PORT OF OAKLAND

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July 31, 2013

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

RE: RO#0000010_2013 First Semi-Annual Groundwater Monitoring Report - Port of Oakland, 651 Maritime Street, Oakland, CA_2013-07-31

Dear Mr. Nowell:

Please find enclosed the report entitled *2013 First Semi-Annual Groundwater Monitoring Report - Port of Oakland, 651 Maritime Street, Oakland, CA ("Report")* dated July 31, 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 first 2013 semi-annual sampling event are contained in the enclosed report. The next monitoring event will be performed

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[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

during the November/December 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, REPA
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

2013 First Semi-Annual Groundwater Monitoring Report

Port of Oakland
651 Maritime Street
Oakland, California

July 2013

Report Prepared By:

Malcolm Pirnie, Inc.

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4656016

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July 31, 2013

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

Subject: **2013 First 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 2013 First 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 2013 by Malcolm Pirnie and presents free product measurements collected since July 1, 2011.

Please call me at (925) 296-7856 or email me at tmiller@pirnie.com if you have questions.

Sincerely,

MALCOLM PIRNIE, INC.

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 2013 First 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 January through June 2013. The Alameda County Health Care Services (ACHCS) is providing regulatory oversight under the Local Oversight Program (LOP), case number RO0000010.

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

Former 2277 Seventh Street Site

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

Former 2225 Seventh Street Site

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

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

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

651 Maritime Site

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

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

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

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

[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 2013 first semi-annual groundwater monitoring event at the Site on June 19, 2013. The June 2013 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 well MW-3 (Table 1); hence, this well was neither purged nor sampled. Water level measurements for the June 2013 monitoring event are summarized in Table 1 and included on the groundwater sampling forms in Appendix A.

Malcolm Pirnie purged wells MW-1, 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 June 2013 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 June 2013 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 June 2013 monitoring event.

3.1. Groundwater Flow Direction

Based on the depth-to-water measurements collected, groundwater levels beneath the Site in June 2013 were slightly lower than those observed in December 2012. In December 2012, groundwater elevations ranged from 4.96 feet amsl to 6.75 feet amsl. In March 2013, groundwater elevations ranged from 3.55 feet amsl to 6.07 feet amsl. A groundwater mound that was present in the vicinity of MW-1 and MW-2 in December 2012 was not observed during this monitoring event.. Groundwater gradients at the Site ranged from 0.0037 to 0.025 feet per foot. A shallow groundwater elevation contour map for June 2013 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 well MW-3 during the June 2013 monitoring event. The product thickness in well MW-3 was measured to be 1.52 feet. Product thickness in this well has ranged from not-measurable to 2.70 feet since April 2000 (Table 1). Free-phase product was not observed in MW-1 for the first time since June 2011.

3.3. Analytical Results

Analytical results for the groundwater samples collected during the June 2013 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-1, MW-4, MW-9, MW-10, and MW-12 at concentrations ranging from 66 micrograms per liter (µg/L) to 1,600 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 wells MW-4 and MW-10, which is located near the edge of the free-product plume. TPHg concentrations in wells MW-4 and MW-10 appear to be stable over the past five 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-1 (18 µg/L), MW-4 (19 µg/L), MW-9 (15 µg/L), and MW-10 (61 µg/L). Ethylbenzene was reported in the samples collected from wells MW-1 (4.4 µg/L), MW-9 (1.1 µg/L), and MW-10 (1.2 µg/L). Xylenes were reported in the sample collected from MW-1 at 1.8 µg/L. MTBE was detected in the sample collected from MW-12 at 4.5 µg/L. Toluene was detected in the sample collected from MW-1 at 2.2 µg/L.

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-1, MW-9, MW-10, and MW-12 at concentrations ranging from 100 µg/L to 3,100 µg/L.

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

The laboratory reported TPHmo concentrations below the analytical method reporting limit in the samples analyzed.

Figure 9 illustrates the TPHd concentrations over time for those wells where it has been reported above the analytical method reporting limit in at least 10 percent of the samples (except MW-1, which historically contains free product). 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 detected concentration of TPHd in MW-10, which has been increasing over the past five sampling events, decreased in June 2013.

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 June 2013 sampling event. Monitoring for MNA parameters will be conducted during the December 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 concentration a of 19 µg/L for both samples. The relative percent difference (RPD) between the two samples is calculated below:

Benzene RPD |19-19|/ [(19+19)/2] = 0%

The RPD for is within the analytical laboratory's maximum allowable RPD for matrix spike duplicates and indicates 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 June 2013 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, December 4, 2012, and June 19 2013 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 June 2013 is illustrated on Figure 5. Field sheets documenting these measurements are provided in Appendix C.

5. Conclusions

The June 2013 monitoring and free-phase product measurements indicate that the free-phase product plume is stable, and groundwater concentrations are generally stable and/or decreasing (Figures 6 through 9). Free product measurements indicate that the free-phase product plume appears stable even though the recovery system has been off for approximately 24 months. Water quality results from the June 2013 monitoring event support the assessment that groundwater concentrations are generally stable or decreasing (except for well MW-10, which is located near the edge of the free-phase product plume) 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 June 2013 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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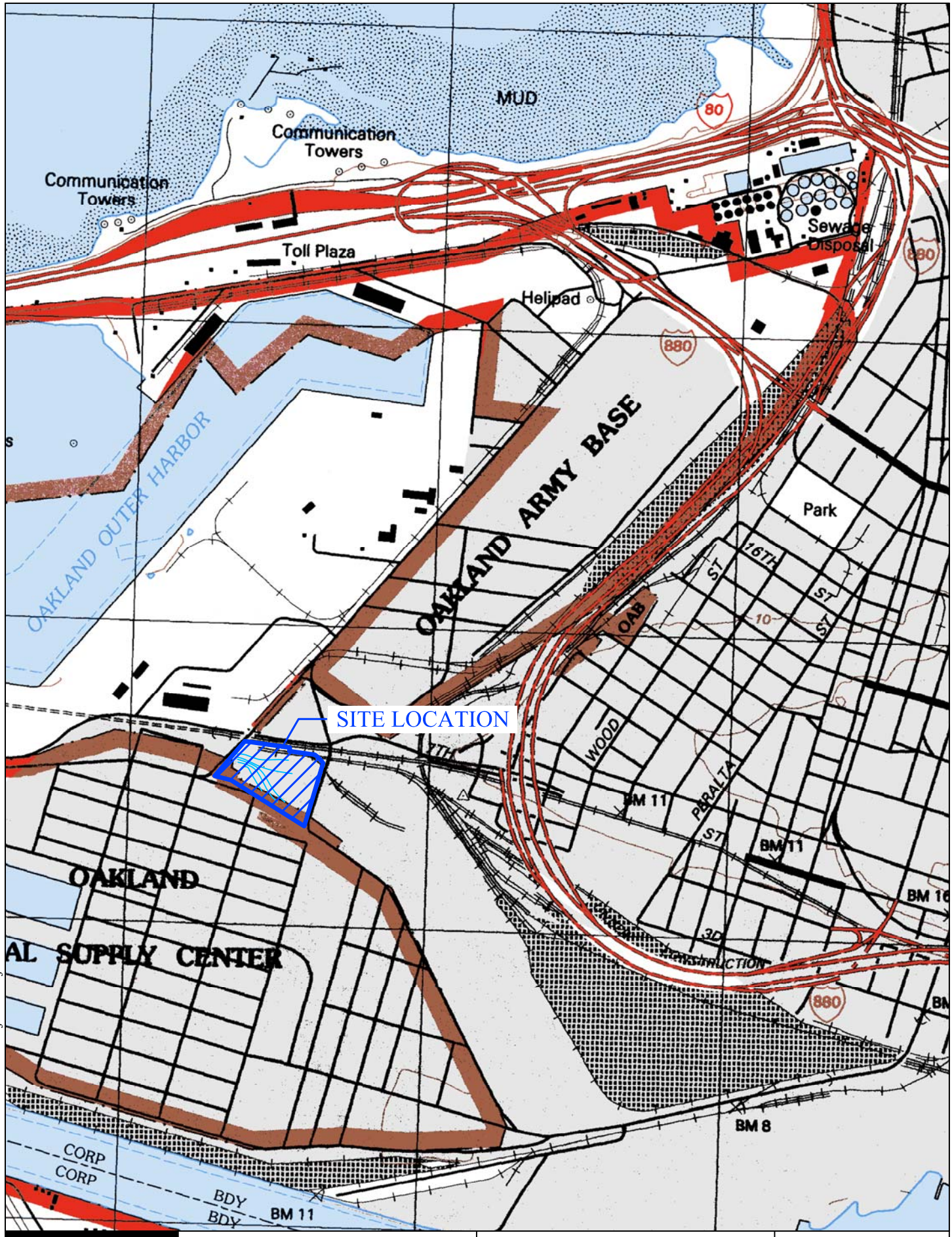
MALCOLM PIRNIE



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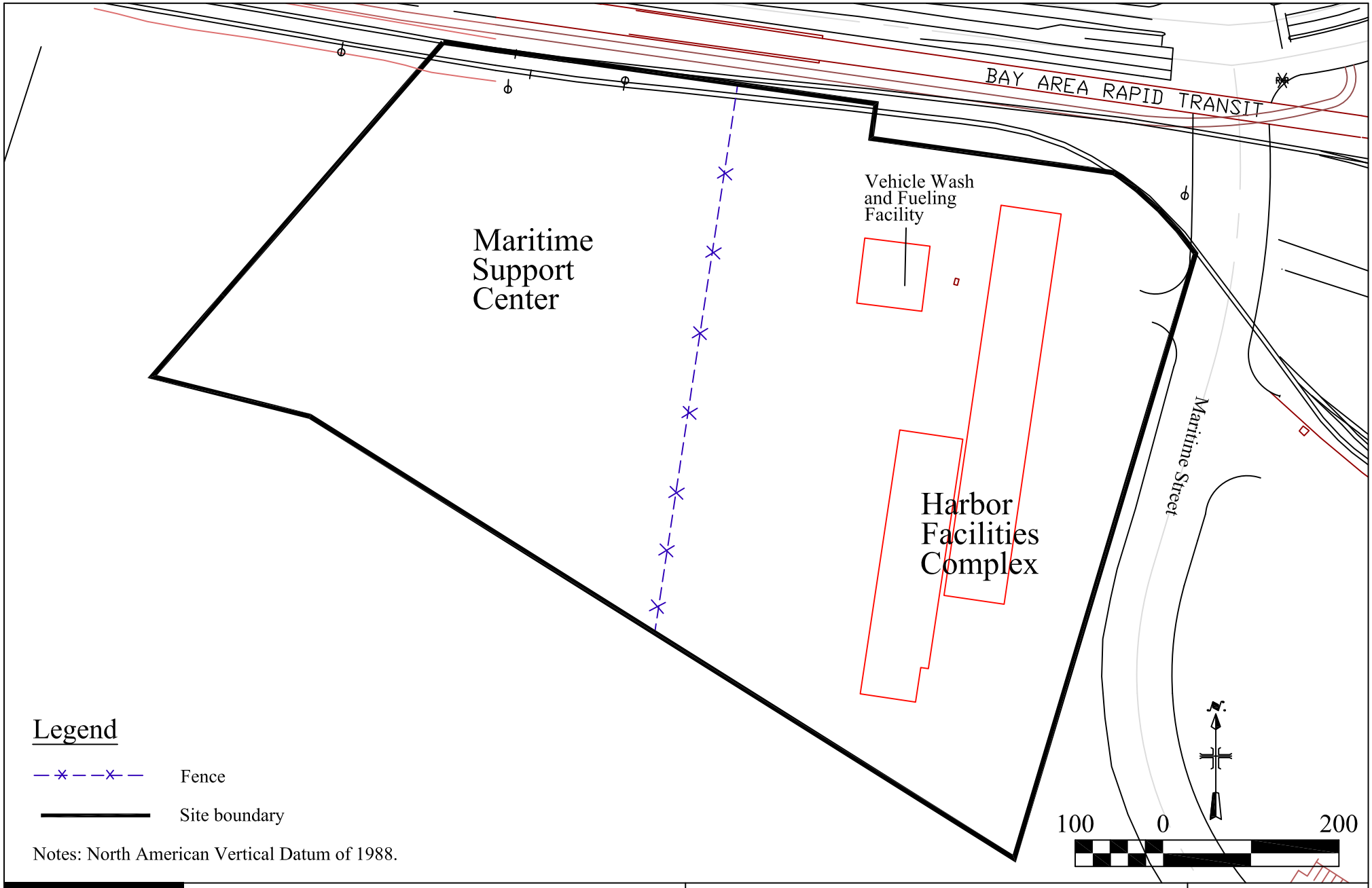
PORT OF OAKLAND
HARBOR FACILITIES
COMPLEX
651 MARITIME STREET

SITE LOCATION MAP

MALCOLM PIRNIE, INC.

JULY 2013

FIGURE 1



MALCOLM PIRNIE

PORT OF OAKLAND

HARBOR FACILITIES COMPLEX
651 MARITIME STREET

HARBOR FACILITIES COMPLEX LAYOUT

MALCOLM PIRNIE, INC.

JULY 2013

FIGURE 2

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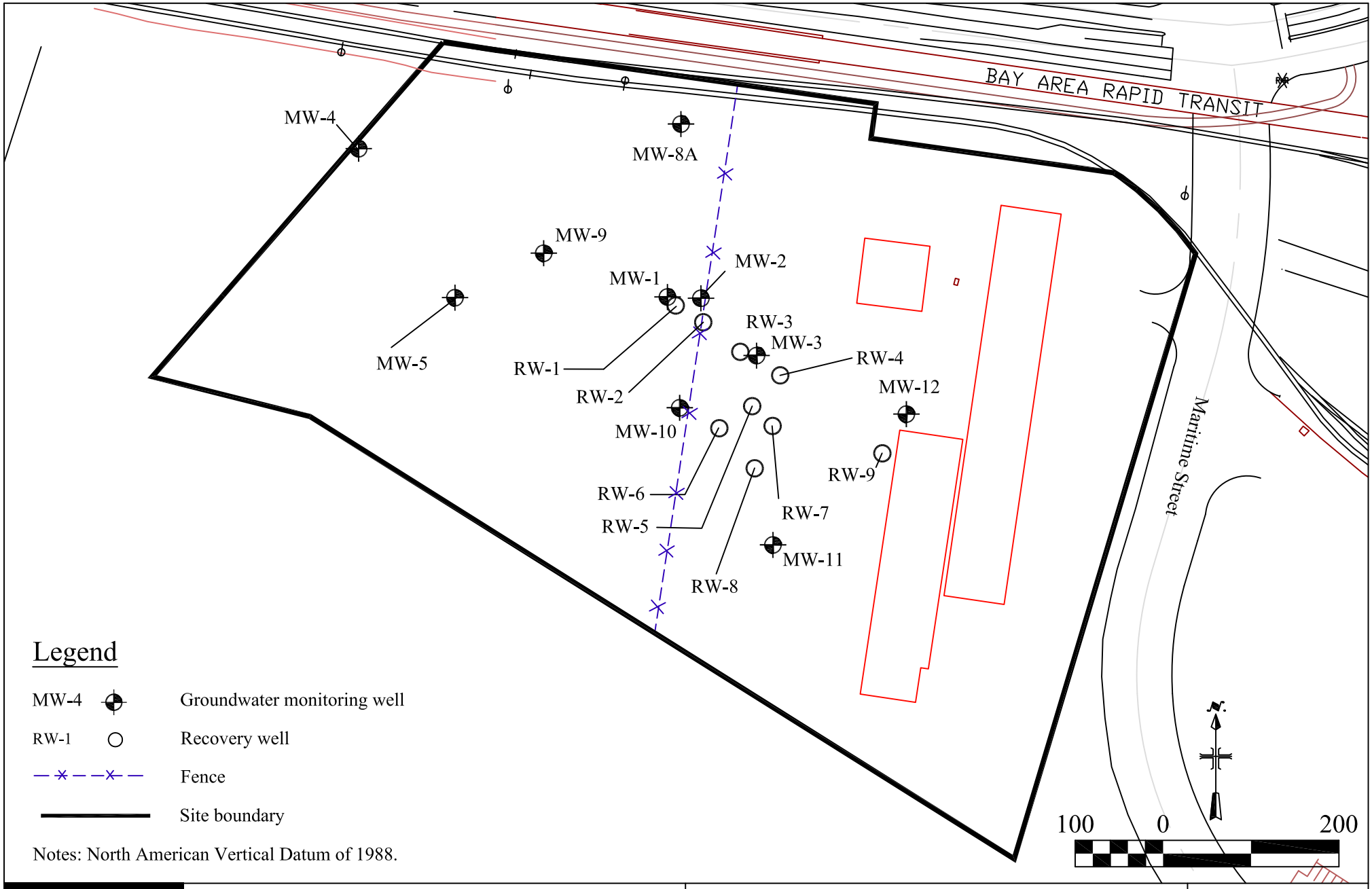

MALCOLM PIRNIE

PORT OF OAKLAND

HARBOR FACILITIES COMPLEX
651 MARITIME STREET

SITE PLAN

MALCOLM PIRNIE, INC.

JULY 2013

FIGURE 3

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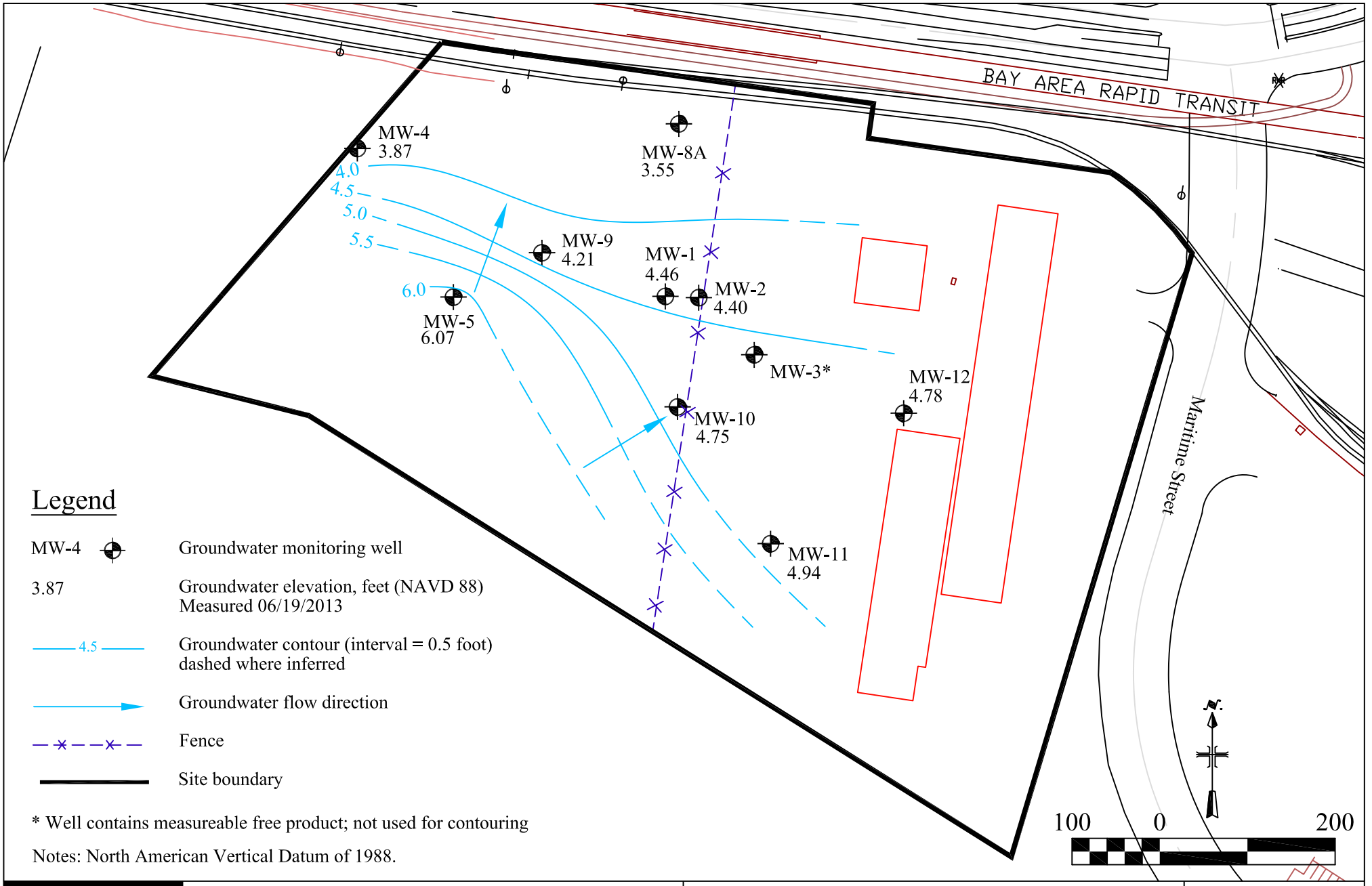

Legend

MW-4 ⊕	Groundwater monitoring well
3.87	Groundwater elevation, feet (NAVD 88) Measured 06/19/2013
4.5	Groundwater contour (interval = 0.5 foot) dashed where inferred
→	Groundwater flow direction
–×–×–	Fence
▬	Site boundary

* Well contains measureable free product; not used for contouring

Notes: North American Vertical Datum of 1988.

MALCOLM PIRNIE

PORT OF OAKLAND

HARBOR FACILITIES COMPLEX
651 MARITIME STREET

GROUNDWATER ELEVATION
ISOCONTOUR MAP - JUNE 2013

MALCOLM PIRNIE, INC.

JULY 2013

FIGURE 4

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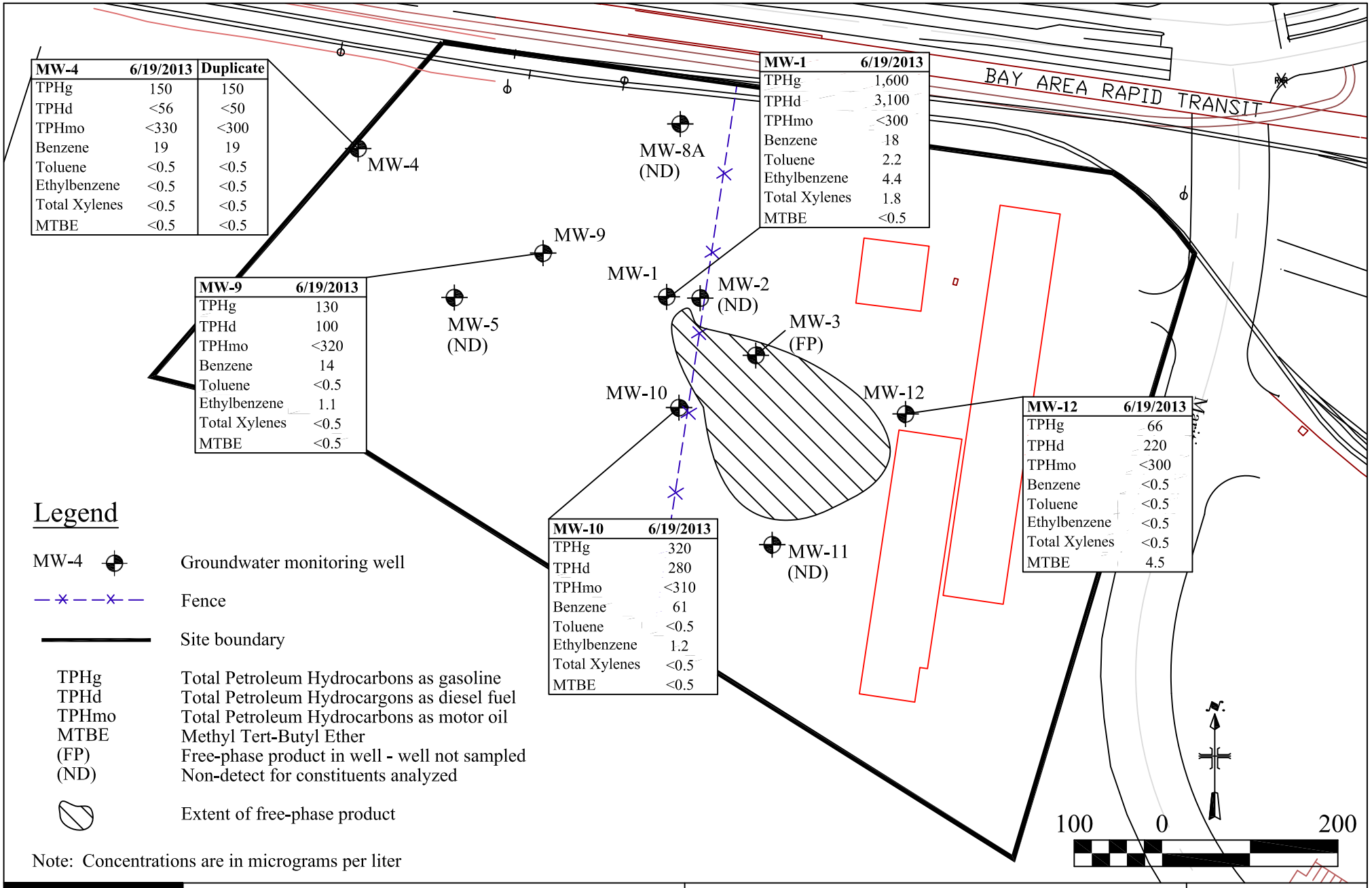

MW-4	6/19/2013	Duplicate
TPHg	150	150
TPHd	<56	<50
TPHmo	<330	<300
Benzene	19	19
Toluene	<0.5	<0.5
Ethylbenzene	<0.5	<0.5
Total Xylenes	<0.5	<0.5
MTBE	<0.5	<0.5

MW-1	6/19/2013
TPHg	1,600
TPHd	3,100
TPHmo	<300
Benzene	18
Toluene	2.2
Ethylbenzene	4.4
Total Xylenes	1.8
MTBE	<0.5

MW-9	6/19/2013
TPHg	130
TPHd	100
TPHmo	<320
Benzene	14
Toluene	<0.5
Ethylbenzene	1.1
Total Xylenes	<0.5
MTBE	<0.5

MW-10	6/19/2013
TPHg	320
TPHd	280
TPHmo	<310
Benzene	61
Toluene	<0.5
Ethylbenzene	1.2
Total Xylenes	<0.5
MTBE	<0.5

MW-12	6/19/2013
TPHg	66
TPHd	220
TPHmo	<300
Benzene	<0.5
Toluene	<0.5
Ethylbenzene	<0.5
Total Xylenes	<0.5
MTBE	4.5

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 - JUNE 2013

MALCOLM PIRNIE, INC.

JULY 2013

FIGURE 5

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Figure 6
TPHg Concentration versus Time

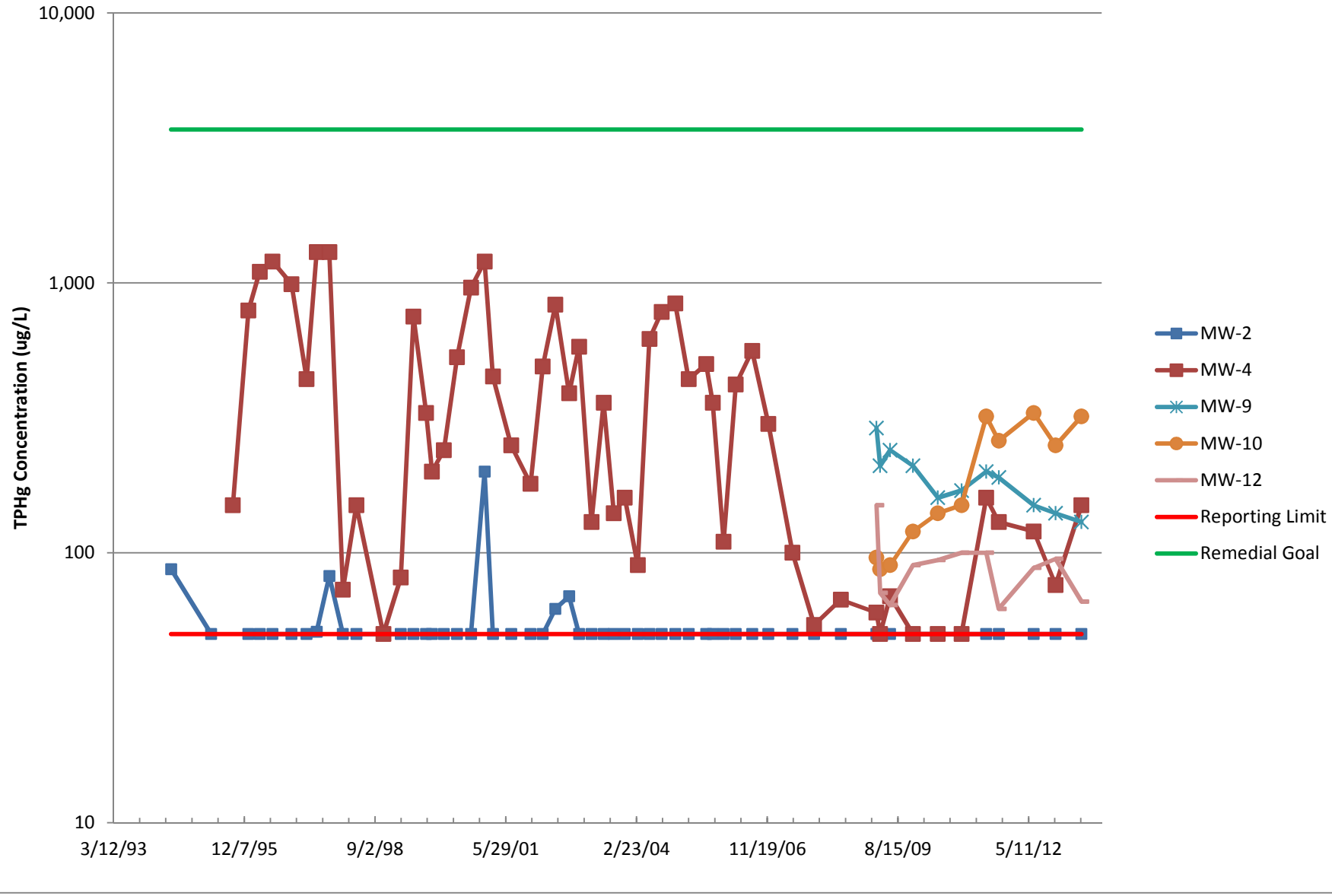


Figure 7
Benzene Concentration versus Time

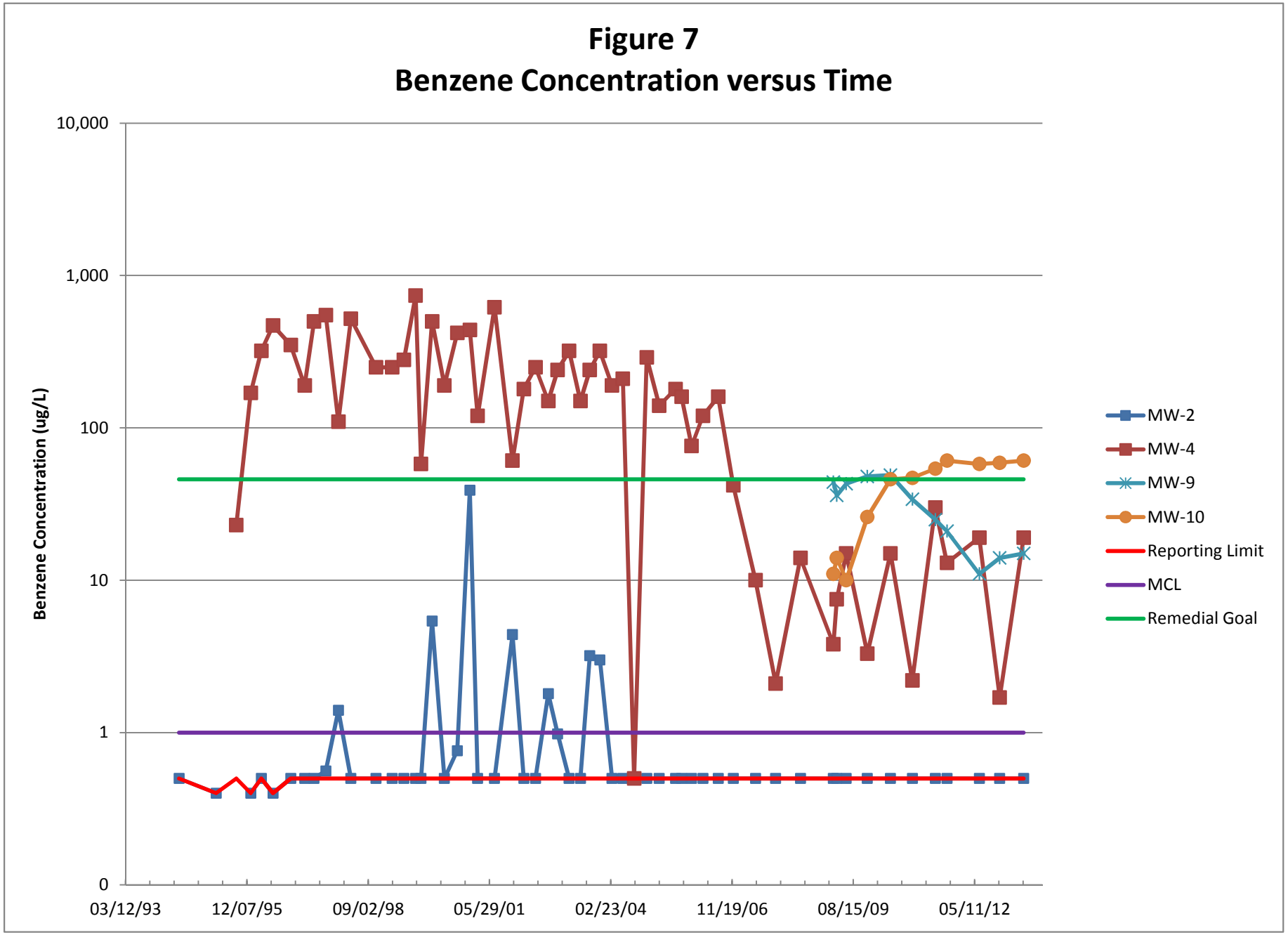


Figure 8
MTBE Concentration versus Time

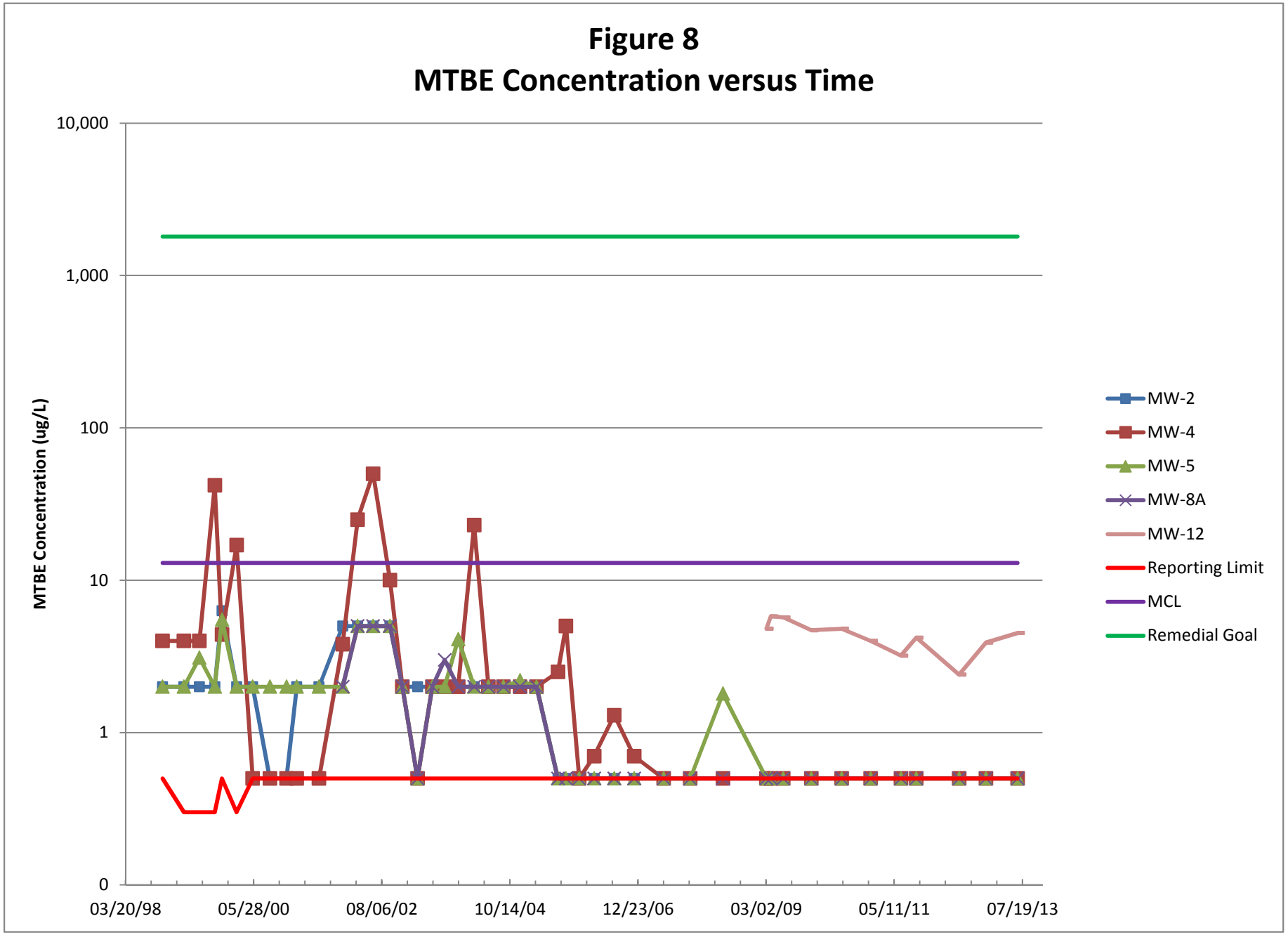
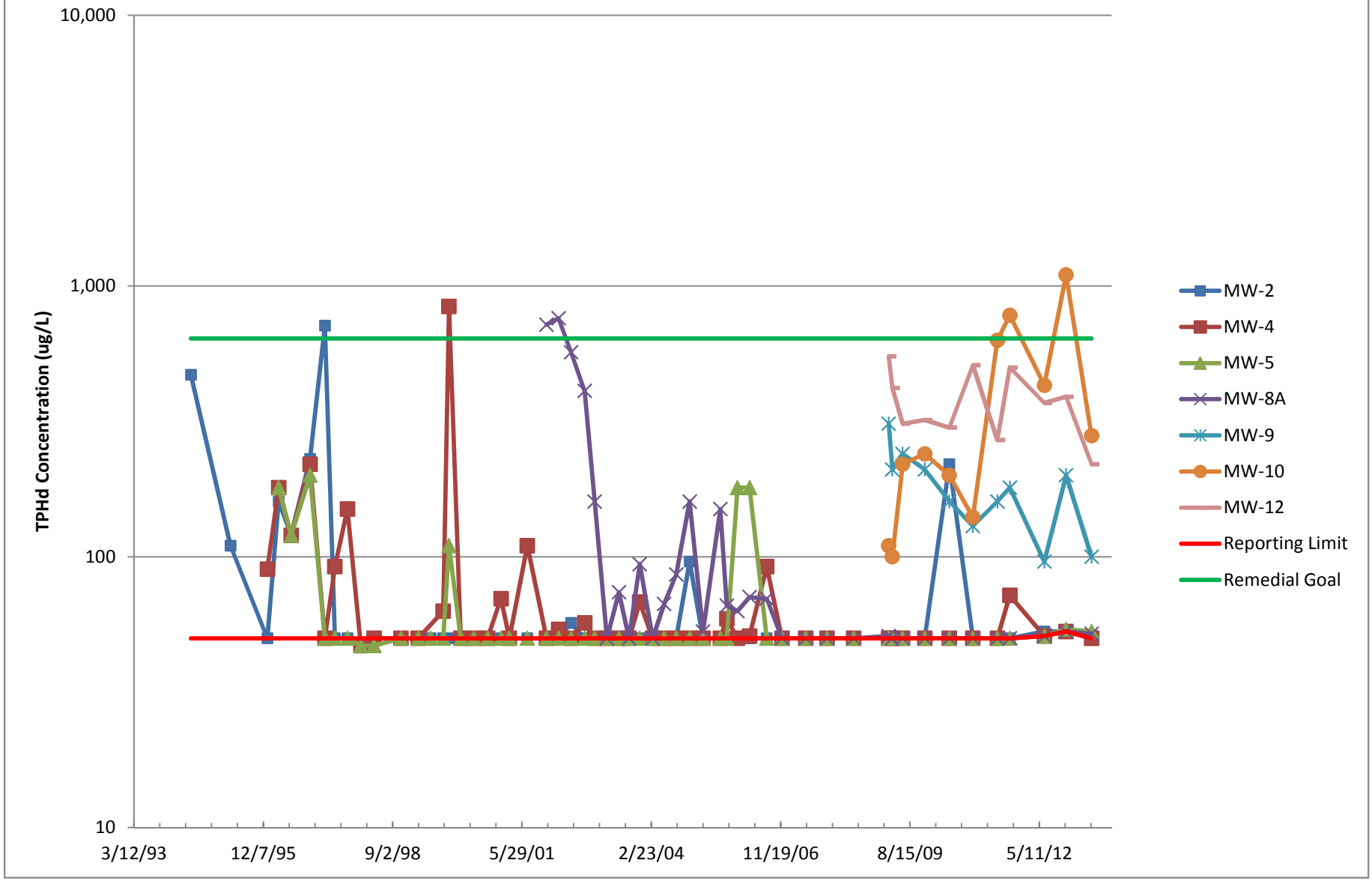


Figure 9
TPHd Concentration versus Time



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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	0.00	5.01
	06/17/10	15.80	10.79 [4]	10.79	0.00	5.01
	12/14/10	15.80	9.42 [4]	9.42	0.00	6.38
	06/07/11	15.80	NP	10.77	0.00	5.03
	06/21/11	15.80	NP	10.37	0.00	5.43
	09/26/11	15.80	11.23 [4]	11.23	0.00	4.57
	12/05/11	15.80	11.15 [4]	11.15	0.00	4.65
	02/06/12	15.80	10.89 [4]	10.89	0.00	4.91
	06/19/12	15.80	11.01 [4]	11.01	0.00	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
	06/19/13	15.80	NP	11.34	0.00	4.46
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
	06/19/13	16.43	NP	12.03	0.0	4.40
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	6.16
	04/01/09	15.66	10.38	11.10	0.72	5.06
	06/17/09	15.66	10.79	12.30	1.51	4.42

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)	12/08/09	15.66	11.05	12.81	1.76	4.08
	06/17/10	15.66	10.39	12.29	1.90	4.70
	12/15/10	15.66	10.13	10.74	0.61	5.35
	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
	12/05/11	15.66	10.83	12.20	1.37	4.42
	02/06/12	15.66	10.60	11.42	0.82	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
	06/19/13	15.66	10.92	12.45	1.53	4.28
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
	06/19/13	15.91	NP	12.04	0.0	3.87
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
	06/19/13	15.39	NP	9.32	0.0	6.07
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
	06/19/13	14.99	NP	11.44	0.0	3.55

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
	06/19/13	16.33	NP	12.12	0.0	4.21
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
	06/19/13	15.65	NP	10.90	0.0	4.75
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
	06/19/13	15.47	NP	10.53	0.0	4.94

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
	6/19/2013	16.79	NP	12.01	0.0	4.78

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
	06/19/13	1,600 [2]	3,100	<300	18	2.2	4.4	1.8	<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
	06/19/13	<50	<51	<310	<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
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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
	06/19/13	150 [2]	<56	<330	19	<0.5	<0.5	<0.5	<0.5
Dup.	06/19/13	150 [2]	<50	<300	19	<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
	06/19/13	<50	<53	<320	<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
	06/19/13	<50	<52	<310	<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
	06/19/13	130	100 [2]	<320	14	<0.5	1.1	<0.5	<0.5
MW-10									
	12/18/08	140 [2]	8,000	430 [2]	<0.5	<0.5	<0.5	<0.5	1.0
	03/04/09	96 [2]	110 [2]	<300	11	<0.5	0.5	<0.5	<0.5
	04/01/09	87 [2]	100 [2]	<300	14	<0.5	0.5	<0.5	<0.5
	06/17/09	90 [2]	220 [2]	<300	10	<0.5	1.0	<0.5	<0.5
	12/08/09	120 [2]	240 [2]	<300	26	<0.5	0.8	<0.5	<0.5
	06/16/10	140 [2]	200	<300	46	<0.5	<0.5	<0.5	<0.5
	12/14/10	150 [2]	140 [2]	<300	47	<0.5	<0.5	<0.5	<0.5
	06/22/11	320 [2]	630	<300	54	<0.5	2.2	<0.5	<0.5
	09/26/11	260 [2]	780 [24]	<300 [24]	61	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
	06/19/13	320 [2]	280 [2]	<310	61	<0.5	1.2	<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
	06/19/13	<50	<50	<300	<1.0	<1.0	<1.0	<1.0	<1.0

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-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
	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
	06/19/13	66 [2]	220 [2]	<300	<0.5	<0.5	<0.5	<0.5	4.5

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.

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

[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 19, 2013
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
	06/19/13	15.56	NP	10.13	0.00	5.43
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
	06/19/13	15.56	10.75	13.62	2.87	3.95
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

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January 1, 2011 Through June 19, 2013
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
	06/19/13	14.92	9.94	14.27	4.33	3.68
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				
	06/19/13	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
	06/19/13	15.75	8.86	10.35	1.49	6.44

TABLE 3. Free Product Recovery System Groundwater Elevation and Free Product Data
January 1, 2011 Through June 19, 2013
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
	06/19/13	15.02	8.25	13.75	5.50	5.12
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
	06/19/13	15.91	9.42	11.11	1.69	5.98

TABLE 3. Free Product Recovery System Groundwater Elevation and Free Product Data
January 1, 2011 Through June 19, 2013
Port of Oakland's Harbor Facilities Complex Site
555 - 651 Maritime Street, Oakland, California

Recovery Well	Date Measured	Elevation [1] Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation [1] (feet)
RW-9						
	01/12/11	16.57	9.26	9.45	0.19	7.25
	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
	06/19/13	16.57	9.68	10.76	1.08	6.57
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 19, 2013
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
	06/19/13	15.66	10.92	12.45	1.53	4.28

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	Recorded by:	CD
Project Name:	Harbor Facilities Center	Date:	6/19/13
Location:	Port of Oakland	Depth of well from TOC (feet):	17.65
	651 Maritime Street, Oakland, California	Well diameter (inches):	2
Weather:	Sunny, low 70's	Screened interval from TOC (feet):	7.65-17.65
Precip. in past 5 days (in.):	0	TOC elevation, NAVD 88 (feet):	15.80
Source:	NOAA PORTS	Groundwater elevation, NAVD 88 (feet):	4.46
Water level instrument:	Solinst 101	Water level from TOC (feet):	11.34 Time: ~~1034~~
		Product level from TOC (feet):	— Time: 1030

CALCULATION OF WELL VOLUME:

(17.65 ft - 11.34 ft x (0.083 ft)² x π x 7.48 gal/ft³ = 1.02 gallons in one casing volume

well depth - water level x (well radius)² x π x gal/ft³ = 1.5 total gallons removed

CALIBRATION: See calibration sheet

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
1033	Began	Purging						
1037	18.77	7.35	0.07	-105.5	0.500		11.79	
1040	18.67	7.21	0.04	-101.3	0.489		11.88	0.5
1043	18.59	7.14	0.08	-99.4	0.483		12.03	1.0
1046	18.55	7.09	0.07	-91.6	0.479		12.09	
1049	18.64	7.07	0.08	-80.6	0.479		12.06	1.25
1052	18.67	7.05	0.12	-74.6	0.477		12.08	
1055	18.70	7.05	0.12	-74.9	0.476		12.08	1.5
1100	Collected sample							

Purge method: Peristaltic pump — Sample Time: 1100

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

Sampling equipment: Peri pump + tubing — VOA attachment: —

Sample containers: 8-500mL ambers, 6 VOAs (HCl)

Sample analyses: TPH-d/mo (8015M + SGCU), TPH-g (8015M), BTEX+MTBE (8260)

Laboratory: C&T

Decontamination method: Dedicated tubing + liquinox — Rinsate disposal: —

Comments: Water black when first began purging. Slight sheen. Cleared after several minutes of purging

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: Sunny, low 70's
Precip. in past 5 days (in.): 0.00
Source: NOAA PORTS
Water level instrument: Solinst 101

Recorded by: CO Date: 6/19/13
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): 4.40
Water level from TOC (feet): 12.03 Time: 1403
Product level from TOC (feet): — Time: —

CALCULATION OF WELL VOLUME:

(18.06 ft - 12.03 ft x (0.083 ft)² x π x 7.48 gal/ft³ = 0.97 gallons in one casing volume
well depth - water level x (well radius)² x π x gal/ft³ = 1.25 total gallons removed

CALIBRATION: See calibration sheet

FIELD MEASUREMENTS:

Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)	Depth to Water (ft btoc)	Cumulative Gallons Removed
1403	Began purging							
1405							12.09	
1414	Pump stopped (bad connection to battery)							
	Restarted at 1414.							
1417	20.31	7.49	0.80	51.0	1.050		12.37	
1420	20.00	7.50	0.49	49.3	1.021		12.54	
1423	19.92	7.44	0.50	52.3	1.001		12.73	
1426	19.96	7.29	0.39	58.1	0.997		12.98	
1429	19.75	7.39	0.25	56.6	0995		13.16	
1432	19.95	7.39	0.20	57.0	1.000		13.28	
1435	19.99	7.39	0.18	56.3	1.002		13.39	
1438	20.03	7.37	0.17	57.0	1.007		13.56	
1440	Collected sample							

Purge method: Low-flow w/ Geopump
Duplicate/blank number: NA
Sampling equipment: YSI 556 & dedicated tubing
Sample containers: 2-500mL ambers, 6 VOAs w/ HCl
Sample analyses: TPH-g/d/mo and MTBE+BTEX
Laboratory: C&T
Decontamination method: Dedicated tubing
Comments:

Sample Time: 1440
Duplicate Sample Time: NA
VOA attachment: none
Rinsate disposal: NA

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: Sunny, 70's
Precip. in past 5 days (in.): 0.0
Source: NOAA PORTS
Water level instrument: Solinst 101

Recorded by: SC/CO Date: 6/19/13
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): 3.87
Water level from TOC (feet): 12.04 Time: 1112
Product level from TOC (feet): ~~3.95~~ Time: —

CALCULATION OF WELL VOLUME:

(22.05 ft - 12.04 ft x (0.083 ft)² x π x 7.48 gal/ft³ = 1.6 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 calibration sheet

FIELD MEASUREMENTS:

Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)	Depth to Water (ft btoc)	Cumulative Gallons Removed
1113	Began Purging							
1118	20.90	7.35	0.31	-68.0	1.809		12.81	
1120	Pump Stopped – restart pump							
1123	20.72	7.34	0.43	-71.9	1.818		12.88	
1126	20.50	7.32	0.43	-70.2	1.811		12.98	
1129	20.31	7.34	0.41	-71.1	1.841		13.10	
1132	20.39	7.30	0.38	-73.0	1.874		13.07	
1135	20.24	7.38	0.31	-73.2	1.906		13.13	1.0
1138	20.19	7.38	0.18	-72.9	1.937		13.16	
1141	20.16	7.39	0.24	-71.9	1.976		13.18	
1144	20.14	7.39	0.22	-72.0	2.013		13.20	
1147	20.06	7.39	0.31	-69.6	2.037		13.19	
1150	20.14	7.38	0.31	-67.4	2.062		13.20	
1153	Sample collected							

Purge method: Peristaltic pump
Duplicate/blank number: ~~MW-4~~ MW-4DUP
Sampling equipment: Peri pump + tubing
Sample containers: 2-500ml ambers, 6 VOAs (HCl)
Sample analyses: TPH-d/mo (8015M + SGCU), TPH-g (8015M), MTBE + BTEX (8260)
Laboratory C+T
Decontamination method: Dedicated tubing + liquinox
Comments: purge water has petroleum hydrocarbon odor

Sample Time: 1153
Duplicate Sample Time: 1153
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: clear, 60s, Sunny
Precip. in past 5 days (in.): 0.0
Source: NOAA PORTS
Water level instrument: Solinst 101

Recorded by: SC Date: 6/19/13
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): 6.07
Water level from TOC (feet): 9.32 Time: 0851
Product level from TOC (feet): — Time: —

CALCULATION OF WELL VOLUME:

(20.80 ft - 9.32 ft x (0.083 ft)² x 0.006889 x π x 7.48 gal/ft³ =
well depth - water level x (well radius)² x π x gal/ft³ =

1.9 gallons in one casing volume
2.5 total gallons removed

CALIBRATION: See calibration sheet

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
853	Began Purging							
858	18.15	7.19	0.31	-14.7	~~2.15~~ 1.898	NM	10.92	Slowed pump
901	18.19	7.21	0.35	-14.4	1.895		10.39	
904	18.14	7.21	0.35	-14.4	1.868		10.27	
907	18.16	7.20	0.48	-14.7	1.761		10.21	
910	18.15	7.20	0.45	-14.8	1.693		10.21	1.0
913	18.16	7.20	0.40	-15.1	1.722		10.21	
916	18.14	7.20	0.36	-15.4	1.775		10.25	
919	18.11	7.20	0.34	-15.6	1.846		10.25	2.0
921	18.11	7.20	0.32	-15.6	1.874		10.26	
924	18.13	7.20	0.31	-15.7	1.894		10.26	
927	Sample collected							

Purge method: Peristaltic pump
Duplicate/blank number: —
Sampling equipment: Peri pump + tubing
Sample containers: 2-500mL ambers, 6 VOAs (HCl)
Sample analyses: TPH-d/mo (8015M + SGCU), TPH-g (8015M), MTBE + BTEX (8260)
Laboratory: C+T
Decontamination method: Dedicated tubing + liquinox

Sample Time: 0927
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	Recorded by:	CO
Project Name:	Harbor Facilities Center	Date:	6/19/13
Location:	Port of Oakland	Depth of well from TOC (feet):	23.14
	651 Maritime Street, Oakland, California	Well diameter (inches):	2
Weather:	Sunny, low 70's	Screened interval from TOC (feet):	7.54-22.54
Precip. in past 5 days (in.):	0	TOC elevation, NAVD 88 (feet):	14.99
Source:	NOAA Ports	Groundwater elevation, NAVD 88 (feet):	3.55
Water level instrument:	Solinst 101	Water level from TOC (feet):	11.44 Time: 0915
		Product level from TOC (feet):	— Time: —

CALCULATION OF WELL VOLUME:

(23.14 ft - 11.44 ft x (0.083 ft)² x π x 7.48 gal/ft³ = 1.89 gallons in one casing volume
well depth - water level x (well radius)² x π x gal/ft³ = 1.75 total gallons removed

CALIBRATION: See calibration sheet

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
0925	19.20	7.27	0.53	-110.2	1.906		11.56	
0928	18.89	7.30	0.34	-101.5	1.908		11.59	
0931	18.66	7.29	0.16	-92.6	1.879		11.62	
0935	18.72	7.32	0.13	-105	1.789		11.64	
0938	18.71	7.40	0.12	-119.1	1.382		11.65	
0941	18.87	7.41	0.12	-105.2	1.300		11.66	
0945	18.69	7.36	0.10	-97.0	1.438		11.67	
0948	18.71	7.34	0.08	-92.1	1.536		11.67	1.5
0951	18.64	7.33	0.07	-107.5	1.582		11.68	
0954	18.63	7.33	0.09	-111.5	1.613		11.69	1.75
1000	Collected sample							

Purge method: Peristaltic pump — Sample Time: 1000
Duplicate/blank number: — — Duplicate Sample Time: —
Sampling equipment: Peri pump and tubing — VOA attachment: —
Sample containers: 2-500mL ambers, 6 VOAs (HCl)
Sample analyses: TPH-d/mo (8015M +SGCU), TPH-g (8015M), MTBE+BTEX (8260) CET
Laboratory:
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-9**

Project No. 4656016
Project Name: Harbor Facilities Center
Location: Port of Oakland
651 Maritime Street, Oakland, California
Weather: clear, 60s, sunny
Precip. in past 5 days (in.): 0.0
Source: NOAA PORTS
Water level instrument: Solinst 101

Recorded by: SC/CO Date: 6/19/13
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): 4.21
Water level from TOC (feet): ~~12.20~~ 12.12 Time: 1021
Product level from TOC (feet): — Time: 1021

CALCULATION OF WELL VOLUME:

(25.00 ft - 12.12 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 =

2.08 gallons in one casing volume
1.0 total gallons removed

CALIBRATION: See calibration sheet

FIELD MEASUREMENTS:

Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)	Depth to Water (ft btoc)	Cumulative Gallons Removed
1022	Began purging							
1028	19.24	7.23	0.60	-92.8	2.268	NM	12.25	
1031	19.22	7.23	0.58	-103.4	2.275		12.25	
1034	19.21	7.22	0.58	-100.8	2.274		12.26	
1037	19.23	7.22	0.57	-104.9	2.278		12.26	1.0
1040	Sample collected							

Purge method: Peristaltic pump
Duplicate/blank number: —
Sampling equipment: Peri pump + tubing
Sample containers: 2-500 mL ambers, 6 VOAs (HCl)
Sample analyses: TPH-d/mo (8015M + SGCU), TPH-g (8015M), MTBE + BTEX (8260)
Laboratory: C+T
Decontamination method: Dedicated tubing + liquinox
Comments: Petroleum hydrocarbon odor on purged water

Sample Time: 1040
Duplicate Sample Time: —
VOA attachment: —
Rinsate disposal: —

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

GROUNDWATER SAMPLING

Well No.: **MW-10**

Project No. 4656016
Project Name: Harbor Facilities Center
Location: Port of Oakland
651 Maritime Street, Oakland, California
Weather: Sunny, low 70's
Precip. in past 5 days (in.): 0.00
Source: NOAA PORTS
Water level instrument: Sdinst 101

Recorded by: CD Date: 6/19/13
Depth of well from TOC (feet): 25
Well diameter (inches): 2
Screened interval from TOC (feet): 15 - 25
TOC elevation, NAVD 88 (feet): 15.65
Groundwater elevation, NAVD 88 (feet): 4.75
Water level from TOC (feet): 10.90 Time: ~~1300~~
Product level from TOC (feet): — Time: 1300

CALCULATION OF WELL VOLUME:

(25.00 ft - 10.90 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 =

2.28 gallons in one casing volume
2.5 total gallons removed

CALIBRATION: See calibration sheet

FIELD MEASUREMENTS:

Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)	Depth to Water (ft btoc)	Cumulative Gallons Removed
1303	Began	purging						
1306	19.96	6.89	0.68	-95.8	2.523		11.51	
1309	18.99	6.86	0.11	-99.9	2.652		11.66	1
1312	18.86	6.84	0.09	-90.9	2.712		11.74	
1315	18.84	6.82	0.06	-91.4	2.749		11.77	2
1318	18.88	6.80	0.05	-87.0	2.775		11.79	
1321	18.91	6.80	0.04	-87.2	2.794		11.79	2.5
1325	Collected	sample						

Purge method: Peristaltic pump
Duplicate/blank number: NA
Sampling equipment: Peri pump and dedicated tubing
Sample containers: 2-500mL Ambers, 6 VOAs (HCl)
Sample analyses: TPH-d/mo (8015M + SGCU), TPH-g (8015M), BTEX+MTBE (8260)
Laboratory: C&T
Decontamination method: Dedicated tubing + liquinox
Comments:

Sample Time: 1325
Duplicate Sample Time: —
VOA attachment:
Rinsate disposal: 55-gal drum

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

GROUNDWATER SAMPLING

Well No.: **MW-11**

Project No. 4656016
Project Name: Harbor Facilities Center
Location: Port of Oakland
651 Maritime Street, Oakland, California
Weather: Sunny, 70's
Precip. in past 5 days (in.): 0.0
Source: NOAA PORTS
Water level instrument: Solinst 101

Recorded by: ES Date: 6/19/13
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): 4.94
Water level from TOC (feet): 10.53 Time: 1302
Product level from TOC (feet): — Time: —

CALCULATION OF WELL VOLUME:

(25.00 ft - ____ ft x (0.083 ft)² x π x 7.48 gal/ft³ = 2.3 gallons in one casing volume
well depth - water level x (well radius)² x π x gal/ft³ = 1.6 total gallons removed

CALIBRATION: See calibration sheet

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
~~1304~~	~~Began purging (ES)~~			not	draining	water, adjusted tubing		
	~~27.36~~	~~8.11~~	~~10.79~~	~~435.4~~	3		~~10.54~~	(2)
1310	Began	purging						
1315	22.91	7.78	0.34	-81.2	5.510		10.83	
1320	22.88	7.64	0.42	-84.8	5.494		10.85	
1325	22.85	7.64	0.45	-85.6	5.486		10.86	
1328	22.88	7.65	0.44	-83.9	5.492		10.86	
1331	22.99	7.65	~~0.39~~ (3)	-81.4	5.509		10.85	
1334	22.98	7.66	0.44	-80.3	5.508		10.85	
1337	22.95	7.66	0.44	-79.6	5.506		10.85	~1.5
1340	22.83	7.65	0.45	-78.6	5.496		10.85	
						Sampled		

Purge method: Peristaltic pump
Duplicate/blank number: —
Sampling equipment: Peri pump + tubing
Sample containers: ~~6~~ 2-500mL ambers, 6 VOAs (HCl)
Sample analyses: TPH-d/mo (8015M + SGCU), TPH-g (8015M), MTBE + BTEX (8260)
Laboratory: C&T
Decontamination method: Dedicated tubing + Liquinox
Comments:

Sample Time: 1343
Duplicate Sample Time: —
VOA attachment: —
Rinsate disposal: —

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

GROUNDWATER SAMPLING

Well No.: **MW-12**

Project No.	4656016	Recorded by:	ES
Project Name:	Harbor Facilities Center	Date:	6/19/13
Location:	Port of Oakland	Depth of well from TOC (feet):	25
	651 Maritime Street, Oakland, California	Well diameter (inches):	2
Weather:	Sunny, clear	Screened interval from TOC (feet):	15 - 25
Precip. in past 5 days (in.):	0.0	TOC elevation, NAVD 88 (feet):	16.79
Source:	NOAA PORTS	Groundwater elevation, NAVD 88 (feet):	4.78
Water level instrument:	Solinst 101	Water level from TOC (feet): 12.01	Time: 1413
		Product level from TOC (feet): —	Time: —

CALCULATION OF WELL VOLUME:

(25.00 ft - 12.01 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 =

2.10 gallons in one casing volume
1.5 total gallons removed

CALIBRATION: See calibration sheet

FIELD MEASUREMENTS:

Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV) *	EC (mS/cm) (µmho/cm)	Turbidity (NTU)	Depth to Water (ft btoc)	Cumulative Gallons Removed
1415	Start purging							
1421	21.07	7.12	0.64	-69.3	1.705		12.11	
1426	21.02	7.15	0.55	-84.2	1.693		12.11	
1431	20.92	7.12	0.48	-94.7	1.686		12.11	
1434	20.80	7.08	0.39	-105.6	1.680		12.11	
1437	20.71	7.07	0.37	-115.8	1.676		12.11	
1445	20.51	7.06	0.35	-166.9	1.670		12.11	
1448	20.48	7.06	0.34	-179.4	1.668		12.11	~1
1451	20.49	7.00	0.33	-193.8	1.670		12.11	
1454	20.52	7.06	0.33	-198.8	1.670		12.11	
1457	20.53	7.07	0.32	-204.9	1.671		12.11	
1500	20.5	7.04	0.32	-208.0	1.670		12.11	
					sampled			

Purge method: Peristaltic pump — Sample Time: 1500
Duplicate/blank number: — Duplicate Sample Time:
Sampling equipment: Peri pump + dedicated tubing — VOA attachment: —
Sample containers: 2-500mL ambers, 6 VOAs (HCl)
Sample analyses: TPH-d/mo (8015M + SGCU), TPH-g (8015M), MTBE + BTEX (8260)
Laboratory: CET
Decontamination method: dedicated tubing + liquinox — Rinsate disposal:
Comments: * ORP drifting, likely issue w/ meter

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

EQUIPCO RENTALS

YSI 556MPS RENTAL
CALIBRATION CERTIFICATE

SERVICE TECHNICIAN: NN DATE: 6-17-13

INSTRUMENT INFORMATION

RENTAL I.D. NUMBER: YSI-556. 35
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)	237.5 mV (YSI Zobell solution)	/	083012

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

Harbor Facilities Complex Passive Methane Abatement System Check
651 Maritime Street, Oakland
Port of Oakland

Date: 6/20/13 **Recorded by:** C. Orsi

Contact Lawrence Dirksen to arrange access:
510-627-1653
ldirksen@portoakland.com

Are roof wind turbines turning? (Yes)/No

T-1
Auto Maintenance Shop
Sample port behind drill press underneath stairs

FID reading w/out carbon filter: 0.0 ppm with carbon filter: 0.0 ppm

Air flow rate: 241 ft/min Direction: In

T-2
Under stairwell in office building

FID reading w/out carbon filter: 0.0 ppm with carbon filter: 0.0 ppm

Air flow rate: 255 ft/min Direction: In

W-1
Welding shop
Sample port is behind grey panel next to fuse box on north wall

FID reading w/out carbon filter: 0.0 ppm with carbon filter: 0.0 ppm

Air flow rate: 145 ft/min Direction: up

W-2
Warehouse
Sample port on riser

FID reading w/out carbon filter: 0.0 ppm with carbon filter: 0.0 ppm

Air flow rate: 98 ft/min Direction: up

Port of Oakland
530 Water Street • Oakland, CA 94607

Appendix B
Laboratory Analytical Reports

4656016

MALCOLM PIRNIE


Curtis & Tompkins, Ltd.
Analytical Laboratories, Since 1878

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

Laboratory Job Number 246318
ANALYTICAL REPORT

Arcadis	Project : 04656016.0000
2000 Powell St.	Location : Port HFC
Emeryville, CA 94608	Level : II

Sample ID	Lab ID
MW-5	246318-001
MW-8A	246318-002
MW-9	246318-003
MW-1	246318-004
MW-4	246318-005
MW-4DUP	246318-006
MW-10	246318-007
MW-11	246318-008
MW-2	246318-009
MW-12	246318-010
QCTB	246318-011

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: Will Rice Date: 06/26/2013

Will S Rice
Project Manager
(510) 486-0900

NELAP # 01107CA

Curtis & Tompkins, Ltd.

CASE NARRATIVE

Laboratory number:	**246318**
Client:	**Arcadis**
Project:	**04656016.0000**
Location:	**Port HFC**
Request Date:	**06/19/13**
Samples Received:	**06/19/13**

This data package contains sample and QC results for eleven water samples, requested for the above referenced project on 06/19/13. The samples were received cold and intact.

TPH-Purgeables and/or BTXE by GC (EPA 8015B):
MW-1 (lab # 246318-004) had pH greater than 2. No other analytical problems were encountered.

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

Volatile Organics by GC/MS (EPA 8260B):
MW-11 (lab # 246318-008) was diluted due to foaming. No other analytical problems were encountered.

246318

ARCADIS
Infrastructure · Water · Environment · Buildings

ID#:

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Page 1 of 1

Lab Work Order #

Send Results to:

Contact & Company Name:	Telephone:
Todd Miller	510-596-9559
Address:	**Fax:**
2000 Powell St, 7th Fl.	510-652-4906
City / State / Zip:	**E-mail Address:**
Emeryville CA 94608	todd.miller@arcadis-us.com
Project Name/Location (City, State):	**Project #:**
Port HFC	216502016.0000
Sampler's Printed Name:	**Sampler's Signature:**
Caroline Orsi	

Preservative		HCl	HCl				
Filtered (✓)							
# of Containers	1	3	3				
Container Information							

Keys

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

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

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

Sample ID	Collection Date	Collection Time	Type (✓) Comp	Type (✓) Grab	Matrix	PARAMETER ANALYSIS & METHOD: TPH-d/mo SG clean up (8015M)	TPHg (8015M)	MTBE + BTEX (8260B)	REMARKS
MW-5	6/19/13		0927		W	X	X	X	
MW-8A			1000			X	X	X	
MW-9			1040			X	X	X	
MW-1			1100			X	X	X	
MW-4			1153			X	X	X	
MW-4DUP			1153			X	X	X	
MW-10			1325			X	X	X	
MW-11		~~1307~~	1343			X	X	X	
MW-2			1440			X	X	X	
MW-12		~~1419~~	1500			X	X	X	
~~TB-0601913~~ QCTB					T		X	X	

Special Instructions/Comments:
Bill Port of Oakland

☐ Special QA/QC Instructions(✓):

Laboratory Information and Receipt		Relinquished By	Received By	Relinquished By	Laboratory Received By
Lab Name:	Cooler Custody Seal (✓) ☐ Intact ☐ Not Intact	Printed Name: Caroline Orsi	Printed Name: Maggie Chiu	Printed Name:	Printed Name:
☐ Cooler packed with ice (✓)		Signature:	Signature:	Signature:	Signature:
Specify Turnaround Requirements: Standard	Sample Receipt:	Firm: ARCADIS	Firm/Courier: C&T	Firm/Courier:	Firm:
Shipping Tracking #:	Condition/Cooler Temp: _____	Date/Time: 6/19/13 1640	Date/Time: 6/19/13 1640	Date/Time:	Date/Time:

20730826 CofC AR Form 01.12.2007

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

ON WET ICE

COOLER RECEIPT CHECKLIST

Curtis & Tompkins, Ltd.

Login # 246318 Date Received 6/19/13 Number of coolers 2
Client ARCADIS Project PORT HFC (04656016.0000)

Date Opened 6/19/13 By (print) TR (sign) TmaRevkar
Date Logged in 6/19/13 By (print) MS (sign)

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

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

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

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

Type of ice used: ☒ Wet ☐ Blue/Gel ☐ None Temp(°C) 4.9, 3.7

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

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

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

COMMENTS

Rev 10, 11/11

Curtis & Tompkins, Ltd.

Total Volatile Hydrocarbons

Lab #:	246318	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	06/19/13
Units:	ug/L	Received:	06/19/13
Diln Fac:	1.000	Analyzed:	06/20/13
Batch#:	199892		

Field ID: MW-5 Lab ID: 246318-001
Type: SAMPLE

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	94	76-128

Field ID: MW-8A Lab ID: 246318-002
Type: SAMPLE

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	97	76-128

Field ID: MW-9 Lab ID: 246318-003
Type: SAMPLE

Analyte	Result	RL
Gasoline C7-C12	130	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	97	76-128

Field ID: MW-1 Lab ID: 246318-004
Type: SAMPLE

Analyte	Result	RL
Gasoline C7-C12	1,600 Y	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	98	76-128

Field ID: MW-4 Lab ID: 246318-005
Type: SAMPLE

Analyte	Result	RL
Gasoline C7-C12	150 Y	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	94	76-128

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

Curtis & Tompkins, Ltd.

Total Volatile Hydrocarbons

Lab #:	246318	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	06/19/13
Units:	ug/L	Received:	06/19/13
Diln Fac:	1.000	Analyzed:	06/20/13
Batch#:	199892		

Field ID: MW-4DUP
Type: SAMPLE
Lab ID: 246318-006

Analyte	Result	RL
Gasoline C7-C12	150 Y	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	96	76-128

Field ID: MW-10
Type: SAMPLE
Lab ID: 246318-007

Analyte	Result	RL
Gasoline C7-C12	320 Y	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	84	76-128

Field ID: MW-11
Type: SAMPLE
Lab ID: 246318-008

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	81	76-128

Field ID: MW-2
Type: SAMPLE
Lab ID: 246318-009

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	95	76-128

Field ID: MW-12
Type: SAMPLE
Lab ID: 246318-010

Analyte	Result	RL
Gasoline C7-C12	66 Y	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	90	76-128

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

Curtis & Tompkins, Ltd.

Total Volatile Hydrocarbons

Lab #:	246318	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	06/19/13
Units:	ug/L	Received:	06/19/13
Diln Fac:	1.000	Analyzed:	06/20/13
Batch#:	199892		

Field ID: QCTB
Type: SAMPLE
Lab ID: 246318-011

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	94	76-128

Type: BLANK
Lab ID: QC694444

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	99	76-128

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 #:	246318	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC694443	Batch#:	199892
Matrix:	Water	Analyzed:	06/20/13
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	1,000	943.4	94	80-120

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	101	76-128

Curtis & Tompkins, Ltd.

Batch QC Report

Total Volatile Hydrocarbons

Lab #:	246318	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8015B
Field ID:	MW-5	Batch#:	199892
MSS Lab ID:	246318-001	Sampled:	06/19/13
Matrix:	Water	Received:	06/19/13
Units:	ug/L	Analyzed:	06/20/13
Diln Fac:	1.000		

Type: MS Lab ID: QC694445

Analyte	MSS Result	Spiked	Result	%REC	Limits
Gasoline C7-C12	14.41	2,000	1,913	95	76-120

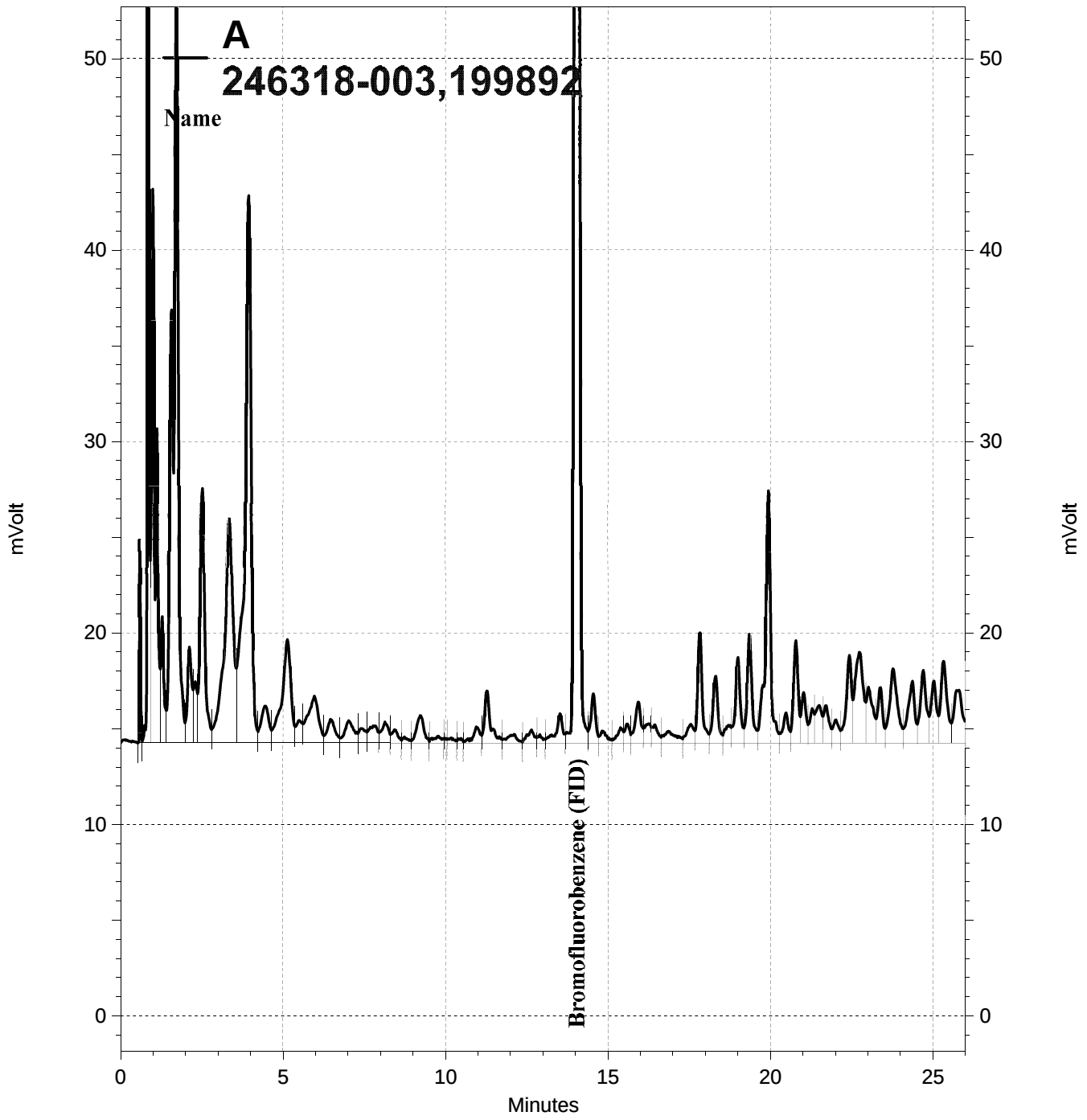
Surrogate	%REC	Limits
Bromofluorobenzene (FID)	93	76-128

Type: MSD Lab ID: QC694446

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	2,000	1,861	92	76-120	3	20

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	91	76-128

RPD= Relative Percent Difference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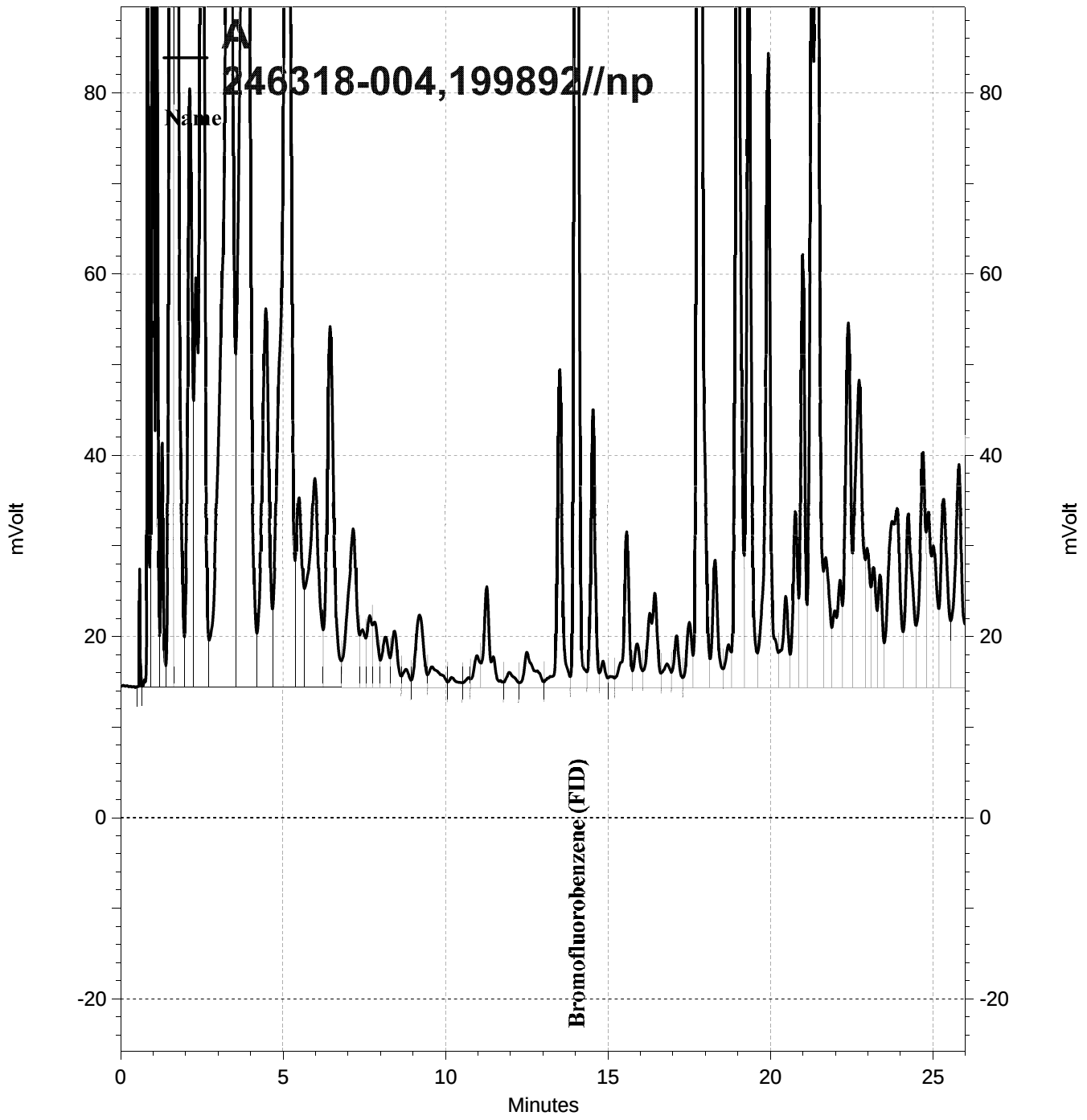

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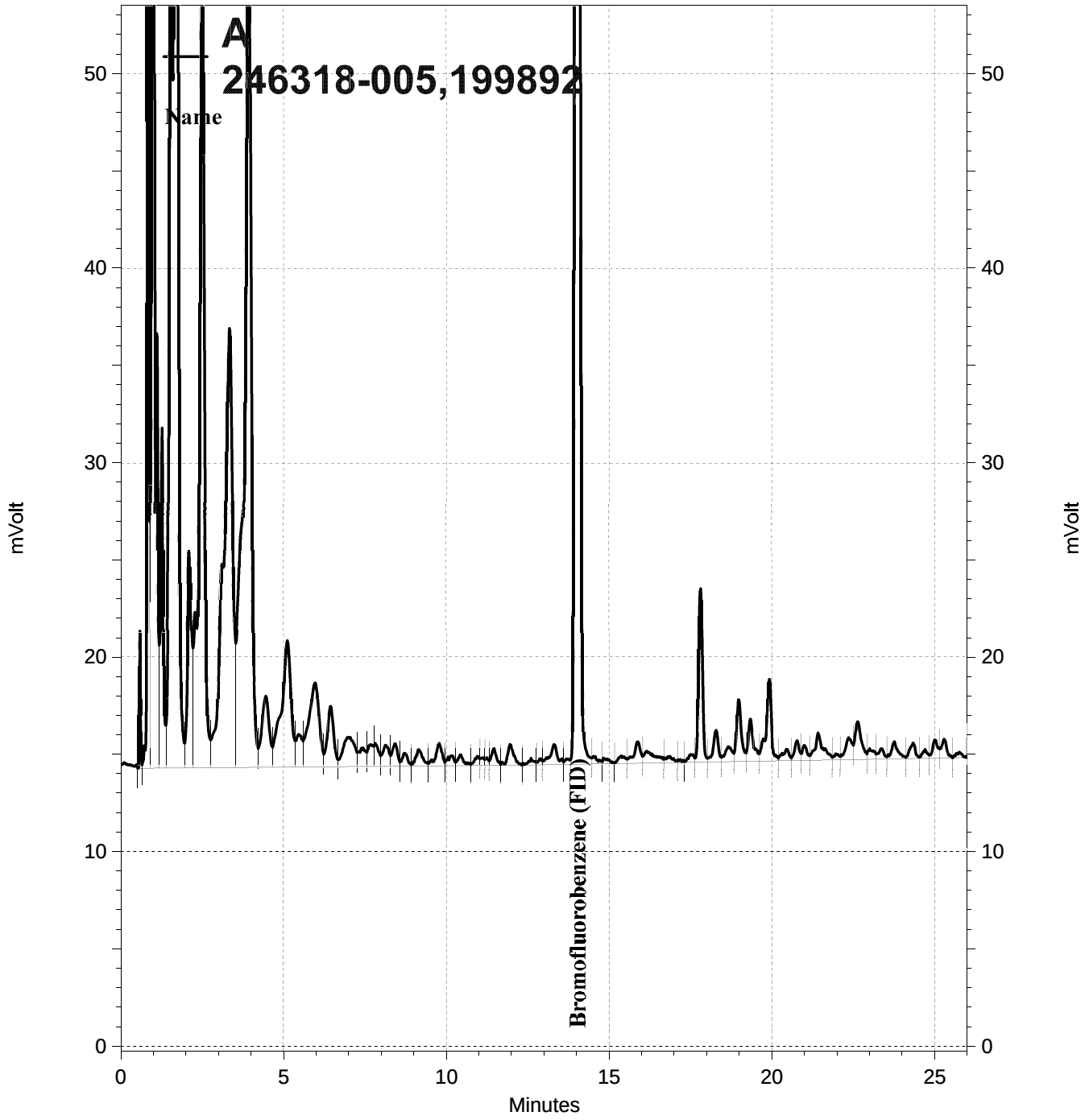

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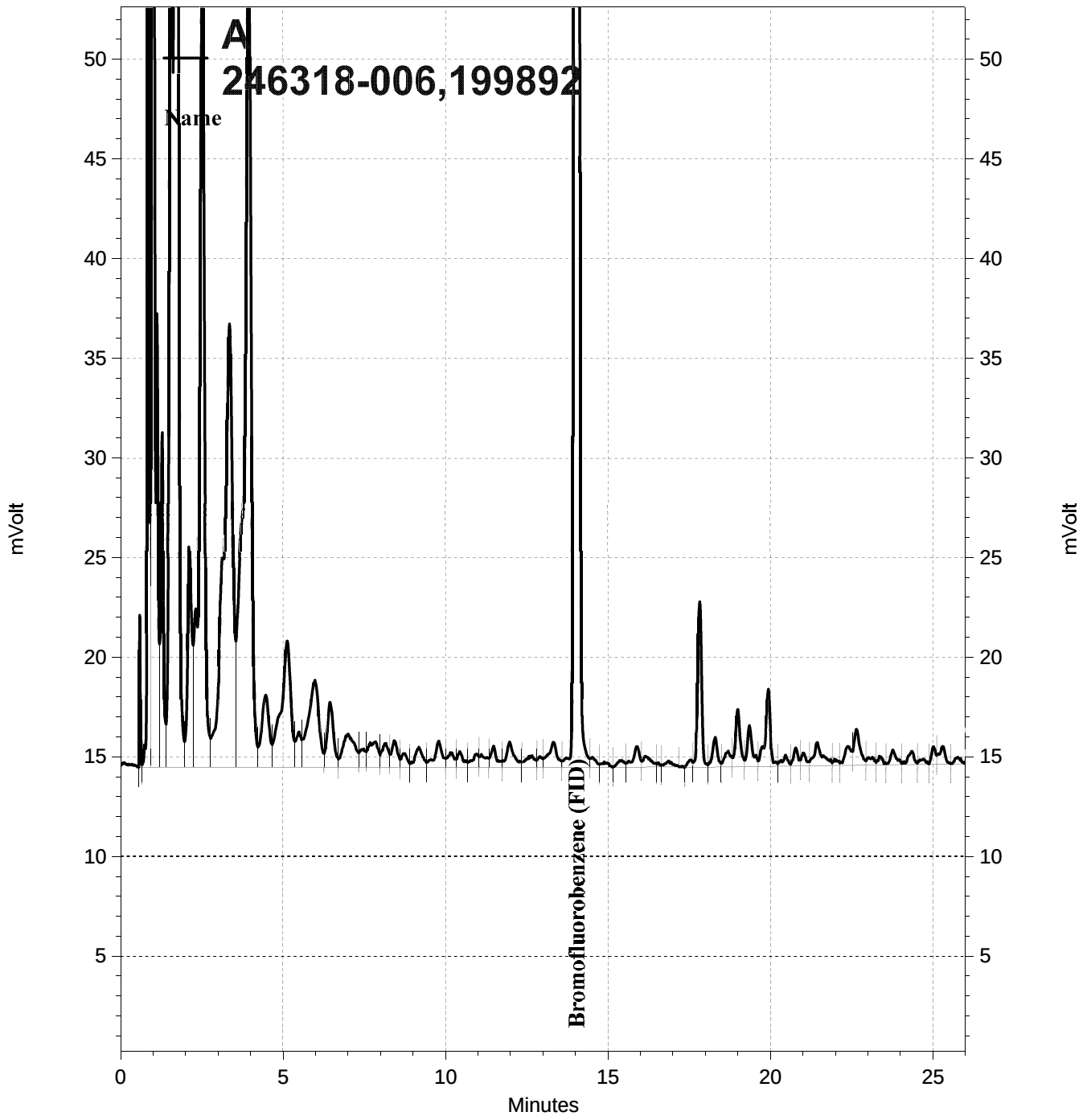
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Name
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Bromofluorobenzene (FID)
Minutes
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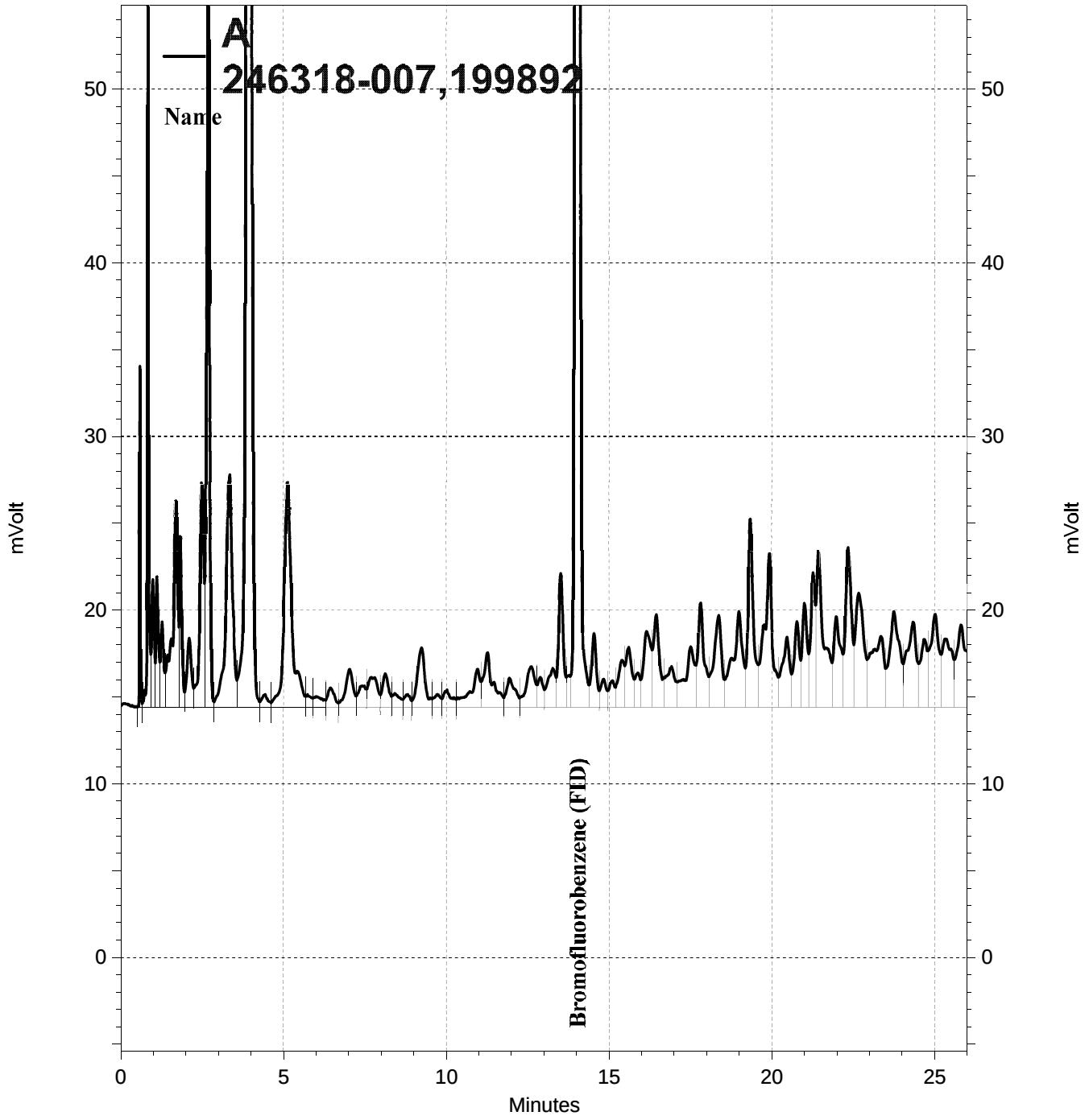
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Minutes
Bromofluorobenzene (FID)
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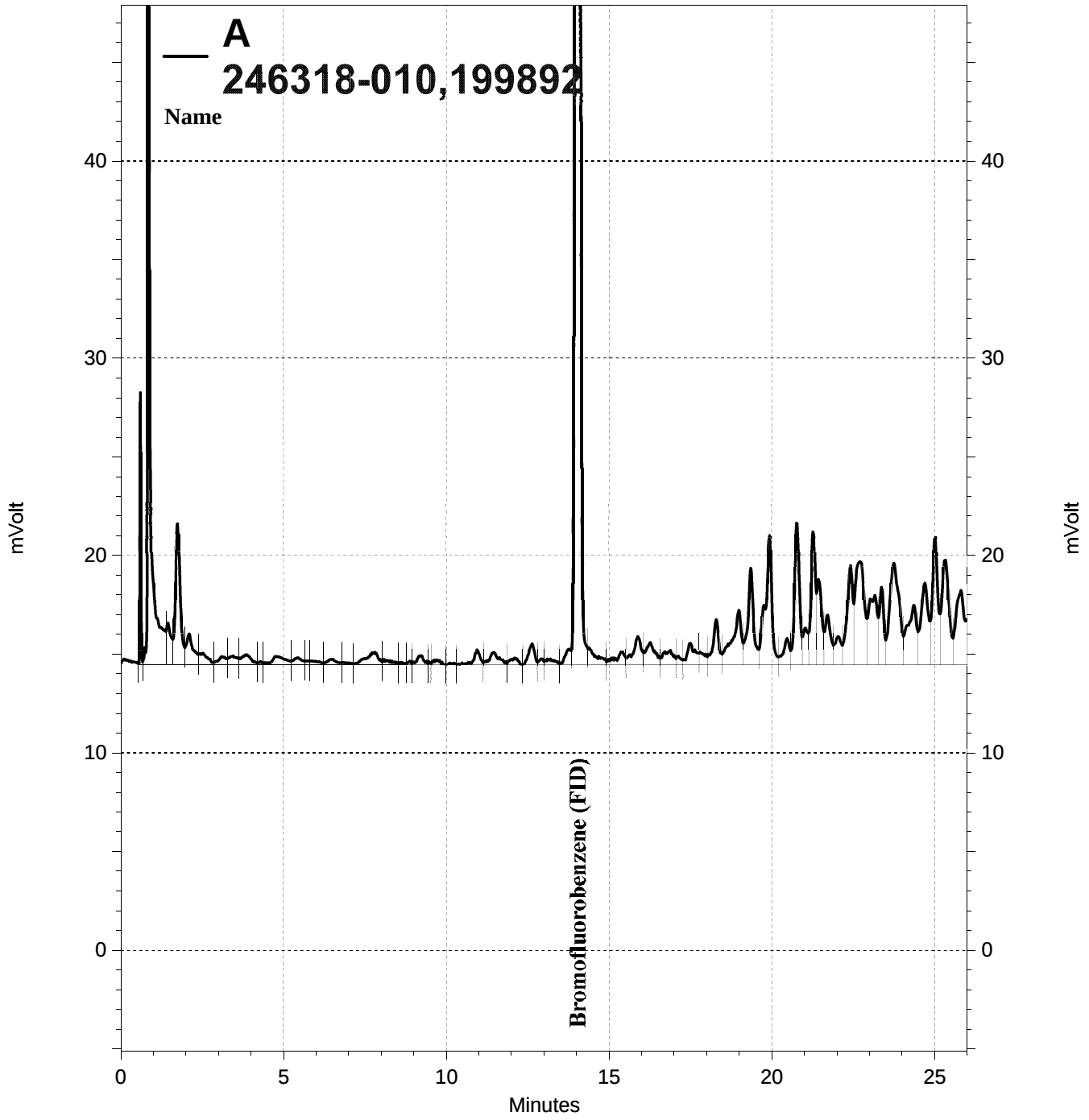

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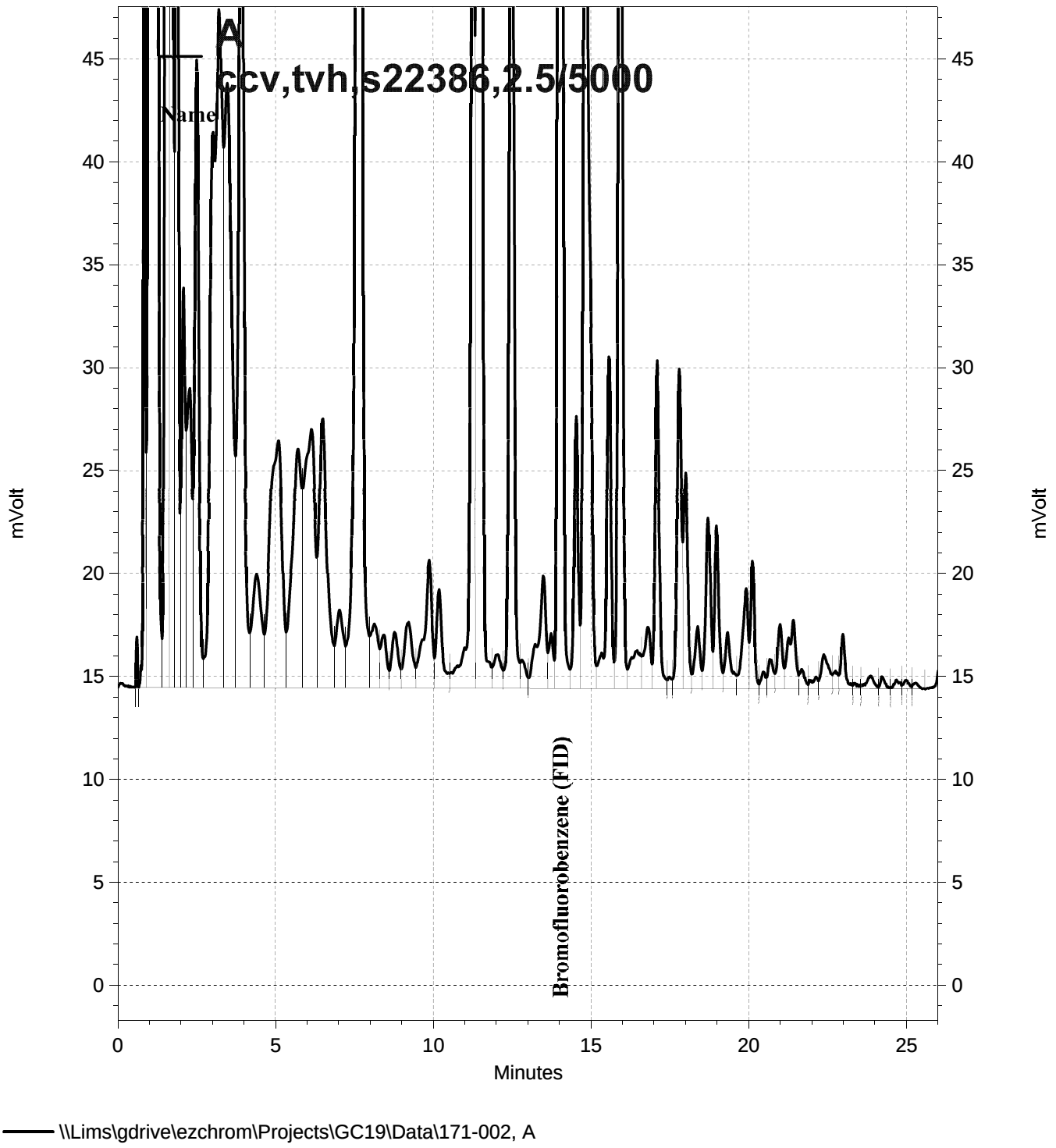

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Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	246318	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 3520C
Project#:	04656016.0000	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	06/19/13
Units:	ug/L	Received:	06/19/13
Diln Fac:	1.000	Prepared:	06/20/13
Batch#:	199910	Analyzed:	06/21/13

Field ID: MW-5 Lab ID: 246318-001
Type: SAMPLE Cleanup Method: EPA 3630C

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

Surrogate	%REC	Limits
o-Terphenyl	129	62-133

Field ID: MW-8A Lab ID: 246318-002
Type: SAMPLE Cleanup Method: EPA 3630C

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

Surrogate	%REC	Limits
o-Terphenyl	131	62-133

Field ID: MW-9 Lab ID: 246318-003
Type: SAMPLE Cleanup Method: EPA 3630C

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

Surrogate	%REC	Limits
o-Terphenyl	127	62-133

Field ID: MW-1 Lab ID: 246318-004
Type: SAMPLE Cleanup Method: EPA 3630C

Analyte	Result	RL
Diesel C10-C24	3,100	50
Motor Oil C24-C36	ND	300

Surrogate	%REC	Limits
o-Terphenyl	116	62-133

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

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	246318	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 3520C
Project#:	04656016.0000	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	06/19/13
Units:	ug/L	Received:	06/19/13
Diln Fac:	1.000	Prepared:	06/20/13
Batch#:	199910	Analyzed:	06/21/13

Field ID: MW-4 Lab ID: 246318-005
Type: SAMPLE Cleanup Method: EPA 3630C

Analyte	Result	RL
Diesel C10-C24	ND	56
Motor Oil C24-C36	ND	330

Surrogate	%REC	Limits
o-Terphenyl	114	62-133

Field ID: MW-4DUP Lab ID: 246318-006
Type: SAMPLE Cleanup Method: EPA 3630C

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

Surrogate	%REC	Limits
o-Terphenyl	106	62-133

Field ID: MW-10 Lab ID: 246318-007
Type: SAMPLE Cleanup Method: EPA 3630C

Analyte	Result	RL
Diesel C10-C24	280 Y	52
Motor Oil C24-C36	ND	310

Surrogate	%REC	Limits
o-Terphenyl	106	62-133

Field ID: MW-11 Lab ID: 246318-008
Type: SAMPLE Cleanup Method: EPA 3630C

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

Surrogate	%REC	Limits
o-Terphenyl	113	62-133

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

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	246318	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 3520C
Project#:	04656016.0000	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	06/19/13
Units:	ug/L	Received:	06/19/13
Diln Fac:	1.000	Prepared:	06/20/13
Batch#:	199910	Analyzed:	06/21/13

Field ID: MW-2 Lab ID: 246318-009
Type: SAMPLE Cleanup Method: EPA 3630C

Analyte	Result	RL
Diesel C10-C24	ND	51
Motor Oil C24-C36	ND	310

Surrogate	%REC	Limits
o-Terphenyl	119	62-133

Field ID: MW-12 Lab ID: 246318-010
Type: SAMPLE Cleanup Method: EPA 3630C

Analyte	Result	RL
Diesel C10-C24	220 Y	50
Motor Oil C24-C36	ND	300

Surrogate	%REC	Limits
o-Terphenyl	88	62-133

Type: BLANK Cleanup Method: EPA 3630C
Lab ID: QC694508

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

Surrogate	%REC	Limits
o-Terphenyl	94	62-133

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 #:	246318	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 3520C
Project#:	04656016.0000	Analysis:	EPA 8015B
Matrix:	Water	Batch#:	199910
Units:	ug/L	Prepared:	06/20/13
Diln Fac:	1.000	Analyzed:	06/21/13

Type: BS Cleanup Method: EPA 3630C
Lab ID: QC694509

Analyte	Spiked	Result	%REC	Limits
Diesel C10-C24	2,500	2,120	85	59-120

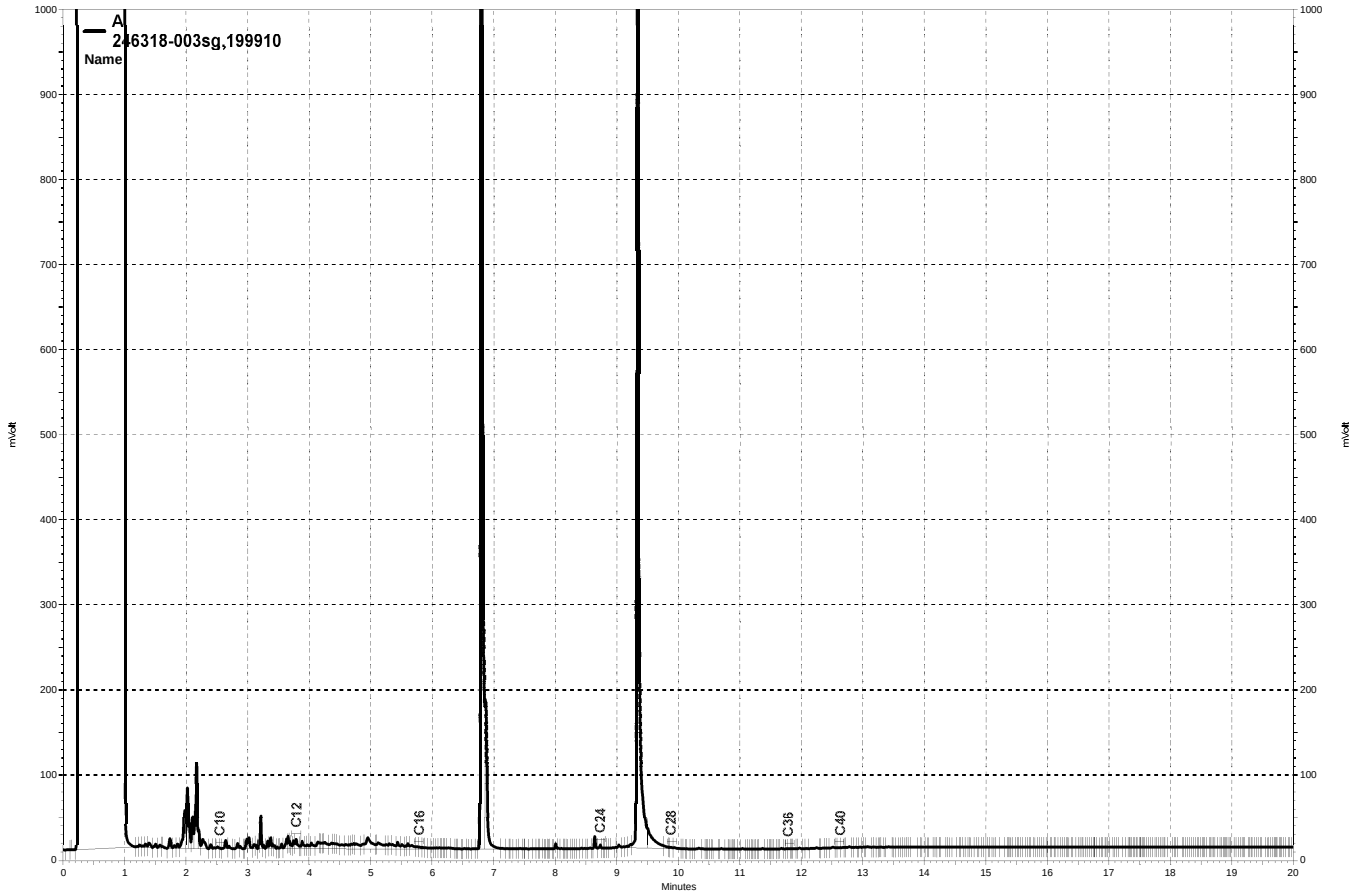
Surrogate	%REC	Limits
o-Terphenyl	104	62-133

Type: BSD Cleanup Method: EPA 3630C
Lab ID: QC694510

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Diesel C10-C24	2,500	2,051	82	59-120	3	46

Surrogate	%REC	Limits
o-Terphenyl	104	62-133

RPD= Relative Percent Difference



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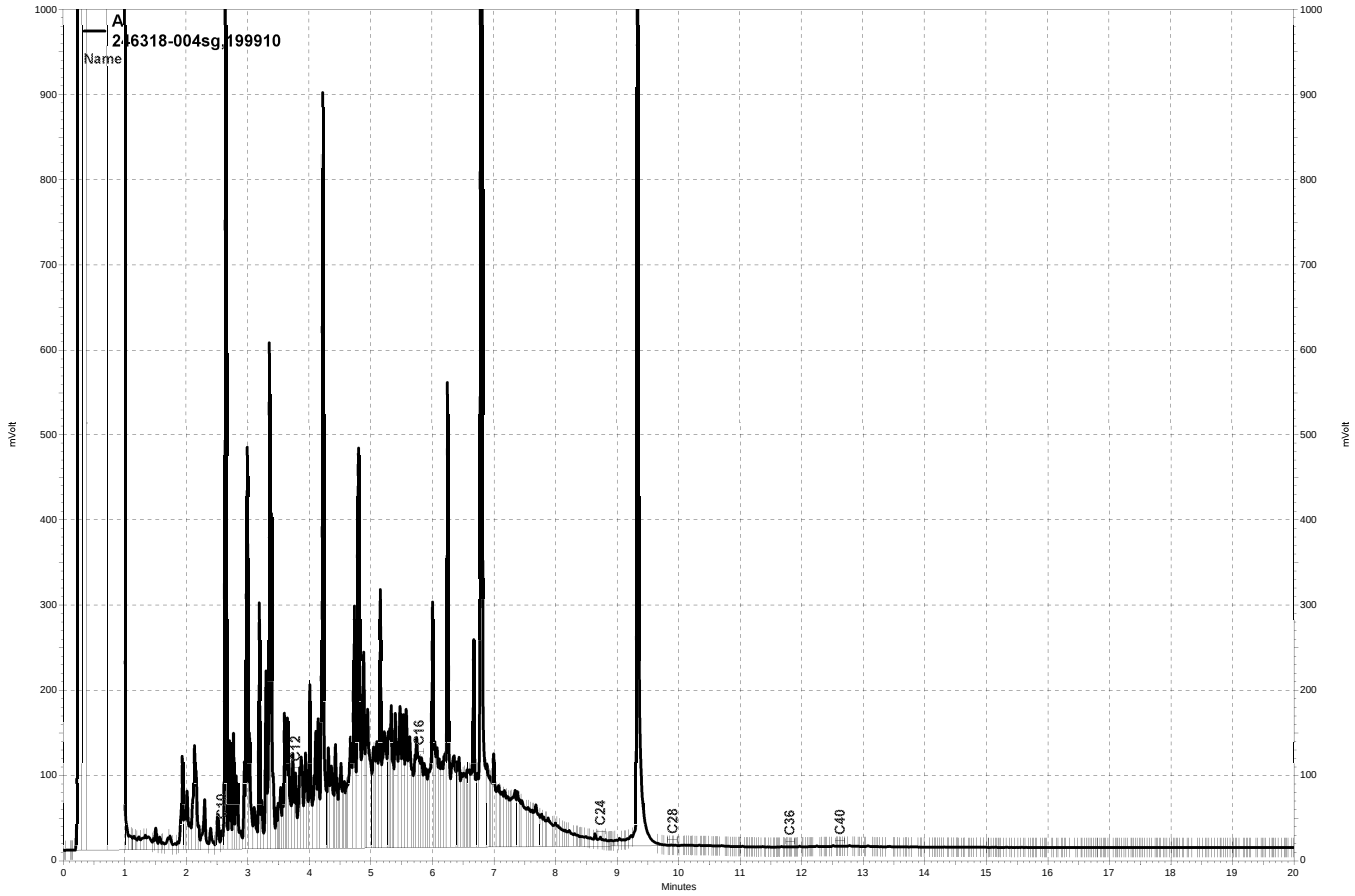

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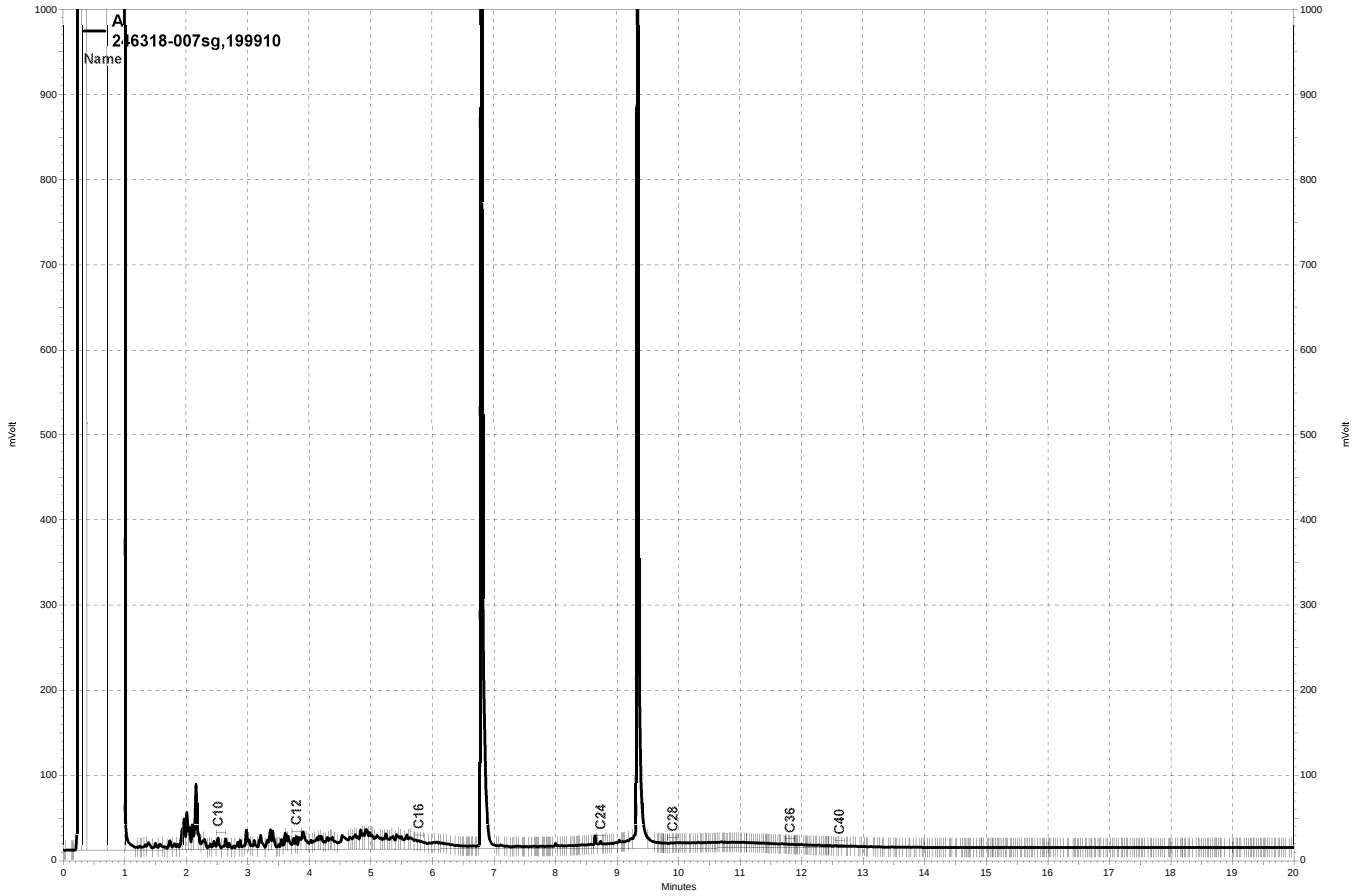

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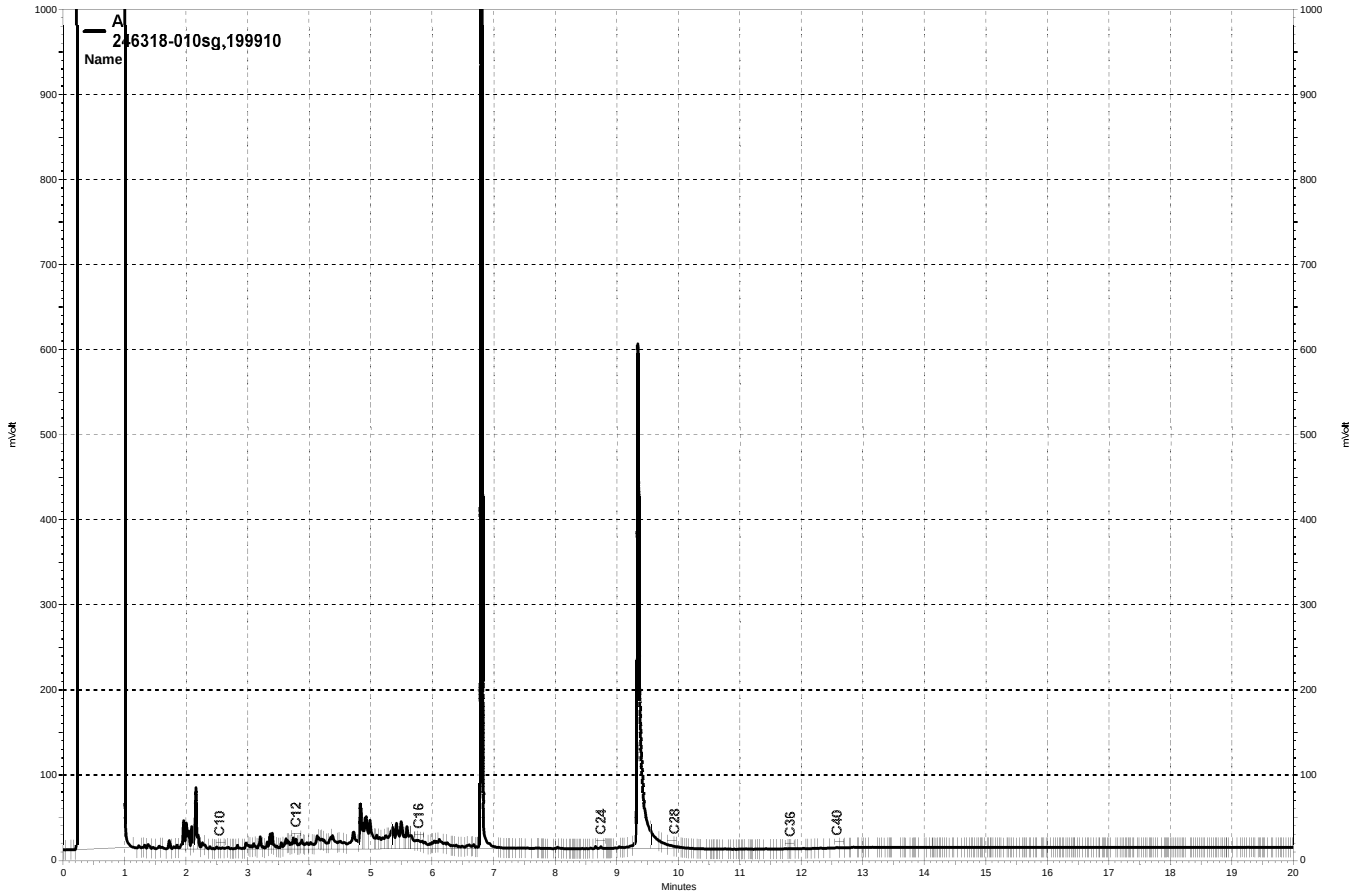

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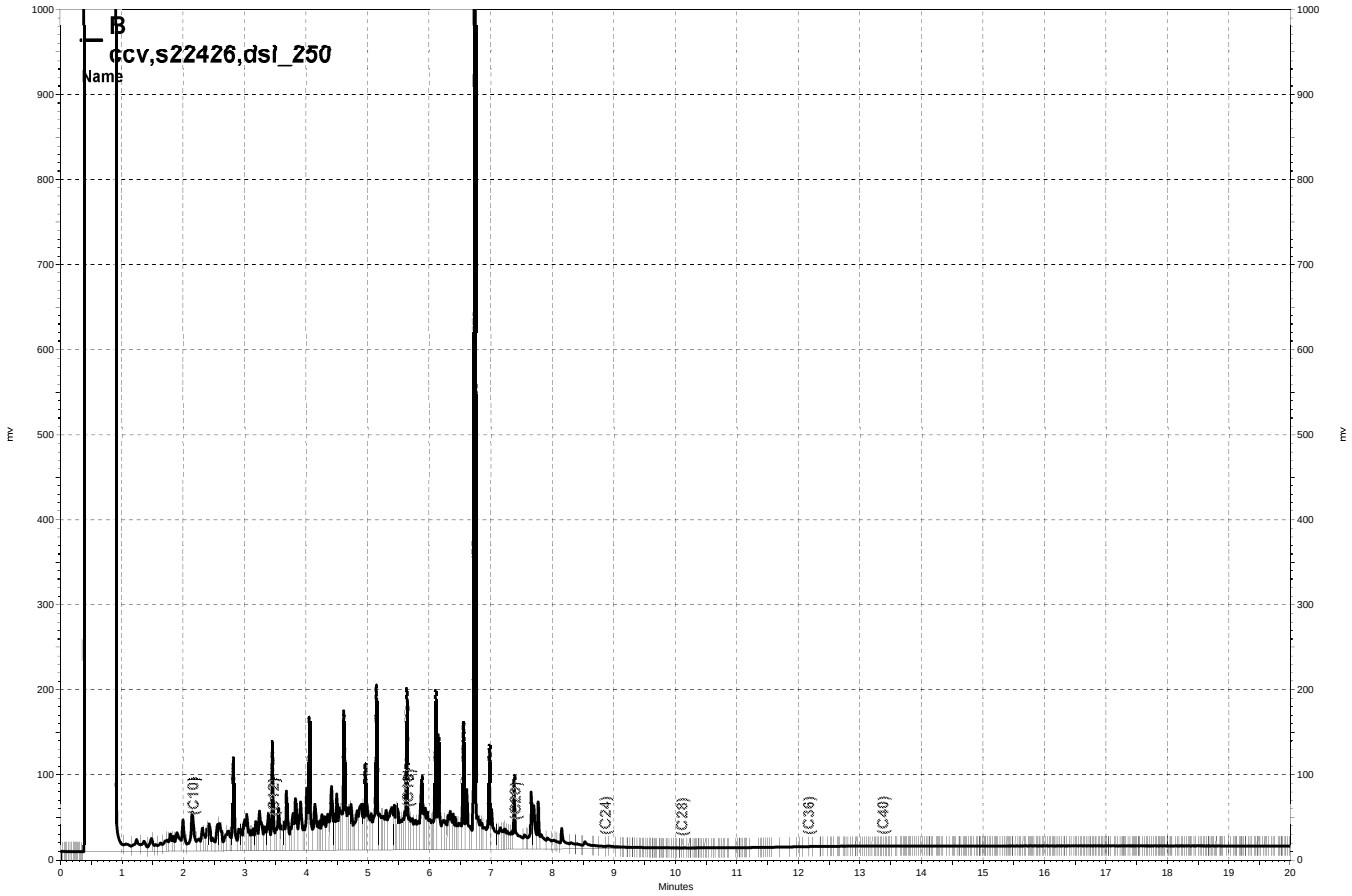

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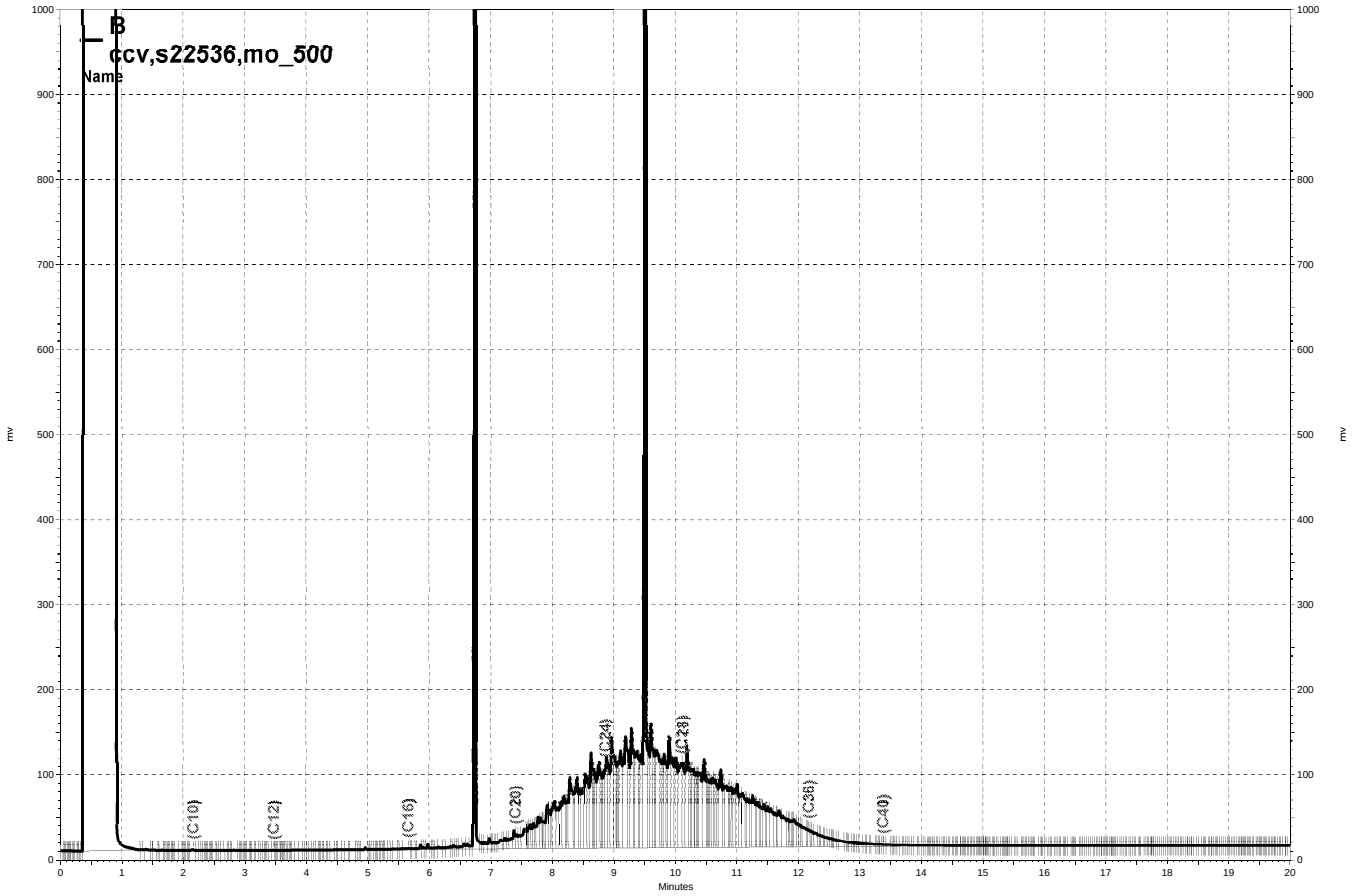

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Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	246318	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Field ID:	MW-5	Batch#:	199889
Lab ID:	246318-001	Sampled:	06/19/13
Matrix:	Water	Received:	06/19/13
Units:	ug/L	Analyzed:	06/20/13
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	121	77-134
1,2-Dichloroethane-d4	138	72-140
Toluene-d8	99	80-120
Bromofluorobenzene	119	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	246318	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Field ID:	MW-8A	Batch#:	199889
Lab ID:	246318-002	Sampled:	06/19/13
Matrix:	Water	Received:	06/19/13
Units:	ug/L	Analyzed:	06/20/13
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	117	77-134
1,2-Dichloroethane-d4	130	72-140
Toluene-d8	105	80-120
Bromofluorobenzene	116	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	246318	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Field ID:	MW-9	Batch#:	199889
Lab ID:	246318-003	Sampled:	06/19/13
Matrix:	Water	Received:	06/19/13
Units:	ug/L	Analyzed:	06/20/13
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	ND	0.5
Benzene	14	0.5
Toluene	ND	0.5
Ethylbenzene	1.1	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5

Surrogate	%REC	Limits
Dibromofluoromethane	114	77-134
1,2-Dichloroethane-d4	136	72-140
Toluene-d8	98	80-120
Bromofluorobenzene	107	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	246318	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Field ID:	MW-1	Batch#:	199945
Lab ID:	246318-004	Sampled:	06/19/13
Matrix:	Water	Received:	06/19/13
Units:	ug/L	Analyzed:	06/21/13
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	ND	0.5
Benzene	18	0.5
Toluene	2.2	0.5
Ethylbenzene	4.4	0.5
m,p-Xylenes	0.9	0.5
o-Xylene	0.9	0.5

Surrogate	%REC	Limits
Dibromofluoromethane	101	77-134
1,2-Dichloroethane-d4	128	72-140
Toluene-d8	99	80-120
Bromofluorobenzene	100	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	246318	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Field ID:	MW-4	Batch#:	200003
Lab ID:	246318-005	Sampled:	06/19/13
Matrix:	Water	Received:	06/19/13
Units:	ug/L	Analyzed:	06/24/13
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	ND	0.5
Benzene	19	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	91	77-134
1,2-Dichloroethane-d4	90	72-140
Toluene-d8	100	80-120
Bromofluorobenzene	91	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	246318	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Field ID:	MW-4DUP	Batch#:	200003
Lab ID:	246318-006	Sampled:	06/19/13
Matrix:	Water	Received:	06/19/13
Units:	ug/L	Analyzed:	06/24/13
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	ND	0.5
Benzene	19	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	90	77-134
1,2-Dichloroethane-d4	91	72-140
Toluene-d8	95	80-120
Bromofluorobenzene	93	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	246318	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Field ID:	MW-10	Batch#:	199889
Lab ID:	246318-007	Sampled:	06/19/13
Matrix:	Water	Received:	06/19/13
Units:	ug/L	Analyzed:	06/20/13
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	ND	0.5
Benzene	61	0.5
Toluene	ND	0.5
Ethylbenzene	1.2	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5

Surrogate	%REC	Limits
Dibromofluoromethane	122	77-134
1,2-Dichloroethane-d4	130	72-140
Toluene-d8	100	80-120
Bromofluorobenzene	105	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	246318	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Field ID:	MW-11	Batch#:	199932
Lab ID:	246318-008	Sampled:	06/19/13
Matrix:	Water	Received:	06/19/13
Units:	ug/L	Analyzed:	06/21/13
Diln Fac:	2.000		

Analyte	Result	RL
MTBE	ND	1.0
Benzene	ND	1.0
Toluene	ND	1.0
Ethylbenzene	ND	1.0
m,p-Xylenes	ND	1.0
o-Xylene	ND	1.0

Surrogate	%REC	Limits
Dibromofluoromethane	124	77-134
1,2-Dichloroethane-d4	119	72-140
Toluene-d8	97	80-120
Bromofluorobenzene	89	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	246318	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Field ID:	MW-2	Batch#:	199889
Lab ID:	246318-009	Sampled:	06/19/13
Matrix:	Water	Received:	06/19/13
Units:	ug/L	Analyzed:	06/20/13
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	114	77-134
1,2-Dichloroethane-d4	129	72-140
Toluene-d8	96	80-120
Bromofluorobenzene	113	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	246318	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Field ID:	MW-12	Batch#:	199889
Lab ID:	246318-010	Sampled:	06/19/13
Matrix:	Water	Received:	06/19/13
Units:	ug/L	Analyzed:	06/20/13
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	4.5	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	117	77-134
1,2-Dichloroethane-d4	134	72-140
Toluene-d8	96	80-120
Bromofluorobenzene	109	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	246318	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Field ID:	QCTB	Batch#:	199889
Lab ID:	246318-011	Sampled:	06/19/13
Matrix:	Water	Received:	06/19/13
Units:	ug/L	Analyzed:	06/20/13
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	116	77-134
1,2-Dichloroethane-d4	137	72-140
Toluene-d8	95	80-120
Bromofluorobenzene	111	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Aromatics by GC/MS

Lab #:	246318	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Matrix:	Water	Batch#:	199889
Units:	ug/L	Analyzed:	06/20/13
Diln Fac:	1.000		

Type: BS Lab ID: QC694427

Analyte	Spiked	Result	%REC	Limits
MTBE	12.50	13.50	108	58-120
Benzene	12.50	11.49	92	78-125
Toluene	12.50	12.51	100	79-123
Ethylbenzene	12.50	12.48	100	80-126
m,p-Xylenes	25.00	26.41	106	80-123
o-Xylene	12.50	11.44	92	75-120

Surrogate	%REC	Limits
Dibromofluoromethane	111	77-134
1,2-Dichloroethane-d4	123	72-140
Toluene-d8	106	80-120
Bromofluorobenzene	109	80-120

Type: BSD Lab ID: QC694428

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	12.50	14.10	113	58-120	4	23
Benzene	12.50	11.96	96	78-125	4	20
Toluene	12.50	11.76	94	79-123	6	20
Ethylbenzene	12.50	12.55	100	80-126	1	20
m,p-Xylenes	25.00	25.75	103	80-123	3	20
o-Xylene	12.50	10.79	86	75-120	6	20

Surrogate	%REC	Limits
Dibromofluoromethane	112	77-134
1,2-Dichloroethane-d4	124	72-140
Toluene-d8	102	80-120
Bromofluorobenzene	106	80-120

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Aromatics by GC/MS

Lab #:	246318	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC694429	Batch#:	199889
Matrix:	Water	Analyzed:	06/20/13
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	116	77-134
1,2-Dichloroethane-d4	132	72-140
Toluene-d8	103	80-120
Bromofluorobenzene	109	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Aromatics by GC/MS

Lab #:	246318	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Matrix:	Water	Batch#:	199932
Units:	ug/L	Analyzed:	06/21/13
Diln Fac:	1.000		

Type: BS Lab ID: QC694610

Analyte	Spiked	Result	%REC	Limits
MTBE	12.50	12.01	96	58-120
Benzene	12.50	12.45	100	78-125
Toluene	12.50	11.95	96	79-123
Ethylbenzene	12.50	11.66	93	80-126
m,p-Xylenes	25.00	22.99	92	80-123
o-Xylene	12.50	9.437	75	75-120

Surrogate	%REC	Limits
Dibromofluoromethane	116	77-134
1,2-Dichloroethane-d4	117	72-140
Toluene-d8	98	80-120
Bromofluorobenzene	90	80-120

Type: BSD Lab ID: QC694611

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	12.50	12.62	101	58-120	5	23
Benzene	12.50	12.10	97	78-125	3	20
Toluene	12.50	11.66	93	79-123	2	20
Ethylbenzene	12.50	11.30	90	80-126	3	20
m,p-Xylenes	25.00	22.20	89	80-123	3	20
o-Xylene	12.50	9.369	75	75-120	1	20

Surrogate	%REC	Limits
Dibromofluoromethane	117	77-134
1,2-Dichloroethane-d4	117	72-140
Toluene-d8	97	80-120
Bromofluorobenzene	90	80-120

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Aromatics by GC/MS

Lab #:	246318	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC694612	Batch#:	199932
Matrix:	Water	Analyzed:	06/21/13
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	128	77-134
1,2-Dichloroethane-d4	117	72-140
Toluene-d8	98	80-120
Bromofluorobenzene	91	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Aromatics by GC/MS

Lab #:	246318	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Matrix:	Water	Batch#:	199945
Units:	ug/L	Analyzed:	06/21/13
Diln Fac:	1.000		

Type: BS Lab ID: QC694661

Analyte	Spiked	Result	%REC	Limits
MTBE	15.00	13.07	87	58-120
Benzene	15.00	14.36	96	78-125
Toluene	15.00	14.75	98	79-123
Ethylbenzene	15.00	14.51	97	80-126
m,p-Xylenes	30.00	30.67	102	80-123
o-Xylene	15.00	13.85	92	75-120

Surrogate	%REC	Limits
Dibromofluoromethane	101	77-134
1,2-Dichloroethane-d4	126	72-140
Toluene-d8	94	80-120
Bromofluorobenzene	103	80-120

Type: BSD Lab ID: QC694662

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	15.00	14.50	97	58-120	10	23
Benzene	15.00	14.94	100	78-125	4	20
Toluene	15.00	14.59	97	79-123	1	20
Ethylbenzene	15.00	15.71	105	80-126	8	20
m,p-Xylenes	30.00	30.26	101	80-123	1	20
o-Xylene	15.00	13.81	92	75-120	0	20

Surrogate	%REC	Limits
Dibromofluoromethane	103	77-134
1,2-Dichloroethane-d4	121	72-140
Toluene-d8	100	80-120
Bromofluorobenzene	101	80-120

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Aromatics by GC/MS

Lab #:	246318	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC694663	Batch#:	199945
Matrix:	Water	Analyzed:	06/21/13
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	113	77-134
1,2-Dichloroethane-d4	131	72-140
Toluene-d8	103	80-120
Bromofluorobenzene	109	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Aromatics by GC/MS

Lab #:	246318	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC694907	Batch#:	200003
Matrix:	Water	Analyzed:	06/24/13
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	90	77-134
1,2-Dichloroethane-d4	92	72-140
Toluene-d8	96	80-120
Bromofluorobenzene	93	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Aromatics by GC/MS

Lab #:	246318	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Matrix:	Water	Batch#:	200003
Units:	ug/L	Analyzed:	06/24/13
Diln Fac:	1.000		

Type: BS Lab ID: QC694908

Analyte	Spiked	Result	%REC	Limits
MTBE	23.75	20.40	86	58-120
Benzene	23.75	21.95	92	78-125
Toluene	23.75	21.57	91	79-123
Ethylbenzene	23.75	22.48	95	80-126
m,p-Xylenes	47.50	45.07	95	80-123
o-Xylene	23.75	21.81	92	75-120

Surrogate	%REC	Limits
Dibromofluoromethane	89	77-134
1,2-Dichloroethane-d4	90	72-140
Toluene-d8	95	80-120
Bromofluorobenzene	92	80-120

Type: BSD Lab ID: QC694909

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	23.75	20.82	88	58-120	2	23
Benzene	23.75	21.56	91	78-125	2	20
Toluene	23.75	21.13	89	79-123	2	20
Ethylbenzene	23.75	21.92	92	80-126	3	20
m,p-Xylenes	47.50	44.17	93	80-123	2	20
o-Xylene	23.75	21.19	89	75-120	3	20

Surrogate	%REC	Limits
Dibromofluoromethane	90	77-134
1,2-Dichloroethane-d4	89	72-140
Toluene-d8	97	80-120
Bromofluorobenzene	88	80-120

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Aromatics by GC/MS

Lab #:	246318	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Field ID:	ZZZZZZZZZZ	Batch#:	200003
MSS Lab ID:	246323-050	Sampled:	06/17/13
Matrix:	Water	Received:	06/19/13
Units:	ug/L	Analyzed:	06/24/13
Diln Fac:	1.000		

Type: MS Lab ID: QC694985

Analyte	MSS Result	Spiked	Result	%REC	Limits
MTBE	<0.1000	20.00	18.22	91	63-120
Benzene	<0.1000	20.00	19.05	95	80-125
Toluene	<0.1000	20.00	18.69	93	80-122
Ethylbenzene	<0.1561	20.00	19.42	97	80-124
m,p-Xylenes	<0.1000	40.00	37.58	94	80-121
o-Xylene	<0.09974	20.00	18.62	93	77-120

Surrogate	%REC	Limits
Dibromofluoromethane	93	77-134
1,2-Dichloroethane-d4	95	72-140
Toluene-d8	98	80-120
Bromofluorobenzene	93	80-120

Type: MSD Lab ID: QC694986

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	20.00	18.96	95	63-120	4	27
Benzene	20.00	19.98	100	80-125	5	21
Toluene	20.00	20.47	102	80-122	9	21
Ethylbenzene	20.00	20.66	103	80-124	6	21
m,p-Xylenes	40.00	40.51	101	80-121	8	21
o-Xylene	20.00	19.75	99	77-120	6	22

Surrogate	%REC	Limits
Dibromofluoromethane	93	77-134
1,2-Dichloroethane-d4	93	72-140
Toluene-d8	99	80-120
Bromofluorobenzene	92	80-120

RPD= Relative Percent Difference

Data Validation Worksheet

Lab Report # 246318 DV by: CO
Project Port Harbor Facilities Complex Date: 07/22/2013

Lab IDs	Sample IDs	Date Collected	Parameters		
			TPHg (8015B)	TPHd/mo (8015B)	MTBE BTEX (8260B)
-001	MW-5	6/19/13	X	X	X
-002	MW-8A	6/19/13	X	X	X
-003	MW-9	6/19/13	X	X	X
-004	MW-1	6/19/13	X	X	X
-005	MW-4	6/19/13	X	X	X
-006	MW-4DUP	6/19/13	X	X	X
-007	MW-10	6/19/13	X	X	X
-008	MW-11	6/19/13	X	X	X
-009	MW-2	6/19/13	X	X	X
-010	MW-12	6/19/13	X	X	X
-011	QCTB	6/19/13	X		X

Lab ID: C+T **NO QUALS**
Cooler Temperature: 4.9 C one cooler, 3.7 C one cooler
Chain-of-Custody: OK
Samples preservatives: OK

Parameter: **TPHg**

HTs: 14 days preserved, 7 days unpreserved – analyzed 06/20/13
Batch IDs: 199892
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 6/21/13
Batch IDs: 199910
Surrogates: OK
Method Blank: OK, surrogates OK
BS/BSD: BS OK, surrogate OK
BSD OK, surrogates OK

Parameter: **BTEX + MTBE**

HTs: 14 days – analyzed 6/20/13, 6/21/13, 6/24/13
Batch IDs: 199889, 199932, 199945, 200003
Surrogates: OK
Method Blank: OK, surrogates OK
BS/BSD: BS OK, surrogates OK
BSD OK, surrogates OK
MS/MSD: MS OK, surrogates OK
MSD OK, surrogates OK

Port of Oakland
530 Water Street • Oakland, CA 94607

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:	6/19/13		
Recorded By:	C. Orsi		
Recovery Well	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)
RW-1	Inaccessible		
RW-2	—	10.13	—
RW-3	10.75	13.62	2.87
RW-4	9.94	14.27	4.33
RW-5	Truck parked over well		
RW-6	8.86	10.35	1.49
RW-7	8.25	13.75	5.50
RW-8	9.42	11.11	1.69
RW-9	9.68	10.76	1.08
MW-1	NM	NM	NA
MW-2	NM	NM	NA
MW-3	10.92	12.45	1.53
MW-4	NM	NM	NA
MW-5	NM	NM	NA
MW-8A	NM	NM	NA
MW-9	NM	NM	NA
MW-10	NM	NM	NA
MW-11	NM	NM	NA
MW-12	NM	NM	NA