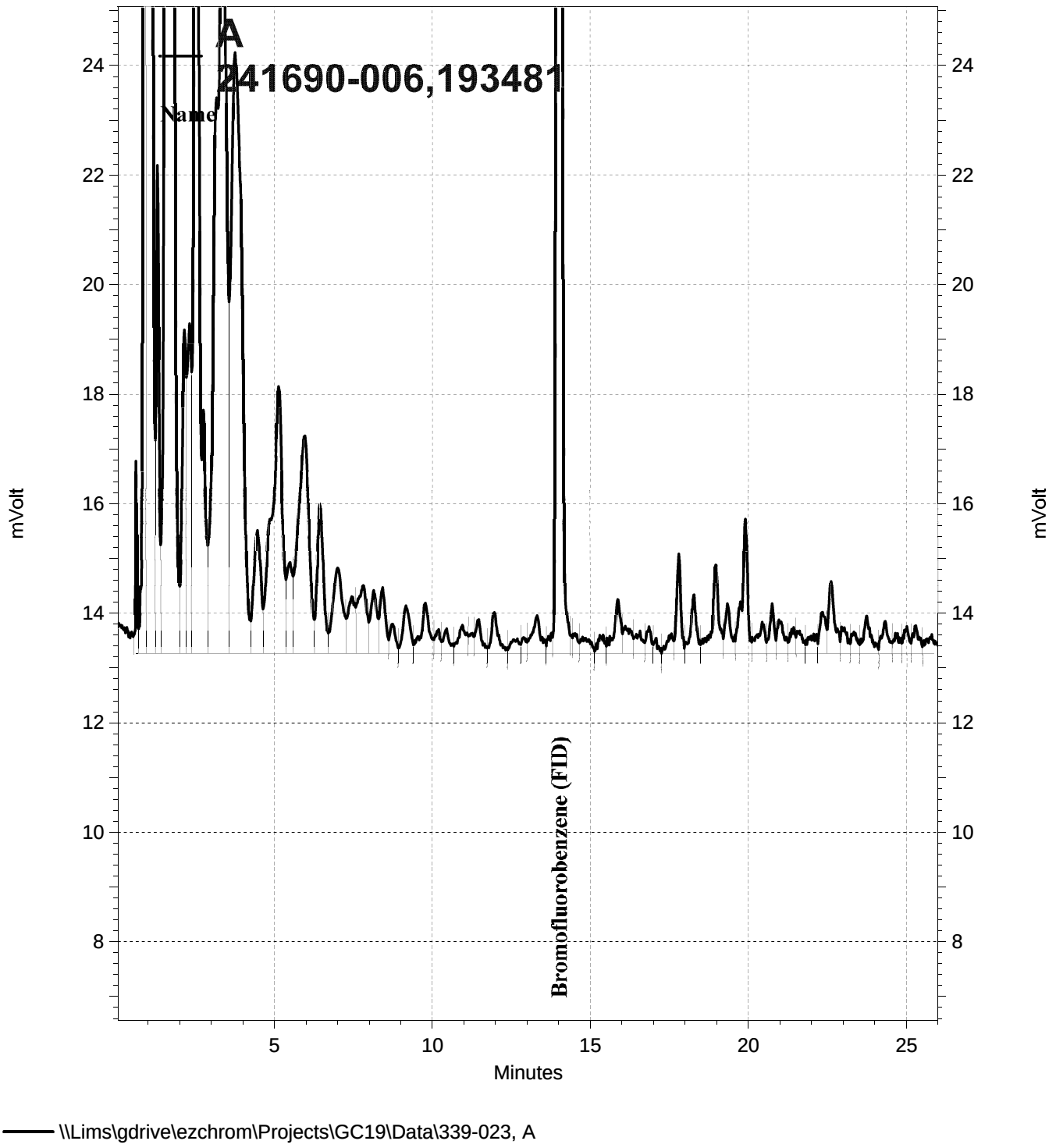
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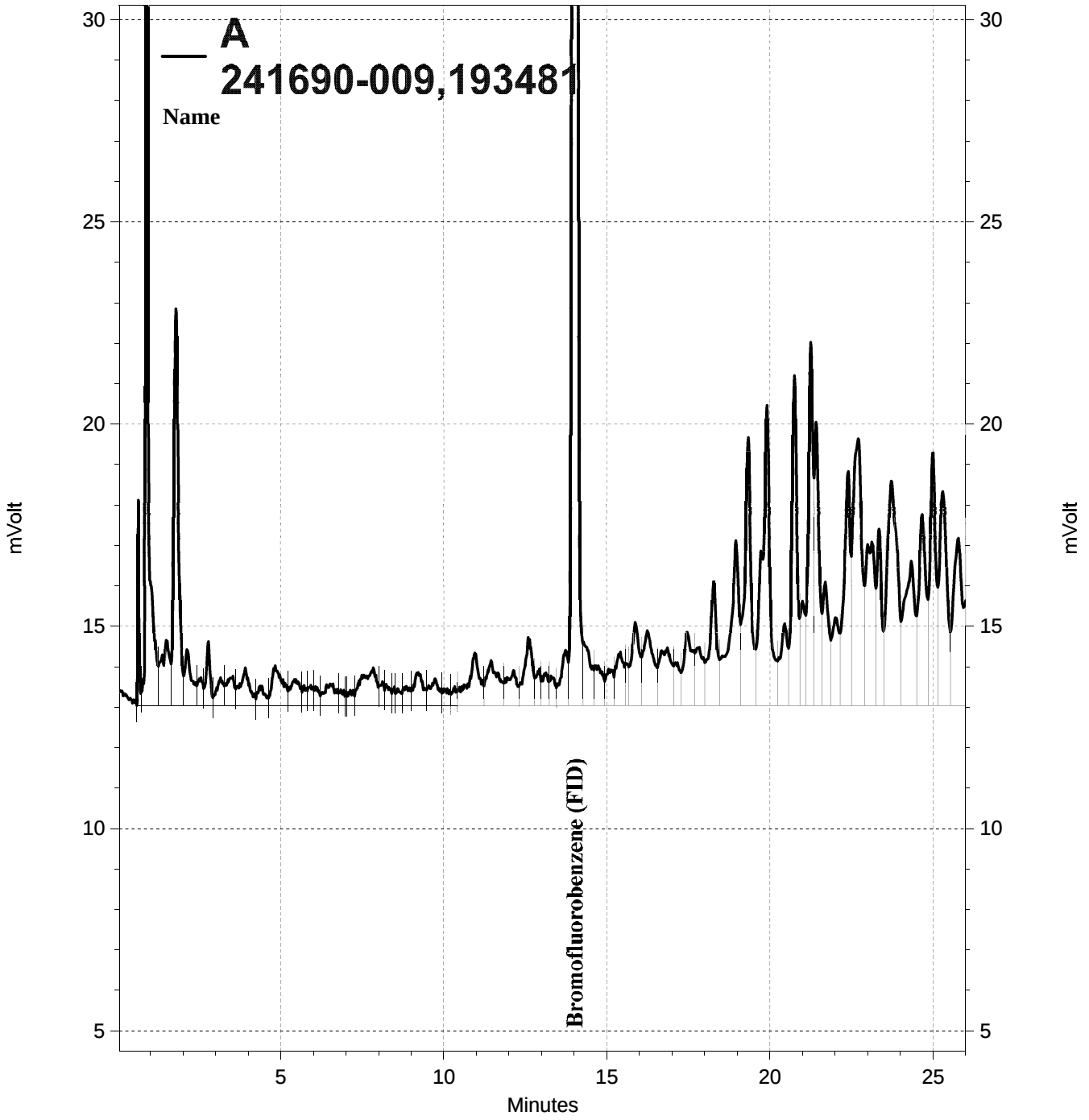
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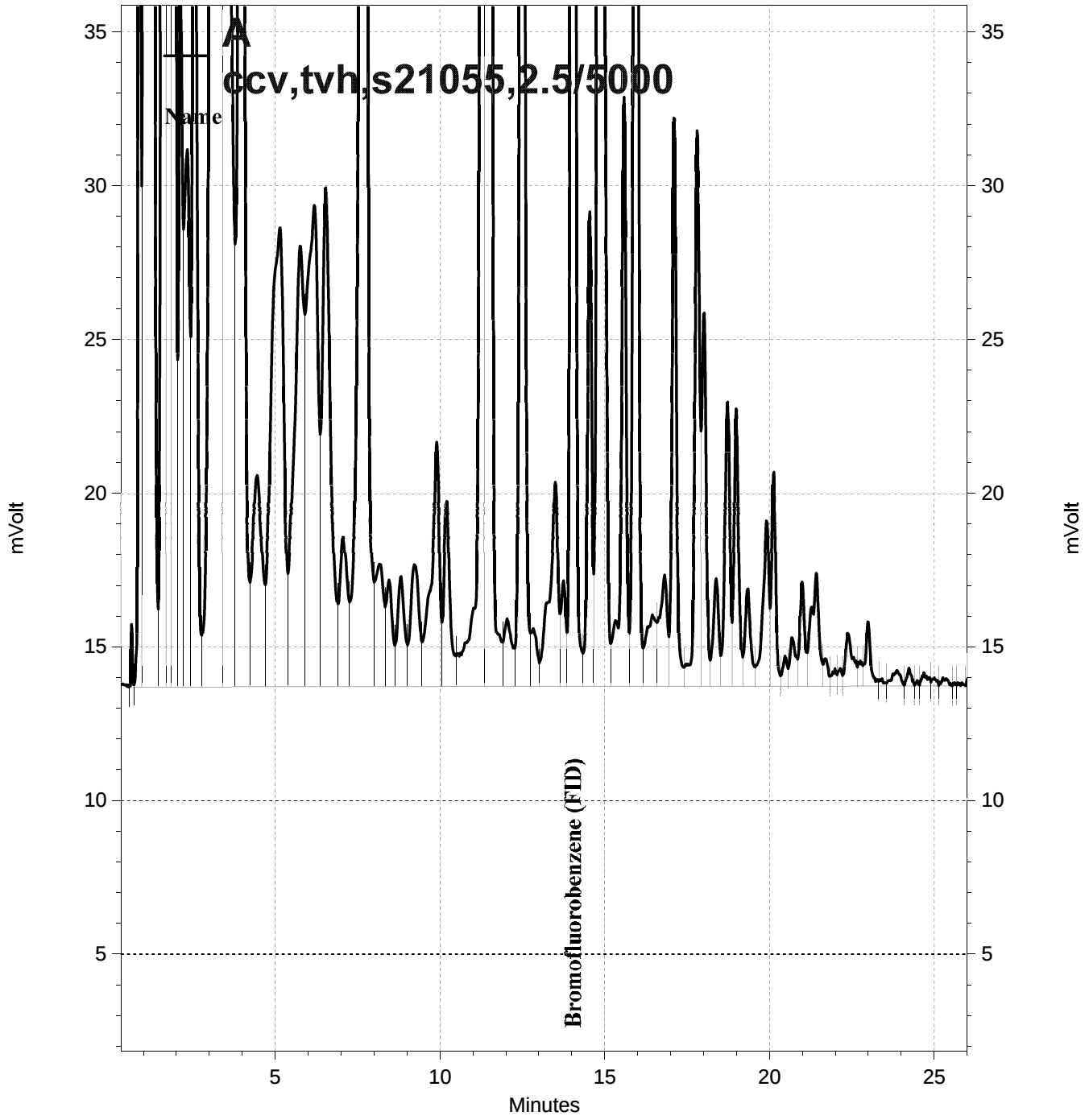
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Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	241690	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 3520C
Project#:	4656016	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	12/04/12
Units:	ug/L	Received:	12/04/12
Diln Fac:	1.000	Prepared:	12/05/12
Batch#:	193525		

Field ID: MW-5
Type: SAMPLE
Lab ID: 241690-001
Analyzed: 12/06/12
Cleanup Method: EPA 3630C

Analyte	Result	RL
Diesel C10-C24	ND	54
Motor Oil C24-C36	ND	330

Surrogate	%REC	Limits
o-Terphenyl	113	61-134

Field ID: MW-8A
Type: SAMPLE
Lab ID: 241690-002
Analyzed: 12/06/12
Cleanup Method: EPA 3630C

Analyte	Result	RL
Diesel C10-C24	ND	53
Motor Oil C24-C36	ND	320

Surrogate	%REC	Limits
o-Terphenyl	95	61-134

Field ID: MW-9
Type: SAMPLE
Lab ID: 241690-003
Analyzed: 12/06/12
Cleanup Method: EPA 3630C

Analyte	Result	RL
Diesel C10-C24	200 Y	53
Motor Oil C24-C36	ND	320

Surrogate	%REC	Limits
o-Terphenyl	115	61-134

Field ID: MW-10
Type: SAMPLE
Lab ID: 241690-004
Analyzed: 12/06/12
Cleanup Method: EPA 3630C

Analyte	Result	RL
Diesel C10-C24	1,100	53
Motor Oil C24-C36	ND	320

Surrogate	%REC	Limits
o-Terphenyl	127	61-134

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

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	241690	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 3520C
Project#:	4656016	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	12/04/12
Units:	ug/L	Received:	12/04/12
Diln Fac:	1.000	Prepared:	12/05/12
Batch#:	193525		

Field ID: MW-4 Analyzed: 12/06/12
Type: SAMPLE Cleanup Method: EPA 3630C
Lab ID: 241690-005

Analyte	Result	RL
Diesel C10-C24	ND	53
Motor Oil C24-C36	ND	320

Surrogate	%REC	Limits
o-Terphenyl	114	61-134

Field ID: MW-4DUP Analyzed: 12/07/12
Type: SAMPLE Cleanup Method: EPA 3630C
Lab ID: 241690-006

Analyte	Result	RL
Diesel C10-C24	56 Y	52
Motor Oil C24-C36	ND	310

Surrogate	%REC	Limits
o-Terphenyl	116	61-134

Field ID: MW-2 Analyzed: 12/07/12
Type: SAMPLE Cleanup Method: EPA 3630C
Lab ID: 241690-007

Analyte	Result	RL
Diesel C10-C24	ND	53
Motor Oil C24-C36	ND	320

Surrogate	%REC	Limits
o-Terphenyl	122	61-134

Field ID: MW-11 Analyzed: 12/07/12
Type: SAMPLE Cleanup Method: EPA 3630C
Lab ID: 241690-008

Analyte	Result	RL
Diesel C10-C24	ND	53
Motor Oil C24-C36	ND	320

Surrogate	%REC	Limits
o-Terphenyl	110	61-134

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

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	241690	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 3520C
Project#:	4656016	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	12/04/12
Units:	ug/L	Received:	12/04/12
Diln Fac:	1.000	Prepared:	12/05/12
Batch#:	193525		

Field ID:	MW-12	Analyzed:	12/07/12
Type:	SAMPLE	Cleanup Method:	EPA 3630C
Lab ID:	241690-009		

Analyte	Result	RL
Diesel C10-C24	390 Y	53
Motor Oil C24-C36	ND	320

Surrogate	%REC	Limits
o-Terphenyl	97	61-134

Type:	BLANK	Analyzed:	12/06/12
Lab ID:	QC668806	Cleanup Method:	EPA 3630C

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

Surrogate	%REC	Limits
o-Terphenyl	126	61-134

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 #:	241690	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 3520C
Project#:	4656016	Analysis:	EPA 8015B
Matrix:	Water	Batch#:	193525
Units:	ug/L	Prepared:	12/05/12
Diln Fac:	1.000	Analyzed:	12/07/12

Type: BS Cleanup Method: EPA 3630C
Lab ID: QC668807

Analyte	Spiked	Result	%REC	Limits
Diesel C10-C24	2,500	2,970	119	60-120

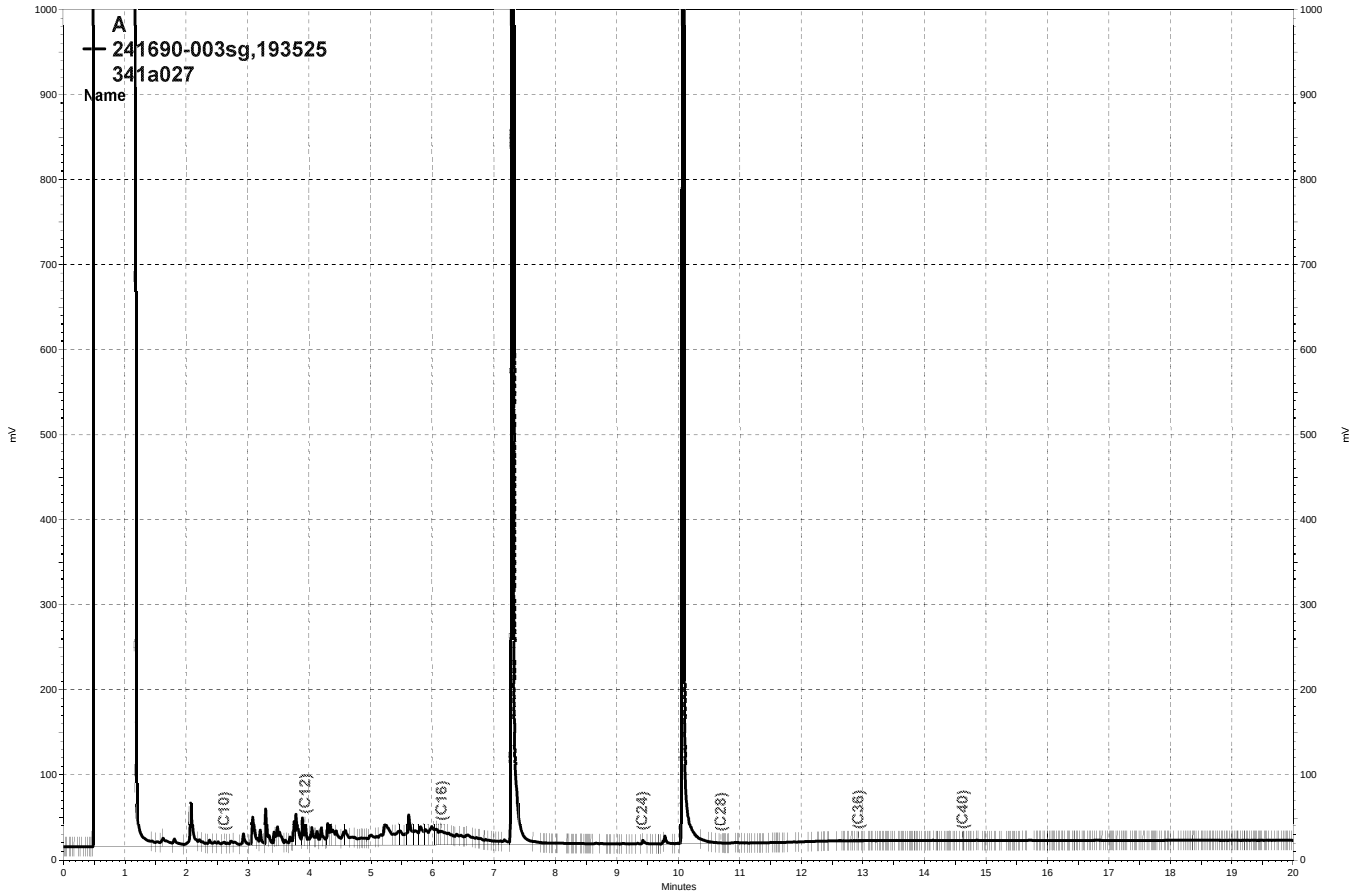
Surrogate	%REC	Limits
o-Terphenyl	167 *	61-134

Type: BSD Cleanup Method: EPA 3630C
Lab ID: QC668808

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Diesel C10-C24	2,500	2,314	93	60-120	25	35

Surrogate	%REC	Limits
o-Terphenyl	129	61-134

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



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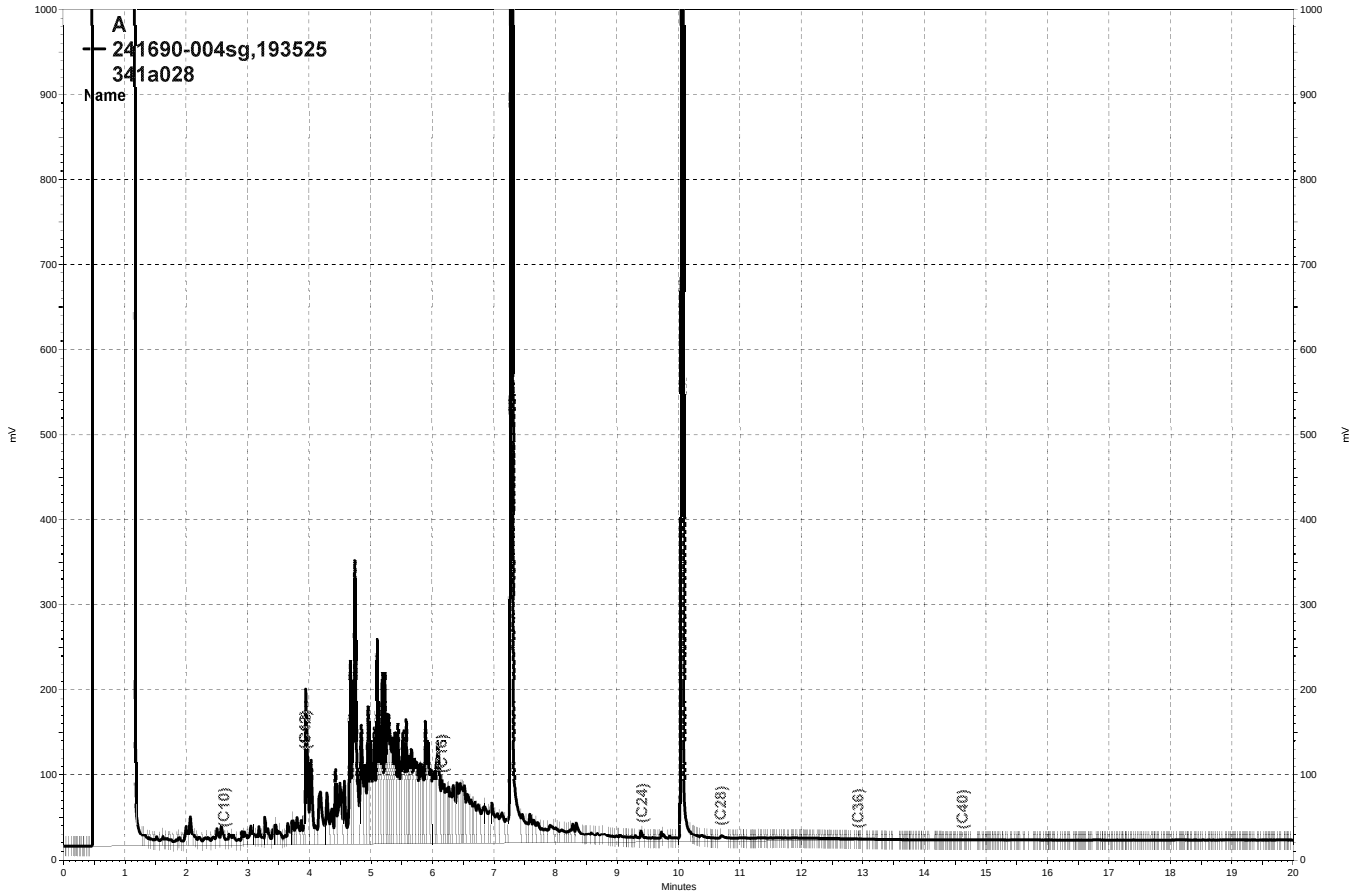

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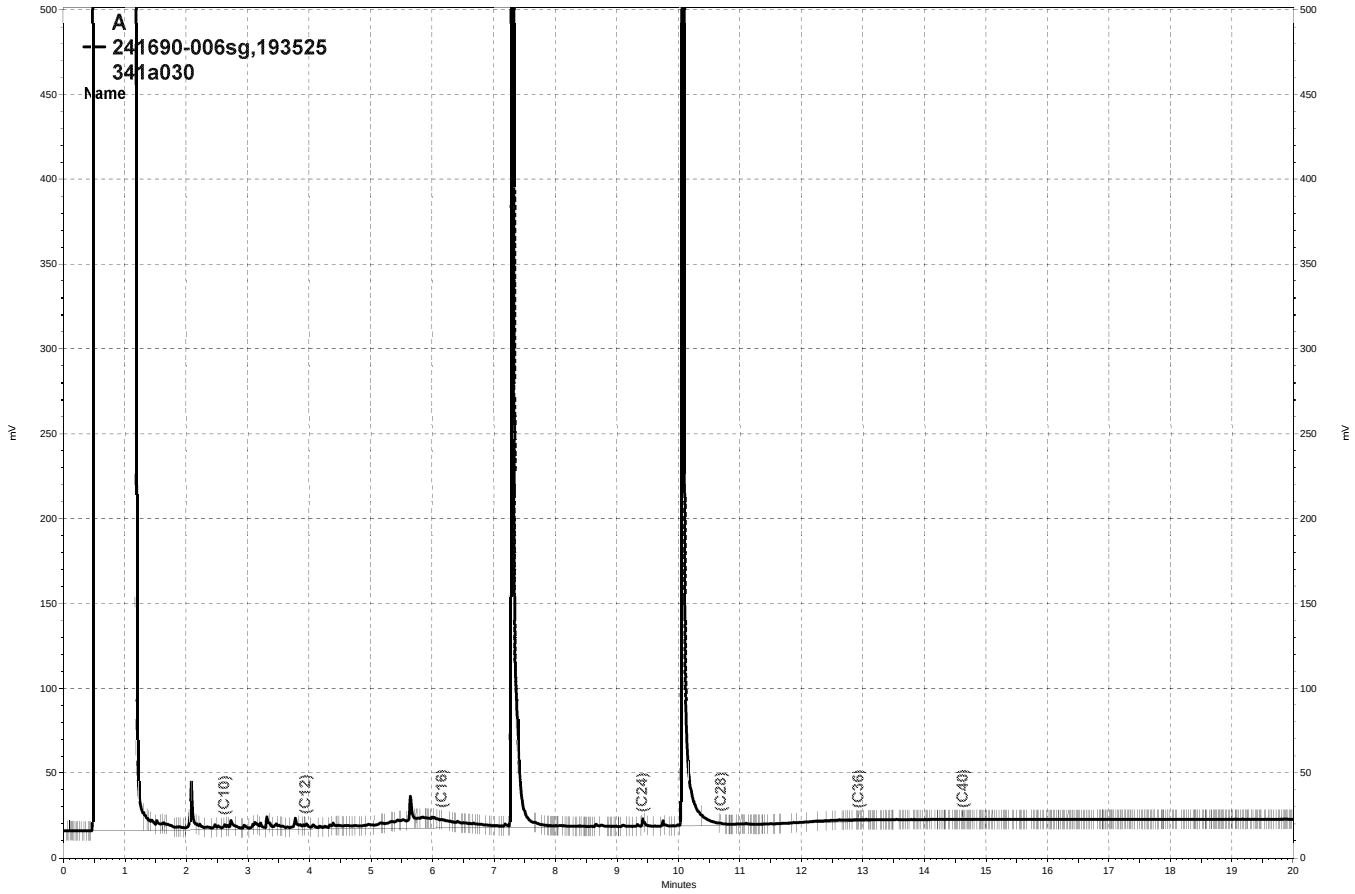

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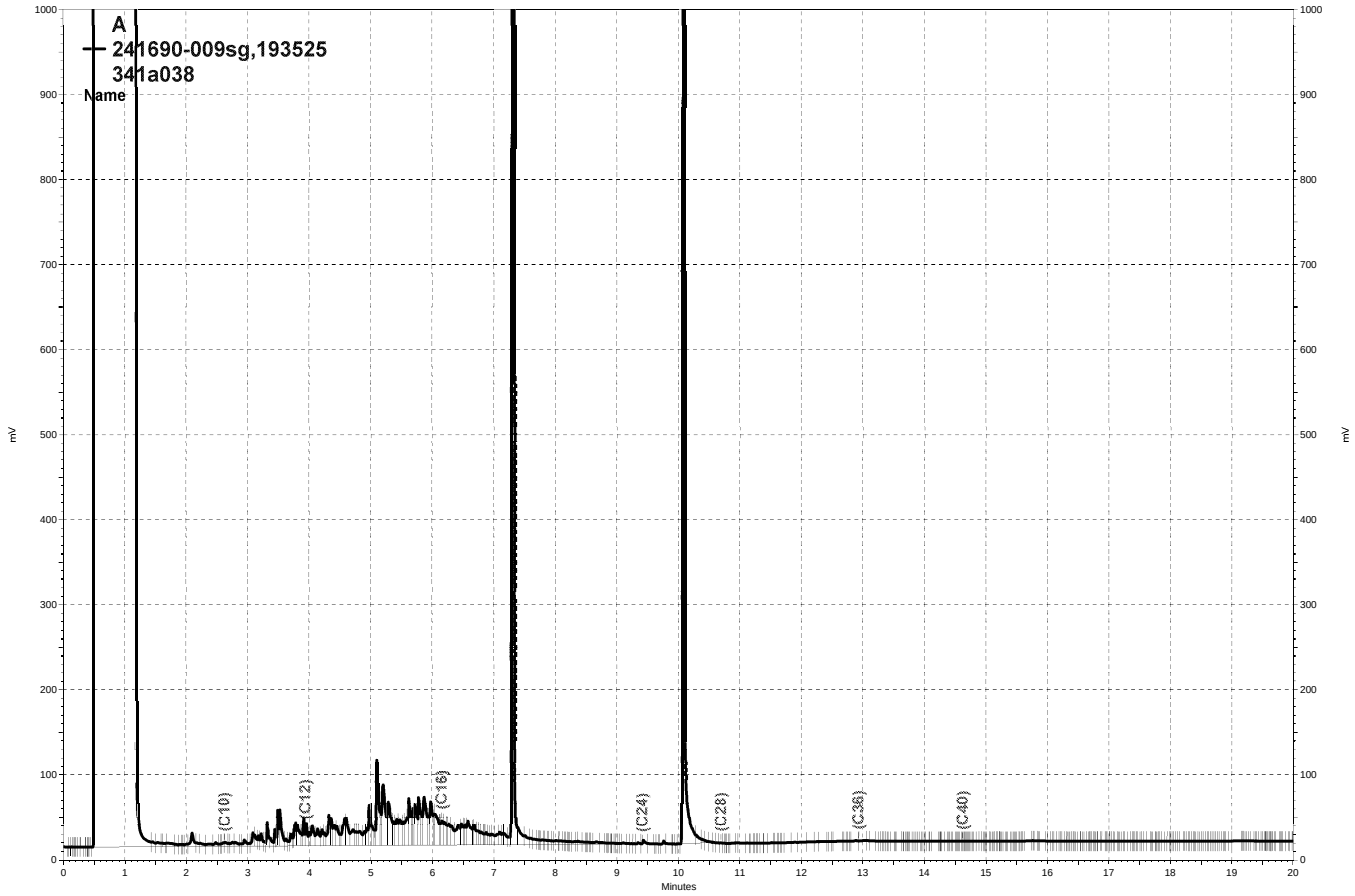

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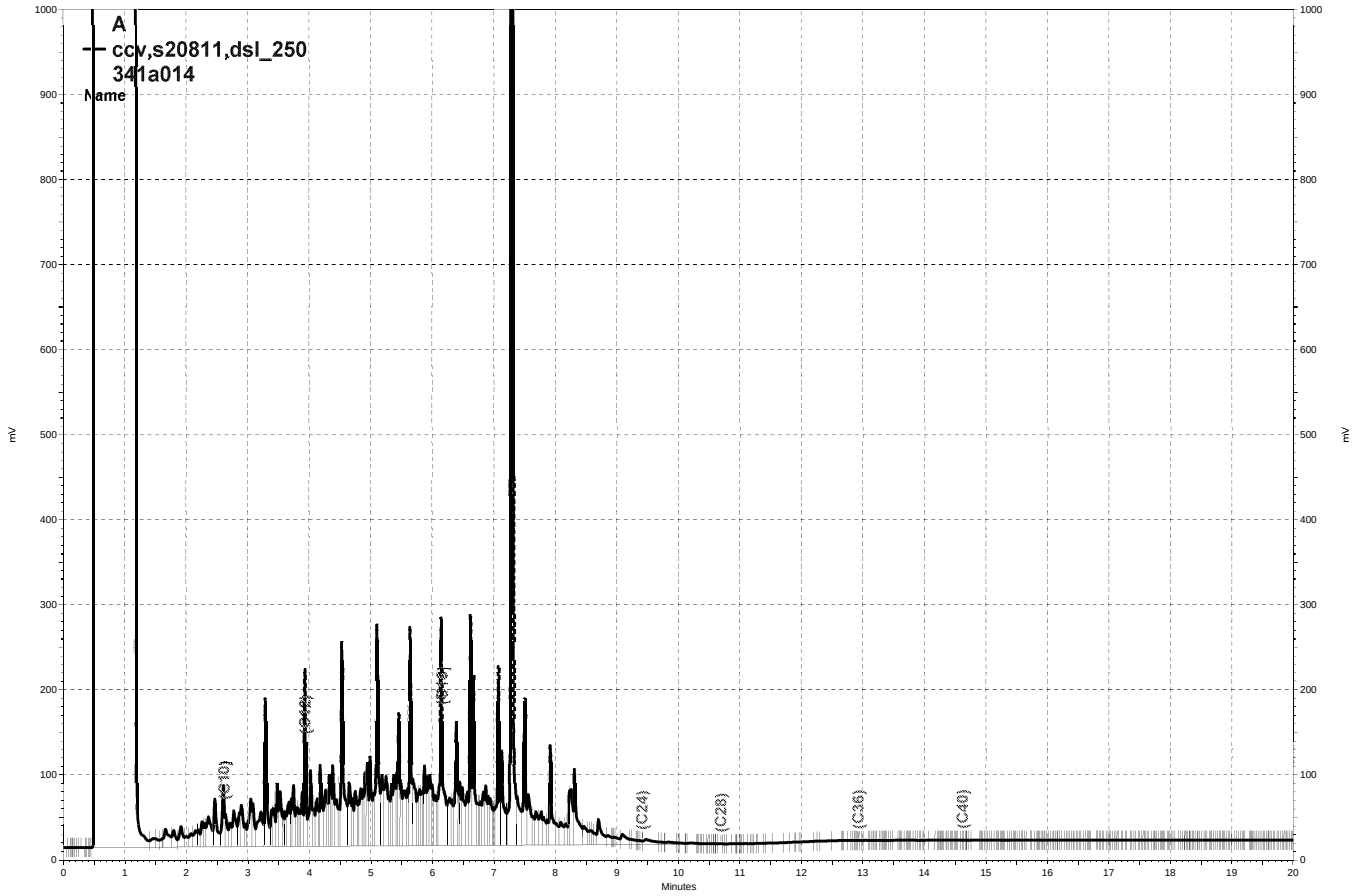

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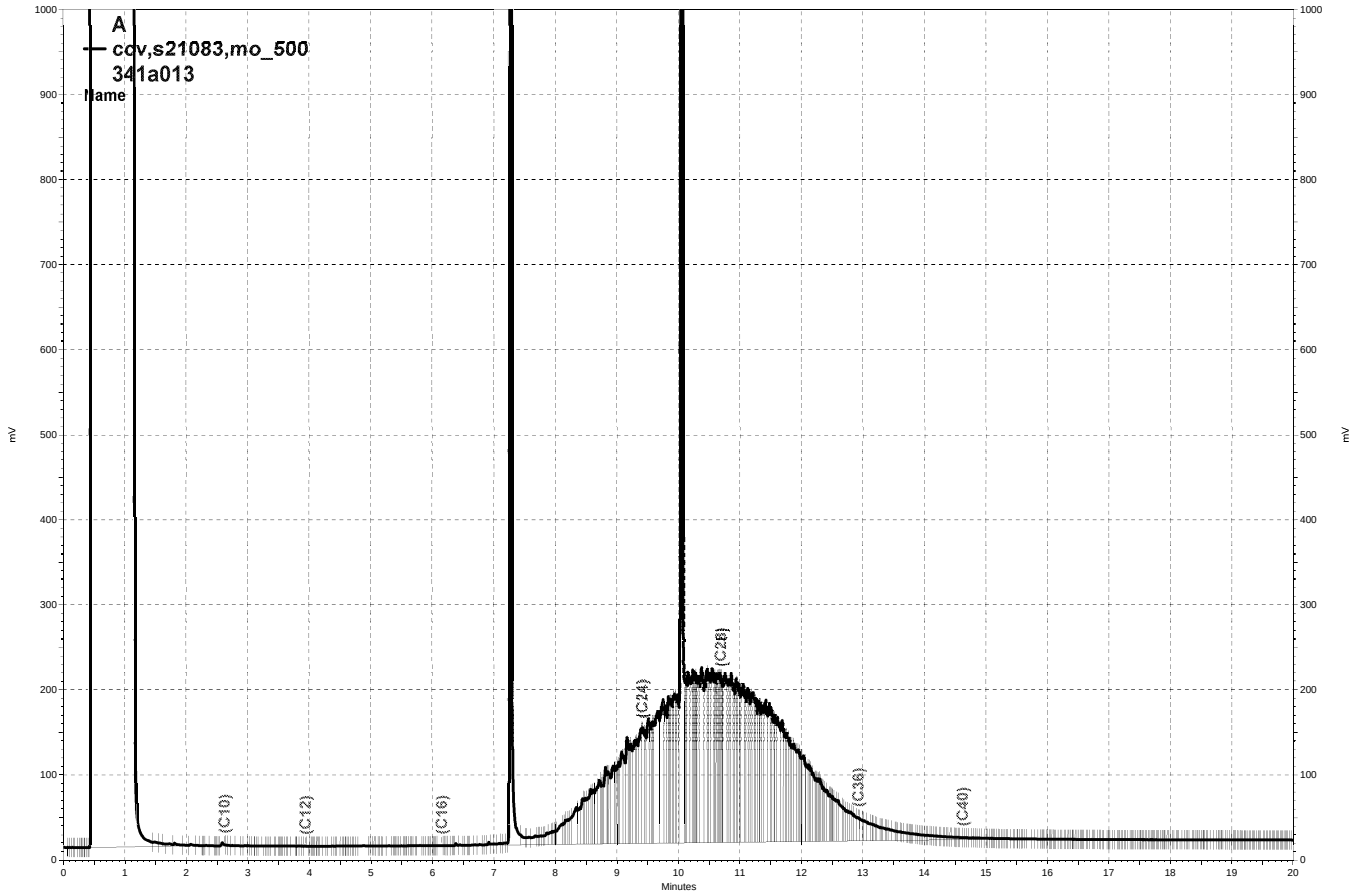

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Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	241690	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-5	Batch#:	193440
Lab ID:	241690-001	Sampled:	12/04/12
Matrix:	Water	Received:	12/04/12
Units:	ug/L	Analyzed:	12/04/12
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	106	80-127
1,2-Dichloroethane-d4	103	69-148
Toluene-d8	93	80-120
Bromofluorobenzene	99	80-121

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	241690	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-8A	Batch#:	193440
Lab ID:	241690-002	Sampled:	12/04/12
Matrix:	Water	Received:	12/04/12
Units:	ug/L	Analyzed:	12/05/12
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	100	80-127
1,2-Dichloroethane-d4	97	69-148
Toluene-d8	93	80-120
Bromofluorobenzene	101	80-121

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	241690	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-9	Batch#:	193440
Lab ID:	241690-003	Sampled:	12/04/12
Matrix:	Water	Received:	12/04/12
Units:	ug/L	Analyzed:	12/05/12
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	ND	0.5
Benzene	14	0.5
Toluene	ND	0.5
Ethylbenzene	1.8	0.5
m,p-Xylenes	ND	0.5
o-Xylene	1.5	0.5

Surrogate	%REC	Limits
Dibromofluoromethane	102	80-127
1,2-Dichloroethane-d4	100	69-148
Toluene-d8	94	80-120
Bromofluorobenzene	101	80-121

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	241690	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-10	Batch#:	193440
Lab ID:	241690-004	Sampled:	12/04/12
Matrix:	Water	Received:	12/04/12
Units:	ug/L	Analyzed:	12/05/12
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	ND	0.5
Benzene	59	0.5
Toluene	ND	0.5
Ethylbenzene	0.9	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5

Surrogate	%REC	Limits
Dibromofluoromethane	105	80-127
1,2-Dichloroethane-d4	102	69-148
Toluene-d8	90	80-120
Bromofluorobenzene	101	80-121

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	241690	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-4	Batch#:	193440
Lab ID:	241690-005	Sampled:	12/04/12
Matrix:	Water	Received:	12/04/12
Units:	ug/L	Analyzed:	12/05/12
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	ND	0.5
Benzene	1.7	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	69-148
Toluene-d8	92	80-120
Bromofluorobenzene	99	80-121

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	241690	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-4DUP	Batch#:	193440
Lab ID:	241690-006	Sampled:	12/04/12
Matrix:	Water	Received:	12/04/12
Units:	ug/L	Analyzed:	12/05/12
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	ND	0.5
Benzene	1.3	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	96	80-127
1,2-Dichloroethane-d4	92	69-148
Toluene-d8	93	80-120
Bromofluorobenzene	101	80-121

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	241690	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-2	Batch#:	193440
Lab ID:	241690-007	Sampled:	12/04/12
Matrix:	Water	Received:	12/04/12
Units:	ug/L	Analyzed:	12/05/12
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	97	80-127
1,2-Dichloroethane-d4	94	69-148
Toluene-d8	87	80-120
Bromofluorobenzene	107	80-121

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	241690	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-11	Batch#:	193440
Lab ID:	241690-008	Sampled:	12/04/12
Matrix:	Water	Received:	12/04/12
Units:	ug/L	Analyzed:	12/05/12
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	96	80-127
1,2-Dichloroethane-d4	95	69-148
Toluene-d8	95	80-120
Bromofluorobenzene	101	80-121

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	241690	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-12	Batch#:	193440
Lab ID:	241690-009	Sampled:	12/04/12
Matrix:	Water	Received:	12/04/12
Units:	ug/L	Analyzed:	12/05/12
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	3.9	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	107	80-127
1,2-Dichloroethane-d4	102	69-148
Toluene-d8	92	80-120
Bromofluorobenzene	101	80-121

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	241690	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	TB-120412	Batch#:	193440
Lab ID:	241690-010	Sampled:	12/04/12
Matrix:	Water	Received:	12/04/12
Units:	ug/L	Analyzed:	12/04/12
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	99	69-148
Toluene-d8	91	80-120
Bromofluorobenzene	101	80-121

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Aromatics by GC/MS

Lab #:	241690	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC668465	Batch#:	193440
Matrix:	Water	Analyzed:	12/04/12
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
MTBE	20.00	18.82	94	59-120
Benzene	20.00	18.59	93	80-123
Toluene	20.00	19.39	97	80-120
Ethylbenzene	20.00	19.28	96	80-123
m,p-Xylenes	40.00	38.92	97	80-123
o-Xylene	20.00	20.59	103	80-122

Surrogate	%REC	Limits
Dibromofluoromethane	101	80-127
1,2-Dichloroethane-d4	93	69-148
Toluene-d8	93	80-120
Bromofluorobenzene	96	80-121

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Aromatics by GC/MS

Lab #:	241690	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:	QC668467	Batch#:	193440
Matrix:	Water	Analyzed:	12/04/12
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	98	69-148
Toluene-d8	93	80-120
Bromofluorobenzene	101	80-121

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Aromatics by GC/MS

Lab #:	241690	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	ZZZZZZZZZZ	Batch#:	193440
MSS Lab ID:	241666-005	Sampled:	12/03/12
Matrix:	Water	Received:	12/03/12
Units:	ug/L	Analyzed:	12/05/12
Diln Fac:	1.000		

Type: MS Lab ID: QC668632

Analyte	MSS Result	Spiked	Result	%REC	Limits
MTBE	<0.1000	25.00	21.99	88	68-120
Benzene	<0.1051	25.00	26.53	106	80-121
Toluene	<0.1000	25.00	24.35	97	80-120
Ethylbenzene	<0.1000	25.00	26.04	104	80-120
m,p-Xylenes	<0.1000	50.00	49.99	100	80-120
o-Xylene	<0.1231	25.00	25.81	103	80-120

Surrogate	%REC	Limits
Dibromofluoromethane	102	80-127
1,2-Dichloroethane-d4	99	69-148
Toluene-d8	90	80-120
Bromofluorobenzene	97	80-121

Type: MSD Lab ID: QC668633

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	25.00	18.47	74	68-120	17	20
Benzene	25.00	24.91	100	80-121	6	20
Toluene	25.00	24.05	96	80-120	1	20
Ethylbenzene	25.00	24.36	97	80-120	7	20
m,p-Xylenes	50.00	49.38	99	80-120	1	20
o-Xylene	25.00	25.44	102	80-120	1	20

Surrogate	%REC	Limits
Dibromofluoromethane	103	80-127
1,2-Dichloroethane-d4	96	69-148
Toluene-d8	91	80-120
Bromofluorobenzene	99	80-121

RPD= Relative Percent Difference

Port of Oakland
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Appendix C
Free Product and Water Level Measurement Field Sheets

4656016

MALCOLM PIRNIE

Depth to Water and Free Product Measurements
Harbor Facilities Complex
Port of Oakland, CA

Site Visit Date:	9/19/12		
Recorded By:	C. Orsi		
Recovery Well	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)
RW-1	Inaccessible		
RW-2	—	10.35	—
RW-3	10.87	13.07	2.20
RW-4	9.62	14.21	4.59
RW-5	Not accessible		—
RW-6	9.10	10.83	1.73
RW-7	8.45	11.44	2.99
RW-8	10.55	11.45	0.90
RW-9	9.81	11.04	1.23
MW-1	11.40	11.41	0.01
MW-2	—	12.03	—
MW-3	10.90	13.01	2.11
MW-4	—	11.90	—
MW-5	—	9.39	—
MW-8A	—	11.38	—
MW-9	—	12.03	—
MW-10	—	10.57	—
MW-11	—	10.54	—
MW-12	—	12.04	—

Depth to Water and Free Product Measurements
Harbor Facilities Complex
Port of Oakland, CA

Site Visit Date:	12/4/12		
Recorded By:	CO/SC		
Recovery Well	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)
RW-1	Inaccessible		
RW-2	–	6.89	–
RW-3	9.35	13.54	4.19
RW-4	8.37	11.69	3.32
RW-5	not accessible		
RW-6	8.83	10.79	1.96
RW-7	8.25	8.33	0.08
RW-8	9.29	11.32	2.03
RW-9	9.50	11.06	1.56
MW-1	–	9.05	–
MW-2	–	9.82	–
MW-3	9.64	10.65	1.01
MW-4	–	10.95	–
MW-5	–	9.17	–
MW-8A	–	9.87	–
MW-9	–	11.15	–
MW-10	–	9.96	–
MW-11	–	9.65	–
MW-12	–	10.74	–

* well doesn't close right. New cap for black sleeve needed