PORT OF OAKLAND

January 23, 2014

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

RE: RO#0000010_2013 Second Semi-Annual Groundwater Monitoring Report - Port of Oakland, 651 Maritime Street, Oakland, CA_2014-01-23

Dear Mr. Nowell:

Please find enclosed the report entitled *2013 Second Semi-Annual Groundwater Monitoring Report - Port of Oakland, 651 Maritime Street, Oakland, CA ("Report")* dated January, 2014, prepared by ARCADIS, U.S., Inc. ("ARCADIS") 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 ARCADIS to perform groundwater monitoring and maintenance of the remediation system. Results of the second 2013 semi-annual sampling event are

[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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contained in the enclosed report. 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 ARCADIS 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.): Katherine Brandt, P.G. (ARCADIS)
Yane Nordhav (Baseline Environmental)

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PORT OF OAKLAND

2013 Second Semi-Annual Groundwater Monitoring Report

Port of Oakland
651 Maritime Street
Oakland, California

January 2014

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Caroline Orsi
Staff Geologist

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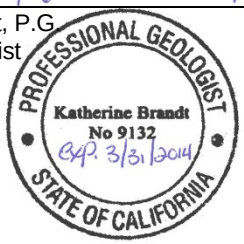

2013 Second Semi-Annual Groundwater Monitoring Report

Port of Oakland
651 Maritime Street
Oakland, California

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Port of Oakland

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Our Ref.:
04656020.HFC1

Date:
January 17, 2014

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Acronyms and Abbreviations

ACHCS	Alameda County Health Care Services
amsl	above mean sea level
ARCADIS	ARCADIS U.S., Inc.
BTEX	Benzene, toluene, ethylbenzene, and total xylenes
C&T	Curtis and Tomkins, Ltd.
DO	Dissolved oxygen
ESS	Environmental Sampling Services
FS/CAP	Feasibility Study/Corrective Action Plan
GAC	Granular activated carbon
LOP	Local Oversight Program
MCL	Maximum contaminant level
MNA	Monitored natural attenuation
MSE	MSE Group
MTBE	Methyl tert-butyl ether
NESCO	National Environmental Service Company
ORC	Oxygen Releasing Compound™
ORP	Oxidation/reduction potential
PAHs	polycyclic aromatic
Port	Port of Oakland
ppm	Parts per million
QA/QC	Quality assurance/quality control
RAMCON	RAMCON Engineering and Environmental Contracting
RPD	Relative percent difference
RWQCB	Regional Water Quality Control Board
TDS	Total dissolved solids
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	United States Environmental Protection Agency
UST	Underground Storage Tank
µg/L	micrograms per liter
µm	micrometer

1. Introduction

This 2013 Second Semi-Annual Groundwater Monitoring Report (Report) for 651 Maritime Street, Oakland, California (Site)[1] has been prepared by ARCADIS U.S., Inc (ARCADIS), on behalf of the Port of Oakland (Port). This Report includes the period from July through December 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

[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.

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

651 Maritime Site

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

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

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

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

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

In 2006, the ACHCS approved a modification of the groundwater monitoring frequency from quarterly to semi-annually at the Site. The first semi-annual monitoring event occurred on July 28, 2006. The ACHCS also approved the use of Oxygen Release Compound™ (ORC) in well MW-4 to increase the dissolved oxygen (DO) concentration in groundwater and stimulate aerobic biodegradation of the petroleum hydrocarbons present in the groundwater at that location.[5]

In 2007, the product recovery system was enhanced by adding a low vacuum to the recovery well heads to increase product recovery rates. Air drawn from the recovery wells was 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.

[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

Environmental Sampling Services (ESS), under contract with ARCADIS, conducted the 2013 second semi-annual groundwater monitoring event at the Site on December 12th, 13th, and 16th, 2013. The December 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 were 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. 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; hence, this well was neither purged nor sampled. Water level measurements for the December 2013 monitoring event are summarized in Table 1 and included on the groundwater sampling forms in Appendix A.

ESS 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. ESS monitored field water quality parameters (including temperature, pH, oxidation/reduction potential (ORP), DO concentration, and electrical conductivity) of the purge water using portable field instruments calibrated to manufacturer's specifications. Purging continued until water quality parameters stabilized as recharge rates permitted. Field-measured groundwater quality information collected during the December 2013 monitoring event is provided on groundwater sampling forms included in Appendix A.

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

- TPHg in accordance with U.S. Environmental Protection Agency (USEPA) Method 8015B;
- TPHd and TPHmo in accordance with USEPA Method 8015B;
- BTEX and methyl tert-butyl ether (MTBE) in accordance with USEPA Method 8260B;
- Total dissolved solids (TDS) in accordance with USEPA Method 16.1;
- Dissolved metals and cations (sodium, potassium, calcium, magnesium, manganese, and iron) in accordance with USEPA Methods 6010B and 200.7;
- Major anions (sulfate, chloride, nitrate, and nitrite) in accordance with USEPA Method 300.0;
- Alkalinity (bicarbonate and carbonate) in accordance with Standard Method 2320B;
- Orthophosphate in accordance with Standard Method 4500P-E; and
- Dissolved sulfate in accordance with Standard Method 4500S2-D.

Samples collected for dissolved metals analysis were field filtered using a 0.45 micrometer (µm) glass fiber filter to remove suspended sediment.

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 21 gallons of purge and decontamination water were generated during the December 2013 monitoring event. ESS placed the water in a properly labeled 55-gallon drum, which was stored in the free product recovery system enclosure located within the Harbor Facilities Complex. The Port's environmental services contractor will dispose of the water in accordance with applicable laws and regulations.

3. Results

The following sections summarize the field and laboratory results collected during the second six months of 2013.

3.1 Groundwater Flow Direction

Based on the depth-to-water measurements collected, groundwater levels beneath the Site in December 2013 were slightly lower than those observed in June 2013. In June 2013, groundwater elevations ranged from 3.55 feet above mean sea level (amsl) to 6.07 feet amsl. In December 2013, groundwater elevations ranged from 3.24 feet amsl to 5.92 feet amsl. Groundwater gradients at the Site ranged from 0.0019 to 0.03 feet per foot. Groundwater flow is generally to the northeast. A shallow groundwater elevation contour map for December 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 December 2013 monitoring event. The product thickness in well MW-3 was measured to be 2.00 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 third consecutive monitoring event. Free-phase product has not been observed in any other monitoring wells since records have been kept, beginning in 1997 for MW-2 and MW-5; 2001 for MW-8A; and 2008 for MW-9, MW-10, MW-11, and MW-12.

3.3 Analytical Results

Analytical results for the groundwater samples collected during the December 2013 monitoring event are illustrated on Figure 5 and summarized in Tables 2 and 3. 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 81 micrograms per liter (µg/L) (MW-4) to 1,700 µg/L (MW-1). The laboratory also reported that chromatograms resulting from the TPHg analyses at MW-12 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 stable trend over time for concentrations of TPHg in all wells, with the exception of a small increase in the TPHg concentration at MW-9 during this reporting

period. The TPHg concentration at MW-9 in December 2013 is within its historic range. All TPHg concentrations reported during this sampling event are below the Site remedial goal of 3,700 µg/L.[7]

3.3.2 BTEX and MTBE

The laboratory reported benzene in the groundwater samples collected from wells MW-1 (10 µg/L), MW-4 (2.6 µg/L), MW-9 (28 µg/L), and MW-10 (57 µg/L). Ethylbenzene was reported in the samples collected from wells MW-1 (1.2 µg/L) and MW-9 (6.9 µg/L). Xylenes were reported in the samples collected from MW-1 (3.3 µg/L) and MW-9 (1.9 µg/L). MTBE was detected in the samples collected from MW-9 (4.0 µg/L) and MW-12 (4.5 µg/L). Toluene was detected in the samples collected from MW-1 (2.2 µg/L) and MW-9 (0.6 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 benzene concentration at MW-9 increased during this reporting period; however, it is still within its historic range. The reported concentration in MW-10 is above the Site remedial goal of 46 µg/L. 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 and the California maximum contaminant level (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-10, and MW-12 at concentrations ranging from 130 µg/L (MW-10) to 1,700 µg/L (MW-1). The laboratory reported TPHmo concentrations below the analytical method reporting limit in all of 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 contained free product). TPHd concentrations in most of the Site monitoring wells are stable or decreasing and remain

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

below the Site remedial goal of 640 µg/L. The detected concentration of TPHd in MW-10, which had been increasing between December 2010 and December 2012, has decreased over the past two monitoring events.

3.3.4 Monitored Natural Attenuation Parameters

In accordance with the Feasibility Study/Corrective Action Plan (FS/CAP), samples were analyzed for monitored natural attenuation (MNA) parameters in December 2013. Methane was detected in all wells at concentrations ranging from 53 µg/L to 6,800 µg/L. DO was below the detection limit of 1 mg/L in all nine wells. Ferrous iron was detected in eight of the nine wells (not detected in MW-2), at concentrations ranging from 0.50 mg/L to 13 mg/L. Dissolved sulfide was detected in the samples collected from wells MW-1, MW-9, MW-10, and MW-12 at concentrations of 0.09 mg/L to 0.56 mg/L.

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

3.4 Quality Assurance / Quality Control

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

The laboratory reported benzene in sample MW-4 and duplicate sample MW-4DUP at concentrations of 2.6 µg/L and 2.4 µg/L, respectively. The relative percent difference (RPD) between the two samples is calculated below:

Benzene RPD |2.6-2.4| / [(2.6+2.4)/2] = 8%

The RPD 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 trip blanks using deionized water as a water quality control sample. The trip blanks were stored in the coolers and accompanied groundwater samples from collection to transport to the laboratory. One trip blank was submitted for each day of sampling and 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.

ARCADIS 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, ARCADIS considers the data collected during the December 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 ACHCS on May 16, 2011, ARCADIS 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 are collected from monitoring and recovery wells during each groundwater monitoring event to confirm stability of the free-phase product.

Free product and water level measurements for these dates are included in Table 4. Based on the measurements collected, the free-phase product plume appears stable. Product thickness increased in recovery wells RW-6 and RW-7, located near the center of the plume, but decreased or remained stable in recovery wells at the edges of the plume. Free product was not observed in any new wells in December 2013. The observed area of free-phase product as assessed in December 2013 is illustrated on Figure 5. Field sheets documenting these measurements are provided in Appendix C.

5. Conclusions

The December 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 30 months. Water quality results from the December 2013 monitoring event support the assessment that groundwater concentrations are generally stable or decreasing and below their respective site-specific risk-based target levels. Results of the MNA assessment indicate that petroleum hydrocarbons are actively being reduced through anaerobic degradation.

Risk-based target levels for the Site were derived following the Regional Water Quality Control Board (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 parts per million (ppm)); and (3) risks are managed through implementation of institutional controls and deed restrictions.

Based on the results of the December 2013 monitoring event, as well as previous events, ARCADIS 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. Per the FS/CAP, site wells will be sampled for MNA parameters again in 2016; however, based on the consistent results of the 2011 and 2013 MNA samples, ARCADIS recommends that MNA parameters be removed from the 2016 sampling program.

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Tables

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
	12/12/13	15.80	NP	10.87	0.00	4.93
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
	12/12/13	16.43	NP	12.31	0.0	4.12
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
	12/12/13	15.66	11.23	13.23	2.00	3.83
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
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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
	12/12/13	15.91	NP	12.22	0.0	3.69
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
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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
	12/12/13	15.39	NP	9.47	0.0	5.92
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
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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
	12/12/13	14.99	NP	11.75	0.0	3.24

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
	12/12/13	16.33	NP	12.41	0.0	3.92
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
	12/12/13	15.65	NP	11.23	0.0	4.42
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
	12/12/13	15.47	NP	11.04	0.0	4.43

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
	12/12/2013	16.79	NP	12.47	0.0	4.32

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
	12/13/13	1,700	1,700	<300	10	2.6	1.2	3.3	<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
	12/12/13	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
MW-3									
	Not sampled due to the presence of free-phase product								
MW-4									
	09/11/95	150	<200	500	23	<0.3	<0.3	<0.4	NA
	01/08/96	790	90	400	170	1.2	0.6	0.6	NA
	04/04/96	1,100	180	300	320	1.6	1.1	1.2	NA
	07/10/96	1,200	120	300	470	1.5	0.8	0.8	NA
	12/03/96	990	220 [1,2]	<250	350	3.3	1.3	1.3	NA
	03/28/97	440 [2]	<50	<250	190	1.2	0.64	<1.0	NA
	06/13/97	1,300	92 [5]	<250	500	5.5	3.4	2.8	NA
	09/18/97	1,300	150	<250	550	4.9	2.1	2.00	NA
	12/31/97	73 [1,2,3]	<47	<280	110 [1]	1.0 [1]	<0.5	<1.0	NA
	04/13/98	150 [2,3]	<50	<300	520	2.9	<2.5	<5.0	NA
	11/06/98	<50	<50	<300	250	1.7	<1.0	<1.0	<4
	03/19/99	81	<50	<300	250	<1	1.2	<1.0	<4
Dup.	06/24/99	190	<50	<300	360	1.4	2.2	1.0	24
	09/28/99	750 [3,5]	63 [3,5]	<300	280	1.5	<1.0	<1.0	<4
	11/12/99	330 [3]	840 [2]	<300	740	<2.5	<2.5	<2.5	42 [9]
	02/11/00	200 [2]	<50	<300	58	0.73	<0.5	<0.5	4.4 [8]
	05/22/00	240	<50	<300	500	<2.5	<2.5	<2.5	17
	09/06/00	530 [2,3]	<50	<300	190	0.93	0.6	0.57	<0.5 [10]
	12/19/00	960 [3,11]	70 [5]	<300	420	<2.5	<2.5	<2.5	<0.5 [10,12]

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

Monitoring Well	Date Sampled	Concentration (µg/L)							
		TPH-G	TPH-D	TPH-MO	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE
MW-4 (cont)	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
	12/13/13	81	<50	<300	2.6	<0.5	<0.5	<0.5	<0.5
Dup.	12/13/13	85	<50	<300	2.4	<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]

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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)	02/11/00	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	05/22/00	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	09/06/00	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	12/19/00	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	02/21/01	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	07/10/01	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	12/05/01	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	03/08/02	<50	<50	<500	<0.5	<0.5	<0.5	<0.5	<5.0
	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
	12/16/13	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5

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

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

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		TPH-G	TPH-D	TPH-MO	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE
MW-8A (cont)	12/14/10	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/23/11	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	09/26/11	<50	<50 [24]	<300 [24]	<0.5	<0.5	<0.5	<0.5	<0.5
	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
	12/13/13	<50	<50	<300	<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
	12/13/13	210	<50	<300	28	0.6	6.9	1.9	4.0
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
	12/13/13	280	130 [2]	<300	57	0.6	<0.5	<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

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-11 (cont)	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
	12/12/13	<50	<50	<300	<1.0	<1.0	<1.0	<1.0	<1.0
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
	12/12/13	82 [2]	240 [2]	<300	<0.5	<0.5	<0.5	0.9	4.9

Notes:

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

µg/L = micrograms per liter

Dup. = duplicate sample

NA = not analyzed

TPHg = total petroleum hydrocarbons in gasoline range.

TPHd = total petroleum hydrocarbons in diesel range.

TPHmo = total petroleum hydrocarbons in motor oil range.

MTBE = methyl tert-butyl ether

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

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

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

[4] Chromatographic pattern matches known laboratory contaminant.

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

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

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

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

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

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

[11] Sample exhibits unknown single peak or peaks.

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

[13] Lighter hydrocarbons contributed to the quantitation.

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

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

[16] Sample extracted out of hold time.

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

[18] Unmodified or weakly modified gasoline is significant.

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

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

[20] Gasoline compounds are significant.

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

[22] Heavier hydrocarbons contributed to the quantitation.

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

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

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

Monitoring Well	Date Sampled	Field Parameters			Analytical Concentrations																	
		DO (mg/L)	ORP (mV)	Iron (II) (mg/L)	Carbon Dioxide (mg/L)	Methane (µg/L)	Iron (II) (mg/L)	Manganese (II) (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Sulfide (Dissolved, mg/L)	Nitrate (as N, mg/L)	Nitrite (as N, mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Orthophosphate (as P, mg/L)	Carbonate (mg/L)	Bicarbonate (mg/L)	Alkalinity, Total (as $CaCO_3$, mg/L)	Total Dissolved Solids (mg/L)
MW-1																						
	06/22/11	0.04	-99.7	0.91	17	6,300	0.84	0.52	25	16	1.0	48	0.24	<0.05	<0.05	<0.50	11	0.13	<6.7	250	250	270
	09/26/11	Not sampled due to the presence of free-phase product																				
	12/13/13	0.1	-107.1	NA	NA	5,800	6.9	0.61	24	18	<5	58	0.17	<0.05	<0.05	<0.50	7.1	0.046	<6.7	250	250	270
MW-2																						
	06/22/11	3.27	27.3	0.00	23	0.69	<0.10	0.077	26	27	1.1	150	<0.04	0.25	<0.05	31	19	0.13	<6.7	500	500	610
	09/26/11	0.38	108.5	0.00	31	18	<0.10	0.19	29	29	1.3	180	<0.04	<0.05	<0.05	29	23	0.15	<10	560	560	660
	12/12/13	0.74	-15.6	NA	NA	270	<0.10	0.51	32	36	1.4	240	<0.04	<0.05	<0.05	25	21	0.17	<2.0	640	640	680
MW-3																						
	6/22/2011	Not sampled due to the presence of free-phase product																				
	9/26/2011	Not sampled due to the presence of free-phase product																				
	12/12/2013	Not sampled due to the presence of free-phase product																				
MW-4																						
	06/21/11	0.09	-32.0	0.05	2.5 J	3,400	<0.10	0.18	21	57	14	340	<0.04	<0.05	<0.05	5.3	280	0.64	<6.7	800	800	1,280
Dup.	06/21/11	0.09	-32.0	0.04	3.1	3,500	<0.10	0.18	20	58	14	340	<0.04	<0.05	<0.05	5.5	280	0.64	<6.7	770	770	1,270
	09/27/11	0.42	-137.0	0.51	15	4,100	0.46	0.31	41	68	9.8	250	<0.04	<0.05	<0.05	1.9	170	0.53	<10	860	860	1,150 [1]
Dup.	09/27/11	0.42	-137.0	0.51	16	4,100	0.27	0.25	36	65	9.2	240	<0.04	<0.05	<0.05	2.0	150	0.51	<10	810	810	1,150 [1]
	12/13/13	0.23	-162.1	NA	NA	3,900	3.0	0.89	67	100	21	450	<0.04	<0.05	<0.05	2.6	500	0.27	<6.7	890	890	1,690
Dup.	12/13/13	0.23	-162.1	NA	NA	3,200	3.0	0.87	66	100	21	470	<0.04	<0.05	<0.05	2.5	490	0.27	<6.7	890	890	1,610
MW-5																						
	06/22/11	0.24	-52.5	0.30	27	74	0.46	0.67	48	21	16	230	<0.04	<0.05	<0.05	69	300	0.35	<6.7	360	360	960
	09/27/11	0.33	-68.5	0.59	30	78	0.59	0.77	54	22	17	260	<0.04	<0.05	<0.05	74	290	0.33	<10	350	350	1,010 [1]
	12/16/13	0.50	-94.1	NA	NA	53	0.50	0.77	62	29	20	300	<0.04	<0.05	<0.05	72	350	<0.13	<5.0	410	410	1,080
MW-6																						
	12/18/02	Monitoring well was destroyed																				
MW-7																						
	12/18/02	Monitoring well was destroyed																				
MW-8																						
	11/21/98	Monitoring well was destroyed and replaced with well MW-8A																				
MW-8A																						
	06/23/11	0.44	-203.1	1.85	5.0	400	2.3	0.67	46	58	15	230	<0.04	<0.05	<0.05	38	140	1.3	<6.7	760	760	1,060
	09/26/11	0.16	-109.1	2.57	52	310	2.9	0.85	53	65	18	280	<0.04	<0.05	<0.05	47	160	1.3	<10	810	810	360
	12/13/13	0.17	-149.8	NA	NA	89	2.8	0.85	58	72	20	290	<0.04	<0.05	<0.05	39	170	0.37	<6.7	780	780	1,150
MW-9																						
	06/22/11	0.14	-130.1	3.30*	71	10,000	6.3	0.87	70	46	14	280	0.09	<0.05	<0.05	0.54	290	1.3	<6.7	750	750	1,240
	09/27/11	0.22	-122.2	3.62	71	9,500	6.6	0.93	71	46	15	350	0.08	<0.05	<0.05	0.69	270	1.3	<10	770	770	1,360 [1]
	12/13/13	0.30	-139.1	NA	NA	5,000	4.8	0.60	40	49	7.7	390	0.14	<0.05	<0.05	2.60	170	0.48	<6.7	930	930	1,260
MW-10																						
	06/22/11	0.03	-118	3.30*	160	7,300	7.8	4.2	130	67	30	420	0.09	<0.05	<0.10	4.1	530	0.46	<6.7	1,100	1,100	2,030
	09/26/11	0.15	-138.7	2.1	170	7,300	8.8	4.5	150	72	31	450	0.11	<0.05	<0.05	28	520	0.60	<10	1,100	1,100	680
	12/13/13	0.15	-139.3	NA	NA	5,500	13	5.6	170	82	34	440	0.09	<0.05	<0.05	10	500	0.07	<6.7	1,100	1,100	2,050
MW-11																						
	06/21/11	0.06	-178.4	0.93	44	7,900	1.4	0.39	25	52	46	970	<0.04	<0.10	<0.10	<1.0	970	9.6	<6.7	1,500	1,500	3,140
	09/26/11	0.20	-198.9	0.47	46	8,300	1.5	0.38	25	51	49	1,100	<0.04	<0.05	<0.05	<1.0	1,000	7.7	<10	1,500	1,500	3,180
	12/12/13	0.27	-188.3	NA	NA	6,300	2.0	0.34	25	54	56	1,200	<0.04	<0.25	<0.25	<2.5	940	1.7	<2.0	1,500	1,500	3,130
MW-12																						
	06/23/11	0.18	-253.8	0.41	85	5,100	0.46	1.3	93	43	15	160	4.7	<0.05	<0.05	2.4	180	0.76	<6.7	620	620	940
	09/26/11	0.36	-260.9	0.40	88	4,900	0.67	1.4	96	43	15	180	3.3	<0.05	<0.05	1.5	180	0.73	<10	640	640	1,000
	12/12/13	0.31	-120.3	NA	NA	6,800	1.3	1.4	91	43	16	240	0.56	<0.05	<0.05	<0.5	170	0.21	<2.0	660	660	930

Notes:
* Sample iron (II) concentration exceeded range of instrument.
DO = dissolved oxygen
ORP = oxidation-reduction potential
mg/L = milligrams per liter
ug/L = microgram per Liter
N = nitrogen
NA = not analyzed
P = phosphorus
$CaCO_3$ = calcium carbonate
J = estimated value
[1] Batch spike duplicate for TDS outside of acceptable relative percent difference range.

TABLE 4. Free Product Recovery System Groundwater Elevation and Free Product Data
January 1, 2011 Through December 12, 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
	12/12/13	15.56	NP	10.11	0.00	5.45
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
	12/12/13	15.56	11.12	14.12	3.00	3.54
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

TABLE 4. Free Product Recovery System Groundwater Elevation and Free Product Data
January 1, 2011 Through December 12, 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)	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
	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
	12/12/13	14.92	9.95	14.07	4.12	3.73
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				
	12/12/13	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

TABLE 4. Free Product Recovery System Groundwater Elevation and Free Product Data
January 1, 2011 Through December 12, 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-6 (cont)	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
	12/12/13	15.75	9.19	14.07	4.88	5.10
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
	12/12/13	15.02	8.47	16.13	7.66	4.25
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

TABLE 4. Free Product Recovery System Groundwater Elevation and Free Product Data
January 1, 2011 Through December 12, 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-8 (cont)	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
	12/12/13	15.91	9.29	12.24	2.95	5.74
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
	12/12/13	16.57	10.11	10.14	0.03	6.45
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

TABLE 4. Free Product Recovery System Groundwater Elevation and Free Product Data
January 1, 2011 Through December 12, 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)	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
	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
	12/12/13	15.66	11.23	13.23	2.00	3.83

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.

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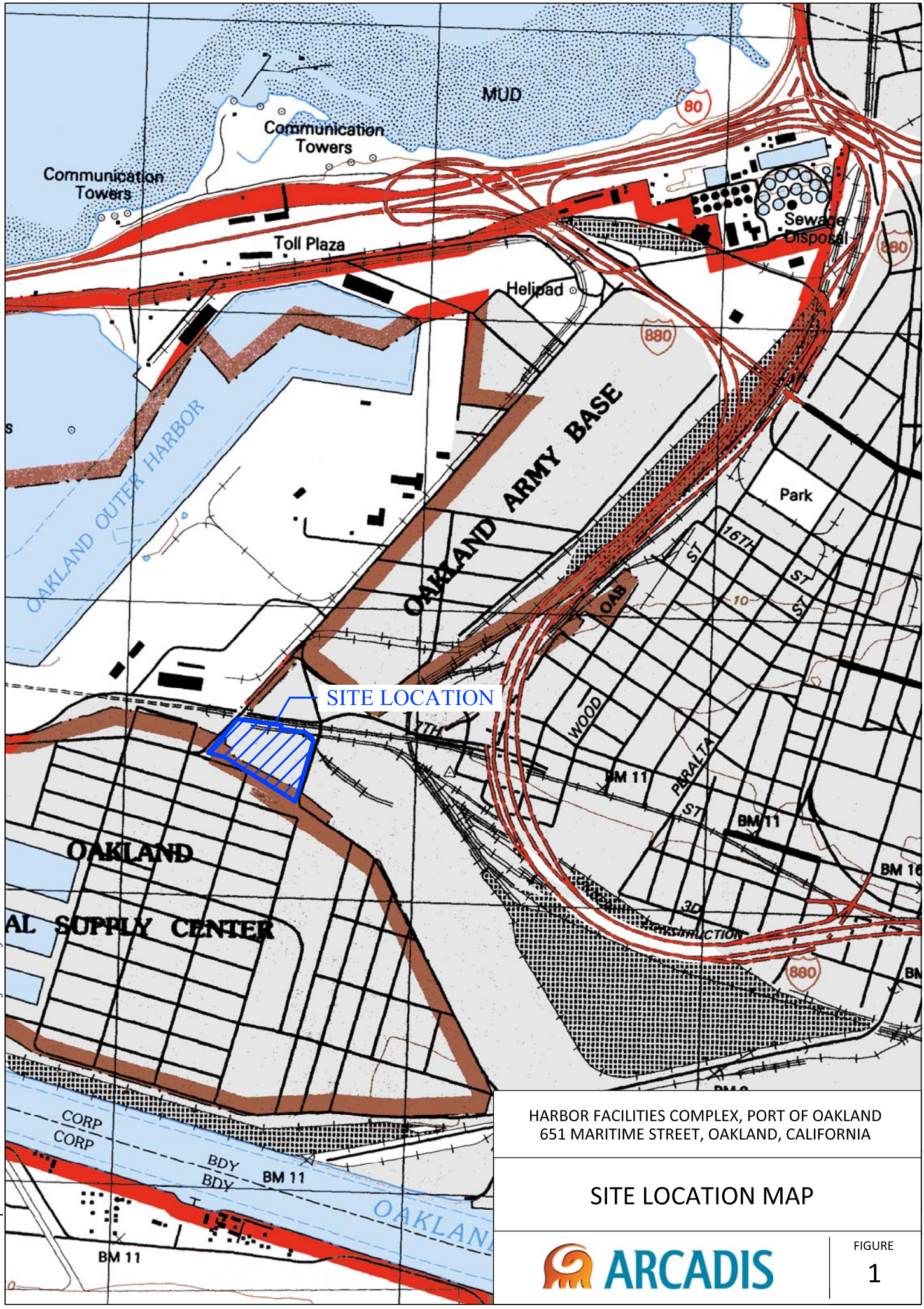
Figures



HARBOR FACILITIES COMPLEX, PORT OF OAKLAND
651 MARITIME STREET, OAKLAND, CALIFORNIA

SITE LOCATION MAP

ARCADIS

FIGURE
1

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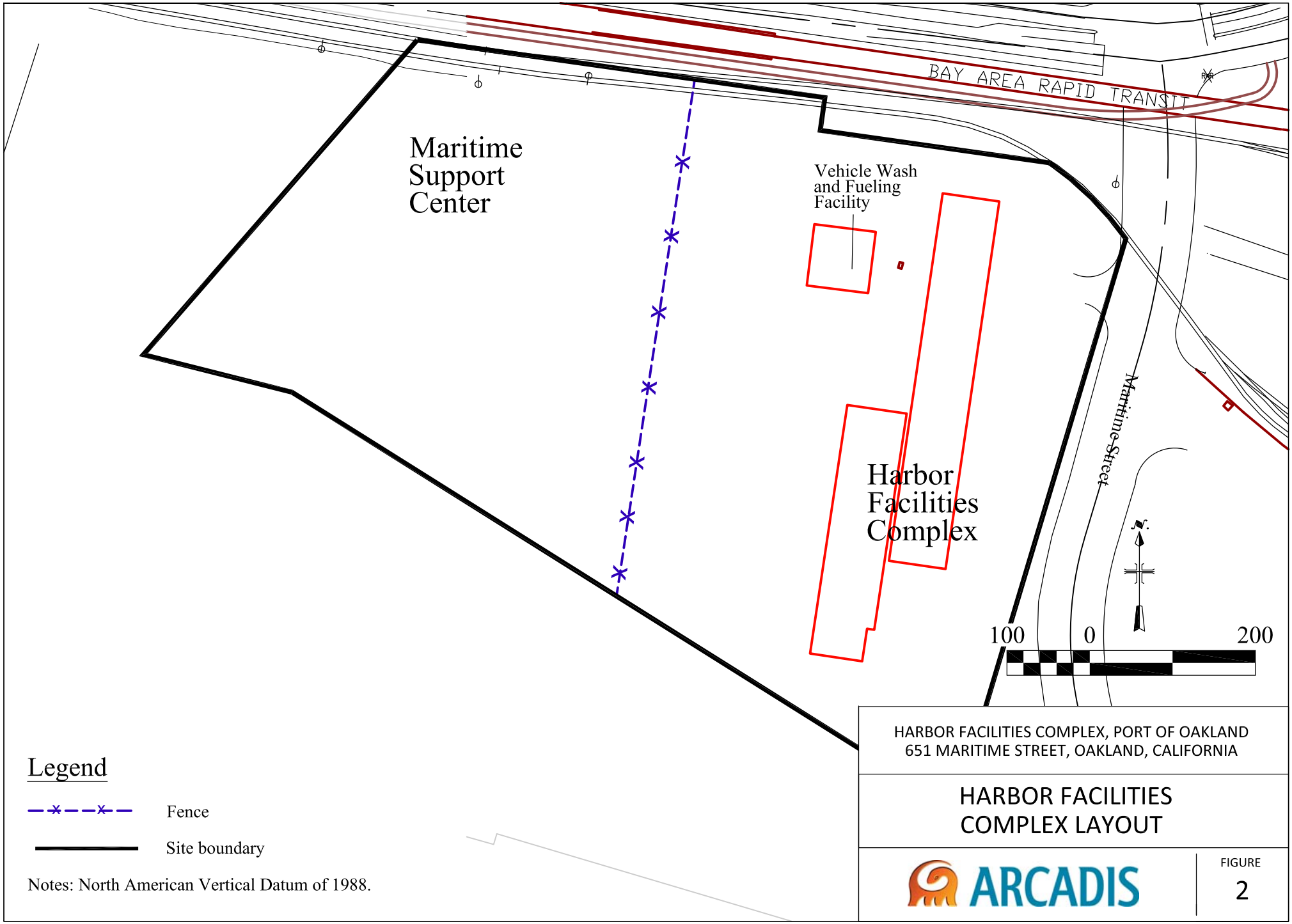


Legend

Fence

Site boundary

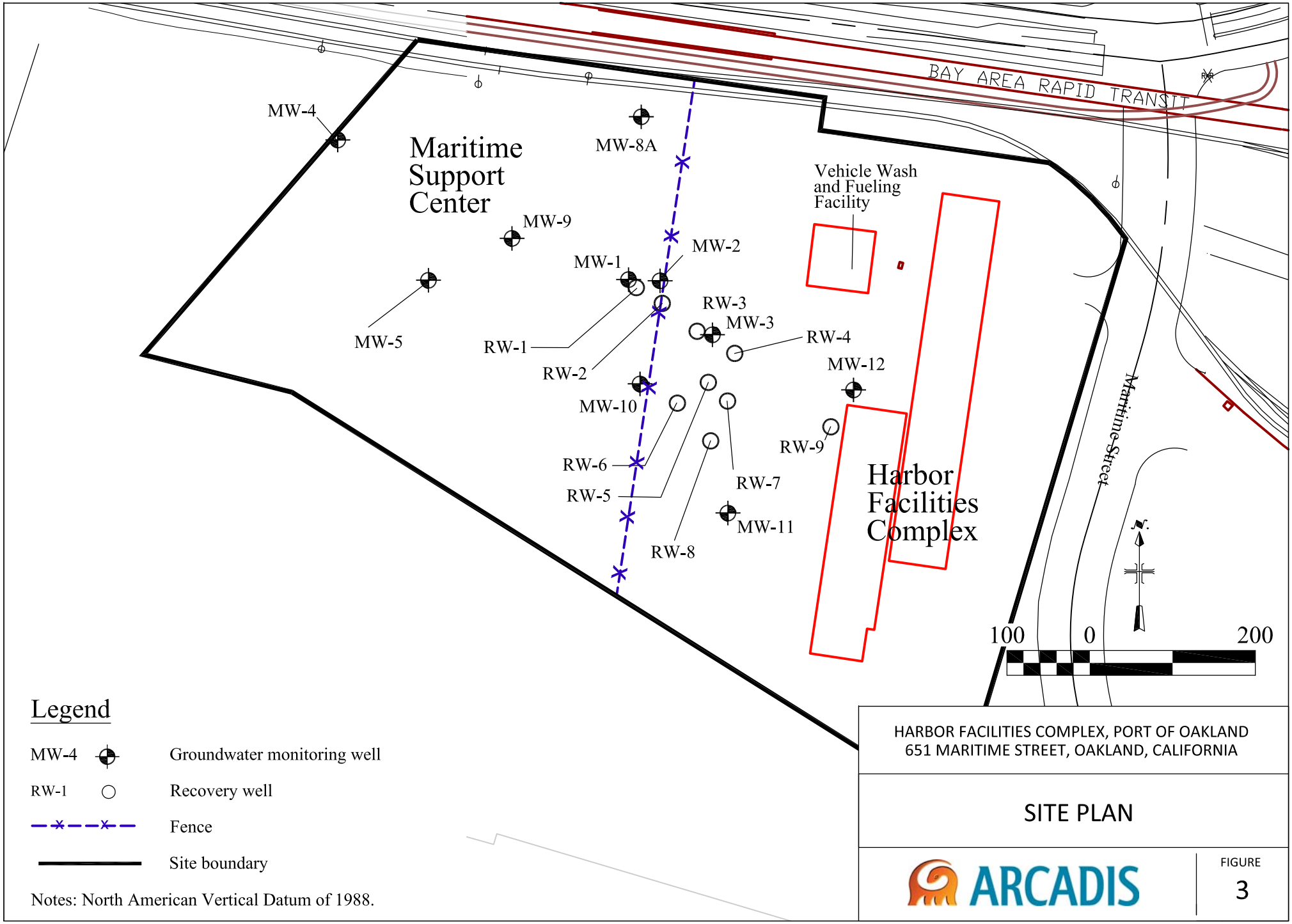
Notes: North American Vertical Datum of 1988.

HARBOR FACILITIES COMPLEX, PORT OF OAKLAND
651 MARITIME STREET, OAKLAND, CALIFORNIA

HARBOR FACILITIES COMPLEX LAYOUT

ARCADIS

FIGURE 2



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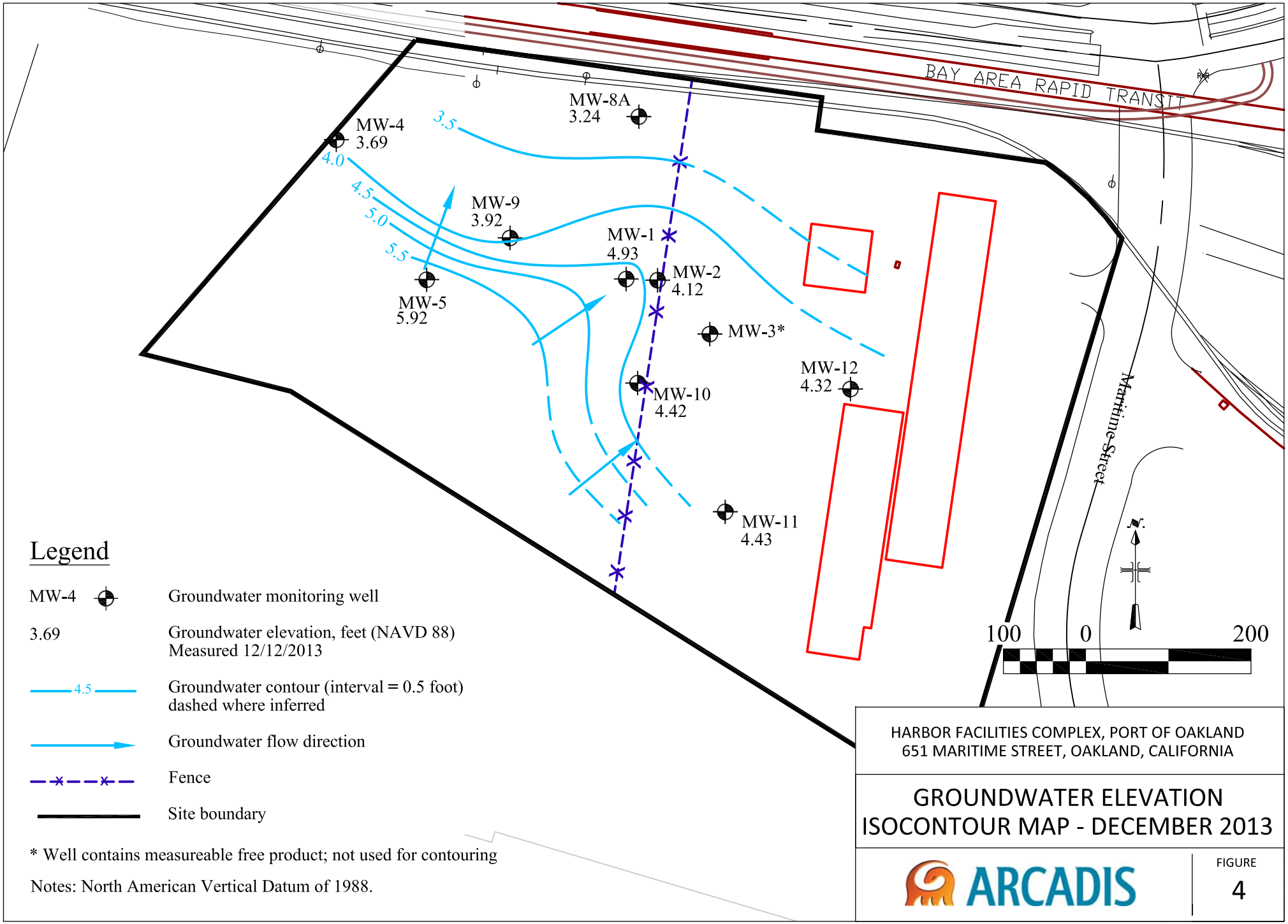


Legend

MW-4 ⊕	Groundwater monitoring well
3.69	Groundwater elevation, feet (NAVD 88) Measured 12/12/2013
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

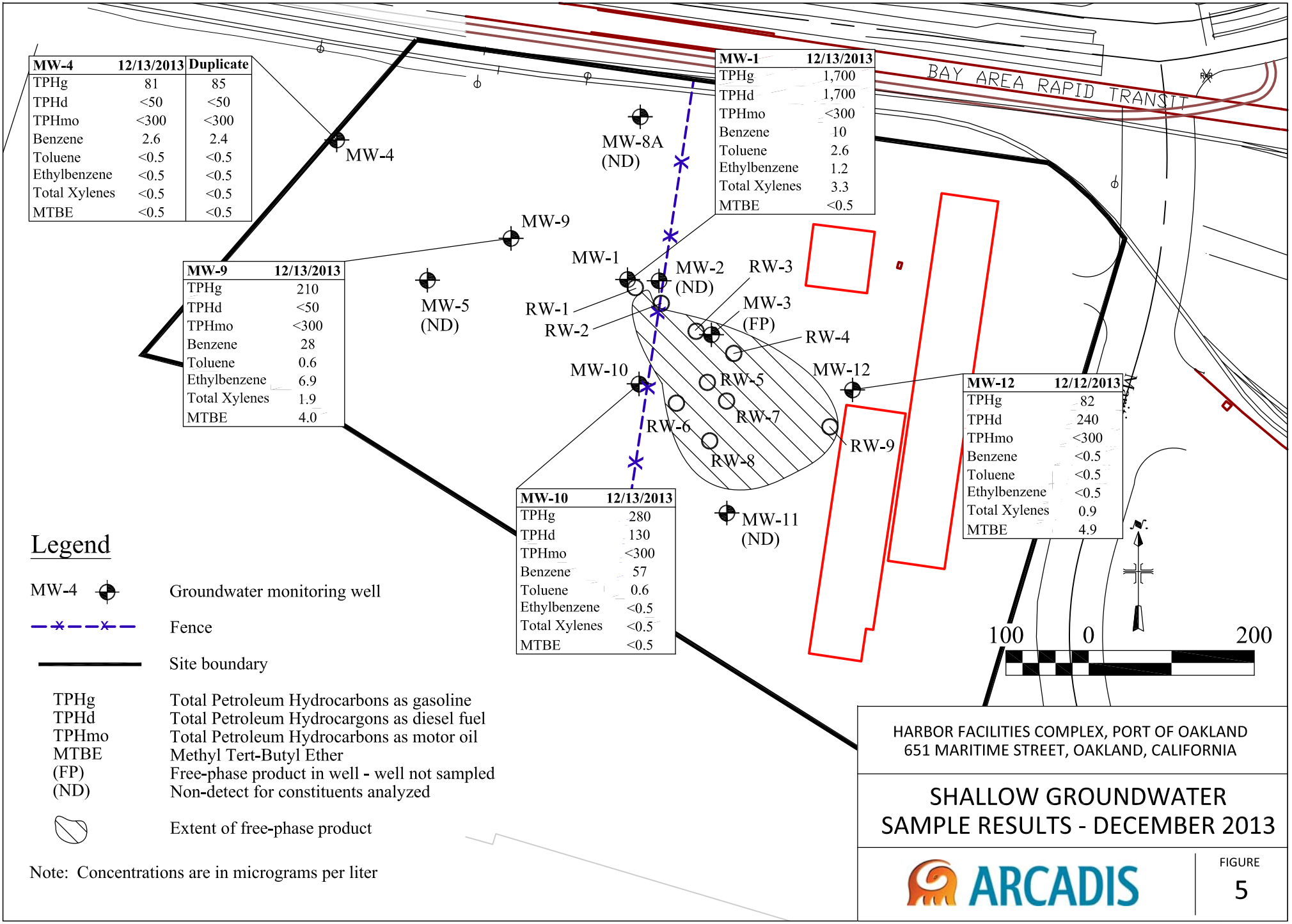
Notes: North American Vertical Datum of 1988.

HARBOR FACILITIES COMPLEX, PORT OF OAKLAND
651 MARITIME STREET, OAKLAND, CALIFORNIA

GROUNDWATER ELEVATION ISOCONTOUR MAP - DECEMBER 2013

ARCADIS

FIGURE 4



MW-4	12/13/2013	Duplicate
TPHg	81	85
TPHd	<50	<50
TPHmo	<300	<300
Benzene	2.6	2.4
Toluene	<0.5	<0.5
Ethylbenzene	<0.5	<0.5
Total Xylenes	<0.5	<0.5
MTBE	<0.5	<0.5

MW-1	12/13/2013
TPHg	1,700
TPHd	1,700
TPHmo	<300
Benzene	10
Toluene	2.6
Ethylbenzene	1.2
Total Xylenes	3.3
MTBE	<0.5

MW-9	12/13/2013
TPHg	210
TPHd	<50
TPHmo	<300
Benzene	28
Toluene	0.6
Ethylbenzene	6.9
Total Xylenes	1.9
MTBE	4.0

MW-10	12/13/2013
TPHg	280
TPHd	130
TPHmo	<300
Benzene	57
Toluene	0.6
Ethylbenzene	<0.5
Total Xylenes	<0.5
MTBE	<0.5

MW-12	12/12/2013
TPHg	82
TPHd	240
TPHmo	<300
Benzene	<0.5
Toluene	<0.5
Ethylbenzene	<0.5
Total Xylenes	0.9
MTBE	4.9

Legend

MW-4 — Groundwater monitoring well

Fence

Site boundary

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

Extent of free-phase product

Note: Concentrations are in micrograms per liter

HARBOR FACILITIES COMPLEX, PORT OF OAKLAND
651 MARITIME STREET, OAKLAND, CALIFORNIA

SHALLOW GROUNDWATER SAMPLE RESULTS - DECEMBER 2013

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FIGURE 5

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Figure 6
TPHg Concentration versus Time

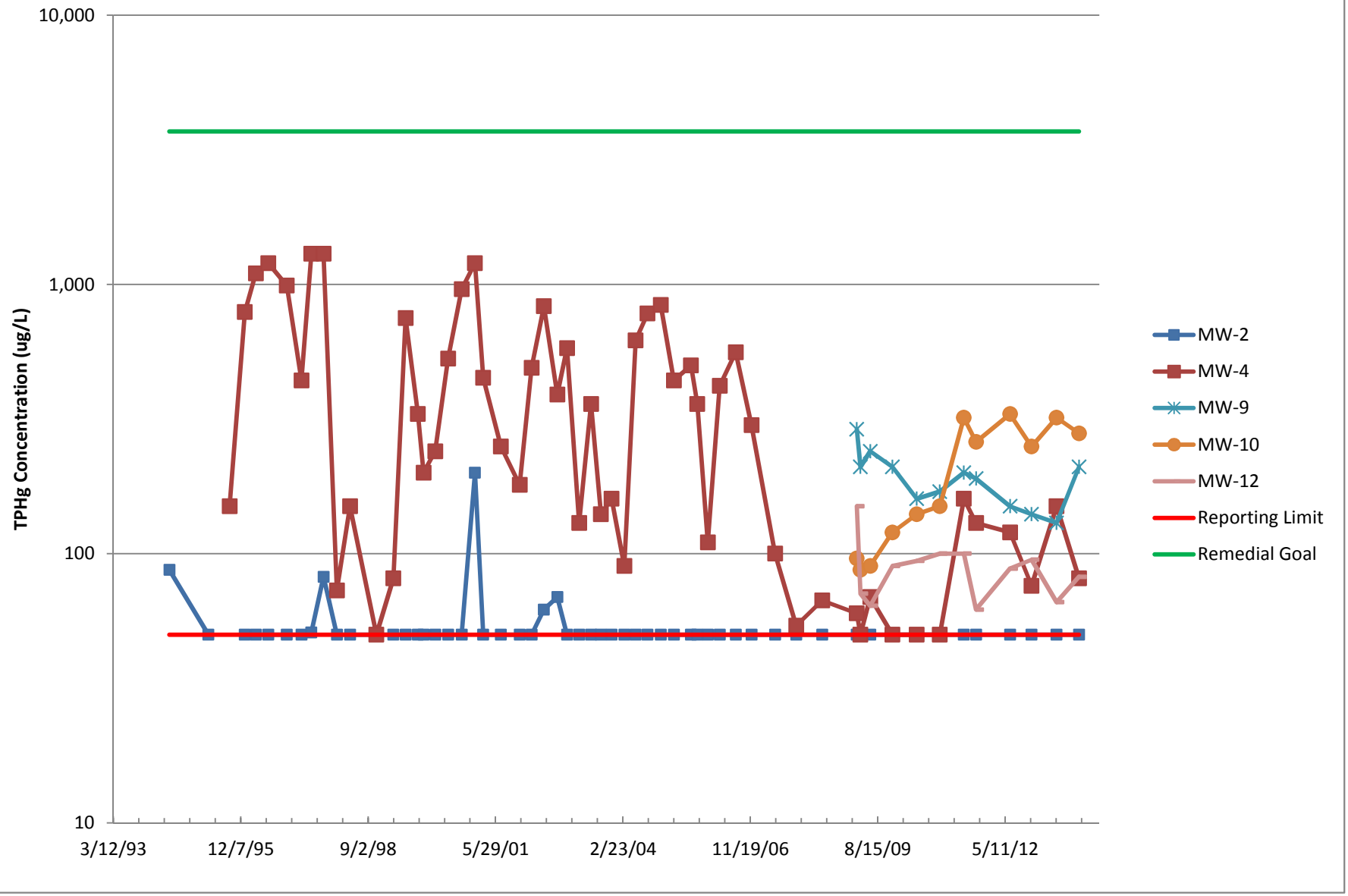


Figure 7
Benzene Concentration versus Time

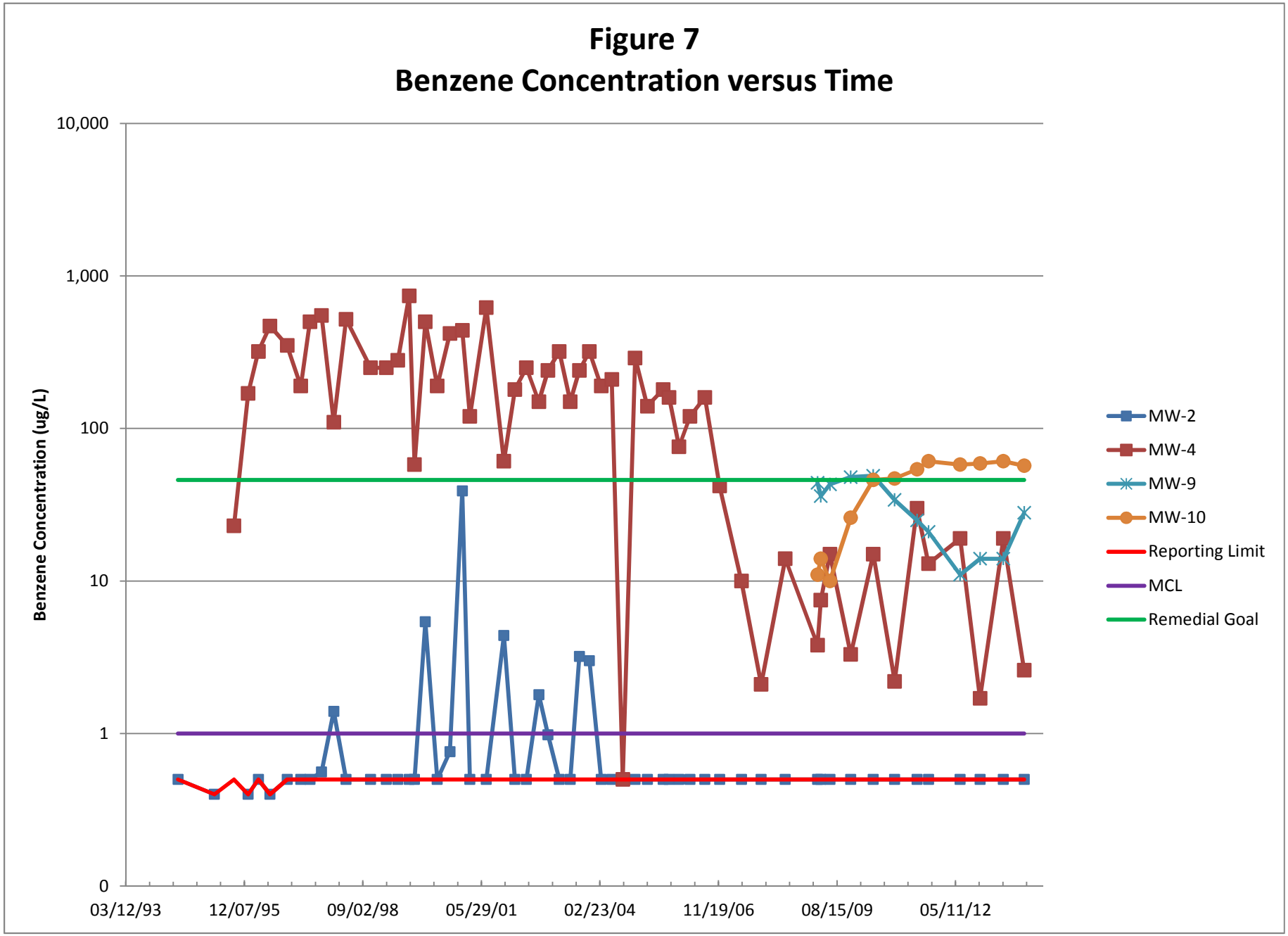


Figure 8
MTBE Concentration versus Time

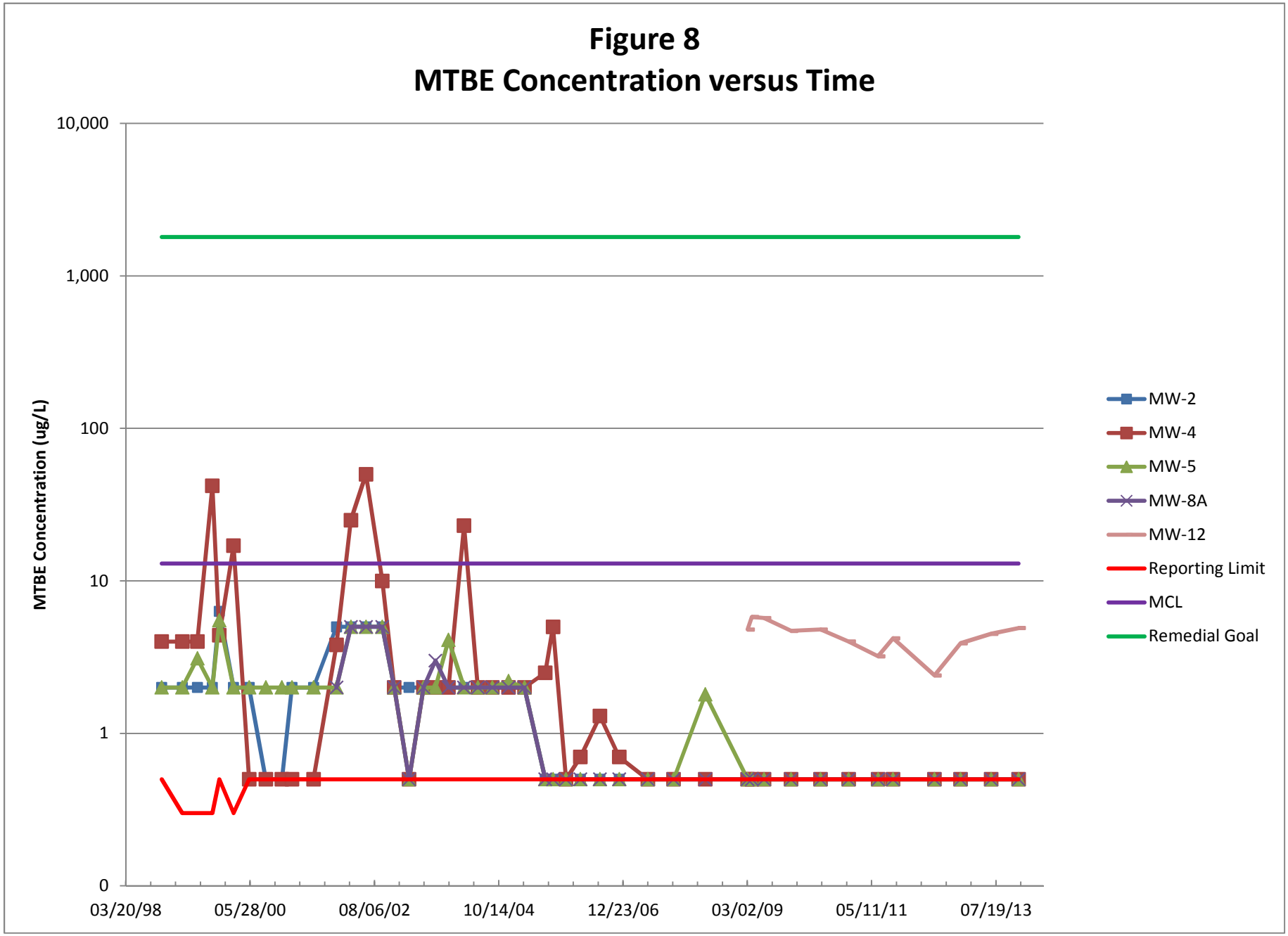
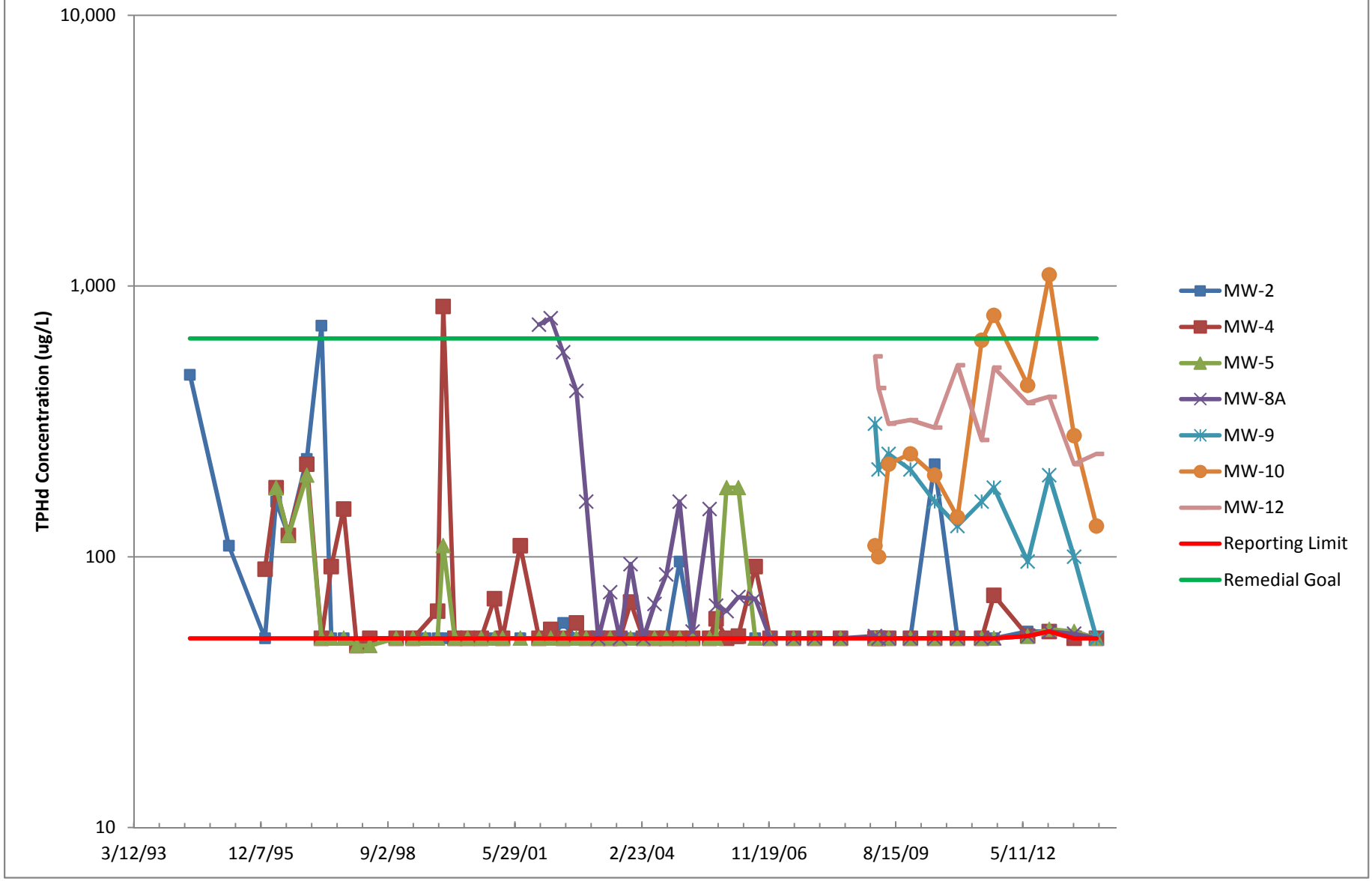


Figure 9
TPHd Concentration versus Time



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Appendix A

Groundwater Sampling Forms

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

Site Visit Date:	Dec. 12, 2013			
Recorded By:	J. Lee			
Recovery Well	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Time of measurement
RW-1	Inaccessible			
RW-2	ND	10.11	∅	10.12
RW-3	11.12	14.12	3.0	9.52
RW-4	9.95	14.07	4.12	10:14
RW-5	under water Truck; no access.			* gained access in late pm but could not remove cap.
RW-6	9.19	11.46	2.27	9:59
RW-7	8.47	16.13	7.66	10:03
RW-8	9.29	12.24	2.95	10:09
RW-9	10.11	10.14	0.03	9:40
MW-1	ND	10.18	∅	8:53
MW-2	ND	12.31	∅	8:57
MW-3	11.23	13.23	2.00	9:45
MW-4	ND	12.17	∅	8:29
MW-5	ND	9.45	∅	9:14
MW-8A	ND	11.71	∅	8:50
MW-9	ND	12.38	∅	9:12
MW-10	ND	10.85	∅	9:00
MW-11	ND	11.15	∅	9:25
MW-12	ND	1242	∅	9:35

Measured on 12/12/2013 by J. Lee
Meter: Solinst o/w gc Interface #~~5855~~ 9371-1

GROUNDWATER SAMPLING

Well No.: **MW-1**

Project No. 4656016 | Recorded by: J. Lee | Date: 12/13/2013
Project Name: Harbor Facilities Center | Depth of well from TOC (feet): 17.65
Location: Port of Oakland | Well diameter (inches): 2
651 Maritime Street, Oakland, California | Screened interval from TOC (feet): 7.65-17.65
Weather: Sunny, clear skies high 50's°F | TOC elevation, NAVD 88 (feet): 15.80
Precip. in past 5 days (in.): 0 | Groundwater elevation, NAVD 88 (feet): 4.93
Source: NOAA Ports | Water level from TOC (feet): 10.87 | Time: 13:12
Water level instrument: O/W Interface ~~5855-1~~ or 12/19/13 9371-1 | Product level from TOC (feet): ND | Time: 13:12

CALCULATION OF WELL VOLUME:

(17.65 ft - 10.87 ft) x (0.083 ft)^2 x π x 7.48 gal/ft^3 = 1.09 gallons in one casing volume
well depth - water level x (well radius)^2 x π x gal/ft^3 = ~1.75 total gallons removed

CALIBRATION: See "Daily Equip. Calib." 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
									D=10.89 w/tube set
13:20	19.25	7.31	0.35	-129.5	443	30.5	~~11.15~~ 11.15		Initial
13:22	19.56	7.16	0.10	-122.0	388	12.4	~~11.49~~ 11.49		0.25
13:24	19.55	7.13	0.10	-117.0	394	5.23	11.65		0.50
13:25	19.69	7.14	0.10	-114.2	398	4.59	11.78		0.75
13:27	19.79	7.17	0.10	-110.1	407	3.98	11.99		1.0
13:29	19.81	7.20	0.10	-107.6	411	3.45	12.15		1.2
13:31	19.90	7.22	0.10	←	-107.1 414	2.73	12.35		1.5

Purge method: Peristaltic Pump + Del. Tubing | Sample Time: 13:32
Duplicate/blank number: None | Duplicate Sample Time: —
Sampling equipment: Peristaltic Pump | VOA attachment:
Sample containers: VOAs, 1L ambers, Poly (9, 2, 4, respectively) = # of containers
Sample analyses: TPHg/BTEX, MTBE, DO, MO; Anions, TDS, Diss. Sulfides, Diss. Cations, RSK175
Laboratory: CTB
Decontamination method: Tap Wtr w/ liquinox, DI Rinse | Rinsate disposal:
Comments: Diss. Cations were field filtered.
Oily sheen observed in purged wtr. O/W Probe came out coated w/ oily-like material.

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

GROUNDWATER SAMPLING

Well No.: **MW-2**

Project No.	4656016	Recorded by: J. Lee	Date: 12/12/2012
Project Name:	Harbor Facilities Center	Depth of well from TOC (feet):	18.06
Location:	Port of Oakland	Well diameter (inches):	2
	651 Maritime Street, Oakland, California	Screened interval from TOC (feet):	8.06-18.06
Weather:	Sunny, 50's°F	TOC elevation, NAVD 88 (feet):	16.43
Precip. in past 5 days (in.):	0	Groundwater elevation, NAVD 88 (feet):	4.12
Source:	NOAA Ports	Water level from TOC (feet): 12.31	Time: 13:28
Water level instrument:	Solinst # 49914	Product level from TOC (feet): —	Time: —

CALCULATION OF WELL VOLUME:

(18.06 ft - 12.31 ft x (0.083 ft)² x π x 7.48 gal/ft³ = 0.93 gallons in one casing volume
well depth - water level x (well radius)² x π x gal/ft³ = ~1.0 total gallons removed

CALIBRATION: see "Daily Equip. 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~~ Liters Removed
13:39	18.75	7.36	1.32	-17.9	1060	3.78	12.48	Initial (0.5)
13:41	19.03	7.37	1.03	-29.1	1056	2.28	12.67	~~0.5~~ 1.0
13:44	19.13	7.34	0.86	-27.0	1039	1.62	12.78	1.5
13:47	19.23	7.23	0.70	-27.0	1035	1.17	12.98	2.0
13:50	19.14	7.26	0.55	-27.3	1037	0.93	13.12	2.5
13:53	19.14	7.23	0.80	-20.2	1044	0.44	~~13.26~~ 13.26	3.0
13:57	19.13	7.24	0.77	-14.5	1046	0.62	13.40	3.5
14:00	19.09	7.32	0.74	-15.6	1047	0.68	13.53	4.0

Purge method: Peristaltic Pump + Ded. Tubing — Sample Time: 14:00
Duplicate/blank number: — Duplicate Sample Time: —
Sampling equipment: Peristaltic Pump — VOA attachment: none
Sample containers: VOAs, Ambers, Polys (9, 2, 4, respectively) = # of containers
Sample analyses: TPHg/BTEX, TPH-D & MO; RSKCO2, Anions, TDS, Diss. Sulfide, Diss. Cations, MTBE
Laboratory: CTB
Decontamination method: Tap Water/Liquinox, DI Rinse — Rinsate disposal: —
Comments: Diss. Cations = field filtered. Clear
& after sampling = 17.50↓

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

GROUNDWATER SAMPLING

Well No.: **MW-3**

Project No. 4656016 | Recorded by: J. Lee | Date: 12/12/2013
Project Name: Harbor Facilities Center | Depth of well from TOC (feet): 17.47
Location: Port of Oakland | Well diameter (inches): 2
651 Maritime Street, Oakland, California | Screened interval from TOC (feet): 7.47-17.47
Weather: Cold am | TOC elevation, NAVD 88 (feet):
Precip. in past 5 days (in.): Ø | Groundwater elevation, NAVD 88 (feet):
Source: NOAA Ports | Water level from TOC (feet): 13.23 | Time: 9:45
Water level instrument: oil/wtr. Interface Meter #9855 9571-1 | Product level from TOC (feet): 11.23 | Time: 9:45

CALCULATION OF WELL VOLUME:

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

CALIBRATION:

FIELD MEASUREMENTS:

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

Purge method: None | Sample Time: —
Duplicate/blank number: — | Duplicate Sample Time: —
Sampling equipment: — | VOA attachment:
Sample containers: —
Sample analyses: —
Laboratory: —
Decontamination method: | Rinsate disposal:
Comments: NO SAMPLES COLLECTED DUE TO PRODUCT.

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

GROUNDWATER SAMPLING

Well No.: **MW-4**

Project No. 4656016
Project Name: Harbor Facilities Center
Location: Port of Oakland
651 Maritime Street, Oakland, California
Weather: Overcast, foggy am
Precip. in past 5 days (in.): 0
Source: NOAA Ports
Water level instrument: Solinst # 49914

Recorded by: J Lee Date: 12/13/2015
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): 3.69
Water level from TOC (feet): 12.22 Time: 8:20
Product level from TOC (feet): NA Time: —

CALCULATION OF WELL VOLUME:

(22.05 ft - 12.22 ft) x (0.083 ft)² x π x 7.48 gal/ft³ = 1.59 gallons in one casing volume
well depth - water level x (well radius)² x π x gal/ft³ = 4.0 total gallons removed

CALIBRATION:

see Daily 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
								∑=12.25 w/ tube set
8:28	17.43	7.57	1.01	65.5	1243	25.5	13.06	Initial
8:32	18.15	7.51	2.59	-31.3	1285	14.8	13.21	0.25
8:37	18.84	7.28	0.87	-145.6	1588	13.8	13.36	0.5
8:41	19.22	7.30	1.49	-164.6	1700	9.96	13.69	.75
8:44	19.40	7.32	1.41	-169.5	1762	24.2	13.80	1.0
8:47	19.46	7.33	1.16	-171.4	1839	26.7	13.87	1.25
8:50	19.51	7.34	0.95	-171.4	1904	28.5	13.90	1.50
8:53	19.49	7.33	0.75	-170.4	1951	19.6	13.91	1.75
8:56	19.49	7.33	0.49	-169.0	2010	18.5	13.92	2.0
8:59	19.41	7.33	0.38	-168.2	2095	16.4	13.92	2.25
9:03	19:37	7.33	0.30	-167.2	2142	10.4	13.92	2.5
9:06	19.40	7.32	0.28	-166.8	2202	7.73	13.93	2.75
9:09	19.48	7.31	0.25	-166.3	2253	5.78	13.97	3.00
9:12	19.54	7.30	0.25	-165.9	2297	6.40	14.03	3.25
9:14	19.51	7.30	0.23	-164.1	2358	5.09	14.04	3.50
9:17	19.51	7.30	0.24	-164.0	2401	7.31	14.08	3.75
9:20	19.51	7.29	0.23	-162.1	2422	8.42	14.10	4.00

Purge method: Peristaltic Pump + Ded. Tubing
Duplicate/blank number: MW-4DUP
Sampling equipment: Peristaltic Pump
Sample containers: VOAs, Amber Liters, Polys (9, 2, 4, respectively) = # of containers per set
Sample analyses: TPHg/BTEX, MTBE; RSK175, TPHD+Mo; Anions, Diss. Sulfide + Diss. Cations, TDS
Laboratory
Decontamination method: Tap w/ Liquinox, DI Rinse
Comments: Diss. Cations were Field Filtered.

Sample Time: 9:21
Duplicate Sample Time: 9:21
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: Cool am, 50°F, clear skies
Precip. in past 5 days (in.): 0
Source: NOAA Ports
Water level instrument: Solinst # 449914

Recorded by: J. Lee Date: 12/16/2013
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): 5.92
Water level from TOC (feet): 9.47 Time: 9:03
Product level from TOC (feet): NA Time: —

CALCULATION OF WELL VOLUME:

(20.80 ft - 9.47 ft) x (0.083 ft)² x π x 7.48 gal/ft³ = 1.03 gallons in one casing volume
well depth - water level x (well radius)² x π x gal/ft³ = 2.5 total gallons removed

CALIBRATION: See "Daily Equip. Calib." 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
							9.47' w/ tube	set
10 9:10	16.93	7.08	1.06	-38.6	1643	5.03	10.09	Initial
9:13	17.90	7.08	0.38	-50.0	1613	8.00	10.62	0.25
9:16	18.29	7.09	0.34	-62.6	1605	5.05	10.89	0.50
9:19	18.36	7.09	0.38	-65.5	1652	4.35	10.96	0.75
9:22	18.41	7.10	0.67	-69.1	1680	2.01	11.01	1.0
9:26	18.45	7.10	1.09	-71.3	1712	1.73	11.02	1.25
9:29	18.50	7.11	1.37	-74.1	1773	1.92	11.04	1.50
9:32	18.50	7.11	1.05	-78.3	1793	1.45	11.06	1.75
9:35	18.52	7.12	0.72	-87.9	1798	1.38	11.10 ~~11.05~~	2.00
9:38	18.51	7.12	0.58	-91.4	1823	1.01	11.11	2.25
9:41	18.67	7.12	0.50	-94.1	1820	1.20	11.30	2.50

Purge method: Peristaltic Pump + Ded. Tubing
Duplicate/blank number: —
Sampling equipment: Peristaltic Pump
Sample containers: VOAs, 1-Leachers, Polys (9,2,4, respectively) = # of containers
Sample analyses: TPHg/BTEX, MTBE, TPH-D+MO; Diss. Sulfide, TDS, Anions, Diss. Cations, RSK175
Laboratory: CTL
Decontamination method: Tap w/ Liquinox, DI Rinse
Comments: Diss. Cations were field filtered.

Sample Time: 9:42
Duplicate Sample Time: —
VOA attachment:
Rinsate disposal:
Note: well was not accessible until ~9:05am.

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

GROUNDWATER SAMPLING

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

Project No.	4656016	Recorded by:	J. Lee
Project Name:	Harbor Facilities Center	Date:	12/13/2013
Location:	Port of Oakland	Depth of well from TOC (feet):	23.14
	651 Maritime Street, Oakland, California	Well diameter (inches):	2
Weather:	less overcast, fog burning off	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 Posts	Groundwater elevation, NAVD 88 (feet):	3.24
Water level instrument:	Solinst #49914	Water level from TOC (feet):	11.75 Time: 10:33
		Product level from TOC (feet):	NA Time: —

CALCULATION OF WELL VOLUME:

(23.14 ft - 11.75 ft) x (0.083 ft)² x π x 7.48 gal/ft³ = 1.84 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 Daily Equip. Calib. 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
								Initial DTW = 11.75 w/tube set
10:37	17.96	7.24	1.15	-117.8	2569	16.9	11.87	Initial
10:40	18.61	7.23	0.21	-138.0	2377	5.56	11.98	0.25
10:42	18.95	7.24	0.19	-151.0	2154	2.29	12.00	0.5
10:45	19.11	7.25	0.24	-157.6	2014	1.20	12.02	0.75
10:47	19.16	7.26	0.38	-157.3	1887	0.95	12.02	1.0
10:50	19.22	7.26	0.53	-154.3	1834	0.90	12.02	1.25
10:53	19.21	7.26	0.36	-153.0	1831	0.99	12.03	1.50
10:55	19.27	7.26	0.22	-149.8	1823	0.73	12.04	1.75
10:58	19.29	7.26	0.17	-149.8	1830	1.92	12.04	2.00

Purge method: Peristaltic Pump + Ded. Tubing — Sample Time: 10:59

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

Sampling equipment: Peristaltic Pump — VOA attachment:

Sample containers: VOAs, H~~Cl~~, 1 liter ambers, Polys (9, 2, 4 respectively) = # of containers

Sample analyses: TPHg/BTEX, MTBE, TPHD+MO; Diss. Sulfides, Anions, TDS, Diss. Cations, RSK-175

Laboratory: CTB

Decontamination method: Tap Wtr & Liquinox, DI Rinse — Rinsate disposal:

Comments: Diss. Cations were field filtered.

TOC = top of casing

NAVD 88 = North American Vertical Datum of 1988.

GROUNDWATER SAMPLING

Well No.: **MW-9**

Project No.	4656016	Recorded by:	J. Lee — Date: 12/13/2013
Project Name:	Harbor Facilities Center	Depth of well from TOC (feet):	25
Location:	Port of Oakland	Well diameter (inches):	2
	651 Maritime Street, Oakland, California	Screened interval from TOC (feet):	15 - 25
Weather:	clear skies, cool, high 50's°F	TOC elevation, NAVD 88 (feet):	16.33
Precip. in past 5 days (in.):	0	Groundwater elevation, NAVD 88 (feet):	3.92
Source:	NOAA Ports	Water level from TOC (feet): 12.41	Time: 14:24
Water level instrument:	Solinst #49914	Product level from TOC (feet): NA	Time: —

CALCULATION OF WELL VOLUME:

(25.00 ft - 12.41 ft) x (0.083 ft)^2 x π x 7.48 gal/ft^3 = 2.03 gallons in one casing volume

well depth - water level x (well radius)^2 x π x gal/ft^3 = ~2.5 total gallons removed

CALIBRATION: See "Daily Equip. Calib." 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
								~~Static~~ D=12.41 w/tube set
14:38	18.86	7.19	1.80	-109.4	1870	4.44	12.53	Initial
14:40	19.48	7.19	0.53	-124.9	1940	2.31	12.53	0.25
14:42	19.66	7.19	0.40	-130.6	1961	1.72	12.75	0.50
14:44	19.68	7.19	0.57	-132.9	1967	1.46	12.72	0.75
14:46	19.71	7.18	0.82	-135.2	1971	1.12	12.76	1.0
14:48	19.71	7.18	0.91	-136.8	1972	1.24	12.76	1.25
14:50	19.73	7.18	0.81	-137.7	1972	0.91	12.77	1.5
14:52	19.72	7.18	0.59	-137.2	1971	1.07	12.75	1.75
14:54	19.73	7.18	0.44	-137.9	1971	0.82	12.75	2.0
14:56	19.72	7.18	0.30	-139.1	1970	1.14	12.75	2.25

Purge method: Peristaltic Pump + Ded. Tubing — Sample Time: 14:57

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

Sampling equipment: Peristaltic Pump — VOA attachment:

Sample containers: VOAs, 1-Liter Ambers, Poly (9, 2, 4 respectively) = # of sample containers

Sample analyses: TPHg/BTEX, MTBE, DO, NO$_3$, Anions, TDS, Diss. Sulfide, Diss. Cations, RSK-175

Laboratory: CTL

Decontamination method: Tap H$_2$O/Liquinox + DI Rinse — Rinsate disposal:

Comments: Diss. Cations were field filtered

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, cool mid 50's°F
Precip. in past 5 days (in.): 0
Source: NOAA Ports
Water level instrument: Solinst # 49914

Recorded by: J. Lee Date: 12/13/2012
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): 4.42
Water level from TOC (feet): 11.23 Time: 12:10
Product level from TOC (feet): NA Time: —

CALCULATION OF WELL VOLUME:

(25.00 ft - 11.23 ft x (0.083 ft)² x π x 7.48 gal/ft³ = 2.23 gallons in one casing volume
well depth - water level x (well radius)² x π x gal/ft³ = ~2.5 total gallons removed

CALIBRATION: see "Daily Equip. Calib." 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
								V=11.24 w/tube set
12:10								
12:13	18.40	6.84	0.63	-135.1	3182	4.40	12.10	Initial
12:15	18.57	6.83	0.38	-131.0	3188	1.98	12.71	0.25
12:18	18.69	6.83	0.76	-129.5	3193	1.97	12.94	0.50
12:21	18.71	6.82	0.78	-134.4	3193	6.80	13.25	0.75
12:23	18.75	6.82	0.36	-136.3	3190	4.77	13.46	1.0
12:25	18.77	6.82	0.23	-137.2	3190	2.78	13.55	1.25
12:27	18.79	6.82	0.18	-137.6	3189	2.41	13.61	1.50
12:29	18.86	6.82	0.17	-138.4	3190	2.39	13.68	1.75
12:31	18.82	6.82	0.15	-138.6	3181	2.36	13.72	2.0
12:33	18.85	6.82	0.15	-139.3	3166	3.09	13.75	2.25

Purge method: Peristaltic Pump + Ded. Tubing
Sample Time: 12:34
Duplicate/blank number: None
Duplicate Sample Time: —
Sampling equipment: Peristaltic pump
VOA attachment:
Sample containers: VOAs, 1L ambers, Polys (9, 2, 4 respectively) = # of containers
Sample analyses: TPHg/BTEX, MTBE, DO, MO; Anions, Diss. Sulfide; RSK175, Diss. Cations, TDS
Laboratory: CTD
Decontamination method: Tap w/ Liquinox, DI Rinse
Rinsate disposal:
Comments: Diss. Cations were field filtered. Overall color: lt. yell slight odor noted

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, Low 50's°F
Precip. in past 5 days (in.): Ø
Source: NOAA Ports
Water level instrument: Solinst # 49914

Recorded by: J. Lee Date: 12/12/2013
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): 4.43
Water level from TOC (feet): 11.04 Time: 10:30
Product level from TOC (feet): NA Time: —

CALCULATION OF WELL VOLUME:

(25.00 ft - 11.04 ft x (0.083 ft)² x π x 7.48 gal/ft³ = 2.26 gallons in one casing volume
well depth - water level x (well radius)² x π x gal/ft³ = ~2.50 total gallons removed

CALIBRATION: see "Daily Equip. Calib." 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
1							10.95 Initial w/tube set	
10:39	18.53	7.48	0.59	-154.2	4925	33.5	11.11	Initial
10:44	19.70	7.53	0.65	-169.8	4892	15.0	11.16	0.25
10:51	20.12	7.54	1.84	-151.7	4902	4.70	11.17	0.50
10:56	20.01	7.53	1.70	-172.7	4895	4.34	11.15 11.20	0.75
11:04	19.61	7.56	1.07	-146.7	4900	4.29	11.16	1.0
11:09	19.78	7.54	0.93	-133.1	4903	3.37	11.16	1.25
11:16	19.84	7.54	0.79	-151.9	4908	3.02	11.16	1.50
11:21	19.94	7.52	0.63	-155.7	4913	2.84	11.16	1.75
11:27	20.15	7.53	0.41	-144.7	4918	2.62	11.16	2.00
11:33	20.34	7.54	0.35	-188.2	4910	2.25	11.18	2.25
11:35	20.53	7.56	0.29	-193.2	4914	2.16	11.18	~2.37
11:37	20.62	7.53	0.27	-188.3	4910	2.06	11.21	2.50

Purge method: Peristaltic Pump + Dedicated Tubing
Duplicate/blank number: —
Sampling equipment: Peristaltic Pump
Sample containers: VOAs, Ambers, Polys (9, 2, 4 respectively) = # of containers
Sample analyses: TPH-G, BTEX, MTBE, RSK-175, TPH-D+MO(w/Si Gel); TDS, Anions, Sulfide, Diss. Cations
Laboratory: CTB
Decontamination method: Tap Wtr, DI Rinse (Tap w/Liquinox)
Comments: Diss. Cations were field filtered.
Samples reacted w/HCl (effervescently)

Sample Time: 11:38
Duplicate Sample Time: —
VOA attachment:
Rinsate disposal: Well .tlat(overall)

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

GROUNDWATER SAMPLING

Well No.: **MW-12**

Project No. 4656016 | Recorded by: J. Lee | Date: 12/12/2013
Project Name: Harbor Facilities Center | Depth of well from TOC (feet): 25
Location: Port of Oakland | Well diameter (inches): 2
651 Maritime Street, Oakland, California | Screened interval from TOC (feet): 15 - 25
Weather: Sunny, cool - 50's °F | TOC elevation, NAVD 88 (feet): 16.79
Precip. in past 5 days (in.): 0 | Groundwater elevation, NAVD 88 (feet): 4.32
Source: NOAA Ports | Water level from TOC (feet): 12.47 | Time: 12:26
Water level instrument: Solinst# 49914 | Product level from TOC (feet): — | Time: —

CALCULATION OF WELL VOLUME:

(25.00 ft - 12.47 ft x (0.083 ft)² x π x 7.48 gal/ft³ = 2.02 gallons in one casing volume
well depth - water level x (well radius)² x π x gal/ft³ = 2.25 total gallons removed

CALIBRATION: see "Daily Equip. 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
							12.46 w/tube set	
12:33	17.00	6.96	2.66	-92.4	1602	20.5	12.46	Initial
12:35	17.98	6.92	0.31	-100.3	1521	18.3	12.46	0.25
12:38	18.19	6.90	0.35	-102.4	1511	13.7	12.46	0.5
12:41	18.27	6.89	0.84	-104.4	1506	9.86	12.71	.75
12:43	18.37	6.89	1.15	-106.8	1505	5.76	12.73	1.00
12:45	18.39	6.89	0.93	-107.0	1504	3.94	12.73	1.25
12:48	18.34	6.88	0.67	-108.3	1501	2.87	12.73	1.50
12:50	18.29	6.89	0.48	-114.3	1498	2.38	12.73	1.75
12:52	18.30	6.89	0.38	-118.2	1497	2.59	12.73	2.00
12:53	18.38	6.88	0.34	-118.6	1496	2.44	12.73	2.12
12:54	18.41	6.90	0.31	-120.3	1495	2.35	12.73	2.25

Purge method: Peristaltic Pump | Sample Time: 12:56
Duplicate/blank number: — | Duplicate Sample Time: —
Sampling equipment: Peristaltic Pump | VOA attachment:
Sample containers: VOAs, Ambers, Polys (9, 2, 4, respectively) = # of containers
Sample analyses: TPH-G, BTEX, TPH-D, TPH-Oil; NWTPH, TDS, Anions, Diss. Sulfide, Diss. Cations, MTBE
Laboratory: CTB
Decontamination method: Tap Wtr w/ Liquinox, DI Rinse | Rinsate disposal:
Comments: Diss. Cations were field filtered. | Lt. tan tint (overall)

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

Environmental
Sampling Services, LLC

Project Name: Port of Oakland
Project Address: 651 Maritime Street, California
Task: December 2013 Semi-Annual Groundwater Monitoring Event

DAILY EQUIPMENT CALIBRATION SHEET

Date	Time	Instrument Serial Number	Probe Serial Number	Dissolved Oxygen (%)	pH			Specific Conductivity (1,000 µs/cm°)	ORP (231 mV)	Turbidity (0.02 NTU)
					4	7	10			
12/11/2013	10:20	556MPS	09C100611	101.5	4.00	6.98	10.01	1,005	231.0	0.02
12/12/2013	8:10	556MPS	09C100611	100.7	4.00	6.99	10.00	1,001	231.0	0.02
12/6/13	8:34	556MPS	09C100611	101.1	4.00	7.00	10.00	1,000	231.2	0.02

251610

Environmental Sampling Services, LLC

6680 Alhambra Avenue, #102
Martinez, California 94553-6105
Telephone: (925) 372-8108
www.envsampling.com

CHAIN OF CUSTODY RECORD

Page 1 of 1

TURN AROUND TIME Other:

LABORATORY: Curtis Tompkins, Ltd. Berkeley, CA

☐ 24 Hours	☐ 48 Hours	☐ 1 Week	☑ Normal

Report To:	Ms. Caroline Orsi	**Telephone/Fax:**	510-652-4500 / 510-652-4906
Company:	Arcadis U.S., Inc.	**Project Name:**	Port HFC
Address:	2000 Powell Street, 7th Floor Emeryville, CA 94608	**Project Number:**	01656016.0000
		Bill To:	Port of Oakland
E-Mail Results to & cc:	caroline.orsi@arcadis-us.com		
Sampler(s):	Jacqueline Lee ☑	**Sampler's Signature:**	
	Stephen Penman ☐	**Sampler's Signature:**	

Reporting Requirement: PDF: Yes ☑ No ☐ **EPA Data Report:** Level 4

EDD File: Yes ☑ No ☐ Electronic (EDF) : Yes ☑ No ☐

SAMPLE ID	Sample Date	Sample Time	Number of Containers	Type of Container[1]	Matrix: Water	Groundwater	Soil	Soil Vapor	Other	Preservative: Ice	HCl	HNO_3	H_2SO_4	NaOH	TPH-Gas (EPA 8015B)	BTEX & MTBE (EPA 8260B)	TPH-D & MO (EPA 8015B) w/Silica Gel Cleanup	TDS (40CFR136/160.1)	Anions (EPA 300.0) * see "comments"	Dissolved Sulfide (EPA E376.2)	RSK-175 SK 12/16/2013	Field Filtered (FF): Dissolved Na, Ca, K, and Mg (EPA 200.7)	Dissolved Fe and Mn (EPA SW6010B)	Comments
1 QCTB-1	12/12/2013	8:30	3	1	x					x	x				x	x								
2 MW-11	12/12/2013	11:38	15	1, 2, 3		x				x	x	x	x		x	x	x	x	x	x	x	x	x	Anions =
3 MW-12	12/12/2013	12:56	15	1,2,3		x				x	x	x	x		x	x	x	x	x	x	x	x	x	Bicarbonate,
4 MW-2	12/12/2013	14:00	15	1,2,3		x				x	x	x	x		x	x	x	x	x	x	x	x	x	Carbonate,
																								Sulfate, Chloride
																								Nitrate, Nitrite,
																								and
																								Orthophosphate.
																								MW-11 reached =/HCl. SK 12/16/2013

Relinquished By:	Date:	Time:	Received By:
	12/12/2013	15:40	
Relinquished By:	Date:	Time:	Received By:
Relinquished By:	Date:	Time:	Received By:

[1] = Sample Container Type: 1 =VOA 2=Glass 3=High Density Polyethylene 4=Summa Canister

QUESTIONS REGARDING COC, CALL ESS
Send confirmation to: caroline.orsi@arcadis-us.c
After log-in, please email COC to:
jlee@envsampling.com and spen@envsampling.com

SAMPLE RECEIPT
☐ Intact ☐ Cold
☐ On Ice ☐ Ambient
Preservative Correct?
☐ Yes ☐ No ☐ NA

Environmental Sampling Services, LLC

6680 Alhambra Avenue, #102
Martinez, California 94553-6105
Telephone: (925) 372-8108
www.envsampling.com

CHAIN OF CUSTODY RECORD

Page 1 of 1

TURN AROUND TIME Other:

LABORATORY: Curtis Tompkins, Ltd. Berkeley, CA

☐ 24 Hours	☐ 48 Hours	☐ 1 Week	☑ Normal

Report To: Ms. Caroline Orsi **Telephone/Fax:** 510-652-4500 / 510-652-4906
Company: Arcadis U.S., Inc. **Project Name:** Port HFC
Address: 2000 Powell Street, 7th Floor, Emeryville, CA 94608 **Project Number:** 01656016.0000
Bill To: Port of Oakland
E-Mail Results to & cc: caroline.orsi@arcadis-us.com

Sampler(s): Jacqueline Lee ☑ **Sampler's Signature:**
Stephen Penman ☐ **Sampler's Signature:**

Reporting Requirement: PDF: Yes ☑ No ☐ **EPA Data Report:** Level
EDD File: Yes ☑ No ☐ Electronic (EDF) : Yes ☑ No ☐

RSK-175 12/16/2013

SAMPLE ID	Sample Date	Sample Time	Number of Containers	Type of Container[1]	Matrix: Water	Groundwater	Soil	Soil Vapor	Other	Preservative: Ice	HCl	HNO_3	H_2SO_4	NaOH	TPH-Gas (EPA 8015B)	BTEX & MTBE (EPA 8260B)	TPH-D & MO (EPA 8015B) w/Silica Gel Cleanup	TDS (40CFR136/160.1)	Anions (EPA 300.0) * see "comments"	Dissolved Sulfide (EPA E376.2)	RSK-175	Field Filtered (FF): Dissolved Na, Ca, K, and Mg (EPA 200.7)	Dissolved Fe and Mn (EPA SW6010B)	Comments
QCTB-2	12/13/2013	8:30	3	1	x					x	x				x	x								
MW-4	12/13/2013	9:21	15	1, 2, 3		x				x	x	x	x		x	x	x	x	x	x	x	x	x	Anions =
MW-4DUP	12/13/2013	9:21	15	1,2,3		x				x	x	x	x		x	x	x	x	x	x	x	x	x	Bicarbonate,
MW-8A	12/13/2013	10:59	15	1,2,3		x				x	x	x	x		x	x	x	x	x	x	x	x	x	Carbonate,
MW-10	12/13/2013	12:34	15	1,2,3		x				x	x	x	x		x	x	x	x	x	x	x	x	x	Sulfate, Chloride
MW-1	12/13/2013	13:32	15	1,2,3		x				x	x	x	x		x	x	x	x	x	x	x	x	x	Nitrate, Nitrite,
MW-9	12/13/2013	14:57	15	1,2,3		x				x	x	x	x		x	x	x	x	x	x	x	x	x	and
																								Orthophosphate.

Relinquished By:	Date:	Time:	Received By:
	12/13/2013	16:50	
Relinquished By:	Date:	Time:	Received By:
Relinquished By:	Date:	Time:	Received By:

1 = Sample Container Type: 1 =VOA 2=Glass 3=High Density Polyethylene 4=Summa Canister

QUESTIONS REGARDING COC, CALL ESS
Send confirmation to: caroline.orsi@arcadis-us.com
After log-in, please email COC to:
jlee@envsampling.com and spen@envsampling.com

SAMPLE RECEIPT
☐ Intact ☐ Cold
☐ On Ice ☐ Ambient
Preservative Correct?
☐ Yes ☐ No ☐ NA

Environmental Sampling Services, LLC
6680 Alhambra Avenue, #102
Martinez, California 94553-6105
Telephone: (925) 372-8108
www.envsampling.com

CHAIN OF CUSTODY RECORD

TURN AROUND TIME Other:

LABORATORY: Curtis Tompkins, Ltd. Berkeley, CA

☐ 24 Hours	☐ 48 Hours	☐ 1 Week	☑ Normal

Report To: Ms. Caroline Orsi **Telephone/Fax:** 510-652-4500 / 510-652-4906
Company: Arcadis U.S., Inc. **Project Name:** Port HFC
Address: 2000 Powell Street, 7th Floor **Project Number:** 04656016.0000
Emeryville, CA 94608 **Bill To:** Port of Oakland
E-Mail Results to & cc: caroline.orsi@arcadis-us.com

Sampler(s): Jacqueline Lee ☑ **Sampler's Signature:**
Stephen Penman ☐ **Sampler's Signature:**

Reporting Requirement: PDF: Yes ☑ No ☐ **EPA Data Report:** Level II
EDD File: Yes ☑ No ☐ Electronic (EDF) : Yes ☑ No ☐

SAMPLE ID	Sample Date	Sample Time	Number of Containers	Type of Container[1]	Matrix: Water	Groundwater	Soil	Soil Vapor	Other	Preservative: Ice	HCl	HNO_3	H_2SO_4	TPH-Gas (EPA 8015B)	BTEX & MTBE (EPA 8260B)	TPH-D & MO (EPA 8015B) w/Silica Gel Cleanup	TDS (40CFR136/160.1)	Anions (EPA 300.0) * see "comments"	Dissolved Sulfide (EPA E376.2)	RSK-175	Field Filtered (FF): Dissolved Na, Ca, K, and Mg (EPA 200.7)	Dissolved Fe and Mn (EPA SW6010B)	Comments
QCTB-3	12/16/2013	8:30	3	1	X					X	X			X	X								
MW-5	12/16/2013	9:42	15	1,2,3		X				X	X	X	X	X	X	X	X	X	X	X	X	X	Anions = Bicarbonate, Carbonate, Sulfate, Chloride, Nitrate, Nitrite, and Orthophosphate.

Relinquished By:	Date:	Time:	Received By:
	12/16/2013	11:40	
Relinquished By:	Date:	Time:	Received By:
Relinquished By:	Date:	Time:	Received By:

1 = Sample Container Type: 1 =VOA 2=Glass 3=High Density Polyethylene 4=Summa Canister

QUESTIONS REGARDING COC, CALL ESS
Send confirmation to: caroline.orsi@arcadis-us.com
After log-in, please email COC to:
jlee@envsampling.com and spen@envsampling.com

SAMPLE RECEIPT
☐ Intact ☐ Cold
☐ On Ice ☐ Ambient
Preservative Correct?
☐ Yes ☐ No ☐ NA

Appendix B

Laboratory Analytical Reports


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 251610
ANALYTICAL REPORT

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

Sample ID	Lab ID
QCTB-1	251610-001
MW-11	251610-002
MW-12	251610-003
MW-2	251610-004

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: _____ Date: 01/13/2014

Will S Rice
Project Manager
will.rice@ctberk.com

NELAP # 01107CA

Curtis & Tompkins, Ltd.

CASE NARRATIVE

Laboratory number:	**251610**
Client:	**Arcadis**
Project:	**04656016.0000**
Location:	**Port HFC**
Request Date:	**12/12/13**
Samples Received:	**12/12/13**

This data package contains sample and QC results for four water samples, requested for the above referenced project on 12/12/13. The samples were received on ice and intact, directly from the field. Revised to include calcium.

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

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

Volatile Organics by GC/MS (EPA 8260B):
MW-11 (lab # 251610-002) was diluted due to foaming. No other analytical problems were encountered.

Dissolved Gases by GC/FID (RSK-175):
No analytical problems were encountered.

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

Metals (EPA 200.7):
The samples were filtered outside the 40CFR136 recommended 15 minute holding time. No other analytical problems were encountered.

Ion Chromatography (EPA 300.0):
MW-11 (lab # 251610-002) was diluted due to high chloride concentration. No other analytical problems were encountered.

Alkalinity (SM2320B):
No analytical problems were encountered.

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

Total Dissolved Solids (TDS) (SM2540C):
No analytical problems were encountered.

Orthophosphate Phosphorous (SM4500P-E):
Low recoveries were observed for orthophosphate (as P) in the MS/MSD of MW-2 (lab # 251610-004); the LCS was within limits. No other analytical problems

Curtis & Tompkins, Ltd.

CASE NARRATIVE

Laboratory number:	**251610**
Client:	**Arcadis**
Project:	**04656016.0000**
Location:	**Port HFC**
Request Date:	**12/12/13**
Samples Received:	**12/12/13**

Orthophosphate Phosphorous (SM4500P-E):
were encountered.

#
46.1

251610

Environmental Sampling Services, LLC

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Martinez, California 94553-6105
Telephone: (925) 372-8108
www.envsampling.com

CHAIN OF CUSTODY RECORD

Page 1 of 1

TURN AROUND TIME — Other:

LABORATORY:	☐	☐	☐	☑
Curtis Tompkins, Ltd.	24 Hours	48 Hours	1 Week	Normal
Berkeley, CA				

Report To: Ms. Caroline Orsi — **Telephone/Fax:** 510-652-4500 / 510-652-4906
Company: Arcadis U.S., Inc. — **Project Name:** Port HFC
Address: 2000 Powell Street, 7th Floor, Emeryville, CA 94608 — **Project Number:** 01656016.0000
Bill To: Port of Oakland
E-Mail Results to & cc: caroline.orsi@arcadis-us.com

Sampler(s): Jacqueline Lee ☑ — **Sampler's Signature:**
Stephen Penman ☐ — **Sampler's Signature:**

Reporting Requirement: PDF: Yes ☑ No ☐ — **EPA Data Report:** Level II
EDD File: Yes ☑ No ☐ — Electronic (EDF) : Yes ☑ No ☐

SAMPLE ID	Sample Date	Sample Time	Number of Containers	Type of Container[1]	Matrix: Water	Groundwater	Soil	Soil Vapor	Other	Preservative: Ice	HCl	HNO_3	H_2SO_4	TPH-Gas (EPA 8015B)	BTEX & MTBE (EPA 8260B)	TPH-D & MO (EPA 8015B) w/Silica Gel Cleanup	TDS (40CFR136/160.1)	Anions (EPA 300.0) * see "comments"	Dissolved Sulfide (EPA E376.2)	Field Filtered (FF): Dissolved Na, Ca, K, and Mg (EPA 200.7)	Field Filtered (FF): Dissolved Fe and Mn (EPA SW6010B)	Comments
QCTB-1	12/12/2013	8:30	3	1	x					x	x			x	x							
MW-11	12/12/2013	11:38	15	1, 2, 3		x				x	x	x	x	x	x	x	x	x	x	x	x	Anions =
MW-12	12/12/2013	12:56	15	1,2,3		x				x	x	x	x	x	x	x	x	x	x	x	x	Bicarbonate,
MW-2	12/12/2013	14:00	15	1,2,3		x				x	x	x	x	x	x	x	x	x	x	x	x	Carbonate,
																						Sulfate, Chloride,
																						Nitrate, Nitrite,
																						and
																						Orthophosphate.
																						MW-11

Relinquished By:	Date:	Time:	Received By:
[signature]	12/12/2013	15:40	
Relinquished By:	Date:	Time:	Received By:
Relinquished By:	Date:	Time:	Received By:

1 = Sample Container Type: 1 =VOA 2=Glass 3=High Density Polyethylene 4=Summa Canister

QUESTIONS REGARDING COC, CALL ESS
Send confirmation to: caroline.orsi@arcadis-us.com
After log-in, please email COC to:
jlee@envsampling.com and spen@envsampling.com

SAMPLE RECEIPT
☐ Intact ☐ Cold
☐ On Ice ☐ Ambient
Preservative Correct?
☐ Yes ☐ No ☐ NA

251610

Environmental Sampling Services, LLC

6680 Alhambra Avenue, #102
Martinez, California 94553-6105
Telephone: (925) 372-8108
www.envsampling.com

CHAIN OF CUSTODY RECORD

Page 1 of 1

TURN AROUND TIME

LABORATORY: Curtis Tompkins, Ltd. Berkeley, CA

☐ 24 Hours	☐ 48 Hours	☐ 1 Week	☑ Normal	Other:

Report To: Ms. Caroline Orsi
Company: Arcadis U.S., Inc.
Address: 2000 Powell Street, 7th Floor, Emeryville, CA 94608
E-Mail Results to & cc: caroline.orsi@arcadis-us.com

Telephone/Fax: 510-652-4500 / 510-652-4906
Project Name: Port HFC
Project Number: 01656016.0000
Bill To: Port of Oakland

Sampler(s): Jacqueline Lee ☑ Stephen Penman ☐
Sampler's Signature:
Sampler's Signature:

Reporting Requirement: PDF: Yes ☑ No ☐ **EPA Data Report:** Level
EDD File: Yes ☑ No ☐ Electronic (EDF) : Yes ☑ No ☐

12/14/2013

SAMPLE ID	Sample Date	Sample Time	Number of Containers	Type of Container[1]	Matrix: Water	Groundwater	Soil	Soil Vapor	Other	Preservative: Ice	HCl	HNO_3	H_2SO_4	NaOH
QCTB-1	12/12/2013	8:30	3	1	x					x	x			
MW-11	12/12/2013	11:38	15	1, 2, 3		x				x	x	x	x	
MW-12	12/12/2013	12:56	15	1,2,3		x				x	x	x	x	
MW-2	12/12/2013	14:00	15	1,2,3		x				x	x	x	x	

Analysis Request

TPH-Gas (EPA 8015B)	BTEX & MTBE (EPA 8260B)	TPH-D & MO (EPA 8015B) w/Silica Gel Cleanup	TDS (40CFR136/160.1)	Anions (EPA 300.0) * see "comments"	Dissolved Sulfide (EPA E376.2) RSK-175 JK 12/16/2013	Field Filtered (FF): Dissolved Na, Ca, K, and Mg (EPA 200.7)	Field Filtered (FF): Dissolved Fe and Mn (EPA SW6010B)
x	x						
x	x						
x	x	x	x	x	x	x	x
x	x	x	x	x	x	x	x
x	x	x	x	x	x	x	x

Comments

Anions = Bicarbonate, Carbonate, Sulfate, Chloride, Nitrate, Nitrite, and Orthophosphate.

MW-11 reacted w/HCl. JK 12/14/2013

Relinquished By:	Date:	Time:	Received By:
	12/12/2013	15:40	
Relinquished By:	Date:	Time:	Received By:
Relinquished By:	Date:	Time:	Received By:

1 = Sample Container Type: 1 =VOA 2=Glass 3=High Density Polyethylene 4=Summa Canister

QUESTIONS REGARDING COC, CALL ESS
Send confirmation to: caroline.orsi@arcadis-us.com
After log-in, please email COC to:
jlee@envsampling.com and spen@envsampling.com

SAMPLE RECEIPT
☐ Intact ☐ Cold
☐ On Ice ☐ Ambient
Preservative Correct?
☐ Yes ☐ No ☐ NA

COOLER RECEIPT CHECKLIST

Curtis & Tompkins, Ltd.

Login # 251010 Date Received 12/12/13 Number of coolers 1
Client ESS (ARCADIS) Project 01656016.0000 (PORT HFC)

Date Opened 12/12/13 By (print) TR (sign) Tina Ranlett
Date Logged in ↓ By (print) ↓ (sign) ↓

1. Did cooler come with a shipping slip (airbill, etc) _____ YES (NO)
   Shipping info _____
2A. Were custody seals present? .... ☒YES (circle) (on cooler) on samples ☐ NO
   How many 2 Name Signature Date 12/12/13
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) _____

☒ 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
#15.) Received samp #-001 for metals w/ pH >2; added 1 mL HNO_3 (lot # 0000003390) on 12/12/13 @ 1925
- Also for disc sulfides w/ pH <12; added 1 mL NaOH (lot #229303) on 12/12/13 @ 1925

Rev 10, 11/11

Curtis & Tompkins Sample Preservation for 251610

Sample	pH: <2	>9	>12	Other
-002a	[ ]	[ ]	[ ]	_____
b	[ ]	[ ]	[ ]	_____
c	[ ]	[ ]	[ ]	_____
d	[ ]	[ ]	[ ]	_____
e	[ ]	[ ]	[ ]	_____
f	[ ]	[ ]	[ ]	_____
g	[ ]	[ ]	[ ]	_____
h	[ ]	[ ]	[ ]	_____
i	[ ]	[ ]	[ ]	_____
j	1R [X]	[ ]	[ ]	_____
k	[X]	[ ]	[ ]	_____
l	[ ]	[ ]	[X]	_____
m	[ ]	[ ]	[ ]	_____
n	[ ]	[ ]	[ ]	_____
o	[ ]	[ ]	[ ]	_____
-003a	[ ]	[ ]	[ ]	_____
b	[ ]	[ ]	[ ]	_____
c	[ ]	[ ]	[ ]	_____
d	[ ]	[ ]	[ ]	_____
e	[ ]	[ ]	[ ]	_____
f	[ ]	[ ]	[ ]	_____
g	[ ]	[ ]	[ ]	_____
h	[ ]	[ ]	[ ]	_____

Sample	pH: <2	>9	>12	Other
i	[ ]	[ ]	[ ]	_____
j	[ ]	[ ]	[ ]	_____
k	[X]	[ ]	[ ]	_____
l	[ ]	[ ]	[X]	_____
m	[ ]	[ ]	[ ]	_____
n	[ ]	[ ]	[ ]	_____
o	[ ]	[ ]	[ ]	_____
-004a	[ ]	[ ]	[ ]	_____
b	[ ]	[ ]	[ ]	_____
c	[ ]	[ ]	[ ]	_____
d	[ ]	[ ]	[ ]	_____
e	[ ]	[ ]	[ ]	_____
f	[ ]	[ ]	[ ]	_____
g	[ ]	[ ]	[ ]	_____
h	[ ]	[ ]	[ ]	_____
i	[ ]	[ ]	[ ]	_____
j	[ ]	[ ]	[ ]	_____
k	[X]	[ ]	[ ]	_____
l	[ ]	[ ]	[X]	_____
m	[ ]	[ ]	[ ]	_____
n	[ ]	[ ]	[ ]	_____
o	[ ]	[ ]	[ ]	_____

Analyst: 1R
Date: 12/12/13

Curtis & Tompkins, Ltd.

Total Volatile Hydrocarbons

Lab #:	251610	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	12/12/13
Units:	ug/L	Received:	12/12/13
Diln Fac:	1.000	Analyzed:	12/20/13
Batch#:	206436		

Field ID: QCTB-1 Lab ID: 251610-001
Type: SAMPLE

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	108	77-128

Field ID: MW-11 Lab ID: 251610-002
Type: SAMPLE

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	98	77-128

Field ID: MW-12 Lab ID: 251610-003
Type: SAMPLE

Analyte	Result	RL
Gasoline C7-C12	82 Y	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	100	77-128

Field ID: MW-2 Lab ID: 251610-004
Type: SAMPLE

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	107	77-128

Type: BLANK Lab ID: QC721626

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	82	77-128

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 #:	251610	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC721625	Batch#:	206436
Matrix:	Water	Analyzed:	12/20/13
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	1,000	892.9	89	80-120

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	86	77-128

Curtis & Tompkins, Ltd.

Batch QC Report

Total Volatile Hydrocarbons

Lab #:	251610	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8015B
Field ID:	MW-4	Batch#:	206436
MSS Lab ID:	251652-002	Sampled:	12/13/13
Matrix:	Water	Received:	12/13/13
Units:	ug/L	Analyzed:	12/20/13
Diln Fac:	1.000		

Type: MS Lab ID: QC721627

Analyte	MSS Result	Spiked	Result	%REC	Limits
Gasoline C7-C12	81.07	2,000	2,113	102	74-120

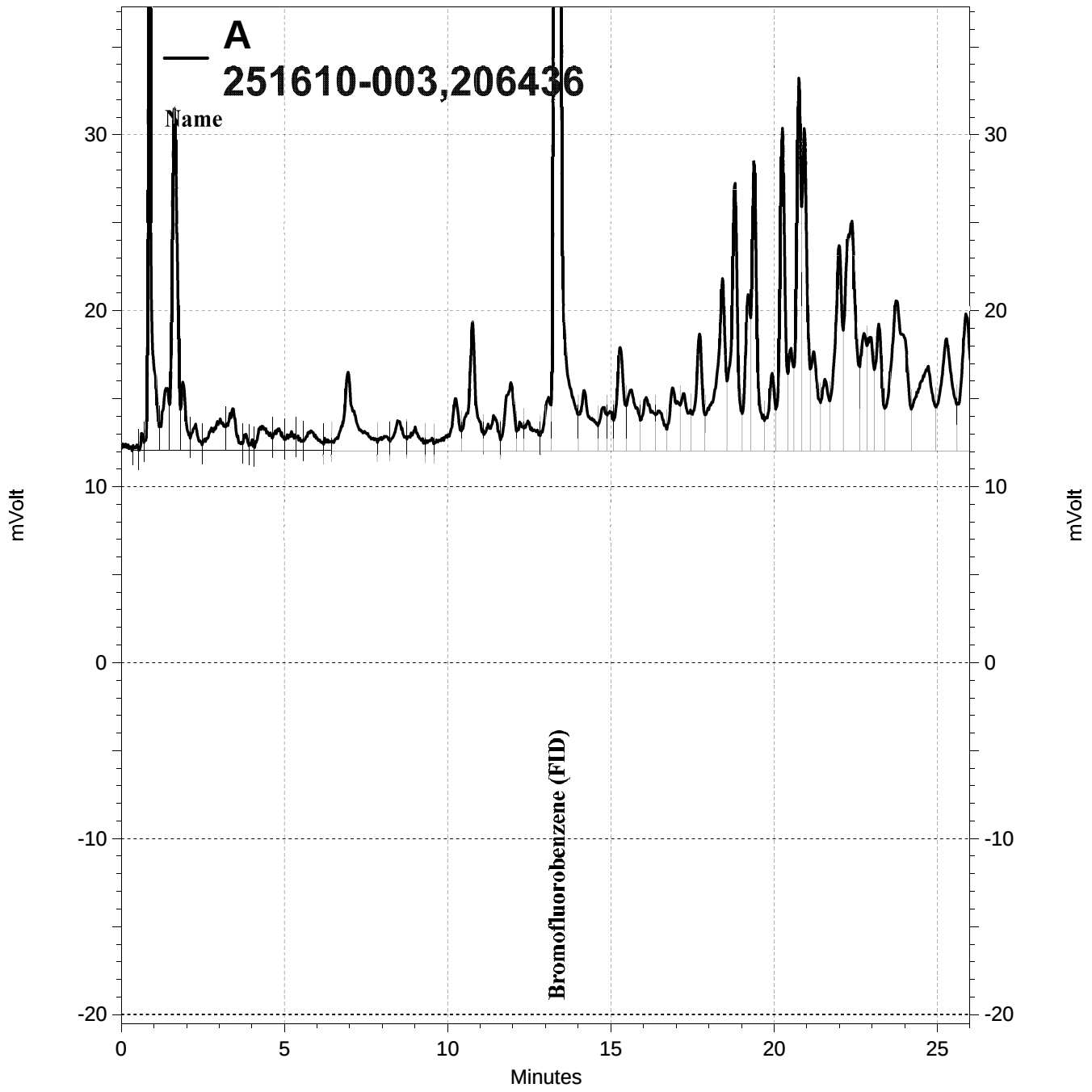
Surrogate	%REC	Limits
Bromofluorobenzene (FID)	119	77-128

Type: MSD Lab ID: QC721628

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	2,000	2,039	98	74-120	4	27

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	108	77-128

RPD= Relative Percent Difference



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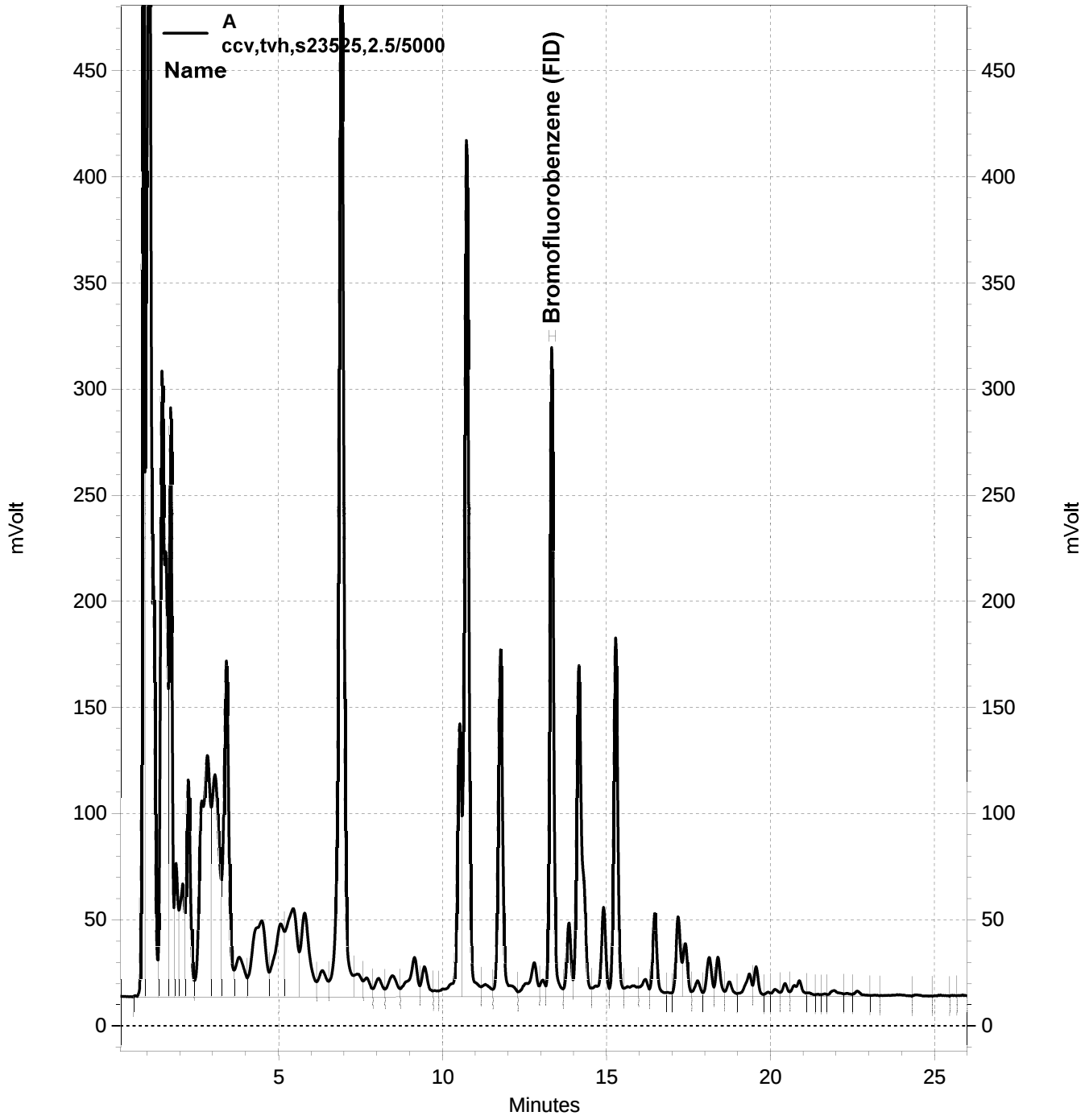

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Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	251610	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 3520C
Project#:	04656016.0000	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	12/12/13
Units:	ug/L	Received:	12/12/13
Diln Fac:	1.000	Prepared:	12/13/13
Batch#:	206124		

Field ID: MW-11
Type: SAMPLE
Lab ID: 251610-002
Analyzed: 12/17/13
Cleanup Method: EPA 3630C

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

Surrogate	%REC	Limits
o-Terphenyl	109	66-129

Field ID: MW-12
Type: SAMPLE
Lab ID: 251610-003
Analyzed: 12/17/13
Cleanup Method: EPA 3630C

Analyte	Result	RL
Diesel C10-C24	240 Y	50
Motor Oil C24-C36	ND	300

Surrogate	%REC	Limits
o-Terphenyl	97	66-129

Field ID: MW-2
Type: SAMPLE
Lab ID: 251610-004
Analyzed: 12/17/13
Cleanup Method: EPA 3630C

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

Surrogate	%REC	Limits
o-Terphenyl	124	66-129

Type: BLANK
Lab ID: QC720385
Analyzed: 12/16/13
Cleanup Method: EPA 3630C

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

Surrogate	%REC	Limits
o-Terphenyl	82	66-129

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 #:	251610	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 3520C
Project#:	04656016.0000	Analysis:	EPA 8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC720386	Batch#:	206124
Matrix:	Water	Prepared:	12/13/13
Units:	ug/L	Analyzed:	12/16/13

Cleanup Method: EPA 3630C

Analyte	Spiked	Result	%REC	Limits
Diesel C10-C24	2,500	1,990	80	61-120

Surrogate	%REC	Limits
o-Terphenyl	100	66-129

Curtis & Tompkins, Ltd.

Batch QC Report

Total Extractable Hydrocarbons

Lab #:	251610	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 3520C
Project#:	04656016.0000	Analysis:	EPA 8015B
Field ID:	ZZZZZZZZZZ	Batch#:	206124
MSS Lab ID:	251565-001	Sampled:	12/11/13
Matrix:	Water	Received:	12/11/13
Units:	ug/L	Prepared:	12/13/13
Diln Fac:	1.000	Analyzed:	12/17/13

Type: MS Cleanup Method: EPA 3630C
Lab ID: QC720387

Analyte	MSS Result	Spiked	Result	%REC	Limits
Diesel C10-C24	365.5	2,500	2,595	89	65-120

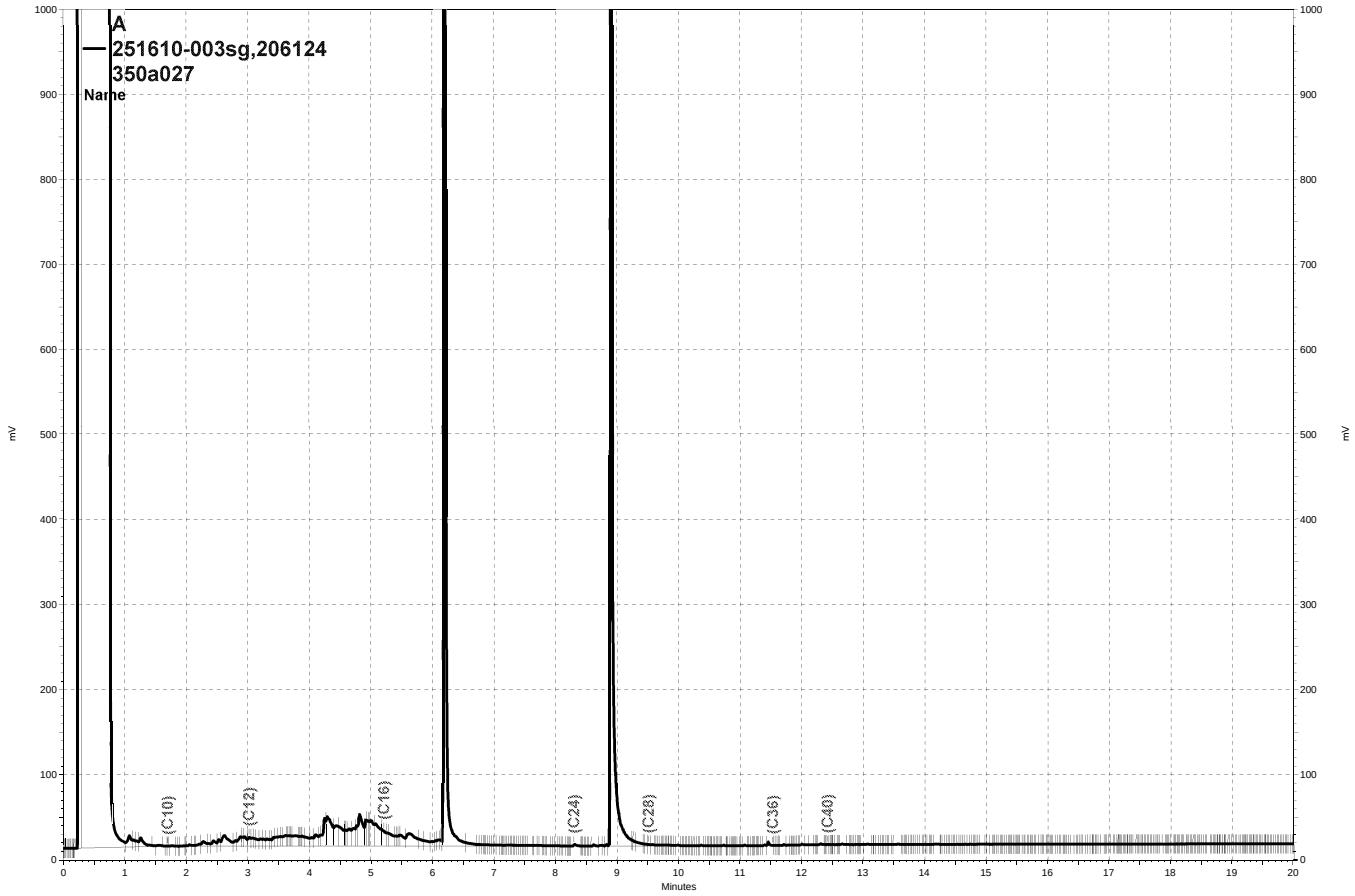
Surrogate	%REC	Limits
o-Terphenyl	115	66-129

Type: MSD Cleanup Method: EPA 3630C
Lab ID: QC720388

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Diesel C10-C24	2,500	2,949	103	65-120	13	26

Surrogate	%REC	Limits
o-Terphenyl	122	66-129

RPD= Relative Percent Difference



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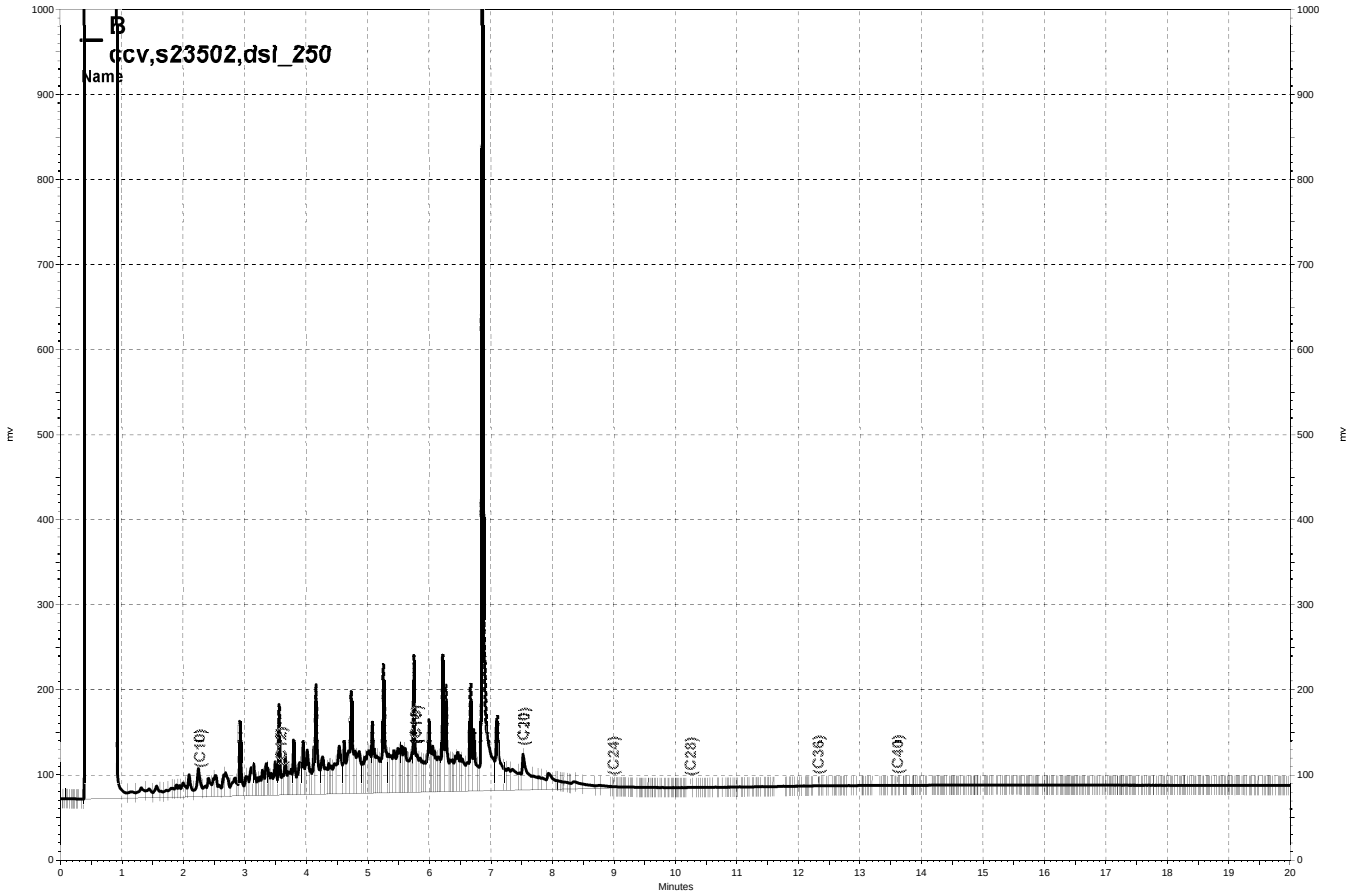

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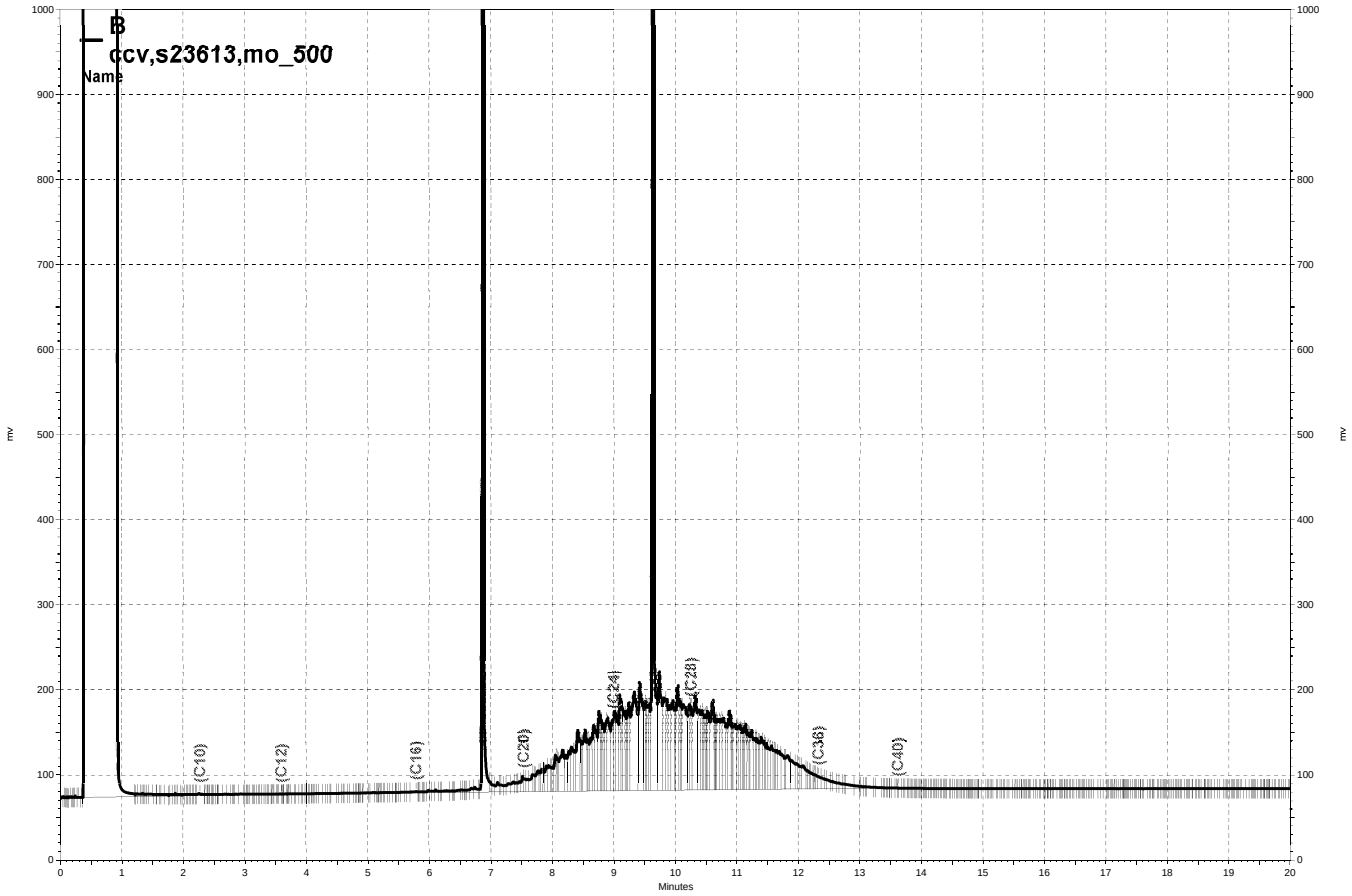

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Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	251610	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Field ID:	QCTB-1	Batch#:	206311
Lab ID:	251610-001	Sampled:	12/12/13
Matrix:	Water	Received:	12/12/13
Units:	ug/L	Analyzed:	12/18/13
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	99	77-136
1,2-Dichloroethane-d4	101	75-139
Toluene-d8	99	80-120
Bromofluorobenzene	98	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	251610	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Field ID:	MW-11	Batch#:	206311
Lab ID:	251610-002	Sampled:	12/12/13
Matrix:	Water	Received:	12/12/13
Units:	ug/L	Analyzed:	12/18/13
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	98	77-136
1,2-Dichloroethane-d4	101	75-139
Toluene-d8	96	80-120
Bromofluorobenzene	98	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	251610	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Field ID:	MW-12	Batch#:	206311
Lab ID:	251610-003	Sampled:	12/12/13
Matrix:	Water	Received:	12/12/13
Units:	ug/L	Analyzed:	12/18/13
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	4.9	0.5
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	0.9	0.5
o-Xylene	ND	0.5

Surrogate	%REC	Limits
Dibromofluoromethane	98	77-136
1,2-Dichloroethane-d4	101	75-139
Toluene-d8	100	80-120
Bromofluorobenzene	99	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	251610	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Field ID:	MW-2	Batch#:	206311
Lab ID:	251610-004	Sampled:	12/12/13
Matrix:	Water	Received:	12/12/13
Units:	ug/L	Analyzed:	12/18/13
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	96	77-136
1,2-Dichloroethane-d4	98	75-139
Toluene-d8	97	80-120
Bromofluorobenzene	99	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Aromatics by GC/MS

Lab #:	251610	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Matrix:	Water	Batch#:	206311
Units:	ug/L	Analyzed:	12/18/13
Diln Fac:	1.000		

Type: BS Lab ID: QC721116

Analyte	Spiked	Result	%REC	Limits
MTBE	12.50	11.05	88	64-121
Benzene	12.50	11.97	96	80-124
Toluene	12.50	12.27	98	80-122
Ethylbenzene	12.50	12.57	101	80-124
m,p-Xylenes	25.00	26.89	108	80-122
o-Xylene	12.50	13.59	109	77-120

Surrogate	%REC	Limits
Dibromofluoromethane	95	77-136
1,2-Dichloroethane-d4	97	75-139
Toluene-d8	100	80-120
Bromofluorobenzene	96	80-120

Type: BSD Lab ID: QC721117

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	12.50	11.55	92	64-121	4	20
Benzene	12.50	11.45	92	80-124	4	20
Toluene	12.50	12.01	96	80-122	2	20
Ethylbenzene	12.50	12.19	97	80-124	3	20
m,p-Xylenes	25.00	25.84	103	80-122	4	20
o-Xylene	12.50	12.82	103	77-120	6	20

Surrogate	%REC	Limits
Dibromofluoromethane	99	77-136
1,2-Dichloroethane-d4	99	75-139
Toluene-d8	99	80-120
Bromofluorobenzene	97	80-120

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Aromatics by GC/MS

Lab #:	251610	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC721118	Batch#:	206311
Matrix:	Water	Analyzed:	12/18/13
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	97	77-136
1,2-Dichloroethane-d4	100	75-139
Toluene-d8	99	80-120
Bromofluorobenzene	97	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Dissolved Gases

Lab #:	251610	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	RSK-175
Analyte:	Methane	Batch#:	206263
Matrix:	Water	Sampled:	12/12/13
Units:	mg/L	Received:	12/12/13
Diln Fac:	1.000	Analyzed:	12/17/13

Field ID	Type	Lab ID	Result	RL
MW-11	SAMPLE	251610-002	6.3	0.005
MW-12	SAMPLE	251610-003	6.8	0.005
MW-2	SAMPLE	251610-004	0.27	0.005
	BLANK	QC720918	ND	0.005

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Gases

Lab #:	251610	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	RSK-175
Analyte:	Methane	Diln Fac:	1.000
Matrix:	Water	Batch#:	206263
Units:	mg/L	Analyzed:	12/17/13

Type	Lab ID	Spiked	Result	%REC	Limits	RPD	Lim
BS	QC720916	0.6544	0.6228	95	78-120		
BSD	QC720917	0.6544	0.5246	80	78-120	17	21

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Dissolved Iron

Lab #:	251610	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 3010A
Project#:	04656016.0000	Analysis:	EPA 6010B
Analyte:	Iron	Sampled:	12/12/13
Matrix:	Filtrate	Received:	12/12/13
Units:	ug/L	Prepared:	12/18/13
Diln Fac:	1.000	Analyzed:	12/27/13
Batch#:	206331		

Field ID	Type	Lab ID	Result	RL
MW-11	SAMPLE	251610-002	2,000	100
MW-12	SAMPLE	251610-003	1,300	100
MW-2	SAMPLE	251610-004	ND	100
	BLANK	QC721193	ND	100

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Dissolved Manganese

Lab #:	251610	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 3010A
Project#:	04656016.0000	Analysis:	EPA 6010B
Analyte:	Manganese	Sampled:	12/12/13
Matrix:	Filtrate	Received:	12/12/13
Units:	ug/L	Prepared:	12/18/13
Diln Fac:	1.000	Analyzed:	12/27/13
Batch#:	206331		

Field ID	Type	Lab ID	Result	RL
MW-11	SAMPLE	251610-002	340	5.0
MW-12	SAMPLE	251610-003	1,400	5.0
MW-2	SAMPLE	251610-004	510	5.0
	BLANK	QC721193	ND	5.0

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Iron

Lab #:	251610	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 3010A
Project#:	04656016.0000	Analysis:	EPA 6010B
Analyte:	Iron	Batch#:	206331
Field ID:	ZZZZZZZZZZ	Sampled:	12/11/13
MSS Lab ID:	251556-002	Received:	12/11/13
Matrix:	Filtrate	Prepared:	12/18/13
Units:	ug/L	Analyzed:	12/27/13
Diln Fac:	1.000		

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
BS	QC721194		1,000	938.9	94	79-120		
BSD	QC721195		1,000	947.0	95	79-120	1	21
MS	QC721196	826.9	1,000	1,717	89	66-127		
MSD	QC721197		1,000	1,715	89	66-127	0	21

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Manganese

Lab #:	251610	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 3010A
Project#:	04656016.0000	Analysis:	EPA 6010B
Analyte:	Manganese	Batch#:	206331
Field ID:	ZZZZZZZZZZ	Sampled:	12/11/13
MSS Lab ID:	251556-002	Received:	12/11/13
Matrix:	Filtrate	Prepared:	12/18/13
Units:	ug/L	Analyzed:	12/27/13
Diln Fac:	1.000		

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
BS	QC721194		50.00	51.10	102	80-120		
BSD	QC721195		50.00	51.22	102	80-120	0	20
MS	QC721196	1,697	50.00	1,712	29 NM	70-128		
MSD	QC721197		50.00	1,688	-19 NM	70-128	1	20

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

Curtis & Tompkins, Ltd.

Dissolved Metals Analytical Report

Lab #:	251610	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 3010A
Project#:	04656016.0000	Analysis:	EPA 200.7
Matrix:	Filtrate	Sampled:	12/12/13
Units:	ug/L	Received:	12/12/13
Batch#:	206331	Prepared:	12/18/13

Field ID: MW-11 Lab ID: 251610-002
Type: SAMPLE Analyzed: 12/27/13

Analyte	Result	RL	Diln Fac
Calcium	25,000	500	1.000
Magnesium	54,000	500	1.000
Potassium	56,000	500	1.000
Sodium	1,200,000	50,000	100.0

Field ID: MW-12 Lab ID: 251610-003
Type: SAMPLE Analyzed: 12/27/13

Analyte	Result	RL	Diln Fac
Calcium	91,000	500	1.000
Magnesium	43,000	500	1.000
Potassium	16,000	500	1.000
Sodium	240,000	50,000	100.0

Field ID: MW-2 Lab ID: 251610-004
Type: SAMPLE Analyzed: 12/27/13

Analyte	Result	RL	Diln Fac
Calcium	32,000	500	1.000
Magnesium	36,000	500	1.000
Potassium	1,400	500	1.000
Sodium	240,000	50,000	100.0

Type: BLANK Diln Fac: 1.000
Lab ID: QC721193

Analyte	Result	RL	Analyzed
Calcium	ND	500	12/27/13
Magnesium	ND	500	12/27/13
Potassium	ND	500	12/27/13
Sodium	ND	500	12/30/13

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Metals Analytical Report

Lab #:	251610	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 3010A
Project#:	04656016.0000	Analysis:	EPA 200.7
Matrix:	Filtrate	Batch#:	206331
Units:	ug/L	Prepared:	12/18/13
Diln Fac:	1.000	Analyzed:	12/27/13

Type: BS Lab ID: QC721194

Analyte	Spiked	Result	%REC	Limits
Calcium	20,000	19,510	98	80-120
Magnesium	20,000	18,970	95	80-120
Potassium	10,000	9,349	93	77-120
Sodium	20,000	19,710	99	79-120

Type: BSD Lab ID: QC721195

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Calcium	20,000	19,190	96	80-120	2	20
Magnesium	20,000	19,140	96	80-120	1	20
Potassium	10,000	9,164	92	77-120	2	20
Sodium	20,000	19,650	98	79-120	0	20

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Metals Analytical Report

Lab #:	251610	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 3010A
Project#:	04656016.0000	Analysis:	EPA 200.7
Field ID:	ZZZZZZZZZZ	Batch#:	206331
MSS Lab ID:	251556-002	Sampled:	12/11/13
Matrix:	Filtrate	Received:	12/11/13
Units:	ug/L	Prepared:	12/18/13
Diln Fac:	1.000	Analyzed:	12/27/13

Type: MS Lab ID: QC721196

Analyte	MSS Result	Spiked	Result	%REC	Limits
Calcium	269,500	20,000	254,200 >LR	-76 NM	67-126
Magnesium	184,900	20,000	190,300 >LR	27 NM	71-120
Potassium	891.1	10,000	10,910	100	71-126
Sodium	67,830	20,000	84,400	83	66-127

Type: MSD Lab ID: QC721197

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Calcium	20,000	253,300 >LR	-81 NM	67-126	NC	20
Magnesium	20,000	189,100 >LR	21 NM	71-120	NC	20
Potassium	10,000	10,950	101	71-126	0	20
Sodium	20,000	83,610	79	66-127	1	28

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

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	251610	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	EPA 300.0
Matrix:	Water	Received:	12/12/13
Units:	mg/L		

Field ID: MW-11 Lab ID: 251610-002
Type: SAMPLE Sampled: 12/12/13 11:38

Analyte	Result	RL	Diln Fac	Batch#	Analyzed
Chloride	940	20	100.0	206095	12/13/13 14:21
Nitrogen, Nitrite	ND	0.25	5.000	206083	12/13/13 08:17
Nitrogen, Nitrate	ND	0.25	5.000	206083	12/13/13 08:17
Sulfate	ND	2.5	5.000	206083	12/13/13 08:17

Field ID: MW-12 Lab ID: 251610-003
Type: SAMPLE Sampled: 12/12/13 12:56

Analyte	Result	RL	Diln Fac	Batch#	Analyzed
Chloride	170	2.0	10.00	206095	12/13/13 16:23
Nitrogen, Nitrite	ND	0.05	1.000	206083	12/13/13 08:44
Nitrogen, Nitrate	ND	0.05	1.000	206083	12/13/13 08:44
Sulfate	ND	0.50	1.000	206083	12/13/13 08:44

Field ID: MW-2 Lab ID: 251610-004
Type: SAMPLE Sampled: 12/12/13 14:00

Analyte	Result	RL	Diln Fac	Batch#	Analyzed
Chloride	21	1.0	5.000	206095	12/13/13 14:56
Nitrogen, Nitrite	ND	0.05	1.000	206083	12/13/13 09:12
Nitrogen, Nitrate	ND	0.05	1.000	206083	12/13/13 09:12
Sulfate	25	0.50	1.000	206083	12/13/13 09:12

Type: BLANK Batch#: 206083
Lab ID: QC720225 Analyzed: 12/12/13 10:24
Diln Fac: 1.000

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

Type: BLANK Batch#: 206095
Lab ID: QC720261 Analyzed: 12/13/13 09:42
Diln Fac: 1.000

Analyte	Result	RL
Chloride	ND	0.20

ND= Not Detected
RL= Reporting Limit

Batch QC Report

Curtis & Tompkins Laboratories Analytical Report

Lab #:	251610	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	EPA 300.0
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC720226	Batch#:	206083
Matrix:	Water	Analyzed:	12/12/13 10:52
Units:	mg/L		

Analyte	Spiked	Result	%REC	Limits
Nitrogen, Nitrite	1.000	0.9504	95	80-120
Nitrogen, Nitrate	1.000	1.007	101	80-120
Sulfate	10.00	10.02	100	80-120

Curtis & Tompkins, Ltd.

Batch QC Report

Curtis & Tompkins Laboratories Analytical Report

Lab #:	251610	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	EPA 300.0
Field ID:	ZZZZZZZZZZ	Diln Fac:	5.000
MSS Lab ID:	251614-001	Batch#:	206083
Matrix:	Water	Sampled:	12/12/13 09:13
Units:	mg/L	Received:	12/12/13

Type: MS Analyzed: 12/13/13 10:07
Lab ID: QC720229

Analyte	MSS Result	Spiked	Result	%REC	Limits
Nitrogen, Nitrite	0.009728	2.500	2.646	105	80-120
Nitrogen, Nitrate	<0.005240	2.500	2.508	100	80-120
Sulfate	0.5318	25.00	24.85	97	79-120

Type: MSD Analyzed: 12/13/13 10:35
Lab ID: QC720230

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Nitrogen, Nitrite	2.500	2.643	105	80-120	0	23
Nitrogen, Nitrate	2.500	2.514	101	80-120	0	20
Sulfate	25.00	25.23	99	79-120	2	20

RPD= Relative Percent Difference

Batch QC Report

Curtis & Tompkins Laboratories Analytical Report

Lab #:	251610	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	EPA 300.0
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC720262	Batch#:	206095
Matrix:	Water	Analyzed:	12/13/13 09:59
Units:	mg/L		

Analyte	Spiked	Result	%REC	Limits
Chloride	4.000	3.902	98	80-120

Batch QC Report

Curtis & Tompkins Laboratories Analytical Report

Lab #:	251610	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	EPA 300.0
Field ID:	ZZZZZZZZZZ	Diln Fac:	100.0
MSS Lab ID:	251611-005	Batch#:	206095
Matrix:	Water	Sampled:	12/12/13 11:01
Units:	mg/L	Received:	12/12/13

Type: MS Analyzed: 12/14/13 11:10
Lab ID: QC720436

Analyte	MSS Result	Spiked	Result	%REC	Limits
Chloride	51.89	200.0	240.8	94	75-120

Type: MSD Analyzed: 12/14/13 11:27
Lab ID: QC720437

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Chloride	200.0	235.7	92	75-120	2	20

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Alkalinity

Lab #:	251610	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	SM2320B
Matrix:	Water	Sampled:	12/12/13
Units:	mg/L	Received:	12/12/13
Batch#:	206513	Analyzed:	12/24/13

Field ID: MW-11 Lab ID: 251610-002
Type: SAMPLE Diln Fac: 2.000

Analyte	Result	RL
Alkalinity, Bicarbonate	1,500	2.0
Alkalinity, Carbonate	ND	2.0
Alkalinity, Hydroxide	ND	2.0
Alkalinity, Total as CaCO3	1,500	2.0

Field ID: MW-12 Lab ID: 251610-003
Type: SAMPLE Diln Fac: 2.000

Analyte	Result	RL
Alkalinity, Bicarbonate	660	2.0
Alkalinity, Carbonate	ND	2.0
Alkalinity, Hydroxide	ND	2.0
Alkalinity, Total as CaCO3	660	2.0

Field ID: MW-2 Lab ID: 251610-004
Type: SAMPLE Diln Fac: 2.000

Analyte	Result	RL
Alkalinity, Bicarbonate	640	2.0
Alkalinity, Carbonate	ND	2.0
Alkalinity, Hydroxide	ND	2.0
Alkalinity, Total as CaCO3	640	2.0

Type: BLANK Diln Fac: 1.000
Lab ID: QC721954

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

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Alkalinity

Lab #:	251610	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	SM2320B
Analyte:	Alkalinity, Total as CaCO3	Units:	mg/L
Type:	LCS	Diln Fac:	4.000
Lab ID:	QC721955	Batch#:	206513
Matrix:	Water	Analyzed:	12/24/13

Spiked	Result	%REC	Limits
200.0	183.2	92	90-110

Curtis & Tompkins, Ltd.

Batch QC Report

Alkalinity

Lab #:	251610	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	SM2320B
Analyte:	Alkalinity, Total as CaCO3	Diln Fac:	10.00
Field ID:	ZZZZZZZZZZ	Batch#:	206513
MSS Lab ID:	251598-009	Sampled:	12/12/13
Matrix:	Water	Received:	12/12/13
Units:	mg/L	Analyzed:	12/24/13

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
MS	QC721956	425.5	500.0	868.0	89	80-120		
MSD	QC721957		500.0	828.0	81	80-120	5	25

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Dissolved Sulfide

Lab #:	251610	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	SM4500S2-D
Analyte:	Dissolved Sulfide	Batch#:	206308
Matrix:	Water	Sampled:	12/12/13
Units:	mg/L	Received:	12/12/13
Diln Fac:	1.000	Analyzed:	12/18/13

Field ID	Type	Lab ID	Result	RL
MW-11	SAMPLE	251610-002	ND	0.04
MW-12	SAMPLE	251610-003	0.56	0.04
MW-2	SAMPLE	251610-004	ND	0.04
	BLANK	QC721106	ND	0.04

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Sulfide

Lab #:	251610	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	SM4500S2-D
Analyte:	Dissolved Sulfide	Diln Fac:	1.000
Field ID:	MW-5	Batch#:	206308
MSS Lab ID:	251679-002	Sampled:	12/16/13
Matrix:	Water	Received:	12/16/13
Units:	mg/L	Analyzed:	12/18/13

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
MS	QC721107	<0.04000	0.5870	0.5649	96	57-131		
MSD	QC721108		0.5870	0.5579	95	57-131	1	21
LCS	QC721109		0.5870	0.5710	97	80-120		

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Orthophosphate Phosphorous

Lab #:	251610	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	SM4500P-E
Analyte:	Orthophosphate (as P)	Batch#:	206149
Matrix:	Water	Received:	12/12/13
Units:	mg/L	Analyzed:	12/13/13 18:20

Field ID	Type	Lab ID	Result	RL	Diln Fac	Sampled
MW-11	SAMPLE	251610-002	1.7	0.15	5.000	12/12/13 11:38
MW-12	SAMPLE	251610-003	0.21	0.030	1.000	12/12/13 12:56
MW-2	SAMPLE	251610-004	0.17	0.030	1.000	12/12/13 14:00
	BLANK	QC720495	ND	0.030	1.000	

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Orthophosphate Phosphorous

Lab #:	251610	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	SM4500P-E
Analyte:	Orthophosphate (as P)	Diln Fac:	1.000
Field ID:	MW-2	Batch#:	206149
MSS Lab ID:	251610-004	Sampled:	12/12/13 14:00
Matrix:	Water	Received:	12/12/13
Units:	mg/L	Analyzed:	12/13/13 18:20

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
LCS	QC720496		0.4000	0.3716	93	80-120		
MS	QC720497	0.1703	0.4000	0.4585	72 *	80-120		
MSD	QC720498		0.4000	0.4596	72 *	80-120	0	20

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

Curtis & Tompkins, Ltd.

Total Dissolved Solids (TDS)

Lab #:	251610	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	SM2540C
Analyte:	Total Dissolved Solids	Sampled:	12/12/13
Matrix:	Water	Received:	12/12/13
Units:	mg/L	Prepared:	12/18/13
Batch#:	206321	Analyzed:	12/19/13

Field ID	Type	Lab ID	Result	RL	Diln Fac
MW-11	SAMPLE	251610-002	3,130	20	2.000
MW-12	SAMPLE	251610-003	930	10	1.000
MW-2	SAMPLE	251610-004	680	10	1.000
	BLANK	QC721157	ND	10	1.000

ND= Not Detected
RL= Reporting Limit

Batch QC Report

Total Dissolved Solids (TDS)

Lab #:	251610	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	SM2540C
Analyte:	Total Dissolved Solids	Batch#:	206321
Matrix:	Water	Prepared:	12/18/13
Units:	mg/L	Analyzed:	12/19/13
Diln Fac:	1.000		

Field ID	Type	MSS Lab ID	Lab ID	MSS Result	Spiked	Result	RL	%REC	Limits	RPD	Lim	Sampled	Received
	LCS		QC721158		104.0	84.00		81	74-120				
ZZZZZZZZZZ	SDUP	251613-005	QC721159	958.0		982.0	10.00			2	5	12/12/13	12/12/13
MW-5	SDUP	251679-002	QC721160	1,076		1,090	10.00			1	5	12/16/13	12/16/13

RL= Reporting Limit
RPD= Relative Percent Difference

18.0

Curtis & Tompkins, Ltd.

Data Validation Worksheet

Lab Report # 251610 DV by: CO
Project Port Harbor Facilities Complex Date: 01/14/2014

Lab IDs	Sample IDs	Date Collected	Parameters								
			TPHg 8015B	TPHd/mo 8015B	MTBE BTEX 8260B	TDS	Anions 300.0	Diss. Sulfide 376.2	Diss. Gases	Diss. Metals 200.7 and 6010B	Alkalinity
-001	QCTB-1	12/12/13	X		X						
-002	MW-11	12/12/13	X	X	X	X	X	X	X	X	X
-003	MW-12	12/12/13	X	X	X	X	X	X	X	X	X
-004	MW-2	12/12/13	X	X	X	X	X	X	X	X	X

Lab ID: C+T **NO QUALS**
Cooler Temperature: Not noted; login indicates on ice.
Chain-of-Custody: OK
Samples preservatives: OK

Parameter: **TPHg**

HTs: 14 days preserved, 7 days unpreserved – analyzed 12/20/13 (OK; all samples preserved)
Batch IDs: 206436
Surrogates: OK
Method Blank: OK, surrogates OK
LCS: OK, surrogates OK
MS/MSD: MS OK, surrogates OK
MSD OK, surrogates OK

Parameter: **TPHd/mo**

HTs: 14 days – analyzed 12/17/13
Batch IDs: 206124
Surrogates: OK
Method Blank: OK, surrogates OK
LCS: OK, surrogates OK
MS/MSD: MS OK, surrogate OK
MSD OK, surrogates OK

Parameter: **BTEX + MTBE**

HTs: 14 days – analyzed 12/18/13
Batch IDs: 206311
Surrogates: OK
Method Blank: OK, surrogates OK
BS/BSD: BS OK, surrogates OK
BSD OK, surrogates OK

Parameter: **Dissolved Gases**

HTs: 14 days – analyzed 12/17/13
Batch IDs: 206263
Method Blank: OK
BS/BSD: BS OK
BSD OK

Parameter: **Dissolved Fe + Mn (6010B)**

HTs: 180 days – analyzed 12/27/13
Batch IDs: 206331
Method Blank: OK
BS/BSD: BS OK
BSD OK
MS/MSD: MS % recovery outside of control limits; sample concentration >4x spike; no qual
MSD % recovery outside of control limits; sample concentration >4x spike; no qual

---

Parameter: **Dissolved Metals (200.7)**

HTs: 180 days – analyzed 12/27/13
Batch IDs: 206331
Method Blank: OK
BS/BSD: BS OK
BSD OK
MS/MSD: MS % recovery outside of control limits; sample concentration >4x spike; no qual
MSD % recovery outside of control limits; sample concentration >4x spike; no qual

---

Parameter: **Anions (300.0)**

HTs: 48 hours (nitrates) – analyzed 12/13/13
Batch IDs: 206095, 206083
Method Blank: OK
LCS: LCS OK
MS/MSD: MS OK
MSD OK

Parameter: **Alkalinity**

HTs: 14 days – analyzed 12/24/13
Batch IDs: 206513
Method Blank: OK
LCS: LCS OK
MS/MSD: MS OK
MSD OK

Parameter: **Sulfide**

HTs: 7 days – analyzed 12/18/13
Batch IDs: 206308
Method Blank: OK
LCS: LCS OK
MS/MSD: MS OK
MSD OK

Parameter: **Orthophosphate**

HTs: 48 hours – analyzed 12/13/13
Batch IDs: 206149
Method Blank: OK
LCS: LCS OK
MS/MSD: Low recoveries for MS/MSD. LCS within limits.

Parameter: **TDS**
HTs: 7 days – analyzed 12/19/13
Batch IDs: 206321
Method Blank: OK
LCS: LCS OK


Curtis & Tompkins, Ltd.
Analytical Laboratories, Since 1878

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

Laboratory Job Number 251652
ANALYTICAL REPORT

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

Sample ID	Lab ID
QCTB-2	251652-001
MW-4	251652-002
MW-4DUP	251652-003
MW-8A	251652-004
MW-10	251652-005
MW-1	251652-006
MW-9	251652-007

This data package has been reviewed for technical correctness and completeness. Release of this data has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following 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: _____ Date: 01/06/2014

Will S Rice
Project Manager
will.rice@ctberk.com

NELAP # 01107CA

Curtis & Tompkins, Ltd.

CASE NARRATIVE

Laboratory number:	**251652**
Client:	**Arcadis**
Project:	**04656016.0000**
Location:	**Port HFC**
Request Date:	**12/13/13**
Samples Received:	**12/13/13**

This data package contains sample and QC results for seven water samples, requested for the above referenced project on 12/13/13. The samples were received cold and intact.

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

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

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

Dissolved Gases by GC/FID (RSK-175):
No analytical problems were encountered.

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

Metals (EPA 200.7):
The samples were filtered outside the 40CFR136 recommended 15 minute holding time. No other analytical problems were encountered.

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

Alkalinity (SM2320B):
No analytical problems were encountered.

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

Total Dissolved Solids (TDS) (SM2540C):
No analytical problems were encountered.

Orthophosphate Phosphorous (SM4500P-E):
Low recoveries were observed for orthophosphate (as P) in the MS/MSD of MW-2 (lab # 251610-004); the LCS was within limits. No other analytical problems were encountered.

MW 12/12 251652 251652

Environmental Sampling Services, LLC
6680 Alhambra Avenue, #102
Martinez, California 94553-6105
Telephone: (925) 372-8108
www.envsampling.com

CHAIN OF CUSTODY RECORD

Page 1 of 1

TURN AROUND TIME Other:

LABORATORY:	☐	☐	☐	☑
Curtis Tompkins, Ltd.	24 Hours	48 Hours	1 Week	Normal
Berkeley, CA				

Report To: Ms. Caroline Orsi **Telephone/Fax:** 510-652-4500 / 510-652-4906
Company: Arcadis U.S., Inc. **Project Name:** Port HFC
Address: 2000 Powell Street, 7th Floor **Project Number:** 04656016.0000
Emeryville, CA 94608 **Bill To:** Port of Oakland
E-Mail Results to caroline.orsi@arcadis-us.com
& cc:
Sampler(s): Jacqueline Lee ☑ **Sampler's Signature:**
Stephen Penman ☐ **Sampler's Signature:**

Reporting Requirement: PDF: Yes ☑ No ☐ **EPA Data Report:** Level II
EDD File: Yes ☑ No ☐ Electronic (EDF) : Yes ☑ No ☐

Analysis Request

SAMPLE ID	Sample Date	Sample Time	Number of Containers	Type of Container[1]	Matrix: Water	Groundwater	Soil	Soil Vapor	Other	Preservative: Ice	HCl	HNO_3	H_2SO_4	TPH-Gas (EPA 8015B)	BTEX & MTBE (EPA 8260B)	TPH-D & MO (EPA 8015B) w/Silica Gel Cleanup	TDS (40CFR136/160.1)	Anions (EPA 300.0) * see "comments"	Dissolved Sulfide (EPA E376.2)	Field Filtered (FF): Dissolved Na, Ca, K, and Mg (EPA 200.7)	Dissolved Fe and Mn (EPA SW6010B)
1 QCTB-2	12/13/2013	8:30	3	1	x					x	x			x	x						
2 MW-4	12/13/2013	9:21	15	1, 2, 3		x				x	x	x	x	x	x	x	x	x	x	x	x
3 MW-4DUP	12/13/2013	9:21	15	1,2,3		x				x	x	x	x	x	x	x	x	x	x	x	x
4 MW-8A	12/13/2013	10:59	15	1,2,3		x				x	x	x	x	x	x	x	x	x	x	x	x
5 MW-10	12/13/2013	12:34	15	1,2,3		x				x	x	x	x	x	x	x	x	x	x	x	x
6 MW-1	12/13/2013	13:32	15	1,2,3		x				x	x	x	x	x	x	x	x	x	x	x	x
7 MW-9	12/13/2013	14:57	15	1,2,3		x				x	x	x	x	x	x	x	x	x	x	x	x

Comments
Anions =
Bicarbonate,
Carbonate,
Sulfate,
Chloride,
Nitrate, Nitrite,
and
Orthophosphate.

Relinquished By:	Date:	Time:	Received By:
	12/13/2013	16:50	
Relinquished By:	Date:	Time:	Received By:
Relinquished By:	Date:	Time:	Received By:

1 = Sample Container Type: 1 =VOA 2=Glass 3=High Density Polyethylene 4=Summa Canister

QUESTIONS REGARDING COC, CALL ESS
Send confirmation to: caroline.orsi@arcadis-us.com
After log-in, please email COC to:
jlee@envsampling.com and spen@envsampling.com

SAMPLE RECEIPT
☐ Intact ☐ Cold
☐ On Ice ☐ Ambient
Preservative Correct?
☐ Yes ☐ No ☐ NA

COOLER RECEIPT CHECKLIST

Curtis & Tompkins, Ltd.

Login # ~~251652~~ MS 12/13 Date Received 12/13/13 Number of coolers 3
Client Arcadis Project Port HFC (04636016.0000)

Date Opened 12/13/13 By (print) AM (sign) Amy Mull
Date Logged in 6 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) _____

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

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

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

COMMENTS

_____

_____

_____

_____

_____

_____

Rev 10, 11/11

Curtis & Tompkins Sample Preservation for 251652

Sample	pH: <2	>9	>12	Other
-002a	[ ]	[ ]	[ ]	_____
b	[ ]	[ ]	[ ]	_____
c	[ ]	[ ]	[ ]	_____
d	[ ]	[ ]	[ ]	_____
e	[ ]	[ ]	[ ]	_____
f	[ ]	[ ]	[ ]	_____
g	[ ]	[ ]	[ ]	_____
h	[ ]	[ ]	[ ]	_____
i	[ ]	[ ]	[ ]	_____
j	[ ]	[ ]	[ ]	_____
k	[X]	[ ]	[ ]	_____
l	[ ]	[ ]	[X]	_____
m	[ ]	[ ]	[ ]	_____
n	[ ]	[ ]	[ ]	_____
o	[ ]	[ ]	[ ]	_____
-003a	[ ]	[ ]	[ ]	_____
b	[ ]	[ ]	[ ]	_____
c	[ ]	[ ]	[ ]	_____
d	[ ]	[ ]	[ ]	_____
e	[ ]	[ ]	[ ]	_____
f	[ ]	[ ]	[ ]	_____
g	[ ]	[ ]	[ ]	_____
h	[ ]	[ ]	[ ]	_____
i	[ ]	[ ]	[ ]	_____
j	[ ]	[ ]	[ ]	_____
k	[X]	[ ]	[ ]	_____
l	[ ]	[ ]	[X]	_____
m	[ ]	[ ]	[ ]	_____
n	[ ]	[ ]	[ ]	_____
o	[ ]	[ ]	[ ]	_____

Sample	pH: <2	>9	>12	Other
-004a	[ ]	[ ]	[ ]	_____
b	[ ]	[ ]	[ ]	_____
c	[ ]	[ ]	[ ]	_____
d	[ ]	[ ]	[ ]	_____
e	[ ]	[ ]	[ ]	_____
f	[ ]	[ ]	[ ]	_____
g	[ ]	[ ]	[ ]	_____
h	[ ]	[ ]	[ ]	_____
i	[ ]	[ ]	[ ]	_____
j	[ ]	[ ]	[ ]	_____
k	[X]	[ ]	[ ]	_____
l	[ ]	[ ]	[X]	_____
m	[ ]	[ ]	[ ]	_____
n	[ ]	[ ]	[ ]	_____
o	[ ]	[ ]	[ ]	_____
-005a	[ ]	[ ]	[ ]	_____
b	[ ]	[ ]	[ ]	_____
c	[ ]	[ ]	[ ]	_____
d	[ ]	[ ]	[ ]	_____
e	[ ]	[ ]	[ ]	_____
f	[ ]	[ ]	[ ]	_____
g	[ ]	[ ]	[ ]	_____
h	[ ]	[ ]	[ ]	_____
i	[ ]	[ ]	[ ]	_____
j	[ ]	[ ]	[ ]	_____
k	[X]	[ ]	[ ]	_____
l	[ ]	[ ]	[X]	_____
m	[ ]	[ ]	[ ]	_____
n	[ ]	[ ]	[ ]	_____
o	[ ]	[ ]	[ ]	_____

Sample	pH: <2	>9	>12	Other
-006a	[ ]	[ ]	[ ]	_____
b	[ ]	[ ]	[ ]	_____
c	[ ]	[ ]	[ ]	_____
d	[ ]	[ ]	[ ]	_____
e	[ ]	[ ]	[ ]	_____
f	[ ]	[ ]	[ ]	_____
g	[ ]	[ ]	[ ]	_____
h	[ ]	[ ]	[ ]	_____
i	[ ]	[ ]	[ ]	_____
j	[ ]	[ ]	[ ]	_____
k	[X]	[ ]	[ ]	_____
l	[ ]	[ ]	[X]	_____
m	[ ]	[ ]	[ ]	_____
n	[ ]	[ ]	[ ]	_____
o	[ ]	[ ]	[ ]	_____
-007a	[ ]	[ ]	[ ]	_____
b	[ ]	[ ]	[ ]	_____
c	[ ]	[ ]	[ ]	_____
d	[ ]	[ ]	[ ]	_____
e	[ ]	[ ]	[ ]	_____
f	[ ]	[ ]	[ ]	_____
g	[ ]	[ ]	[ ]	_____
h	[ ]	[ ]	[ ]	_____
i	[ ]	[ ]	[ ]	_____
j	[ ]	[ ]	[ ]	_____
k	[X]	[ ]	[ ]	_____
l	[ ]	[ ]	[X]	_____
m	[ ]	[ ]	[ ]	_____
n	[ ]	[ ]	[ ]	_____
o	[ ]	[ ]	[ ]	_____

Analyst: MB

Date: 12/13/13

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Curtis & Tompkins, Ltd.

Total Volatile Hydrocarbons

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	12/13/13
Units:	ug/L	Received:	12/13/13
Diln Fac:	1.000	Analyzed:	12/20/13
Batch#:	206436		

Field ID: QCTB-2 Lab ID: 251652-001
Type: SAMPLE

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	91	77-128

Field ID: MW-4 Lab ID: 251652-002
Type: SAMPLE

Analyte	Result	RL
Gasoline C7-C12	81	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	98	77-128

Field ID: MW-4DUP Lab ID: 251652-003
Type: SAMPLE

Analyte	Result	RL
Gasoline C7-C12	85	50

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

Field ID: MW-8A Lab ID: 251652-004
Type: SAMPLE

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	105	77-128

Field ID: MW-10 Lab ID: 251652-005
Type: SAMPLE

Analyte	Result	RL
Gasoline C7-C12	280	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	103	77-128

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Total Volatile Hydrocarbons

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	12/13/13
Units:	ug/L	Received:	12/13/13
Diln Fac:	1.000	Analyzed:	12/20/13
Batch#:	206436		

Field ID: MW-1 Lab ID: 251652-006
Type: SAMPLE

Analyte	Result	RL
Gasoline C7-C12	1,700	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	116	77-128

Field ID: MW-9 Lab ID: 251652-007
Type: SAMPLE

Analyte	Result	RL
Gasoline C7-C12	210	50

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

Type: BLANK Lab ID: QC721626

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	82	77-128

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Total Volatile Hydrocarbons

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC721625	Batch#:	206436
Matrix:	Water	Analyzed:	12/20/13
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	1,000	892.9	89	80-120

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	86	77-128

Curtis & Tompkins, Ltd.

Batch QC Report

Total Volatile Hydrocarbons

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8015B
Field ID:	MW-4	Batch#:	206436
MSS Lab ID:	251652-002	Sampled:	12/13/13
Matrix:	Water	Received:	12/13/13
Units:	ug/L	Analyzed:	12/20/13
Diln Fac:	1.000		

Type: MS Lab ID: QC721627

Analyte	MSS Result	Spiked	Result	%REC	Limits
Gasoline C7-C12	81.07	2,000	2,113	102	74-120

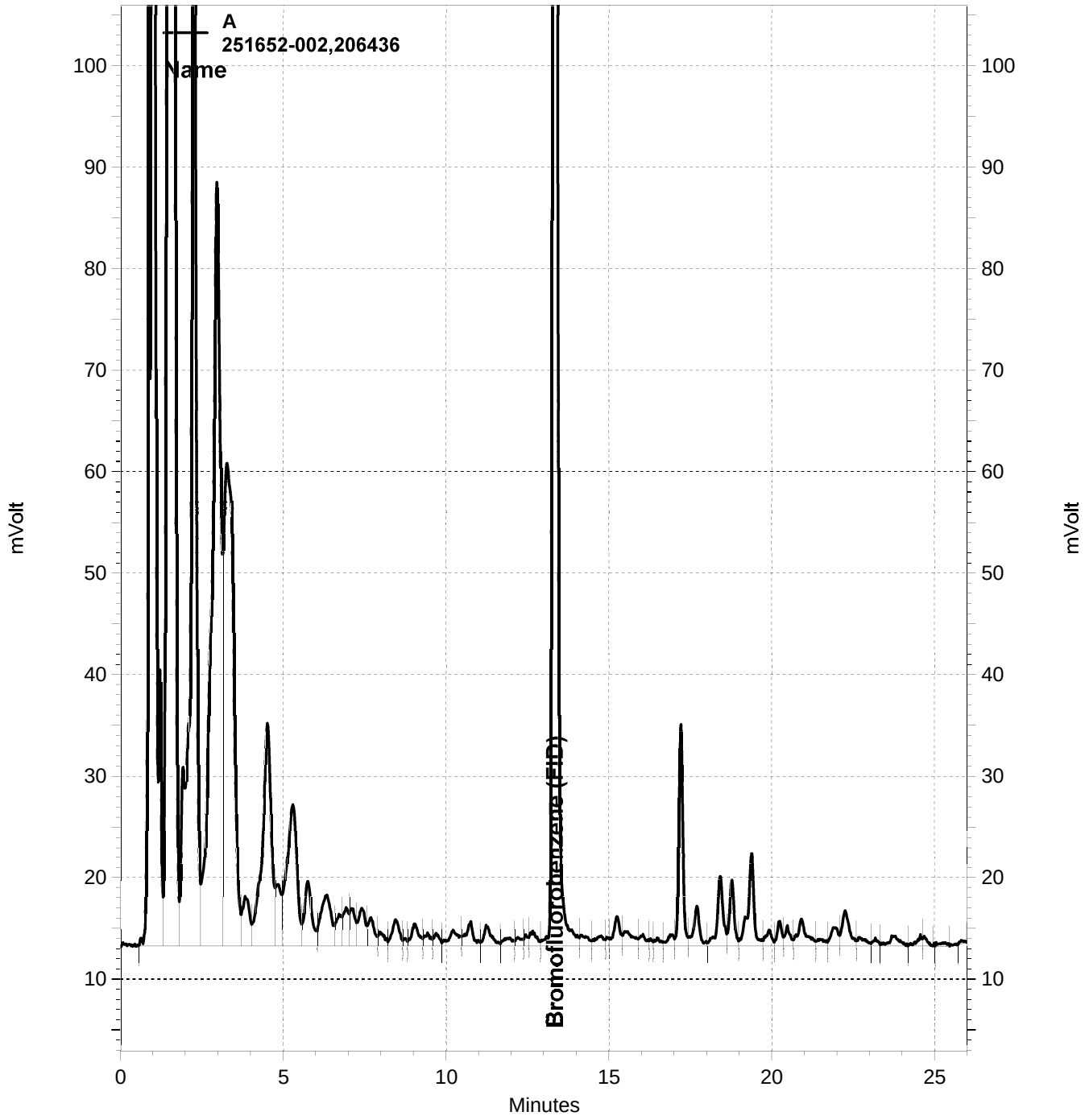
Surrogate	%REC	Limits
Bromofluorobenzene (FID)	119	77-128

Type: MSD Lab ID: QC721628

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	2,000	2,039	98	74-120	4	27

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	108	77-128

RPD= Relative Percent Difference



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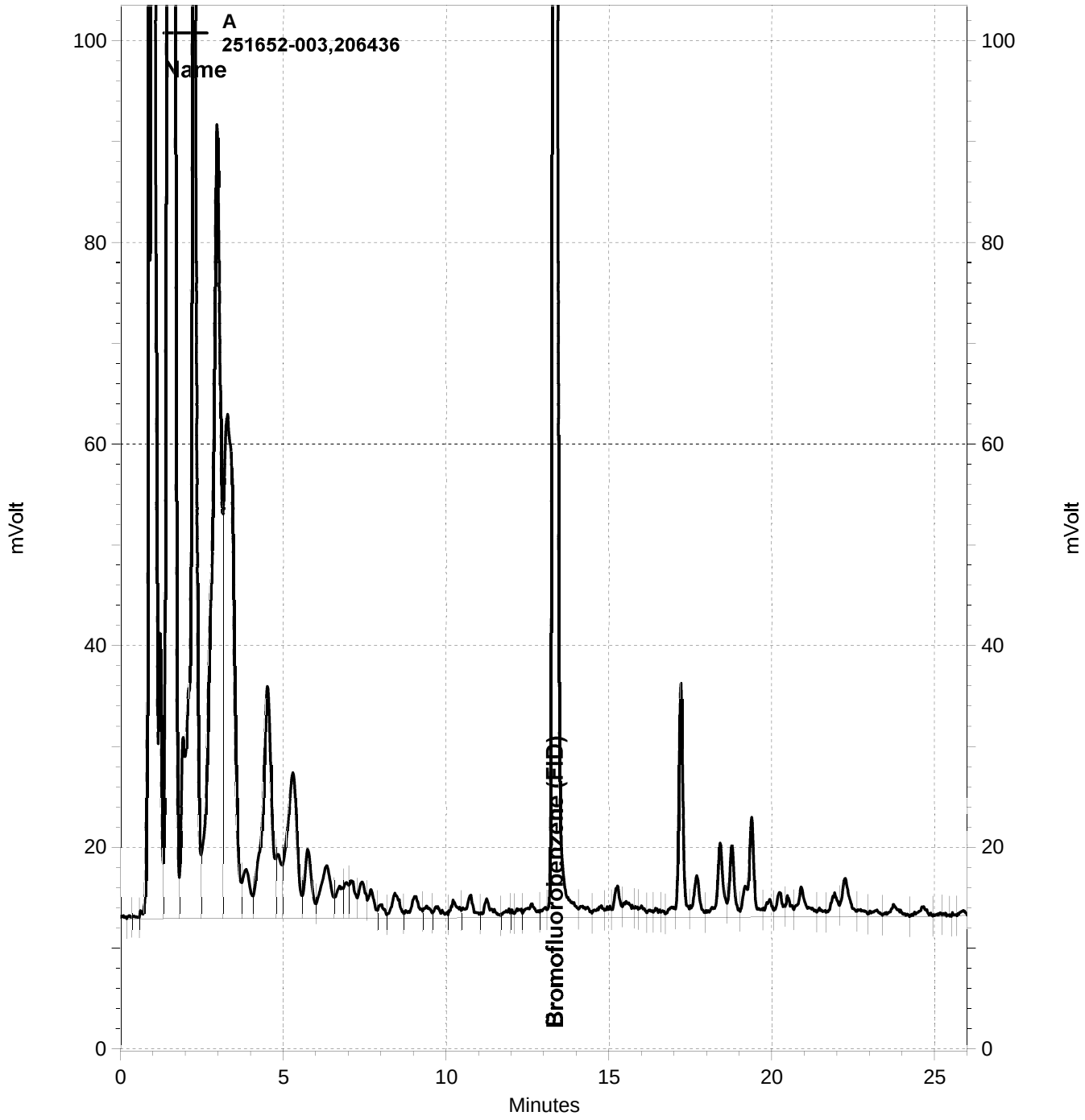

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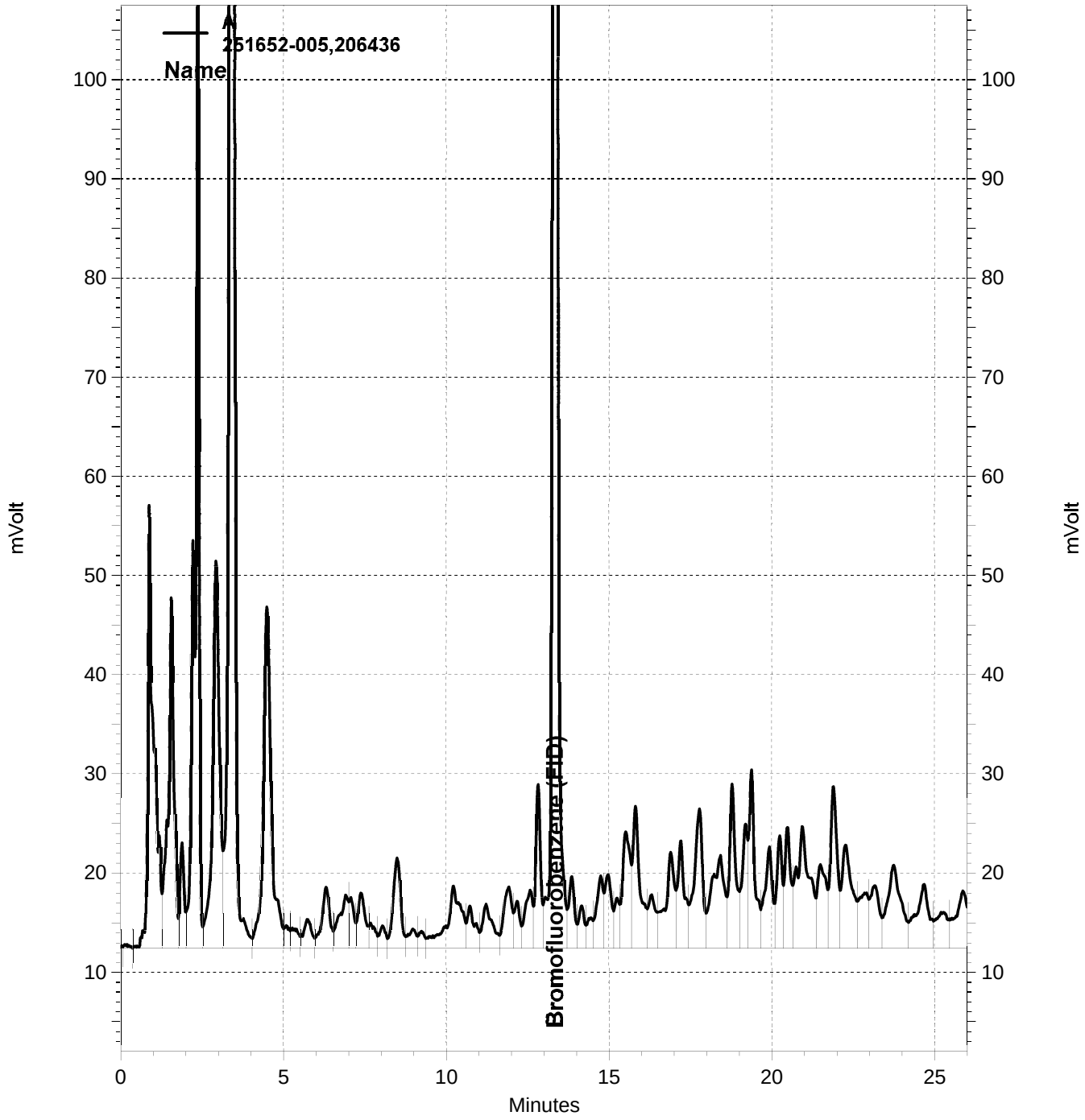

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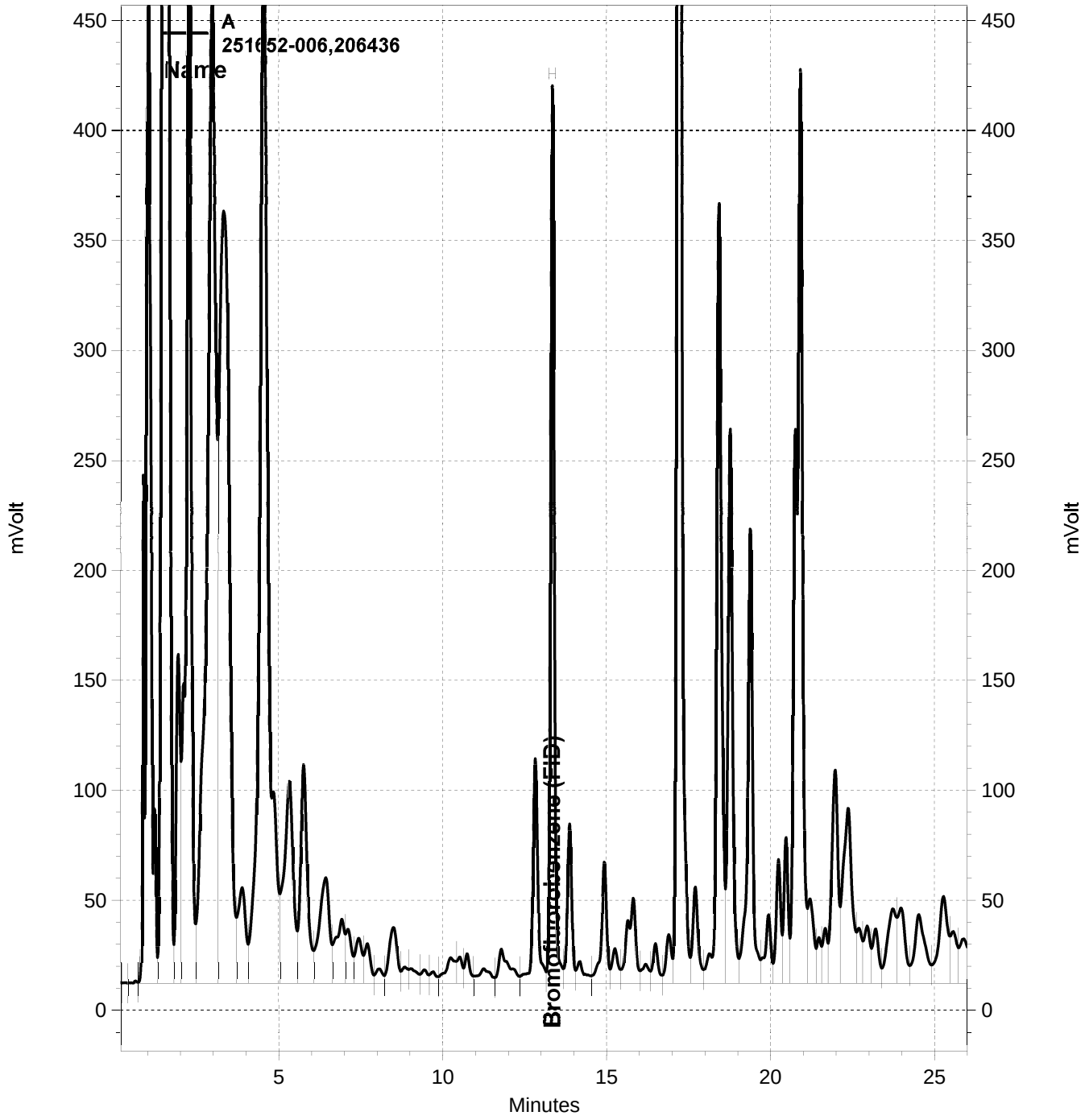

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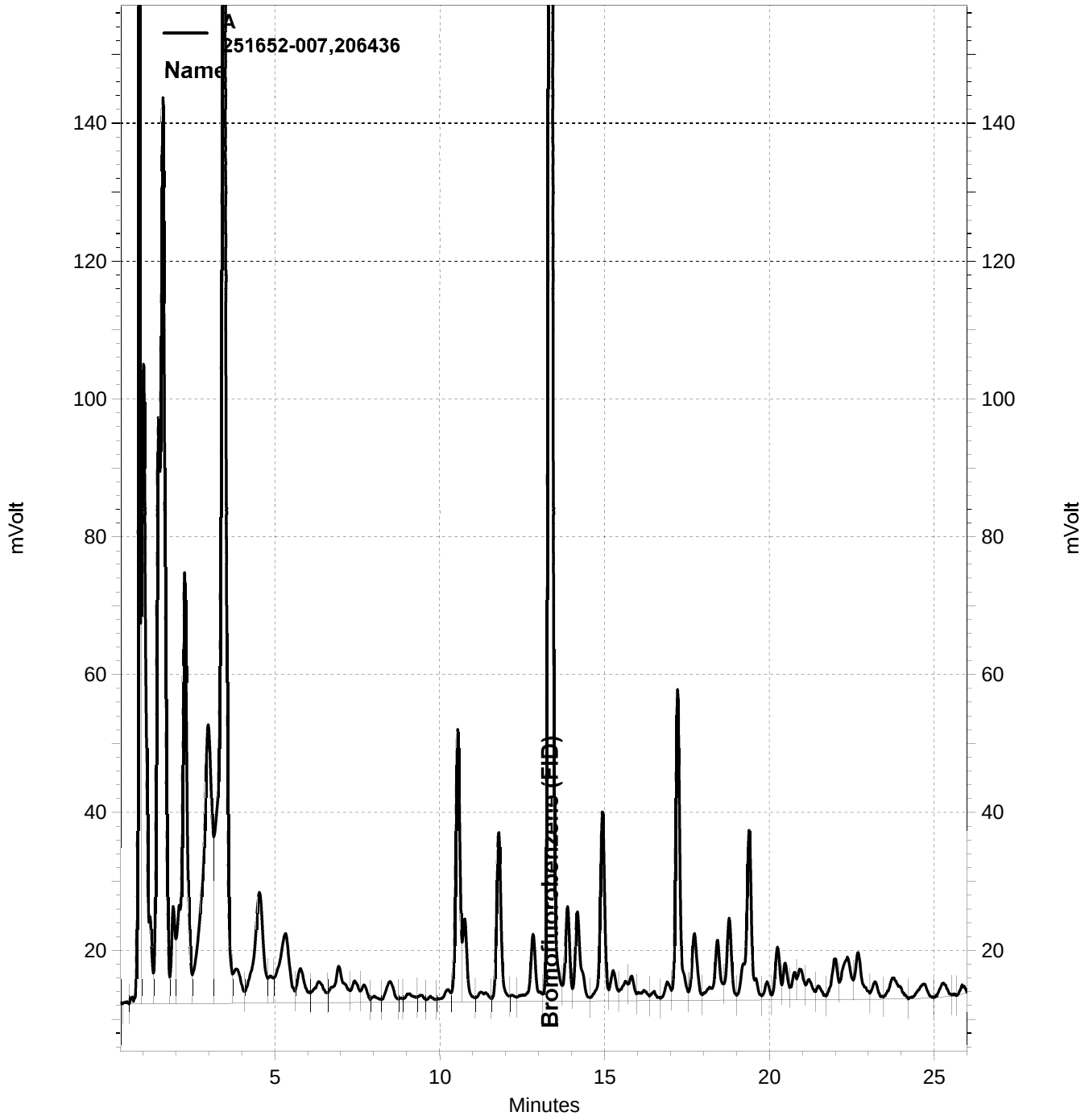

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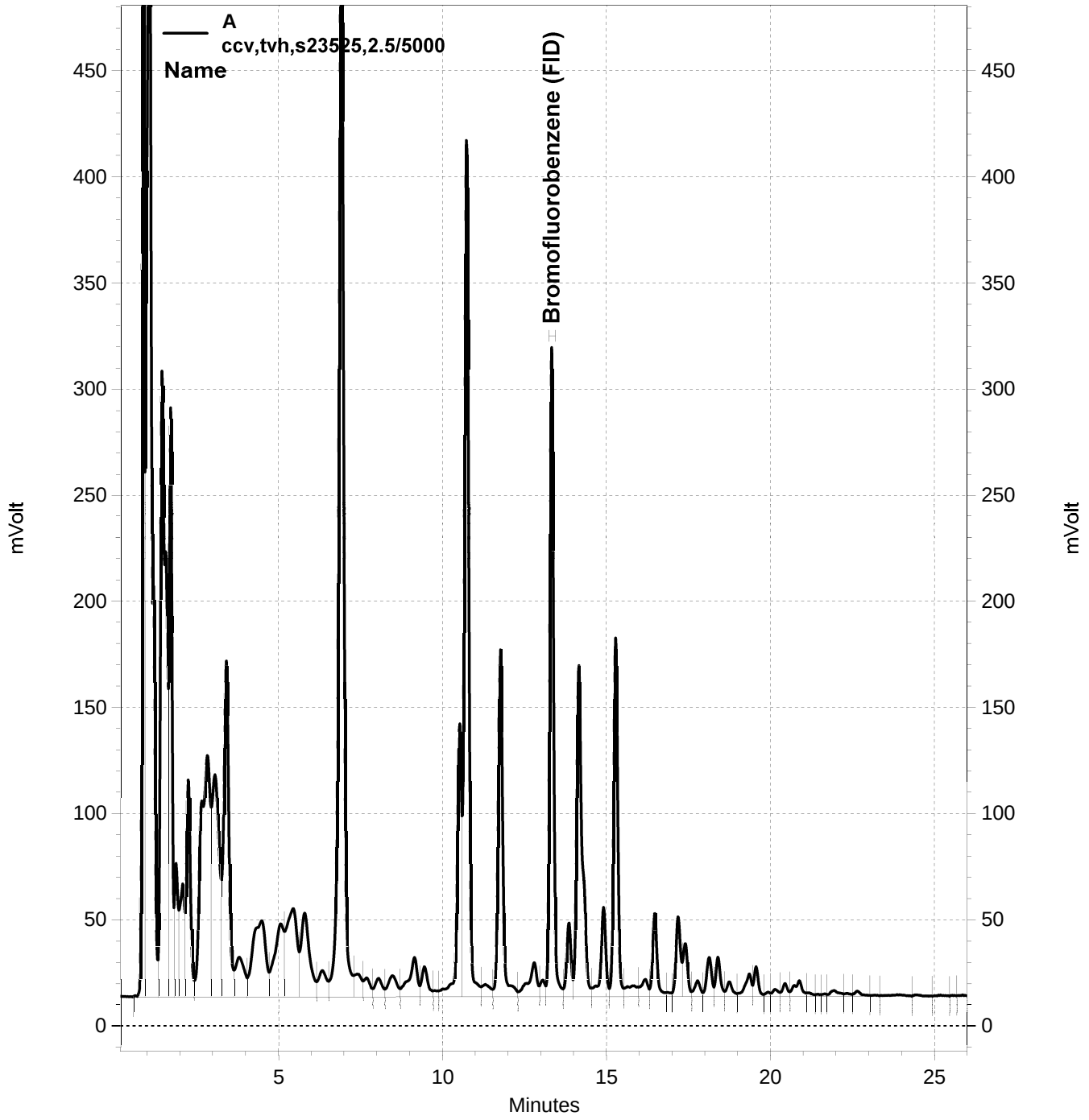

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Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 3520C
Project#:	04656016.0000	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	12/13/13
Units:	ug/L	Received:	12/13/13
Diln Fac:	1.000	Prepared:	12/16/13
Batch#:	206199	Analyzed:	12/17/13

Field ID: MW-4 Lab ID: 251652-002
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	109	66-129

Field ID: MW-4DUP Lab ID: 251652-003
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	111	66-129

Field ID: MW-8A Lab ID: 251652-004
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	105	66-129

Field ID: MW-10 Lab ID: 251652-005
Type: SAMPLE Cleanup Method: EPA 3630C

Analyte	Result	RL
Diesel C10-C24	130 Y	50
Motor Oil C24-C36	ND	300

Surrogate	%REC	Limits
o-Terphenyl	102	66-129

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

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 3520C
Project#:	04656016.0000	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	12/13/13
Units:	ug/L	Received:	12/13/13
Diln Fac:	1.000	Prepared:	12/16/13
Batch#:	206199	Analyzed:	12/17/13

Field ID: MW-1 Lab ID: 251652-006
Type: SAMPLE Cleanup Method: EPA 3630C

Analyte	Result	RL
Diesel C10-C24	1,700	50
Motor Oil C24-C36	ND	300

Surrogate	%REC	Limits
o-Terphenyl	105	66-129

Field ID: MW-9 Lab ID: 251652-007
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	66-129

Type: BLANK Cleanup Method: EPA 3630C
Lab ID: QC720694

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

Surrogate	%REC	Limits
o-Terphenyl	109	66-129

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 #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 3520C
Project#:	04656016.0000	Analysis:	EPA 8015B
Matrix:	Water	Batch#:	206199
Units:	ug/L	Prepared:	12/16/13
Diln Fac:	1.000	Analyzed:	12/17/13

Type: BS Cleanup Method: EPA 3630C
Lab ID: QC720695

Analyte	Spiked	Result	%REC	Limits
Diesel C10-C24	2,500	2,007	80	61-120

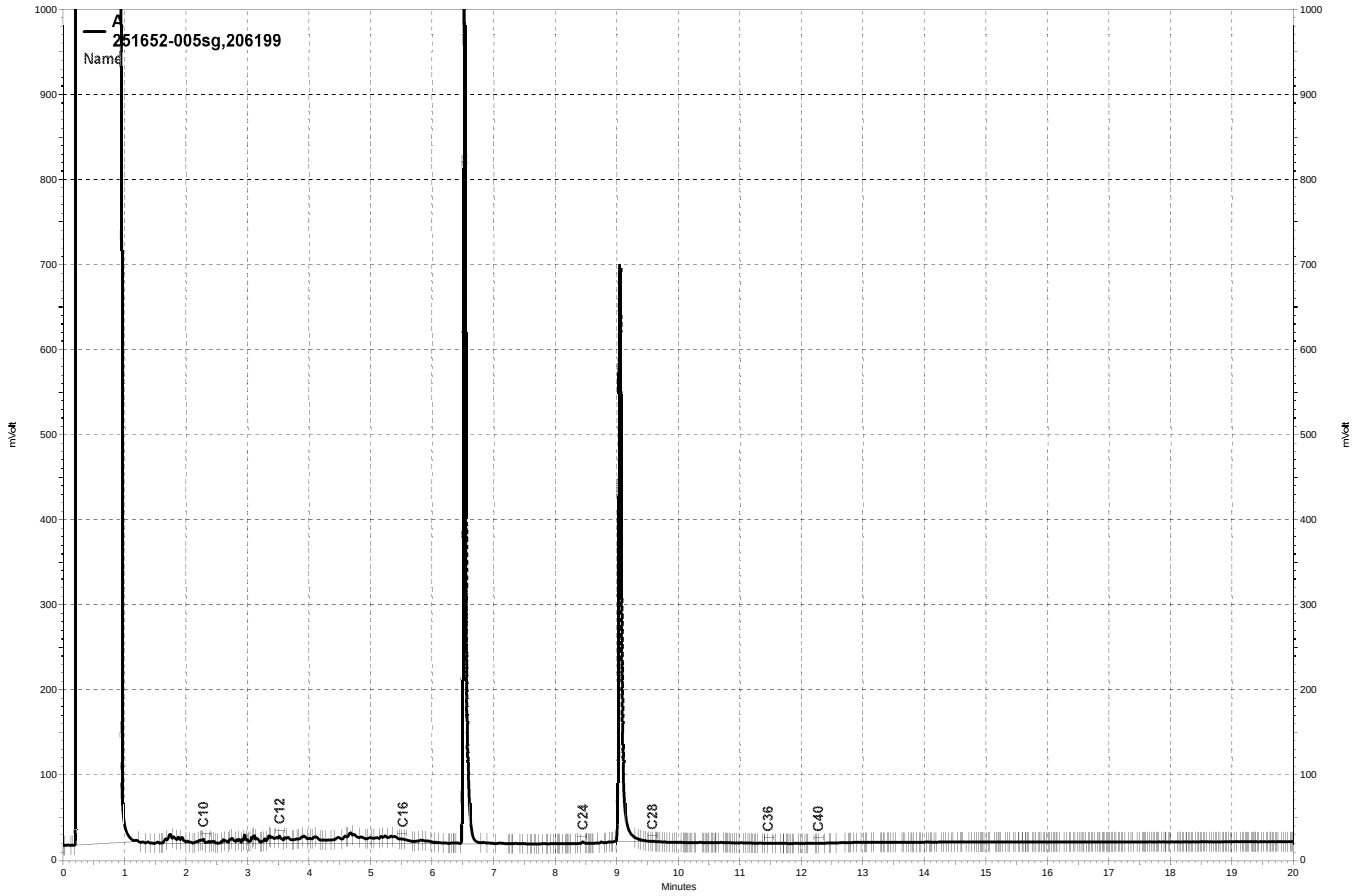
Surrogate	%REC	Limits
o-Terphenyl	120	66-129

Type: BSD Cleanup Method: EPA 3630C
Lab ID: QC720696

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Diesel C10-C24	2,500	1,804	72	61-120	11	45

Surrogate	%REC	Limits
o-Terphenyl	112	66-129

RPD= Relative Percent Difference



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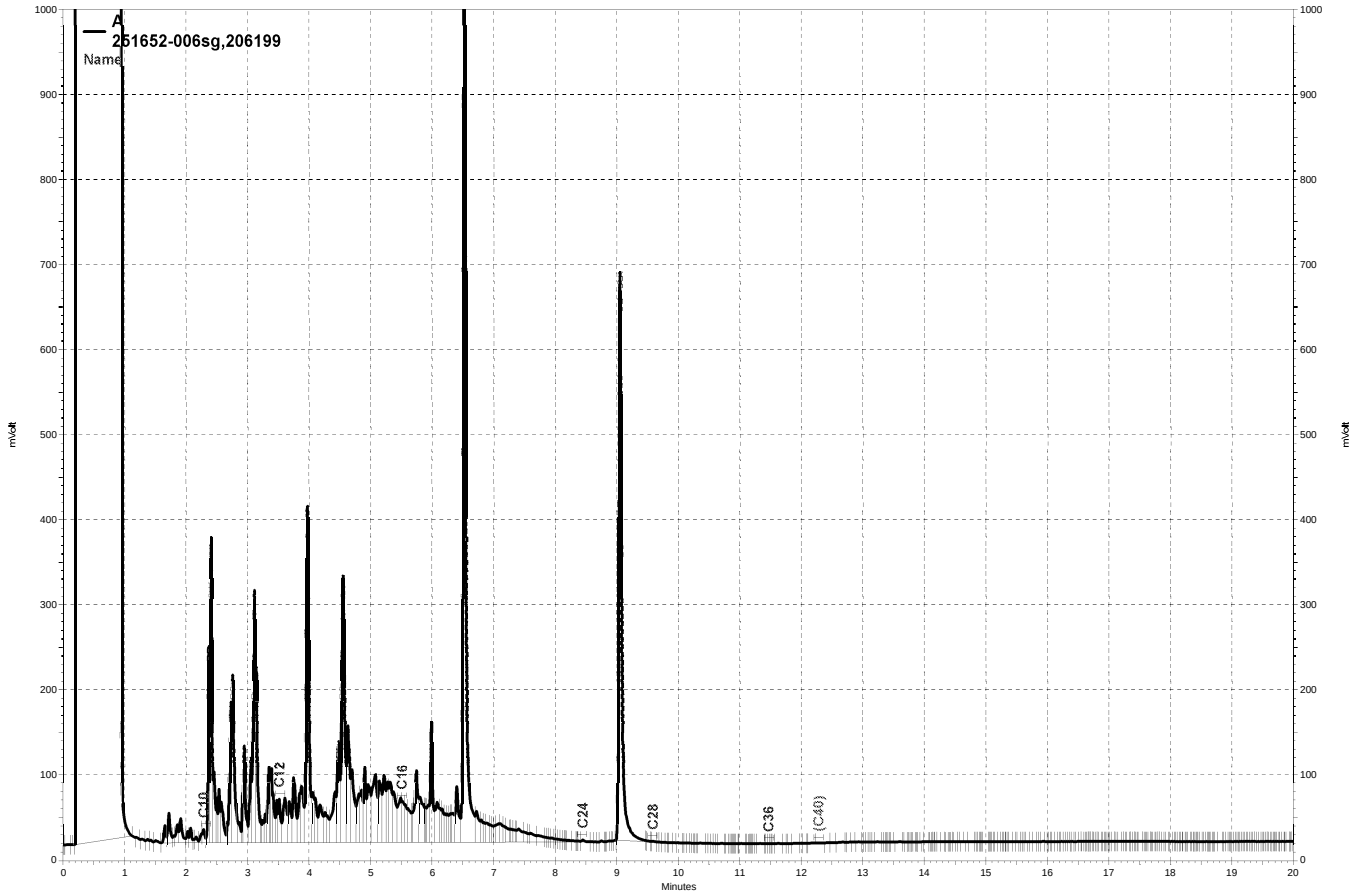

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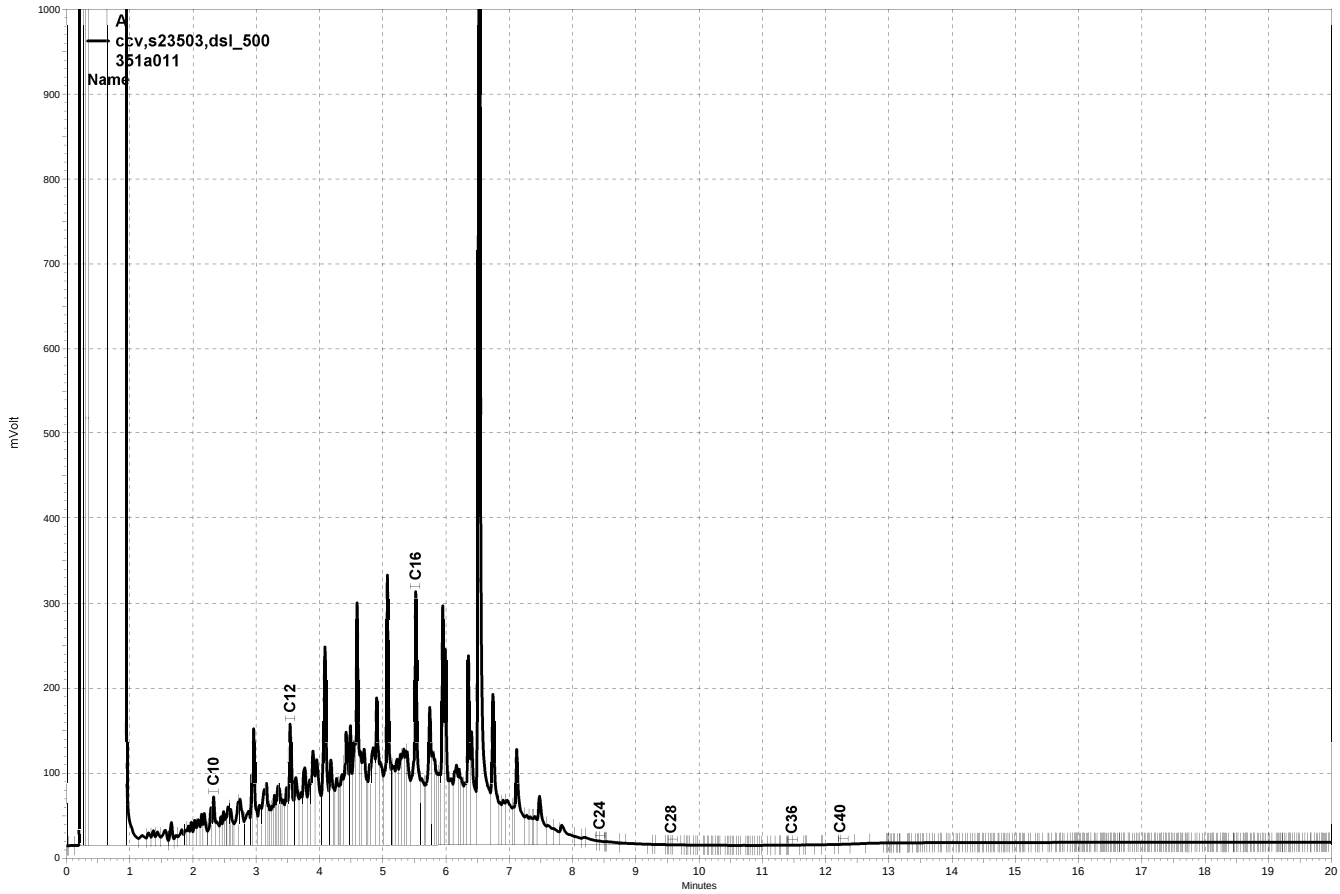

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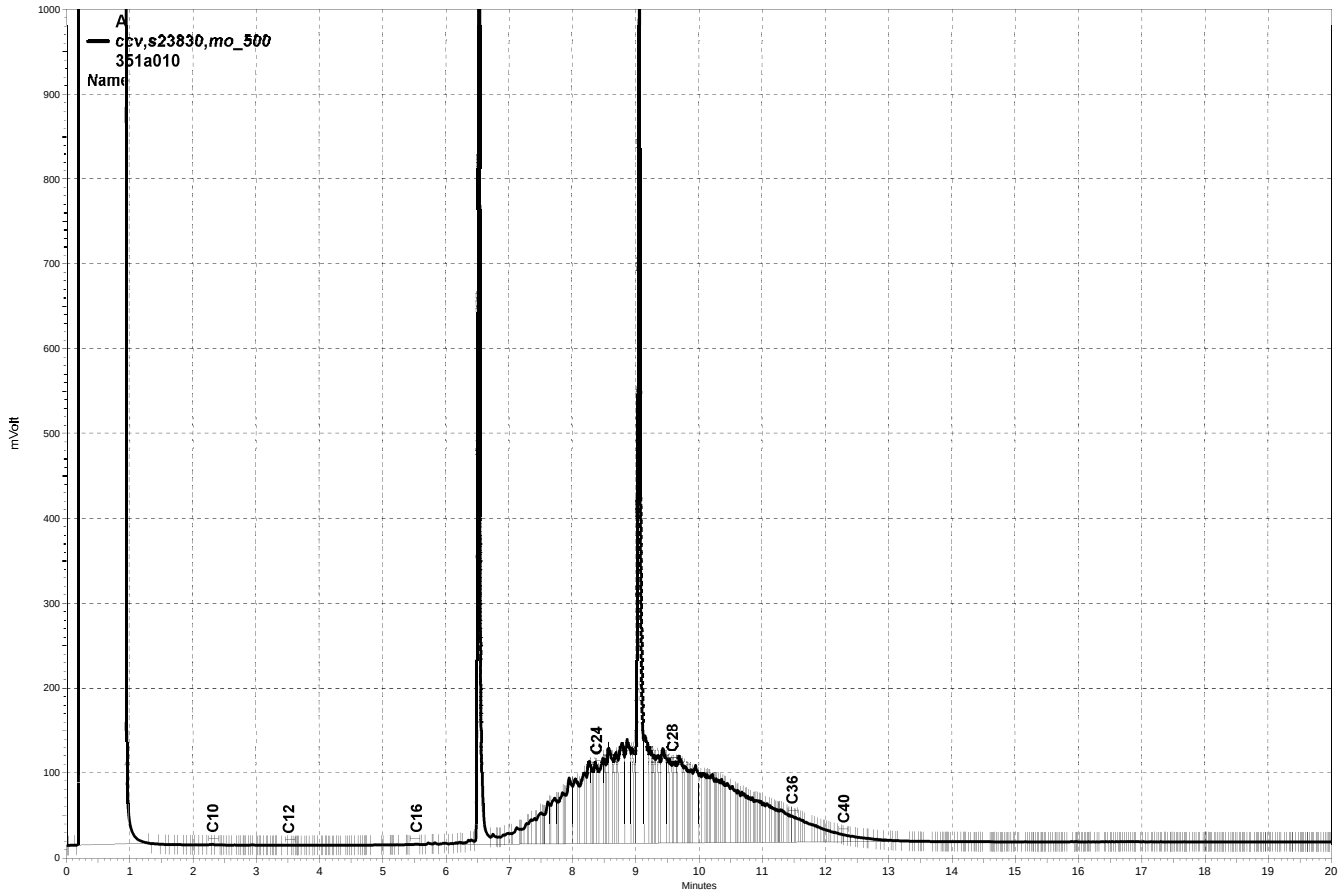

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Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Field ID:	QCTB-2	Batch#:	206422
Lab ID:	251652-001	Sampled:	12/13/13
Matrix:	Water	Received:	12/13/13
Units:	ug/L	Analyzed:	12/20/13
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	100	77-136
1,2-Dichloroethane-d4	100	75-139
Toluene-d8	98	80-120
Bromofluorobenzene	100	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Field ID:	MW-4	Batch#:	206422
Lab ID:	251652-002	Sampled:	12/13/13
Matrix:	Water	Received:	12/13/13
Units:	ug/L	Analyzed:	12/20/13
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	ND	0.5
Benzene	2.6	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	99	77-136
1,2-Dichloroethane-d4	104	75-139
Toluene-d8	99	80-120
Bromofluorobenzene	99	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Field ID:	MW-4DUP	Batch#:	206422
Lab ID:	251652-003	Sampled:	12/13/13
Matrix:	Water	Received:	12/13/13
Units:	ug/L	Analyzed:	12/20/13
Diln Fac:	1.000		

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

Surrogate	%REC	Limits
Dibromofluoromethane	96	77-136
1,2-Dichloroethane-d4	98	75-139
Toluene-d8	99	80-120
Bromofluorobenzene	101	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Field ID:	MW-8A	Batch#:	206422
Lab ID:	251652-004	Sampled:	12/13/13
Matrix:	Water	Received:	12/13/13
Units:	ug/L	Analyzed:	12/20/13
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	99	77-136
1,2-Dichloroethane-d4	104	75-139
Toluene-d8	97	80-120
Bromofluorobenzene	99	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Field ID:	MW-10	Batch#:	206422
Lab ID:	251652-005	Sampled:	12/13/13
Matrix:	Water	Received:	12/13/13
Units:	ug/L	Analyzed:	12/20/13
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	ND	0.5
Benzene	57	0.5
Toluene	0.6	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5

Surrogate	%REC	Limits
Dibromofluoromethane	97	77-136
1,2-Dichloroethane-d4	103	75-139
Toluene-d8	99	80-120
Bromofluorobenzene	103	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Field ID:	MW-1	Batch#:	206422
Lab ID:	251652-006	Sampled:	12/13/13
Matrix:	Water	Received:	12/13/13
Units:	ug/L	Analyzed:	12/20/13
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	ND	0.5
Benzene	10	0.5
Toluene	2.6	0.5
Ethylbenzene	1.2	0.5
m,p-Xylenes	1.6	0.5
o-Xylene	1.7	0.5

Surrogate	%REC	Limits
Dibromofluoromethane	99	77-136
1,2-Dichloroethane-d4	107	75-139
Toluene-d8	97	80-120
Bromofluorobenzene	98	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Field ID:	MW-9	Batch#:	206422
Lab ID:	251652-007	Sampled:	12/13/13
Matrix:	Water	Received:	12/13/13
Units:	ug/L	Analyzed:	12/20/13
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	ND	0.5
Benzene	28	0.5
Toluene	0.6	0.5
Ethylbenzene	6.9	0.5
m,p-Xylenes	1.9	0.5
o-Xylene	4.0	0.5

Surrogate	%REC	Limits
Dibromofluoromethane	101	77-136
1,2-Dichloroethane-d4	101	75-139
Toluene-d8	100	80-120
Bromofluorobenzene	99	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Aromatics by GC/MS

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Matrix:	Water	Batch#:	206422
Units:	ug/L	Analyzed:	12/20/13
Diln Fac:	1.000		

Type: BS Lab ID: QC721566

Analyte	Spiked	Result	%REC	Limits
MTBE	12.50	12.39	99	64-121
Benzene	12.50	12.76	102	80-124
Toluene	12.50	13.56	108	80-122
Ethylbenzene	12.50	13.40	107	80-124
m,p-Xylenes	25.00	28.45	114	80-122
o-Xylene	12.50	14.38	115	77-120

Surrogate	%REC	Limits
Dibromofluoromethane	97	77-136
1,2-Dichloroethane-d4	100	75-139
Toluene-d8	98	80-120
Bromofluorobenzene	96	80-120

Type: BSD Lab ID: QC721567

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	12.50	12.36	99	64-121	0	20
Benzene	12.50	12.34	99	80-124	3	20
Toluene	12.50	12.87	103	80-122	5	20
Ethylbenzene	12.50	13.09	105	80-124	2	20
m,p-Xylenes	25.00	26.86	107	80-122	6	20
o-Xylene	12.50	13.50	108	77-120	6	20

Surrogate	%REC	Limits
Dibromofluoromethane	98	77-136
1,2-Dichloroethane-d4	102	75-139
Toluene-d8	97	80-120
Bromofluorobenzene	98	80-120

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Aromatics by GC/MS

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC721568	Batch#:	206422
Matrix:	Water	Analyzed:	12/20/13
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	100	77-136
1,2-Dichloroethane-d4	101	75-139
Toluene-d8	99	80-120
Bromofluorobenzene	100	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Dissolved Gases

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	RSK-175
Analyte:	Methane	Batch#:	206382
Matrix:	Water	Sampled:	12/13/13
Units:	mg/L	Received:	12/13/13
Diln Fac:	1.000	Analyzed:	12/19/13

Field ID	Type	Lab ID	Result	RL
MW-4	SAMPLE	251652-002	3.9	0.005
MW-4DUP	SAMPLE	251652-003	3.2	0.005
MW-8A	SAMPLE	251652-004	0.089	0.005
MW-10	SAMPLE	251652-005	5.5	0.005
MW-1	SAMPLE	251652-006	5.8	0.005
MW-9	SAMPLE	251652-007	5.0	0.005
	BLANK	QC721412	ND	0.005

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Gases

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	RSK-175
Analyte:	Methane	Diln Fac:	1.000
Matrix:	Water	Batch#:	206382
Units:	mg/L	Analyzed:	12/19/13

Type	Lab ID	Spiked	Result	%REC	Limits	RPD	Lim
BS	QC721410	0.6544	0.6398	98	78-120		
BSD	QC721411	0.6544	0.5725	87	78-120	11	21

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Dissolved Iron

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 3010A
Project#:	04656016.0000	Analysis:	EPA 6010B
Analyte:	Iron	Sampled:	12/13/13
Matrix:	Filtrate	Received:	12/13/13
Units:	ug/L	Prepared:	12/18/13
Batch#:	206331		

Field ID	Type	Lab ID	Result	RL	Diln Fac	Analyzed
MW-4	SAMPLE	251652-002	3,000	100	1.000	12/27/13
MW-4DUP	SAMPLE	251652-003	3,000	100	1.000	12/27/13
MW-8A	SAMPLE	251652-004	2,800	100	1.000	12/27/13
MW-10	SAMPLE	251652-005	13,000	100	1.000	12/27/13
MW-1	SAMPLE	251652-006	6,900	1,000	10.00	01/03/14
MW-9	SAMPLE	251652-007	4,800	100	1.000	12/27/13
	BLANK	QC721193	ND	100	1.000	12/27/13

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Dissolved Manganese

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 3010A
Project#:	04656016.0000	Analysis:	EPA 6010B
Analyte:	Manganese	Sampled:	12/13/13
Matrix:	Filtrate	Received:	12/13/13
Units:	ug/L	Prepared:	12/18/13
Batch#:	206331		

Field ID	Type	Lab ID	Result	RL	Diln Fac	Analyzed
MW-4	SAMPLE	251652-002	890	5.0	1.000	12/27/13
MW-4DUP	SAMPLE	251652-003	870	5.0	1.000	12/27/13
MW-8A	SAMPLE	251652-004	850	5.0	1.000	12/27/13
MW-10	SAMPLE	251652-005	5,600	5.0	1.000	12/27/13
MW-1	SAMPLE	251652-006	610	50	10.00	01/03/14
MW-9	SAMPLE	251652-007	600	5.0	1.000	12/27/13
	BLANK	QC721193	ND	5.0	1.000	12/27/13

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Iron

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 3010A
Project#:	04656016.0000	Analysis:	EPA 6010B
Analyte:	Iron	Batch#:	206331
Field ID:	ZZZZZZZZZZ	Sampled:	12/11/13
MSS Lab ID:	251556-002	Received:	12/11/13
Matrix:	Filtrate	Prepared:	12/18/13
Units:	ug/L	Analyzed:	12/27/13
Diln Fac:	1.000		

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
BS	QC721194		1,000	938.9	94	79-120		
BSD	QC721195		1,000	947.0	95	79-120	1	21
MS	QC721196	826.9	1,000	1,717	89	66-127		
MSD	QC721197		1,000	1,715	89	66-127	0	21

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Manganese

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 3010A
Project#:	04656016.0000	Analysis:	EPA 6010B
Analyte:	Manganese	Batch#:	206331
Field ID:	ZZZZZZZZZZ	Sampled:	12/11/13
MSS Lab ID:	251556-002	Received:	12/11/13
Matrix:	Filtrate	Prepared:	12/18/13
Units:	ug/L	Analyzed:	12/27/13
Diln Fac:	1.000		

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
BS	QC721194		50.00	51.10	102	80-120		
BSD	QC721195		50.00	51.22	102	80-120	0	20
MS	QC721196	1,697	50.00	1,712	29 NM	70-128		
MSD	QC721197		50.00	1,688	-19 NM	70-128	1	20

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

Curtis & Tompkins, Ltd.

Dissolved Metals Analytical Report

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 3010A
Project#:	04656016.0000	Analysis:	EPA 200.7
Analyte:	Calcium	Sampled:	12/13/13
Matrix:	Filtrate	Received:	12/13/13
Units:	ug/L	Prepared:	12/18/13
Batch#:	206331		

Field ID	Type	Lab ID	Result	RL	Diln Fac	Analyzed
MW-4	SAMPLE	251652-002	67,000	500	1.000	12/27/13
MW-4DUP	SAMPLE	251652-003	66,000	500	1.000	12/27/13
MW-8A	SAMPLE	251652-004	58,000	500	1.000	12/27/13
MW-10	SAMPLE	251652-005	170,000	2,500	10.00	01/02/14
MW-1	SAMPLE	251652-006	24,000	4,000	10.00	01/03/14
MW-9	SAMPLE	251652-007	40,000	500	1.000	12/27/13
	BLANK	QC721193	ND	500	1.000	12/27/13

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Dissolved Metals Analytical Report

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 3010A
Project#:	04656016.0000	Analysis:	EPA 200.7
Analyte:	Potassium	Sampled:	12/13/13
Matrix:	Filtrate	Received:	12/13/13
Units:	ug/L	Prepared:	12/18/13
Batch#:	206331		

Field ID	Type	Lab ID	Result	RL	Diln Fac	Analyzed
MW-4	SAMPLE	251652-002	21,000	500	1.000	12/27/13
MW-4DUP	SAMPLE	251652-003	21,000	500	1.000	12/27/13
MW-8A	SAMPLE	251652-004	20,000	500	1.000	12/27/13
MW-10	SAMPLE	251652-005	34,000	500	1.000	12/27/13
MW-1	SAMPLE	251652-006	ND	5,000	10.00	01/06/14
MW-9	SAMPLE	251652-007	7,700	500	1.000	12/27/13
	BLANK	QC721193	ND	500	1.000	12/27/13

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Dissolved Metals Analytical Report

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 3010A
Project#:	04656016.0000	Analysis:	EPA 200.7
Analyte:	Magnesium	Sampled:	12/13/13
Matrix:	Filtrate	Received:	12/13/13
Units:	ug/L	Prepared:	12/18/13
Batch#:	206331		

Field ID	Type	Lab ID	Result	RL	Diln Fac	Analyzed
MW-4	SAMPLE	251652-002	100,000	2,000	10.00	01/02/14
MW-4DUP	SAMPLE	251652-003	100,000	500	1.000	12/27/13
MW-8A	SAMPLE	251652-004	72,000	500	1.000	12/27/13
MW-10	SAMPLE	251652-005	82,000	500	1.000	12/27/13
MW-1	SAMPLE	251652-006	18,000	2,000	10.00	01/03/14
MW-9	SAMPLE	251652-007	49,000	500	1.000	12/27/13
	BLANK	QC721193	ND	500	1.000	12/27/13

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Dissolved Metals Analytical Report

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 3010A
Project#:	04656016.0000	Analysis:	EPA 200.7
Analyte:	Sodium	Sampled:	12/13/13
Matrix:	Filtrate	Received:	12/13/13
Units:	ug/L	Prepared:	12/18/13
Batch#:	206331		

Field ID	Type	Lab ID	Result	RL	Diln Fac	Analyzed
MW-4	SAMPLE	251652-002	450,000	5,000	10.00	01/02/14
MW-4DUP	SAMPLE	251652-003	470,000	5,000	10.00	01/02/14
MW-8A	SAMPLE	251652-004	290,000	5,000	10.00	01/02/14
MW-10	SAMPLE	251652-005	440,000	5,000	10.00	01/02/14
MW-1	SAMPLE	251652-006	58,000	5,000	10.00	01/06/14
MW-9	SAMPLE	251652-007	390,000	5,000	10.00	01/02/14
	BLANK	QC721193	ND	500	1.000	12/30/13

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Metals Analytical Report

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 3010A
Project#:	04656016.0000	Analysis:	EPA 200.7
Analyte:	Calcium	Batch#:	206331
Field ID:	ZZZZZZZZZZ	Sampled:	12/11/13
MSS Lab ID:	251556-002	Received:	12/11/13
Matrix:	Filtrate	Prepared:	12/18/13
Units:	ug/L	Analyzed:	12/27/13
Diln Fac:	1.000		

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
BS	QC721194		20,000	19,510	98	80-120		
BSD	QC721195		20,000	19,190	96	80-120	2	20
MS	QC721196	269,500	20,000	254,200 >LR	-76 NM	67-126		
MSD	QC721197		20,000	253,300 >LR	-81 NM	67-126	NC	20

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

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Metals Analytical Report

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 3010A
Project#:	04656016.0000	Analysis:	EPA 200.7
Analyte:	Potassium	Batch#:	206331
Field ID:	ZZZZZZZZZZ	Sampled:	12/11/13
MSS Lab ID:	251556-002	Received:	12/11/13
Matrix:	Filtrate	Prepared:	12/18/13
Units:	ug/L	Analyzed:	12/27/13
Diln Fac:	1.000		

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
BS	QC721194		10,000	9,349	93	77-120		
BSD	QC721195		10,000	9,164	92	77-120	2	20
MS	QC721196	891.1	10,000	10,910	100	71-126		
MSD	QC721197		10,000	10,950	101	71-126	0	20

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Metals Analytical Report

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 3010A
Project#:	04656016.0000	Analysis:	EPA 200.7
Analyte:	Magnesium	Batch#:	206331
Field ID:	ZZZZZZZZZZ	Sampled:	12/11/13
MSS Lab ID:	251556-002	Received:	12/11/13
Matrix:	Filtrate	Prepared:	12/18/13
Units:	ug/L	Analyzed:	12/27/13
Diln Fac:	1.000		

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
BS	QC721194		20,000	18,970	95	80-120		
BSD	QC721195		20,000	19,140	96	80-120	1	20
MS	QC721196	184,900	20,000	190,300 >LR	27 NM	71-120		
MSD	QC721197		20,000	189,100 >LR	21 NM	71-120	NC	20

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

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Metals Analytical Report

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 3010A
Project#:	04656016.0000	Analysis:	EPA 200.7
Analyte:	Sodium	Batch#:	206331
Field ID:	ZZZZZZZZZZ	Sampled:	12/11/13
MSS Lab ID:	251556-002	Received:	12/11/13
Matrix:	Filtrate	Prepared:	12/18/13
Units:	ug/L	Analyzed:	12/27/13
Diln Fac:	1.000		

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
BS	QC721194		20,000	19,710	99	79-120		
BSD	QC721195		20,000	19,650	98	79-120	0	20
MS	QC721196	67,830	20,000	84,400	83	66-127		
MSD	QC721197		20,000	83,610	79	66-127	1	28

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	EPA 300.0
Matrix:	Water	Batch#:	206137
Units:	mg/L	Received:	12/13/13

Field ID: MW-4 Lab ID: 251652-002
Type: SAMPLE Sampled: 12/13/13 09:21

Analyte	Result	RL	Diln Fac	Analyzed
Chloride	500	10	50.00	12/13/13 22:10
Nitrogen, Nitrite	ND	0.05	1.000	12/13/13 17:31
Nitrogen, Nitrate	ND	0.05	1.000	12/13/13 17:31
Sulfate	2.6	0.50	1.000	12/13/13 17:31

Field ID: MW-4DUP Lab ID: 251652-003
Type: SAMPLE Sampled: 12/13/13 09:21

Analyte	Result	RL	Diln Fac	Analyzed
Chloride	490	10	50.00	12/13/13 22:27
Nitrogen, Nitrite	ND	0.05	1.000	12/13/13 18:06
Nitrogen, Nitrate	ND	0.05	1.000	12/13/13 18:06
Sulfate	2.5	0.50	1.000	12/13/13 18:06

Field ID: MW-8A Lab ID: 251652-004
Type: SAMPLE Sampled: 12/13/13 10:59

Analyte	Result	RL	Diln Fac	Analyzed
Chloride	170	2.0	10.00	12/13/13 22:45
Nitrogen, Nitrite	ND	0.05	1.000	12/13/13 18:41
Nitrogen, Nitrate	ND	0.05	1.000	12/13/13 18:41
Sulfate	39	0.50	1.000	12/13/13 18:41

Field ID: MW-10 Lab ID: 251652-005
Type: SAMPLE Sampled: 12/13/13 12:34

Analyte	Result	RL	Diln Fac	Analyzed
Chloride	500	10	50.00	12/13/13 23:02
Nitrogen, Nitrite	ND	0.05	1.000	12/13/13 19:16
Nitrogen, Nitrate	ND	0.05	1.000	12/13/13 19:16
Sulfate	10	0.50	1.000	12/13/13 19:16

Field ID: MW-1 Diln Fac: 1.000
Type: SAMPLE Sampled: 12/13/13 13:32
Lab ID: 251652-006 Analyzed: 12/13/13 19:51

Analyte	Result	RL
Chloride	7.1	0.20
Nitrogen, Nitrite	ND	0.05
Nitrogen, Nitrate	ND	0.05
Sulfate	ND	0.50

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	EPA 300.0
Matrix:	Water	Batch#:	206137
Units:	mg/L	Received:	12/13/13

Field ID:	MW-9	Lab ID:	251652-007
Type:	SAMPLE	Sampled:	12/13/13 14:57

Analyte	Result	RL	Diln Fac	Analyzed
Chloride	170	4.0	20.00	12/13/13 23:37
Nitrogen, Nitrite	ND	0.05	1.000	12/13/13 20:25
Nitrogen, Nitrate	ND	0.05	1.000	12/13/13 20:25
Sulfate	2.6	0.50	1.000	12/13/13 20:25

Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC720445	Analyzed:	12/14/13 10:35

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

ND= Not Detected
RL= Reporting Limit

Batch QC Report

Curtis & Tompkins Laboratories Analytical Report

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	EPA 300.0
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC720446	Batch#:	206137
Matrix:	Water	Analyzed:	12/14/13 10:52
Units:	mg/L		

Analyte	Spiked	Result	%REC	Limits
Chloride	4.000	3.861	97	80-120
Nitrogen, Nitrite	1.000	1.016	102	80-120
Nitrogen, Nitrate	1.000	1.003	100	80-120
Sulfate	10.00	9.816	98	80-120

Curtis & Tompkins, Ltd.

Batch QC Report

Curtis & Tompkins Laboratories Analytical Report

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	EPA 300.0
Field ID:	MW-4	Diln Fac:	50.00
MSS Lab ID:	251652-002	Batch#:	206137
Matrix:	Water	Sampled:	12/13/13 09:21
Units:	mg/L	Received:	12/13/13

Type: MS Analyzed: 12/13/13 23:54
Lab ID: QC720447

Analyte	MSS Result	Spiked	Result	%REC	Limits
Chloride	501.5	100.0	584.9	83 NM	75-120
Nitrogen, Nitrite	<0.01287	25.00	27.20	109	80-120
Nitrogen, Nitrate	<0.01127	25.00	25.03	100	80-120
Sulfate	2.607	250.0	246.1	97	79-120

Type: MSD Analyzed: 12/14/13 00:12
Lab ID: QC720448

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Chloride	100.0	582.3	81 NM	75-120	0	20
Nitrogen, Nitrite	25.00	27.11	108	80-120	0	23
Nitrogen, Nitrate	25.00	24.69	99	80-120	1	20
Sulfate	250.0	244.5	97	79-120	1	20

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

Curtis & Tompkins, Ltd.

Alkalinity

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	SM2320B
Matrix:	Water	Sampled:	12/13/13
Units:	mg/L	Received:	12/13/13
Batch#:	206526	Analyzed:	12/26/13

Field ID: MW-4 Lab ID: 251652-002
Type: SAMPLE Diln Fac: 6.700

Analyte	Result	RL
Alkalinity, Bicarbonate	890	6.7
Alkalinity, Carbonate	ND	6.7
Alkalinity, Hydroxide	ND	6.7
Alkalinity, Total as CaCO3	890	6.7

Field ID: MW-4DUP Lab ID: 251652-003
Type: SAMPLE Diln Fac: 6.700

Analyte	Result	RL
Alkalinity, Bicarbonate	890	6.7
Alkalinity, Carbonate	ND	6.7
Alkalinity, Hydroxide	ND	6.7
Alkalinity, Total as CaCO3	890	6.7

Field ID: MW-8A Lab ID: 251652-004
Type: SAMPLE Diln Fac: 6.700

Analyte	Result	RL
Alkalinity, Bicarbonate	780	6.7
Alkalinity, Carbonate	ND	6.7
Alkalinity, Hydroxide	ND	6.7
Alkalinity, Total as CaCO3	780	6.7

Field ID: MW-10 Lab ID: 251652-005
Type: SAMPLE Diln Fac: 6.700

Analyte	Result	RL
Alkalinity, Bicarbonate	1,100	6.7
Alkalinity, Carbonate	ND	6.7
Alkalinity, Hydroxide	ND	6.7
Alkalinity, Total as CaCO3	1,100	6.7

Field ID: MW-1 Lab ID: 251652-006
Type: SAMPLE Diln Fac: 6.700

Analyte	Result	RL
Alkalinity, Bicarbonate	250	6.7
Alkalinity, Carbonate	ND	6.7
Alkalinity, Hydroxide	ND	6.7
Alkalinity, Total as CaCO3	250	6.7

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Alkalinity

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	SM2320B
Matrix:	Water	Sampled:	12/13/13
Units:	mg/L	Received:	12/13/13
Batch#:	206526	Analyzed:	12/26/13

Field ID:	MW-9	Lab ID:	251652-007
Type:	SAMPLE	Diln Fac:	6.700

Analyte	Result	RL
Alkalinity, Bicarbonate	930	6.7
Alkalinity, Carbonate	ND	6.7
Alkalinity, Hydroxide	ND	6.7
Alkalinity, Total as CaCO3	930	6.7

Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC722000		

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

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Alkalinity

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	SM2320B
Analyte:	Alkalinity, Total as CaCO3	Units:	mg/L
Type:	LCS	Diln Fac:	4.000
Lab ID:	QC722001	Batch#:	206526
Matrix:	Water	Analyzed:	12/26/13

Spiked	Result	%REC	Limits
200.0	190.4	95	90-110

Curtis & Tompkins, Ltd.

Batch QC Report

Alkalinity

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	SM2320B
Analyte:	Alkalinity, Total as CaCO3	Diln Fac:	10.00
Field ID:	ZZZZZZZZZZ	Batch#:	206526
MSS Lab ID:	251702-010	Sampled:	12/16/13
Matrix:	Water	Received:	12/16/13
Units:	mg/L	Analyzed:	12/26/13

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
MS	QC722002	489.2	500.0	913.0	85	80-120		
MSD	QC722003		500.0	917.0	86	80-120	0	25

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Dissolved Sulfide

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	SM4500S2-D
Analyte:	Dissolved Sulfide	Batch#:	206308
Matrix:	Water	Sampled:	12/13/13
Units:	mg/L	Received:	12/13/13
Diln Fac:	1.000	Analyzed:	12/18/13

Field ID	Type	Lab ID	Result	RL
MW-4	SAMPLE	251652-002	ND	0.04
MW-4DUP	SAMPLE	251652-003	ND	0.04
MW-8A	SAMPLE	251652-004	ND	0.04
MW-10	SAMPLE	251652-005	0.09	0.04
MW-1	SAMPLE	251652-006	0.17	0.04
MW-9	SAMPLE	251652-007	0.14	0.04
	BLANK	QC721106	ND	0.04

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Sulfide

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	SM4500S2-D
Analyte:	Dissolved Sulfide	Diln Fac:	1.000
Field ID:	MW-5	Batch#:	206308
MSS Lab ID:	251679-002	Sampled:	12/16/13
Matrix:	Water	Received:	12/16/13
Units:	mg/L	Analyzed:	12/18/13

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
MS	QC721107	<0.04000	0.5870	0.5649	96	57-131		
MSD	QC721108		0.5870	0.5579	95	57-131	1	21
LCS	QC721109		0.5870	0.5710	97	80-120		

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Orthophosphate Phosphorous

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	SM4500P-E
Analyte:	Orthophosphate (as P)	Batch#:	206149
Matrix:	Water	Received:	12/13/13
Units:	mg/L	Analyzed:	12/13/13 18:20
Diln Fac:	1.000		

Field ID	Type	Lab ID	Result	RL	Sampled
MW-4	SAMPLE	251652-002	0.27	0.030	12/13/13 09:21
MW-4DUP	SAMPLE	251652-003	0.27	0.030	12/13/13 09:21
MW-8A	SAMPLE	251652-004	0.37	0.030	12/13/13 10:59
MW-10	SAMPLE	251652-005	0.067	0.030	12/13/13 12:34
MW-1	SAMPLE	251652-006	0.046	0.030	12/13/13 13:32
MW-9	SAMPLE	251652-007	0.48	0.030	12/13/13 14:57
	BLANK	QC720495	ND	0.030	

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Orthophosphate Phosphorous

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	SM4500P-E
Analyte:	Orthophosphate (as P)	Diln Fac:	1.000
Field ID:	MW-2	Batch#:	206149
MSS Lab ID:	251610-004	Sampled:	12/12/13 14:00
Matrix:	Water	Received:	12/12/13
Units:	mg/L	Analyzed:	12/13/13 18:20

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
LCS	QC720496		0.4000	0.3716	93	80-120		
MS	QC720497	0.1703	0.4000	0.4585	72 *	80-120		
MSD	QC720498		0.4000	0.4596	72 *	80-120	0	20

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

Curtis & Tompkins, Ltd.

Total Dissolved Solids (TDS)

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	SM2540C
Analyte:	Total Dissolved Solids	Sampled:	12/13/13
Matrix:	Water	Received:	12/13/13
Units:	mg/L	Prepared:	12/20/13
Batch#:	206439	Analyzed:	12/23/13

Field ID	Type	Lab ID	Result	RL	Diln Fac
MW-4	SAMPLE	251652-002	1,690	13	1.250
MW-4DUP	SAMPLE	251652-003	1,610	13	1.250
MW-8A	SAMPLE	251652-004	1,150	10	1.000
MW-10	SAMPLE	251652-005	2,050	14	1.429
MW-1	SAMPLE	251652-006	270	10	1.000
MW-9	SAMPLE	251652-007	1,260	11	1.111
	BLANK	QC721629	ND	10	1.000

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Total Dissolved Solids (TDS)

Lab #:	251652	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	SM2540C
Analyte:	Total Dissolved Solids	Batch#:	206439
Field ID:	ZZZZZZZZZZ	Sampled:	12/16/13
Matrix:	Water	Prepared:	12/20/13
Units:	mg/L	Analyzed:	12/23/13
Diln Fac:	1.000		

Type	MSS Lab ID	Lab ID	MSS Result	Spiked	Result	RL	%REC	Limits	RPD	Lim	Received
LCS		QC721630		104.0	88.00		85	74-120			
SDUP	251694-001	QC721631	372.0		374.0	10.00			1	5	12/16/13
SDUP	251761-001	QC721632	452.0		454.0	10.00			0	5	12/17/13

RL= Reporting Limit
RPD= Relative Percent Difference

Data Validation Worksheet

Lab Report # 251652 DV by: CO
Project Port Harbor Facilities Complex Date: 01/14/2014

Lab IDs	Sample IDs	Date Collected	Parameters								
			TPHg 8015B	TPHd/mo 8015B	MTBE BTEX 8260B	TDS	Anions 300.0	Diss. Sulfide 376.2	Diss. Gases	Diss. Metals 200.7 and 6010B	Alkalinity
-001	QCTB-2	12/13/13	X		X						
-002	MW-4	12/13/13	X	X	X	X	X	X	X	X	X
-003	MW-4DUP	12/13/13	X	X	X	X	X	X	X	X	X
-004	MW-8A	12/13/13	X	X	X	X	X	X	X	X	X
-005	MW-10	12/13/13	X	X	X	X	X	X	X	X	X
-006	MW-1	12/13/13	X	X	X	X	X	X	X	X	X
-007	MW-9	12/13/13	X	X	X	X	X	X	X	X	X

Lab ID: C+T **NO QUALS**
Cooler Temperature: Not noted; login indicates on ice.
Chain-of-Custody: OK
Samples preservatives: OK

Parameter: **TPHg**

HTs: 14 days preserved, 7 days unpreserved – analyzed 12/20/13 (OK; all samples preserved)
Batch IDs: 206436
Surrogates: OK
Method Blank: OK, surrogates OK
LCS: OK, surrogates OK
MS/MSD: MS OK, surrogates OK
MSD OK, surrogates OK

Parameter: **TPHd/mo**

HTs: 14 days – analyzed 12/17/13
Batch IDs: 206199
Surrogates: OK
Method Blank: OK, surrogates OK
BS/BSD: BS OK, surrogate OK
BSD OK, surrogates OK

Parameter: **BTEX + MTBE**

HTs: 14 days – analyzed 12/20/13
Batch IDs: 206422
Surrogates: OK
Method Blank: OK, surrogates OK
BS/BSD: BS OK, surrogates OK
BSD OK, surrogates OK

Parameter: **Dissolved Gases**

HTs: 14 days – analyzed 12/19/13
Batch IDs: 206382
Method Blank: OK

BS/BSD: BS OK
BSD OK

Parameter: **Dissolved Fe + Mn (6010B)**

HTs: 180 days – analyzed 12/18/13
Batch IDs: 206331
Method Blank: OK
BS/BSD: BS OK
BSD OK
MS/MSD: MS % recovery outside of control limits; sample concentration >4x spike; no qual
MSD % recovery outside of control limits; sample concentration >4x spike; no qual

---

Parameter: **Dissolved Metals (200.7)**

HTs: 180 days – analyzed 12/27/13, 01/02/14, 01/03/14, 01/06/14
Batch IDs: 206331
Method Blank: OK
BS/BSD: BS OK
BSD OK
MS/MSD: MS % recovery outside of control limits; sample concentration >4x spike; no qual
MSD % recovery outside of control limits; sample concentration >4x spike; no qual

---

Parameter: **Anions (300.0)**

HTs: 48 hours (nitrates) – analyzed 12/13/13
Batch IDs: 206137
Method Blank: OK
LCS: LCS OK
MS/MSD: MS % recovery outside of control limits; sample concentration >4x spike; no qual
MSD OK

Parameter: **Alkalinity**

HTs: 14 days – analyzed 12/26/13
Batch IDs: 206526
Method Blank: OK
LCS: LCS OK
MS/MSD: MS OK
MSD OK

Parameter: **Sulfide**

HTs: 7 days – analyzed 12/18/13
Batch IDs: 206308
Method Blank: OK
LCS: LCS OK
MS/MSD: MS OK
MSD OK

Parameter: **Orthophosphate**

HTs: 48 hours – analyzed 12/13/13
Batch IDs: 206149
Method Blank: OK
LCS: LCS OK

MS/MSD: Low recoveries for MS/MSD. LCS within limits.

Parameter: **TDS**
HTs: 7 days – analyzed 12/23/13
Batch IDs: 206439
Method Blank: OK
LCS: LCS OK


Curtis & Tompkins, Ltd.
Analytical Laboratories, Since 1878

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

Laboratory Job Number 251679
ANALYTICAL REPORT

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

Sample ID	Lab ID
QCTB-3	251679-001
MW-5	251679-002

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: _____ Date: 12/30/2013

Will S Rice
Project Manager
will.rice@ctberk.com

NELAP # 01107CA

Curtis & Tompkins, Ltd.

CASE NARRATIVE

Laboratory number:	**251679**
Client:	**Arcadis**
Project:	**04656016.0000**
Location:	**Port HFC**
Request Date:	**12/16/13**
Samples Received:	**12/16/13**

This data package contains sample and QC results for two water samples, requested for the above referenced project on 12/16/13. The samples were received cold and intact.

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

TPH-Extractables by GC (EPA 8015B):
High surrogate recovery was observed for o-terphenyl in MW-5 (lab # 251679-002); no target analytes were detected in the sample. No other analytical problems were encountered.

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

Dissolved Gases by GC/FID (RSK-175):
No analytical problems were encountered.

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

Alkalinity (SM2320B):
No analytical problems were encountered.

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

Total Dissolved Solids (TDS) (SM2540C):
No analytical problems were encountered.

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

251679

Environmental Sampling Services, LLC

6680 Alhambra Avenue, #102
Martinez, California 94553-6105
Telephone: (925) 372-8108
www.envsampling.com

CHAIN OF CUSTODY RECORD

Page 1 of 1

TURN AROUND TIME Other:

LABORATORY: Curtis Tompkins, Ltd. Berkeley, CA

☐ 24 Hours	☐ 48 Hours	☐ 1 Week	☑ Normal

Report To: Ms. Caroline Orsi
Company: Arcadis U.S., Inc.
Address: 2000 Powell Street, 7th Floor, Emeryville, CA 94608
E-Mail Results to & cc: caroline.orsi@arcadis-us.com

Telephone/Fax: 510-652-4500 / 510-652-4906
Project Name: Port HFC
Project Number: 04656016.0000
Bill To: Port of Oakland

Sampler(s): Jacqueline Lee ☑ **Sampler's Signature:**
Stephen Penman ☐ **Sampler's Signature:**

Reporting Requirement: PDF: Yes ☑ No ☐ **EPA Data Report:** Level II
EDD File: Yes ☑ No ☐ Electronic (EDF) : Yes ☑ No ☐

SAMPLE ID	Sample Date	Sample Time	Number of Containers	Type of Container[1]	Matrix: Water	Groundwater	Soil	Soil Vapor	Other	Preservative: Ice	HCl	HNO_3	H_2SO_4 NaOH 12/16/2013
QCTB-3	12/16/2013	8:30	3	1	X					X	X		
MW-5	12/16/2013	9:42	15	1,2,3		X				X	X	X	X

Analysis Request

TPH-Gas (EPA 8015B)	BTEX & MTBE (EPA 8260B)	TPH-D & MO (EPA 8015B) w/Silica Gel Cleanup	TDS (40CFR136/160.1)	Anions (EPA 300.0) * see "comments"	Dissolved Sulfide (EPA E376.2)	RSK-175 12/16/2013	Field Filtered (FF): Dissolved Na, Ca, K, and Mg (EPA 200.7)	Field Filtered (FF): Dissolved Fe and Mn (EPA SW6010B)
X	X							
X	X	X	X	X	X	X	X	X

Comments

Anions = Bicarbonate, Carbonate, Sulfate, Chloride, Nitrate, Nitrite, and Orthophosphate.

Relinquished By:	Date:	Time:	Received By:
	12/16/2013	11:40	
Relinquished By:	Date:	Time:	Received By:
Relinquished By:	Date:	Time:	Received By:

1 = Sample Container Type: 1 =VOA 2=Glass 3=High Density Polyethylene 4=Summa Canister

QUESTIONS REGARDING COC, CALL ESS
Send confirmation to: caroline.orsi@arcadis-us.com
After log-in, please email COC to:
jlee@envsampling.com and spen@envsampling.com

SAMPLE RECEIPT
☐ Intact ☐ Cold ☐ On Ice ☐ Ambient
Preservative Correct?
☐ Yes ☐ No ☐ NA

1 of 2

3 of 29

COOLER RECEIPT CHECKLIST

Curtis & Tompkins, Ltd.

Login # 251679 Date Received 12/16/13 Number of coolers 1
Client ESS Project PORT HFC (Φ4656Φ16.0000)

Date Opened 12/16/13 By (print) TR (sign) Tina Ranka
Date Logged in ↓ By (print) ↓ (sign) ↓

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

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

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

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

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

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

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

COMMENTS

____
____
____
____
____
____

Rev 10, 11/11

Curtis & Tompkins Sample Preservation for 251679

Sample	pH: <2	>9	>12	Other
-002a	[ ]	[ ]	[ ]	_____
b	[ ]	[ ]	[ ]	_____
c	[ ]	[ ]	[ ]	_____
d	[ ]	[ ]	[ ]	_____
e	[ ]	[ ]	[ ]	_____
f	[ ]	[ ]	[ ]	_____
g	[ ]	[ ]	[ ]	_____
h	[ ]	[ ]	[ ]	_____
i	[ ]	[ ]	[ ]	_____
j	[ ]	[ ]	[ ]	_____
k	[X]	[ ]	[ ]	_____
l	[ ]	[ ]	[X]	_____
m	[ ]	[ ]	[ ]	_____
n	[ ]	[ ]	[ ]	_____
o	[ ]	[ ]	[ ]	_____

Analyst: TK
Date: 12/10/13

Curtis & Tompkins, Ltd.

Total Volatile Hydrocarbons

Lab #:	251679	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	12/16/13
Units:	ug/L	Received:	12/16/13
Diln Fac:	1.000	Analyzed:	12/19/13
Batch#:	206378		

Field ID: QCTB-3 Lab ID: 251679-001
Type: SAMPLE

Analyte	Result	RL
Gasoline C7-C12	ND	50

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

Field ID: MW-5 Lab ID: 251679-002
Type: SAMPLE

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	96	77-128

Type: BLANK Lab ID: QC721397

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	106	77-128

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Total Volatile Hydrocarbons

Lab #:	251679	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC721396	Batch#:	206378
Matrix:	Water	Analyzed:	12/19/13
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	1,000	1,048	105	80-120

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	113	77-128

Curtis & Tompkins, Ltd.

Batch QC Report

Total Volatile Hydrocarbons

Lab #:	251679	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8015B
Field ID:	MW-5	Batch#:	206378
MSS Lab ID:	251679-002	Sampled:	12/16/13
Matrix:	Water	Received:	12/16/13
Units:	ug/L	Analyzed:	12/19/13
Diln Fac:	1.000		

Type: MS Lab ID: QC721398

Analyte	MSS Result	Spiked	Result	%REC	Limits
Gasoline C7-C12	14.00	2,000	1,964	97	74-120

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	104	77-128

Type: MSD Lab ID: QC721399

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	2,000	2,003	99	74-120	2	27

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	108	77-128

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Total Extractable Hydrocarbons

Lab #:	251679	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 3520C
Project#:	04656016.0000	Analysis:	EPA 8015B
Field ID:	MW-5	Sampled:	12/16/13
Matrix:	Water	Received:	12/16/13
Units:	ug/L	Prepared:	12/17/13
Diln Fac:	1.000	Analyzed:	12/18/13
Batch#:	206281		

Type: SAMPLE Cleanup Method: EPA 3630C
Lab ID: 251679-002

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

Surrogate	%REC	Limits
o-Terphenyl	131 *	66-129

Type: BLANK Cleanup Method: EPA 3630C
Lab ID: QC720993

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

Surrogate	%REC	Limits
o-Terphenyl	102	66-129

*= Value outside of QC limits; see narrative
ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Total Extractable Hydrocarbons

Lab #:	251679	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 3520C
Project#:	04656016.0000	Analysis:	EPA 8015B
Matrix:	Water	Batch#:	206281
Units:	ug/L	Prepared:	12/17/13
Diln Fac:	1.000	Analyzed:	12/18/13

Type: BS Cleanup Method: EPA 3630C
Lab ID: QC720994

Analyte	Spiked	Result	%REC	Limits
Diesel C10-C24	2,500	2,196	88	61-120

Surrogate	%REC	Limits
o-Terphenyl	100	66-129

Type: BSD Cleanup Method: EPA 3630C
Lab ID: QC720995

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Diesel C10-C24	2,500	1,880	75	61-120	16	45

Surrogate	%REC	Limits
o-Terphenyl	93	66-129

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	251679	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Field ID:	QCTB-3	Batch#:	206469
Lab ID:	251679-001	Sampled:	12/16/13
Matrix:	Water	Received:	12/16/13
Units:	ug/L	Analyzed:	12/22/13
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	108	77-136
1,2-Dichloroethane-d4	88	75-139
Toluene-d8	89	80-120
Bromofluorobenzene	91	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Purgeable Aromatics by GC/MS

Lab #:	251679	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Field ID:	MW-5	Batch#:	206469
Lab ID:	251679-002	Sampled:	12/16/13
Matrix:	Water	Received:	12/16/13
Units:	ug/L	Analyzed:	12/22/13
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	110	77-136
1,2-Dichloroethane-d4	90	75-139
Toluene-d8	89	80-120
Bromofluorobenzene	91	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Aromatics by GC/MS

Lab #:	251679	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Matrix:	Water	Batch#:	206469
Units:	ug/L	Analyzed:	12/21/13
Diln Fac:	1.000		

Type: BS Lab ID: QC721745

Analyte	Spiked	Result	%REC	Limits
MTBE	12.50	12.21	98	64-121
Benzene	12.50	13.17	105	80-124
Toluene	12.50	11.93	95	80-122
Ethylbenzene	12.50	11.74	94	80-124
m,p-Xylenes	25.00	25.31	101	80-122
o-Xylene	12.50	12.54	100	77-120

Surrogate	%REC	Limits
Dibromofluoromethane	105	77-136
1,2-Dichloroethane-d4	85	75-139
Toluene-d8	90	80-120
Bromofluorobenzene	91	80-120

Type: BSD Lab ID: QC721746

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	12.50	13.28	106	64-121	8	20
Benzene	12.50	12.75	102	80-124	3	20
Toluene	12.50	11.87	95	80-122	1	20
Ethylbenzene	12.50	11.55	92	80-124	2	20
m,p-Xylenes	25.00	25.02	100	80-122	1	20
o-Xylene	12.50	12.47	100	77-120	1	20

Surrogate	%REC	Limits
Dibromofluoromethane	105	77-136
1,2-Dichloroethane-d4	86	75-139
Toluene-d8	90	80-120
Bromofluorobenzene	90	80-120

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Aromatics by GC/MS

Lab #:	251679	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC721747	Batch#:	206469
Matrix:	Water	Analyzed:	12/21/13
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	107	77-136
1,2-Dichloroethane-d4	89	75-139
Toluene-d8	91	80-120
Bromofluorobenzene	92	80-120

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Purgeable Aromatics by GC/MS

Lab #:	251679	Location:	Port HFC
Client:	Arcadis	Prep:	EPA 5030B
Project#:	04656016.0000	Analysis:	EPA 8260B
Field ID:	ZZZZZZZZZZ	Batch#:	206469
MSS Lab ID:	251753-003	Sampled:	12/13/13
Matrix:	Water	Received:	12/17/13
Units:	ug/L	Analyzed:	12/22/13
Diln Fac:	1.000		

Type: MS Lab ID: QC721754

Analyte	MSS Result	Spiked	Result	%REC	Limits
MTBE	<0.1000	25.00	25.96	104	66-120
Benzene	<0.1000	25.00	25.72	103	80-127
Toluene	<0.1000	25.00	22.41	90	80-123
Ethylbenzene	<0.1000	25.00	22.54	90	80-126
m,p-Xylenes	<0.1309	50.00	48.39	97	80-123
o-Xylene	<0.1000	25.00	24.40	98	76-120

Surrogate	%REC	Limits
Dibromofluoromethane	107	77-136
1,2-Dichloroethane-d4	95	75-139
Toluene-d8	88	80-120
Bromofluorobenzene	90	80-120

Type: MSD Lab ID: QC721755

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	25.00	26.28	105	66-120	1	27
Benzene	25.00	26.24	105	80-127	2	23
Toluene	25.00	22.80	91	80-123	2	22
Ethylbenzene	25.00	22.96	92	80-126	2	22
m,p-Xylenes	50.00	49.65	99	80-123	3	22
o-Xylene	25.00	24.66	99	76-120	1	23

Surrogate	%REC	Limits
Dibromofluoromethane	107	77-136
1,2-Dichloroethane-d4	91	75-139
Toluene-d8	88	80-120
Bromofluorobenzene	90	80-120

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Dissolved Gases

Lab #:	251679	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	RSK-175
Analyte:	Methane	Batch#:	206382
Field ID:	MW-5	Sampled:	12/16/13
Matrix:	Water	Received:	12/16/13
Units:	mg/L	Analyzed:	12/19/13
Diln Fac:	1.000		

Type	Lab ID	Result	RL
SAMPLE	251679-002	0.053	0.005
BLANK	QC721412	ND	0.005

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Gases

Lab #:	251679	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	RSK-175
Analyte:	Methane	Diln Fac:	1.000
Matrix:	Water	Batch#:	206382
Units:	mg/L	Analyzed:	12/19/13

Type	Lab ID	Spiked	Result	%REC	Limits	RPD	Lim
BS	QC721410	0.6544	0.6398	98	78-120		
BSD	QC721411	0.6544	0.5725	87	78-120	11	21

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Curtis & Tompkins Laboratories Analytical Report

Lab #:	251679	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	EPA 300.0
Field ID:	MW-5	Batch#:	206178
Matrix:	Water	Sampled:	12/16/13 09:42
Units:	mg/L	Received:	12/16/13

Type: SAMPLE Lab ID: 251679-002

Analyte	Result	RL	Diln Fac	Analyzed
Chloride	350	4.0	20.00	12/16/13 14:55
Nitrogen, Nitrite	ND	0.05	1.000	12/16/13 14:20
Nitrogen, Nitrate	ND	0.05	1.000	12/16/13 14:20
Sulfate	72	10	20.00	12/16/13 14:55

Type: BLANK Diln Fac: 1.000
Lab ID: QC720605 Analyzed: 12/16/13 13:45

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

ND= Not Detected
RL= Reporting Limit

Batch QC Report

Curtis & Tompkins Laboratories Analytical Report

Lab #:	251679	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	EPA 300.0
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC720606	Batch#:	206178
Matrix:	Water	Analyzed:	12/16/13 14:03
Units:	mg/L		

Analyte	Spiked	Result	%REC	Limits
Chloride	4.000	3.798	95	80-120
Nitrogen, Nitrite	1.000	0.9784	98	80-120
Nitrogen, Nitrate	1.000	0.9744	97	80-120
Sulfate	10.00	9.719	97	80-120

Curtis & Tompkins, Ltd.

Batch QC Report

Curtis & Tompkins Laboratories Analytical Report

Lab #:	251679	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	EPA 300.0
Field ID:	ZZZZZZZZZZ	Diln Fac:	5.000
MSS Lab ID:	251691-003	Batch#:	206178
Matrix:	Water	Sampled:	12/16/13 12:25
Units:	mg/L	Received:	12/16/13

Type: MS Analyzed: 12/17/13 05:27
Lab ID: QC720728

Analyte	MSS Result	Spiked	Result	%REC	Limits
Chloride	21.94	10.00	30.51	86	75-120
Nitrogen, Nitrite	<0.01287	2.500	2.477	99	80-120
Nitrogen, Nitrate	1.535	2.500	4.070	101	80-120
Sulfate	7.139	25.00	31.53	98	79-120

Type: MSD Analyzed: 12/17/13 05:44
Lab ID: QC720729

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Chloride	10.00	30.38	84	75-120	0	20
Nitrogen, Nitrite	2.500	2.495	100	80-120	1	23
Nitrogen, Nitrate	2.500	3.944	96	80-120	3	20
Sulfate	25.00	30.93	95	79-120	2	20

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Alkalinity

Lab #:	251679	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	SM2320B
Field ID:	MW-5	Sampled:	12/16/13
Matrix:	Water	Received:	12/16/13
Units:	mg/L	Prepared:	12/26/13
Batch#:	206573		

Type:	SAMPLE	Diln Fac:	5.000
Lab ID:	251679-002	Analyzed:	12/27/13

Analyte	Result	RL
Alkalinity, Bicarbonate	410	5.0
Alkalinity, Carbonate	ND	5.0
Alkalinity, Hydroxide	ND	5.0
Alkalinity, Total as CaCO3	410	5.0

Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC722188	Analyzed:	12/26/13

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

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Alkalinity

Lab #:	251679	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	SM2320B
Analyte:	Alkalinity, Total as CaCO3	Units:	mg/L
Type:	LCS	Diln Fac:	4.000
Lab ID:	QC722189	Batch#:	206573
Matrix:	Water	Analyzed:	12/26/13

Spiked	Result	%REC	Limits
200.0	192.4	96	90-110

Curtis & Tompkins, Ltd.

Batch QC Report

Alkalinity

Lab #:	251679	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	SM2320B
Analyte:	Alkalinity, Total as CaCO3	Diln Fac:	10.00
Field ID:	ZZZZZZZZZZ	Batch#:	206573
MSS Lab ID:	251854-005	Sampled:	12/19/13
Matrix:	Water	Received:	12/19/13
Units:	mg/L	Analyzed:	12/26/13

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
MS	QC722190	378.0	500.0	854.0	95	80-120		
MSD	QC722191		500.0	810.0	86	80-120	5	25

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Dissolved Sulfide

Lab #:	251679	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	SM4500S2-D
Analyte:	Dissolved Sulfide	Batch#:	206308
Field ID:	MW-5	Sampled:	12/16/13
Matrix:	Water	Received:	12/16/13
Units:	mg/L	Analyzed:	12/18/13
Diln Fac:	1.000		

Type	Lab ID	Result	RL
SAMPLE	251679-002	ND	0.04
BLANK	QC721106	ND	0.04

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Sulfide

Lab #:	251679	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	SM4500S2-D
Analyte:	Dissolved Sulfide	Diln Fac:	1.000
Field ID:	MW-5	Batch#:	206308
MSS Lab ID:	251679-002	Sampled:	12/16/13
Matrix:	Water	Received:	12/16/13
Units:	mg/L	Analyzed:	12/18/13

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
MS	QC721107	<0.04000	0.5870	0.5649	96	57-131		
MSD	QC721108		0.5870	0.5579	95	57-131	1	21
LCS	QC721109		0.5870	0.5710	97	80-120		

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Orthophosphate Phosphorous

Lab #:	251679	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	SM4500P-E
Analyte:	Orthophosphate (as P)	Batch#:	206287
Field ID:	MW-5	Sampled:	12/16/13 09:42
Matrix:	Water	Received:	12/16/13
Units:	mg/L	Analyzed:	12/17/13 18:20
Diln Fac:	1.000		

Type	Lab ID	Result	RL
SAMPLE	251679-002	0.13	0.030
BLANK	QC721024	ND	0.030

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Orthophosphate Phosphorous

Lab #:	251679	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	SM4500P-E
Analyte:	Orthophosphate (as P)	Diln Fac:	1.000
Field ID:	MW-5	Batch#:	206287
MSS Lab ID:	251679-002	Sampled:	12/16/13 09:42
Matrix:	Water	Received:	12/16/13
Units:	mg/L	Analyzed:	12/17/13 18:20

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
LCS	QC721025		0.4000	0.3957	99	80-120		
MS	QC721026	0.1276	0.4000	0.4602	83	80-120		
MSD	QC721027		0.4000	0.4625	84	80-120	0	20

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Total Dissolved Solids (TDS)

Lab #:	251679	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	SM2540C
Analyte:	Total Dissolved Solids	Batch#:	206321
Field ID:	MW-5	Sampled:	12/16/13
Matrix:	Water	Received:	12/16/13
Units:	mg/L	Prepared:	12/18/13
Diln Fac:	1.000	Analyzed:	12/19/13

Type	Lab ID	Result	RL
SAMPLE	251679-002	1,080	10
BLANK	QC721157	ND	10

ND= Not Detected
RL= Reporting Limit

Batch QC Report

Total Dissolved Solids (TDS)

Lab #:	251679	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	SM2540C
Analyte:	Total Dissolved Solids	Batch#:	206321
Matrix:	Water	Prepared:	12/18/13
Units:	mg/L	Analyzed:	12/19/13
Diln Fac:	1.000		

Field ID	Type	MSS Lab ID	Lab ID	MSS Result	Spiked	Result	RL	%REC	Limits	RPD	Lim	Sampled	Received
	LCS		QC721158		104.0	84.00		81	74-120				
ZZZZZZZZZZ	SDUP	251613-005	QC721159	958.0		982.0	10.00			2	5	12/12/13	12/12/13
MW-5	SDUP	251679-002	QC721160	1,076		1,090	10.00			1	5	12/16/13	12/16/13

RL= Reporting Limit
RPD= Relative Percent Difference

Data Validation Worksheet

Lab Report # 251679 DV by: CO
Project Port Harbor Facilities Complex Date: 01/15/2014

Lab IDs	Sample IDs	Date Collected	Parameters							
			TPHg 8015B	TPHd/mo 8015B	MTBE BTEX 8260B	TDS	Anions 300.0	Diss. Sulfide 376.2	Diss. Gases	Alkalinity
-001	QCTB-3	12/16/13	X		X					
-002	MW-5	12/16/13	X	X	X	X	X	X	X	X

Lab ID: C+T **NO QUALS**
Cooler Temperature: Not noted; login indicates on ice.
Chain-of-Custody: OK
Samples preservatives: OK

Parameter: **TPHg**

HTs: 14 days preserved, 7 days unpreserved – analyzed 12/19/13
Batch IDs: 206378
Surrogates: OK
Method Blank: OK, surrogates OK
LCS: OK, surrogates OK
MS/MSD: MS OK, surrogates OK
MSD OK, surrogates OK

Parameter: **TPHd/mo**

HTs: 14 days – analyzed 12/22/13
Batch IDs: 206469
Surrogates: High surrogate recovery in sample; target analytes ND; no qual
Method Blank: OK, surrogates OK
BS/BSD: BS OK, surrogates OK
BSD OK, surrogates OK

Parameter: **BTEX + MTBE**

HTs: 14 days – analyzed 12/20/13
Batch IDs: 206422
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

Parameter: **Dissolved Gases**

HTs: 14 days – analyzed 12/19/13
Batch IDs: 206382
Method Blank: OK
BS/BSD: BS OK
BSD OK

Parameter: **Anions (300.0)**

HTs: 48 hours (nitrates) – analyzed 12/16/13
Batch IDs: 206178
Method Blank: OK
LCS: LCS OK
MS/MSD: MS OK
MSD OK

Parameter: **Alkalinity**

HTs: 14 days – analyzed 12/26/13
Batch IDs: 206573
Method Blank: OK
LCS: LCS OK
MS/MSD: MS OK
MSD OK

Parameter: **Sulfide**

HTs: 7 days – analyzed 12/18/13
Batch IDs: 206308
Method Blank: OK
LCS: LCS OK
MS/MSD: MS OK
MSD OK

Parameter: **Orthophosphate**

HTs: 48 hours – analyzed 12/17/13
Batch IDs: 206287
Method Blank: OK
LCS: LCS OK
MS/MSD: MS OK
MSD OK

Parameter: **TDS**
HTs: 7 days – analyzed 12/19/13
Batch IDs: 206321
Method Blank: OK
LCS: LCS OK


Curtis & Tompkins, Ltd.
Analytical Laboratories, Since 1878

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

Laboratory Job Number 252231
ANALYTICAL REPORT

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

Sample ID	Lab ID
MW-5	252231-001

This data package has been reviewed for technical correctness and completeness. Release of this data has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following 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: _____ Date: 01/14/2014

Will S Rice
Project Manager
will.rice@ctberk.com

NELAP # 01107CA

Curtis & Tompkins, Ltd.

CASE NARRATIVE

Laboratory number:	**252231**
Client:	**Arcadis**
Project:	**04656016.0000**
Location:	**Port HFC**
Request Date:	**01/13/14**
Samples Received:	**12/16/13**

This data package contains sample and QC results for one water sample, requested for the above referenced project on 01/13/14. The sample was received on ice and intact, directly from the field.

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

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

251679

Environmental Sampling Services, LLC

6680 Alhambra Avenue, #102
Martinez, California 94553-6105
Telephone: (925) 372-8108
www.envsampling.com

CHAIN OF CUSTODY RECORD

Page 1 of 1

TURN AROUND TIME — Other:

LABORATORY: Curtis Tompkins, Ltd. Berkeley, CA

☐ 24 Hours	☐ 48 Hours	☐ 1 Week	☑ Normal

Report To: Ms. Caroline Orsi
Company: Arcadis U.S., Inc.
Address: 2000 Powell Street, 7th Floor, Emeryville, CA 94608
E-Mail Results to & cc: caroline.orsi@arcadis-us.com

Telephone/Fax: 510-652-4500 / 510-652-4906
Project Name: Port HFC
Project Number: 04656016.0000
Bill To: Port of Oakland

Sampler(s): Jacqueline Lee ☑ — **Sampler's Signature:**
Stephen Penman ☐ — **Sampler's Signature:**

Reporting Requirement: PDF: Yes ☑ No ☐ — **EPA Data Report:** Level II
EDD File: Yes ☑ No ☐ — Electronic (EDF) : Yes ☑ No ☐

	SAMPLE ID	Sample Date	Sample Time	Number of Containers	Type of Container[1]	Matrix: Water	Groundwater	Soil	Soil Vapor	Other	Preservative: Ice	HCl	HNO_3	H_2SO_4	TPH-Gas (EPA 8015B)	BTEX & MTBE (EPA 8260B)	TPH-D & MO (EPA 8015B) w/Silica Gel Cleanup	TDS (40CFR136/160.1)	Anions (EPA 300.0) * see "comments"	Dissolved Sulfide (EPA E376.2)	RSK-175	Field Filtered (FF): Dissolved Na, Ca, K, and Mg (EPA 200.7)	Dissolved Fe and Mn (EPA SW6010B)	Comments
1	QCTB-3	12/16/2013	8:30	3	1	X					X	X			X	X								
2	MW-5	12/16/2013	9:42	15	1,2,3		X				X	X	X	X	X	X	X	X	X	X	X	X	X	Anions =
																								Bicarbonate,
																								Carbonate,
																								Sulfate, Chloride,
																								Nitrate, Nitrite,
																								and
																								Orthophosphate.

1 = Sample Container Type: 1 =VOA 2=Glass 3=High Density Polyethylene 4=Summa Canister

Relinquished By:	Date:	Time:	Received By:
	12/16/2013	11:40	
Relinquished By:	Date:	Time:	Received By:
Relinquished By:	Date:	Time:	Received By:

QUESTIONS REGARDING COC, CALL ESS
Send confirmation to: caroline.orsi@arcadis-us.c
After log-in, please email COC to:
jlee@envsampling.com and spen@envsampling.com

SAMPLE RECEIPT
☐ Intact ☐ Cold
☐ On Ice ☐ Ambient
Preservative Correct?
☐ Yes ☐ No ☐ NA

15225.1

COOLER RECEIPT CHECKLIST

Curtis & Tompkins, Ltd.

Login # 251679 Date Received 12/10/13 Number of coolers 1
Client ESS Project PORT HFC (Φ4656Φ16.0000)

Date Opened 12/10/13 By (print) TR (sign) Tina Rocka
Date Logged in ↓ By (print) ↓ (sign) ↓

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

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

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

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

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

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

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

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

COMMENTS

_____
_____
_____
_____
_____

Rev 10, 11/11

Curtis & Tompkins Sample Preservation for 251679

Sample	pH: <2	>9	>12	Other
-002a	[ ]	[ ]	[ ]	_____
b	[ ]	[ ]	[ ]	_____
c	[ ]	[ ]	[ ]	_____
d	[ ]	[ ]	[ ]	_____
e	[ ]	[ ]	[ ]	_____
f	[ ]	[ ]	[ ]	_____
g	[ ]	[ ]	[ ]	_____
h	[ ]	[ ]	[ ]	_____
i	[ ]	[ ]	[ ]	_____
j	[ ]	[ ]	[ ]	_____
k	[X]	[ ]	[ ]	_____
l	[ ]	[ ]	[X]	_____
m	[ ]	[ ]	[ ]	_____
n	[ ]	[ ]	[ ]	_____
o	[ ]	[ ]	[ ]	_____

Analyst: TK
Date: 12/16/13

Curtis & Tompkins, Ltd.

Dissolved Metals Analytical Report

Lab #:	252231	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	EPA 6010B
Field ID:	MW-5	Sampled:	12/16/13
Matrix:	Filtrate	Received:	12/16/13
Units:	ug/L	Prepared:	01/13/14
Diln Fac:	1.000	Analyzed:	01/14/14
Batch#:	207056		

Type: SAMPLE Lab ID: 252231-001

Analyte	Result	RL
Iron	500	100
Manganese	770	5.0

Type: BLANK Lab ID: QC723970

Analyte	Result	RL
Iron	ND	100
Manganese	ND	5.0

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Metals Analytical Report

Lab #:	252231	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	EPA 6010B
Matrix:	Filtrate	Batch#:	207056
Units:	ug/L	Prepared:	01/13/14
Diln Fac:	1.000	Analyzed:	01/14/14

Type: BS Lab ID: QC723971

Analyte	Spiked	Result	%REC	Limits
Iron	1,000	968.0	97	79-120
Manganese	50.00	49.97	100	80-120

Type: BSD Lab ID: QC723972

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Iron	1,000	904.0	90	79-120	7	21
Manganese	50.00	48.37	97	80-120	3	20

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Metals Analytical Report

Lab #:	252231	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	EPA 6010B
Field ID:	MW-5	Batch#:	207056
MSS Lab ID:	252231-001	Sampled:	12/16/13
Matrix:	Filtrate	Received:	12/16/13
Units:	ug/L	Prepared:	01/13/14
Diln Fac:	1.000	Analyzed:	01/14/14

Type: MS Lab ID: QC723973

Analyte	MSS Result	Spiked	Result	%REC	Limits
Iron	496.8	1,000	1,461	96	66-127
Manganese	771.6	50.00	802.5	62 NM	70-128

Type: MSD Lab ID: QC723974

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Iron	1,000	1,306	81	66-127	11	21
Manganese	50.00	791.8	41 NM	70-128	1	20

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

Curtis & Tompkins, Ltd.

Dissolved Metals Analytical Report

Lab #:	252231	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	EPA 200.7
Field ID:	MW-5	Sampled:	12/16/13
Matrix:	Filtrate	Received:	12/16/13
Units:	ug/L	Prepared:	01/13/14
Batch#:	207056	Analyzed:	01/14/14

Type: SAMPLE Lab ID: 252231-001

Analyte	Result	RL	Diln Fac
Calcium	62,000	500	1.000
Magnesium	29,000	500	1.000
Potassium	20,000	500	1.000
Sodium	300,000	5,000	10.00

Type: BLANK Diln Fac: 1.000
Lab ID: QC723970

Analyte	Result	RL
Calcium	ND	500
Magnesium	ND	500
Potassium	ND	500
Sodium	ND	500

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Metals Analytical Report

Lab #:	252231	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	EPA 200.7
Matrix:	Filtrate	Batch#:	207056
Units:	ug/L	Prepared:	01/13/14
Diln Fac:	1.000	Analyzed:	01/14/14

Type: BS Lab ID: QC723971

Analyte	Spiked	Result	%REC	Limits
Calcium	20,000	19,200	96	80-120
Magnesium	20,000	19,030	95	80-120
Potassium	10,000	8,917	89	77-120
Sodium	20,000	19,400	97	79-120

Type: BSD Lab ID: QC723972

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Calcium	20,000	18,230	91	80-120	5	20
Magnesium	20,000	18,350	92	80-120	4	20
Potassium	10,000	8,530	85	77-120	4	20
Sodium	20,000	18,090	90	79-120	7	20

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

Dissolved Metals Analytical Report

Lab #:	252231	Location:	Port HFC
Client:	Arcadis	Prep:	METHOD
Project#:	04656016.0000	Analysis:	EPA 200.7
Field ID:	MW-5	Sampled:	12/16/13
MSS Lab ID:	252231-001	Received:	12/16/13
Matrix:	Filtrate	Prepared:	01/13/14
Units:	ug/L	Analyzed:	01/14/14
Batch#:	207056		

Type: MS Lab ID: QC723973

Analyte	MSS Result	Spiked	Result	%REC	Limits	Diln Fac
Calcium	61,890	20,000	79,190	86	67-126	1.000
Magnesium	28,710	20,000	47,060	92	71-120	1.000
Potassium	19,910	10,000	29,330	94	71-126	1.000
Sodium	298,500	20,000	304,700	31 NM	66-127	10.00

Type: MSD Lab ID: QC723974

Analyte	Spiked	Result	%REC	Limits	RPD	Lim	Diln Fac
Calcium	20,000	76,350	72	67-126	4	20	1.000
Magnesium	20,000	43,650	75	71-120	8	20	1.000
Potassium	10,000	27,830	79	71-126	5	20	1.000
Sodium	20,000	299,000	3 NM	66-127	2	28	10.00

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

Data Validation Worksheet

Lab Report # 252231 DV by: CO
Project Port Harbor Facilities Complex Date: 01/15/2014

Lab IDs	Sample IDs	Date Collected	Parameters
			Diss. Metals 200.7 and 6010B
-001	MW-5	12/16/13	X

Lab ID: C+T **NO QUALS**
Cooler Temperature: Not noted; login indicates on ice.
Chain-of-Custody: OK
Samples preservatives: OK

Parameter: **Dissolved Fe + Mn (6010B)**

HTs: 180 days – analyzed 12/14/13
Batch IDs: 207056
Method Blank: OK
BS/BSD: BS OK
BSD OK
MS/MSD: MS % recovery outside of control limits; sample concentration >4x spike; no qual
MSD OK

Parameter: **Dissolved Metals (200.7)**

HTs: 180 days – analyzed 1/14/14
Batch IDs: 207056
Method Blank: OK
BS/BSD: BS OK
BSD OK
MS/MSD: MS % recovery outside of control limits; sample concentration >4x spike; no qual
MSD OK

Appendix C

Free Product and Water Level Measurement Field Sheets

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

Site Visit Date:	Dec. 12, 2013			
Recorded By:	J. Lee			
Recovery Well	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Time of measurement
RW-1	Inaccessible			
RW-2	ND	10.11	∅	10.12
RW-3	11.12	14.12	3.0	9.52
RW-4	9.95	14.07	4.12	10:14
RW-5	under water Truck; no access.			* gained access in late pm but could not remove cap.
RW-6	9.19	11.46	2.27	9:59
RW-7	8.47	16.13	7.66	10:03
RW-8	9.29	12.24	2.95	10:09
RW-9	10.11	10.14	0.03	9:40
MW-1	ND	10.18	∅	8:53
MW-2	ND	12.31	∅	8:57
MW-3	11.23	13.23	2.00	9:45
MW-4	ND	12.17	∅	8:29
MW-5	ND	9.45	∅	9:14
MW-8A	ND	11.71	∅	8:50
MW-9	ND	12.38	∅	9:12
MW-10	ND	10.85	∅	9:00
MW-11	ND	11.15	∅	9:25
MW-12	ND	1242	∅	9:35

Measured on 12/12/2013 by J. Lee
Meter: Solinst o/w gc Interface #~~5855~~ 9371-1

Environmental
Sampling Services, LLC

Project Name: Port of Oakland
Project Address: 651 Maritime Street, California
Task: December 2013 Semi-Annual Groundwater Monitoring Event

DAILY EQUIPMENT CALIBRATION SHEET

Date	Time	Instrument Serial Number	Probe Serial Number	Dissolved Oxygen (%)	pH			Specific Conductivity (1,000 µs/cm°)	ORP (231 mV)	Turbidity (0.02 NTU)
					4	7	10			
12/11/2013	10:20	556MPS	09C100611	101.5	4.00	6.98	10.01	1,005	231.0	0.02
12/12/2013	8:10	556MPS	09C100611	100.7	4.00	6.99	10.00	1,001	231.0	0.02
12/6/13	8:34	556MPS	09C100611	101.1	4.00	7.00	10.00	1,000	231.2	0.02

251610

Environmental Sampling Services, LLC

6680 Alhambra Avenue, #102
Martinez, California 94553-6105
Telephone: (925) 372-8108
www.envsampling.com

CHAIN OF CUSTODY RECORD

Page 1 of 1

TURN AROUND TIME Other:

LABORATORY: Curtis Tompkins, Ltd. Berkeley, CA

☐ 24 Hours	☐ 48 Hours	☐ 1 Week	☑ Normal

Report To:	Ms. Caroline Orsi	**Telephone/Fax:**	510-652-4500 / 510-652-4906
Company:	Arcadis U.S., Inc.	**Project Name:**	Port HFC
Address:	2000 Powell Street, 7th Floor Emeryville, CA 94608	**Project Number:**	01656016.0000
		Bill To:	Port of Oakland
E-Mail Results to & cc:	caroline.orsi@arcadis-us.com		
Sampler(s):	Jacqueline Lee ☑	**Sampler's Signature:**	
	Stephen Penman ☐	**Sampler's Signature:**	

Reporting Requirement: PDF: Yes ☑ No ☐ **EPA Data Report:** Level 4

EDD File: Yes ☑ No ☐ Electronic (EDF) : Yes ☑ No ☐

SAMPLE ID	Sample Date	Sample Time	Number of Containers	Type of Container[1]	Matrix: Water	Groundwater	Soil	Soil Vapor	Other	Preservative: Ice	HCl	HNO_3	H_2SO_4	NaOH	TPH-Gas (EPA 8015B)	BTEX & MTBE (EPA 8260B)	TPH-D & MO (EPA 8015B) w/Silica Gel Cleanup	TDS (40CFR136/160.1)	Anions (EPA 300.0) * see "comments"	Dissolved Sulfide (EPA E376.2)	RSK-175 SK 12/16/2013	Field Filtered (FF): Dissolved Na, Ca, K, and Mg (EPA 200.7)	Dissolved Fe and Mn (EPA SW6010B)	Comments
1 QCTB-1	12/12/2013	8:30	3	1	x					x	x				x	x								
2 MW-11	12/12/2013	11:38	15	1, 2, 3		x				x	x	x	x		x	x	x	x	x	x	x	x	x	Anions =
3 MW-12	12/12/2013	12:56	15	1,2,3		x				x	x	x	x		x	x	x	x	x	x	x	x	x	Bicarbonate,
4 MW-2	12/12/2013	14:00	15	1,2,3		x				x	x	x	x		x	x	x	x	x	x	x	x	x	Carbonate,
																								Sulfate, Chloride
																								Nitrate, Nitrite,
																								and
																								Orthophosphate.
																								MW-11 reached =/HCl. SK 12/16/2013

Relinquished By:	Date:	Time:	Received By:
	12/12/2013	15:40	
Relinquished By:	Date:	Time:	Received By:
Relinquished By:	Date:	Time:	Received By:

[1] = Sample Container Type: 1 =VOA 2=Glass 3=High Density Polyethylene 4=Summa Canister

QUESTIONS REGARDING COC, CALL ESS
Send confirmation to: caroline.orsi@arcadis-us.c
After log-in, please email COC to:
jlee@envsampling.com and spen@envsampling.com

SAMPLE RECEIPT
☐ Intact ☐ Cold
☐ On Ice ☐ Ambient
Preservative Correct?
☐ Yes ☐ No ☐ NA

Environmental Sampling Services, LLC

6680 Alhambra Avenue, #102
Martinez, California 94553-6105
Telephone: (925) 372-8108
www.envsampling.com

CHAIN OF CUSTODY RECORD

Page 1 of 1

TURN AROUND TIME Other:

LABORATORY: Curtis Tompkins, Ltd. Berkeley, CA

☐ 24 Hours	☐ 48 Hours	☐ 1 Week	☑ Normal

Report To: Ms. Caroline Orsi **Telephone/Fax:** 510-652-4500 / 510-652-4906
Company: Arcadis U.S., Inc. **Project Name:** Port HFC
Address: 2000 Powell Street, 7th Floor, Emeryville, CA 94608 **Project Number:** 01656016.0000
Bill To: Port of Oakland
E-Mail Results to & cc: caroline.orsi@arcadis-us.com

Sampler(s): Jacqueline Lee ☑ **Sampler's Signature:**
Stephen Penman ☐ **Sampler's Signature:**

Reporting Requirement: PDF: Yes ☑ No ☐ **EPA Data Report:** Level
EDD File: Yes ☑ No ☐ Electronic (EDF) : Yes ☑ No ☐

RSK-175 12/16/2013

SAMPLE ID	Sample Date	Sample Time	Number of Containers	Type of Container[1]	Matrix: Water	Groundwater	Soil	Soil Vapor	Other	Preservative: Ice	HCl	HNO_3	H_2SO_4	NaOH	TPH-Gas (EPA 8015B)	BTEX & MTBE (EPA 8260B)	TPH-D & MO (EPA 8015B) w/Silica Gel Cleanup	TDS (40CFR136/160.1)	Anions (EPA 300.0) * see "comments"	Dissolved Sulfide (EPA E376.2)	RSK-175	Field Filtered (FF): Dissolved Na, Ca, K, and Mg (EPA 200.7)	Dissolved Fe and Mn (EPA SW6010B)	Comments
QCTB-2	12/13/2013	8:30	3	1	x					x	x				x	x								
MW-4	12/13/2013	9:21	15	1, 2, 3		x				x	x	x	x		x	x	x	x	x	x	x	x	x	Anions =
MW-4DUP	12/13/2013	9:21	15	1,2,3		x				x	x	x	x		x	x	x	x	x	x	x	x	x	Bicarbonate,
MW-8A	12/13/2013	10:59	15	1,2,3		x				x	x	x	x		x	x	x	x	x	x	x	x	x	Carbonate,
MW-10	12/13/2013	12:34	15	1,2,3		x				x	x	x	x		x	x	x	x	x	x	x	x	x	Sulfate, Chloride
MW-1	12/13/2013	13:32	15	1,2,3		x				x	x	x	x		x	x	x	x	x	x	x	x	x	Nitrate, Nitrite,
MW-9	12/13/2013	14:57	15	1,2,3		x				x	x	x	x		x	x	x	x	x	x	x	x	x	and
																								Orthophosphate.

Relinquished By:	Date:	Time:	Received By:
	12/13/2013	16:50	
Relinquished By:	Date:	Time:	Received By:
Relinquished By:	Date:	Time:	Received By:

1 = Sample Container Type: 1 =VOA 2=Glass 3=High Density Polyethylene 4=Summa Canister

QUESTIONS REGARDING COC, CALL ESS
Send confirmation to: caroline.orsi@arcadis-us.com
After log-in, please email COC to:
jlee@envsampling.com and spen@envsampling.com

SAMPLE RECEIPT
☐ Intact ☐ Cold
☐ On Ice ☐ Ambient
Preservative Correct?
☐ Yes ☐ No ☐ NA

Environmental Sampling Services, LLC
6680 Alhambra Avenue, #102
Martinez, California 94553-6105
Telephone: (925) 372-8108
www.envsampling.com

CHAIN OF CUSTODY RECORD

TURN AROUND TIME Other:

LABORATORY: Curtis Tompkins, Ltd. Berkeley, CA

☐ 24 Hours	☐ 48 Hours	☐ 1 Week	☑ Normal

Report To: Ms. Caroline Orsi **Telephone/Fax:** 510-652-4500 / 510-652-4906
Company: Arcadis U.S., Inc. **Project Name:** Port HFC
Address: 2000 Powell Street, 7th Floor **Project Number:** 04656016.0000
Emeryville, CA 94608 **Bill To:** Port of Oakland
E-Mail Results to & cc: caroline.orsi@arcadis-us.com

Sampler(s): Jacqueline Lee ☑ **Sampler's Signature:**
Stephen Penman ☐ **Sampler's Signature:**

Reporting Requirement: PDF: Yes ☑ No ☐ **EPA Data Report:** Level II
EDD File: Yes ☑ No ☐ Electronic (EDF) : Yes ☑ No ☐

SAMPLE ID	Sample Date	Sample Time	Number of Containers	Type of Container[1]	Matrix: Water	Groundwater	Soil	Soil Vapor	Other	Preservative: Ice	HCl	HNO_3	H_2SO_4	TPH-Gas (EPA 8015B)	BTEX & MTBE (EPA 8260B)	TPH-D & MO (EPA 8015B) w/Silica Gel Cleanup	TDS (40CFR136/160.1)	Anions (EPA 300.0) * see "comments"	Dissolved Sulfide (EPA E376.2)	RSK-175	Field Filtered (FF): Dissolved Na, Ca, K, and Mg (EPA 200.7)	Dissolved Fe and Mn (EPA SW6010B)	Comments
QCTB-3	12/16/2013	8:30	3	1	X					X	X			X	X								
MW-5	12/16/2013	9:42	15	1,2,3		X				X	X	X	X	X	X	X	X	X	X	X	X	X	Anions = Bicarbonate, Carbonate, Sulfate, Chloride, Nitrate, Nitrite, and Orthophosphate.

Relinquished By:	Date:	Time:	Received By:
	12/16/2013	11:40	
Relinquished By:	Date:	Time:	Received By:
Relinquished By:	Date:	Time:	Received By:

1 = Sample Container Type: 1 =VOA 2=Glass 3=High Density Polyethylene 4=Summa Canister

QUESTIONS REGARDING COC, CALL ESS
Send confirmation to: caroline.orsi@arcadis-us.com
After log-in, please email COC to:
jlee@envsampling.com and spen@envsampling.com

SAMPLE RECEIPT
☐ Intact ☐ Cold
☐ On Ice ☐ Ambient
Preservative Correct?
☐ Yes ☐ No ☐ NA