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Alameda County  
Environmental Health

July 21, 2010

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

**RE: RO#0000010\_2010 First Semi-Annual Groundwater Monitoring and Remediation System Operation and Maintenance Report - Port of Oakland, 651 Maritime Street, Oakland, CA\_2010-07-21**

Dear Mr. Khatri:

Please find enclosed the report entitled *2010 First Semi-Annual Groundwater Monitoring and Remediation System Operation and Maintenance Report - Port of Oakland, 651 Maritime Street, Oakland, CA* ("Report") dated July 2010, prepared by Malcolm Pirnie, Inc. ("Malcolm Pirnie") on behalf of the Port of Oakland ("Port")<sup>1</sup>. 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<sup>2</sup>, January 19, 2007<sup>3</sup>, and September 30, 2008.<sup>4</sup>

The Port has retained Malcolm Pirnie to perform groundwater monitoring and maintenance of the remediation system. Results of the first 2010 semi-annual sampling event are contained in the enclosed report. The next monitoring event will be performed

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<sup>1</sup> 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)**.

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

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

<sup>4</sup> 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.

July 21, 2010

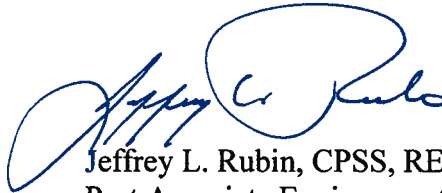
during the November/December 2010 time frame. If you have any questions or comments regarding the results, please contact Jeff Rubin at (510) 627-1134.

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

Sincerely,



Jeffrey R. Jones  
Supervisor  
Environmental Programs and Planning



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

Enclosure: noted

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

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



**Port of Oakland**

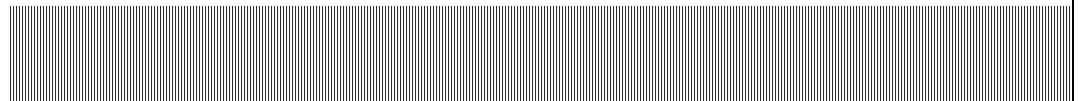
530 Water Street • Oakland, CA 94607

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# **2010 First Semi-Annual Groundwater Monitoring and Remediation System Operation and Maintenance Report**

***651 Maritime Street  
Oakland, California***

July 2010



Report Prepared By:

**Malcolm Pirnie, Inc.**

2000 Powell Street, Suite 1180  
Emeryville, CA 94608  
(510) 596-3060

4656016

**MALCOLM  
PIRNIÉ**

July 22, 2010

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

**Subject: June 2010 Semi-Annual Groundwater Monitoring and Remediation System Operation and Maintenance Report - Port of Oakland, 651 Maritime Street, Oakland, California**

Dear Mr. Rubin:

Enclosed please find the June 2010 Semi-Annual Groundwater Monitoring and Remediation System Operation and Maintenance Report for 651 Maritime Street (formerly 2277 and 2225 Seventh Street), Alameda County Local Oversight Program case number RO0000010. This report has been prepared for submittal to Alameda County Health Care Services, Department of Environmental Health (ACHCS) on behalf of the Port of Oakland (the Port) as required in ACHCS's letter to the Port dated March 23, 2006. The ACHCS requires semi-annual groundwater monitoring and reporting at the Site.

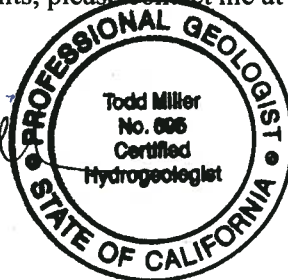
Malcolm Pirnie assumed responsibility for implementing the groundwater monitoring program and operation of the free product recovery system on May 1, 2009. The enclosed report documents the groundwater sampling event conducted at the subject site in June 2010 by Malcolm Pirnie. This report also presents the free product recovery system operation and maintenance data collected by Malcolm Pirnie since January 1, 2010.

If you have any questions or comments, please contact me at (510) 735-3014.

Sincerely,



Todd Miller, CHG  
Project Manager



Enclosure

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## Acronyms Used in the Report

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

# 1. Introduction

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This 2010 First Semi-Annual Groundwater Monitoring and Remediation System Operation and Maintenance Report for 651 Maritime Street, Oakland, California (Site)<sup>1</sup> has been prepared by Malcolm Pirnie on behalf of the Port of Oakland (Port). This is the first semi-annual report for 2010, and includes the period from January through June. 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 Harbor Facilities Complex are related to two former underground storage tank (UST) sites: 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) (Figure 3). Quarterly groundwater monitoring was initiated in 1996 in accordance with an ACHCS approved workplan dated April 18, 1995.

## **Former 2225 Seventh Street Site**

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

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<sup>1</sup> 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 only 651 Maritime Street.



TPHd and BTEX. RAMCON Engineering and Environmental Contracting (RAMCON) removed seven of the USTs (six diesel and one bulk fuel oil) in 1992. RAMCON observed a hole in the bulk fuel 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 ACHCS.<sup>2</sup>

### **651 Maritime Site**

In 2004, the Port developed 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.<sup>3</sup> The ACHCS approved the removal of the system, with the stipulation that a new free product recovery system will be installed. A new system was installed in 2004, and has been in operation continuously since.

In 1998, Harding Lawson Associates abandoned MW-8 to make possible the expansion of the railroad tracks to the north of the Site. Replacement well MW-8A was installed in 2001 (Figure 3). In 2002, several monitoring wells were abandoned to facilitate construction of the new Harbor Facilities Complex. Accordingly, 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.<sup>4</sup>

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<sup>2</sup> Letter from ACHCS to Dongary Investments dated 26 July 1994.

<sup>3</sup> Letter from ACHCS to Port of Oakland dated March 27, 2003.

<sup>4</sup> 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. 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 reported in the groundwater at that location.<sup>5</sup>

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.<sup>6</sup> 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.<sup>4</sup>

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<sup>5</sup> Letter from ACHCS to Port of Oakland dated March 23, 2006.

<sup>6</sup> Letter from Mr. Steven Plunkett (ACHCS) to Mr. Jeffrey Rubin (Port of Oakland) dated September 30, 2008.

## 2. Groundwater Sampling Activities

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Groundwater samples were collected from the Site by Malcolm Pirnie in June 2010 as part of the ACHCS-approved semi-annual groundwater monitoring program.

### 2.1. June 2010 Semi-annual Groundwater Monitoring Activities

Malcolm Pirnie conducted the 2010 first semi-annual groundwater monitoring event at the Site on June 16 and 17. The June 2010 groundwater monitoring event consisted of measuring the groundwater and free-phase product levels, when present, in the 10 groundwater monitoring wells on-site and collecting groundwater samples from the wells without free-phase product. The groundwater and free-phase product levels were measured to the nearest one-hundredth of a foot from the top of the well casing using a dual-phase interface probe. The dual-phase interface probe was decontaminated before each measurement by washing it in a Liquinox solution then rinsing it with water. Instrument readings indicated that there was a detectable amount of free-phase product in monitoring wells MW-1 and MW-3 (Table 1); hence, these wells were neither purged nor sampled. Water level measurements for the June 2010 monitoring event are summarized in Table 1 and included on the groundwater sampling forms in Appendix A.

Malcolm Pirnie purged wells MW-2, MW-4, MW-5, MW-8A, MW-9, MW-10, MW-11, and MW-12 using a peristaltic pump equipped with dedicated silicone and polyethylene tubing. During purging, Malcolm Pirnie monitored field water quality parameters (including temperature, pH, oxidation/reduction potential (ORP), and electrical conductivity) of the purge water using portable field instruments calibrated to manufacturer's specifications. Purging continued until water quality parameters had stabilized, extracting at least two well casing volumes per well when recharge rates permitted. Slow recharge of well MW-2 allowed only one well casing volume to be purged. After purging, the water level in well MW-2 was allowed to recover to approximately 90% of the initial water level before collecting a sample. Field-measured groundwater quality information collected during the June 2010 monitoring event is provided on groundwater sampling forms included in Appendix A.

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

certified analytical laboratory, under appropriate chain-of-custody procedures for the following analyses:

- TPHg in accordance with U.S. Environmental Protection Agency (USEPA) Method 8015B;
- TPHd and TPHmo in accordance with USEPA Method 8015B;
- BTEX and methyl tert-butyl ether (MTBE) in accordance with USEPA Method 8260B.

Prior to analyzing the water samples for TPHd and TPHmo, they were passed through a silica gel column, in accordance with USEPA Method 3630C, to remove non-petroleum-based organics that could potentially interfere with the analysis.

Under approval from ACHCS, well MW-4 has been outfitted with ORC socks to increase the DO concentration in groundwater and stimulate aerobic biodegradation of the petroleum hydrocarbons reported in the groundwater at that location. The ORC socks installed during a previous monitoring event were removed on June 9, 2010, approximately one week prior to conducting the June sampling. At the time the ORC socks were removed, the DO concentration in groundwater in well MW-4 was 6.14 mg/L. The socks were placed back in the well on June 16, 2010, following the sampling event.

Approximately 50 gallons of purge and decontamination water were generated during the June 2010 monitoring event. Malcolm Pirnie placed the water in a properly labeled 55-gallon drum, which was stored in the free product recovery system enclosure located within Harbor Facilities Complex. The Port's environmental services contractor disposed of the water in accordance with applicable rules and regulations.

## 3. Results

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The following section summarizes the field and laboratory results collected during the first six months of 2010.

### 3.1. Groundwater Flow Direction

Based on the depth-to-water measurements collected, groundwater beneath the Site rose in elevation between December 2009 and June 2010. In December 2009, groundwater elevations ranged from 2.85 feet above mean sea level (amsl) to 5.87 feet amsl. In June 2010, groundwater elevation ranged from 3.24 feet amsl to 6.08 feet amsl. The groundwater flow direction at the time of the sampling event was calculated to be toward the north, except in the area around wells MW-3 and MW-10, where it ranged from north-northeast to north-northwest. Groundwater gradients at the site ranged from 0.012 to 0.006 ft/ft. A shallow groundwater surface contour map is included as Figure 4. Current and historical depth-to-water measurements and calculated groundwater elevations are summarized in Table 1.

### 3.2. Product Thickness

Free-phase product was identified in monitoring wells MW-1 and MW-3 during the June 2010 monitoring event. Product in MW-1 appeared as a sheen (no measureable thickness), which was observed on the interface probe after removing it from the well. Product thickness in well MW-1 has ranged from non-detectable to 1.30 feet since April 2000 (Table 1). The product thickness in well MW-3 was measured to be 1.90 feet. Product thickness in this well has ranged from non-detectable to 2.70 feet since April 2000. Product was manually removed from MW-3 on a weekly basis between January 2010 and June 2010 using a peristaltic pump and placed in the 500-gallon concrete encased aboveground storage tank (Convault) located within the system enclosure.

### 3.3. Analytical Results

Analytical results for the groundwater samples collected in June 2010 are illustrated on Figure 5 and summarized in Table 1. 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-9, MW-10, and MW-12, at concentrations ranging from 94 micrograms per liter ( $\mu\text{g/L}$ ) to 160  $\mu\text{g/L}$ . The laboratory also reported that chromatographs resulting from the TPHg analyses exhibited patterns that do not match the gasoline standard. Chromatographs are included in the laboratory reports in Appendix B.

### 3.3.2. BTEX and MTBE

The laboratory reported benzene in the groundwater samples collected from wells MW-4 (15  $\mu\text{g/L}$ ), MW-9 (49  $\mu\text{g/L}$ ), and MW-10 (46  $\mu\text{g/L}$ ). Ethylbenzene was reported in the sample collected from well MW-9 (1.0  $\mu\text{g/L}$ ). Xylenes were reported in the sample collected from well MW-9 at 0.6  $\mu\text{g/L}$ . MTBE was reported in the sample collected from well MW-12 at 4.8  $\mu\text{g/L}$ . Toluene was reported to be below the analytical method reporting limit in the samples analyzed.

### 3.3.3. TPHd and TPHmo

The laboratory reported TPHd in the groundwater samples collected from wells MW-2, MW-9, MW-10, and MW-12, at concentrations ranging from 160  $\mu\text{g/L}$  to 300  $\mu\text{g/L}$ . The laboratory also reported that the chromatographs resulting from analysis of the samples collected from wells MW-2 and MW-9 exhibited patterns that do not match the diesel standard. The laboratory reported TPHmo concentrations to be below the method reporting limit in the samples analyzed. Chromatographs are included in the laboratory reports in Appendix B.

## 3.4. ORC Use

On June 9, seven days before groundwater monitoring was performed at the Site, Malcolm Pirnie removed the ORC socks from well MW-4. The DO concentration measured in the groundwater in well MW-4 immediately after removal of the ORC socks indicated that they are still within their useful lifespan; thus, on June 16, 2010, following completion of the monitoring event, the ORC socks were placed back into the well.

## 3.5. Quality Assurance / Quality Control

Malcolm Pirnie collected a field duplicate from one monitoring well to assess representativeness of the sample collection procedures. Two samples from well MW-4 (MW-4 and MW-4DUP) were analyzed for TPHd, TPHg, BTEX and MTBE.

The analytical laboratory reported detectable concentrations of benzene in the sample and duplicate sample. The relative percent difference (RPD) between the original and the duplicate samples are calculated below:

$$\text{Benzene RPD } |15-18| / [(15+18)/2] = 18.2\%$$

The RPDs for these compounds are less than the analytical laboratory's allowable RPD for matrix spike duplicates and indicate that the field sampling procedures produce acceptable data.

C&T prepared a trip blank 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. The laboratory reported that concentrations of the constituents of concern were below the method reporting limits for the analyses performed, indicating that the collection, preservation, storage, and analysis procedures did not compromise the sample integrity.

Malcolm Pirnie also reviewed the laboratory data for completeness and accuracy (see Quality Control Checklist in Appendix B). The project laboratory Quality Assurance / Quality Control (QA/QC) goals were met and qualification of the data is not necessary.

Based on the above QA/QC evaluation, Malcolm Pirnie considers the data collected during the 2010 first semi-annual monitoring event appropriate and reliable for its intended use.

## 4. Free Product Recovery System

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The Port installed the free product recovery system at the Harbor Facilities Complex in 2004, as required by the ACHCS in a letter dated March 27, 2003. The free product recovery system includes nine recovery wells, RW-1 through RW-9 (Figure 3). Each recovery well is protected by a flush-mounted utility box. Utilities supplied to each recovery well include a pneumatic line to operate a skimmer pump, a product discharge line, and a vacuum line. The Port operates six air-actuated skimmer pumps manufactured by Xitech Instruments, Inc. in the nine recovery wells. Historic field observations indicate that well RW-1 typically only contains a sheen, and free-phase product has not been observed historically in well RW-2. The remaining seven recovery wells contain measureable amounts of free-phase product. Currently, wells RW-1, RW-2 and RW-5 are not outfitted with skimmer pumps. A programmable controller is used to set the frequency and duration that each skimmer pump operates. The skimmers discharge recovered product into the 500-gallon aboveground Convault located in the system enclosure. The Convault is equipped with primary and secondary containment, as well as a sensor that activates a warning light and shuts off air supply to the skimmers when the tank is full.

Malcolm Pirnie operated the system during the entire first semi-annual monitoring period in 2010. Typical operation and maintenance (O&M) tasks include weekly measurements of the product thickness in the recovery wells and confirmation of the position of the inlets of the recovery pumps in the wells relative to the interface of free product and groundwater. Pump inlet depths are adjusted as necessary to optimize recovery. In addition, pump functionality is checked, and filters are checked and changed as necessary. Weekly free-phase product thickness measurements for this semi-annual reporting period are summarized in Table 3. The observed area of free-phase product is shown on Figure 5. Weekly O&M field sheets are provided in Appendix C.

In June 2007, the free product recovery system was upgraded to include the application of low vacuum on the wellheads to improve product recovery. Inducing a vacuum on the wellhead results in an air discharge containing petroleum vapors, which are removed by a series of two vessels, each containing 1,000 pounds of vapor-phase granular activated carbon. Treatment and discharge conditions are provided in a Permit-to-Operate from the Bay Area Air Quality Management District.

Prior to enhancement of the free product recovery system with the installation of the low-vacuum blower, approximately 178 gallons of product were removed in 32 months (December 2004 through July 2007). After installation of the blower, 868 gallons of



product has been recovered in 35 months (August 2007 through June 2010). A total of 1046 gallons of product have been recovered since operation of the new free product recovery system began.

## 5. Conclusions

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The results of the groundwater sampling and free product recovery system O&M tasks indicate that the free-phase product plume appears stable (Figure 5), and groundwater concentrations appear to be stable and/or decreasing (Table 2).

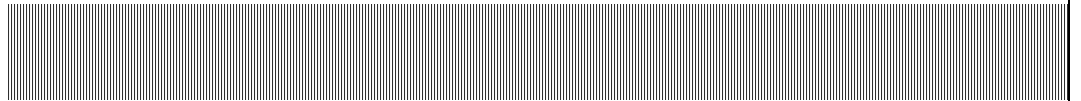


## Port of Oakland

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# Figures



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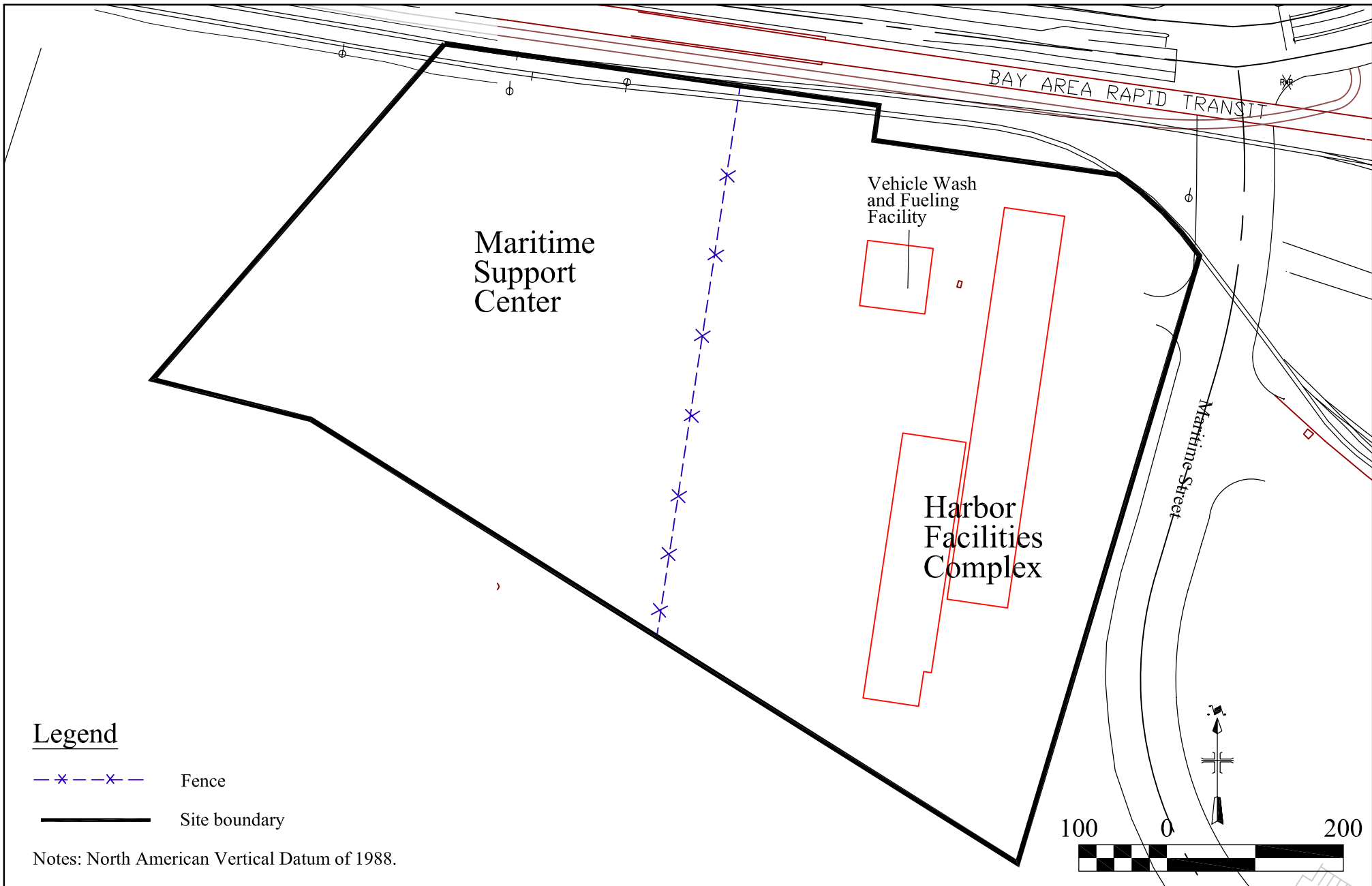
**MALCOLM  
PIRNIE**

PORT OF OAKLAND  
HARBOR FACILITIES  
COMPLEX  
651 MARITIME STREET

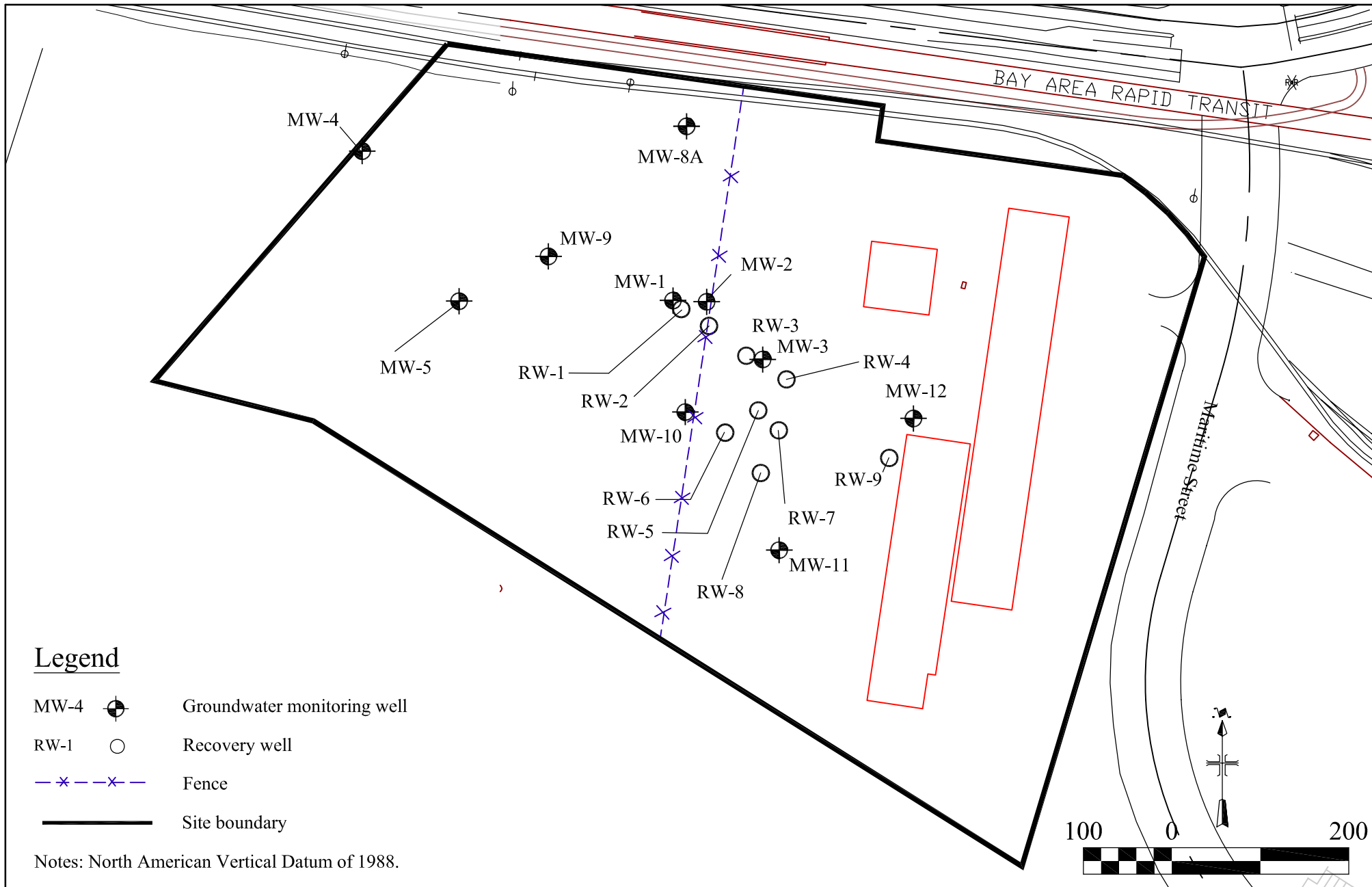
SITE LOCATION MAP

MALCOLM PIRNIE, INC.

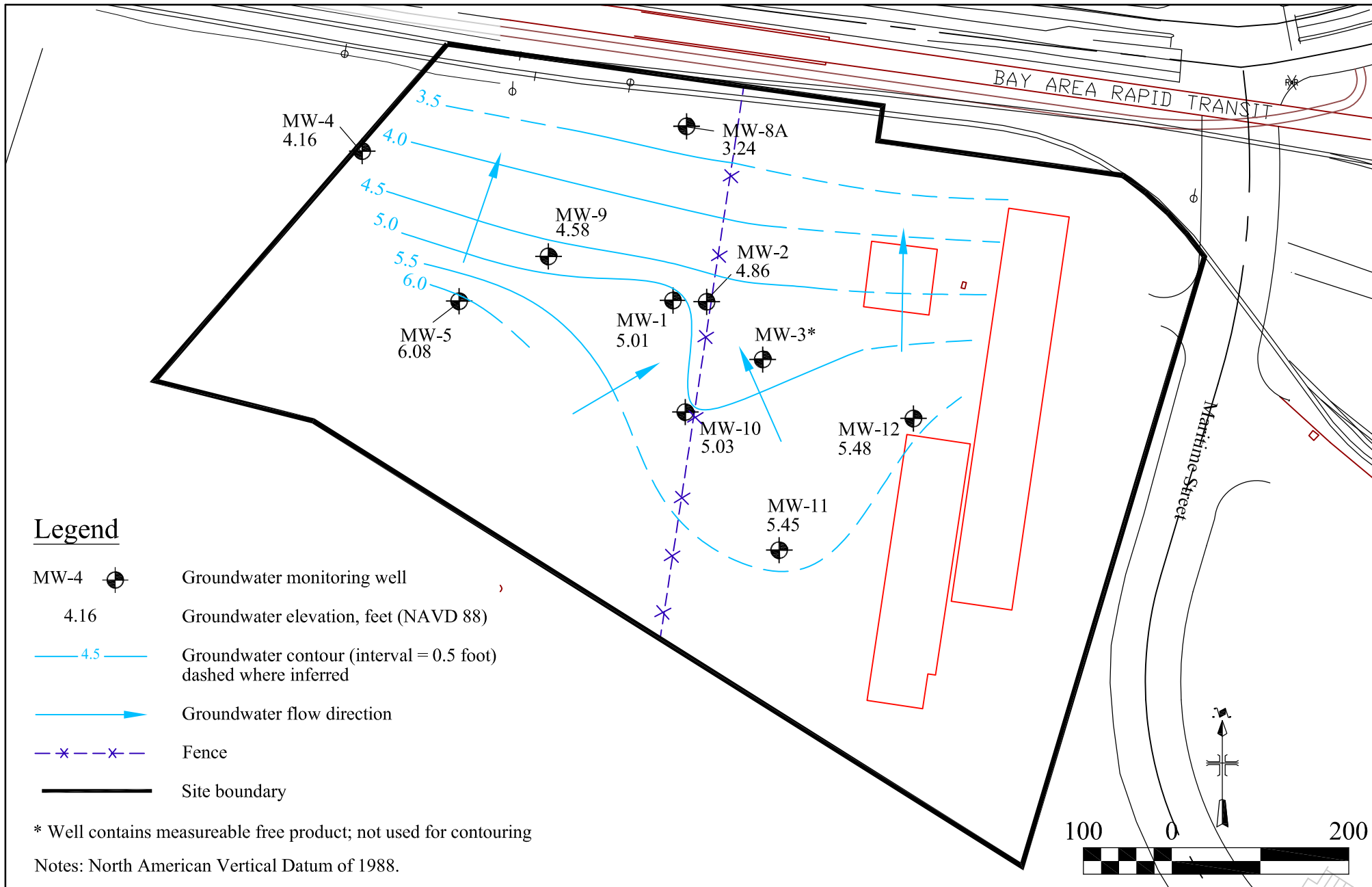
JULY 2010  
FIGURE 1



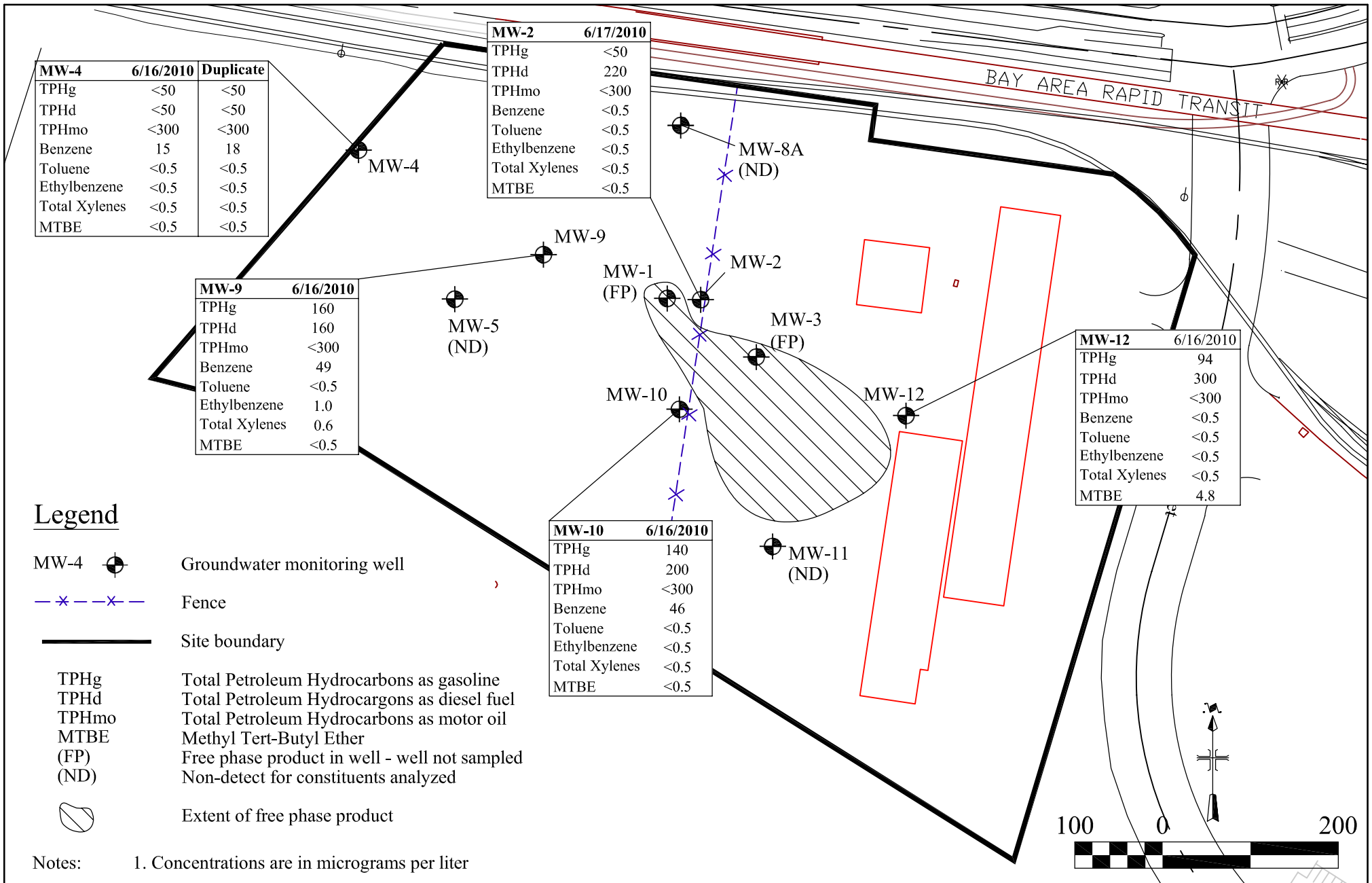
	PORT OF OAKLAND	<b>HARBOR FACILITIES COMPLEX LAYOUT</b>	MALCOLM PIRNIE, INC.
	<b>HARBOR FACILITIES COMPLEX</b> 651 MARITIME STREET		JULY 2010 <b>FIGURE 2</b>



	PORT OF OAKLAND	SITE PLAN	MALCOLM PIRNIE, INC.
	HARBOR FACILITIES COMPLEX 651 MARITIME STREET		JULY 2010 FIGURE 3



	PORT OF OAKLAND	GROUNDWATER ELEVATION ISOCONTOUR MAP - JUNE 2010	MALCOLM PIRNIE, INC.
	HARBOR FACILITIES COMPLEX 651 MARITIME STREET		JULY 2010 FIGURE 4





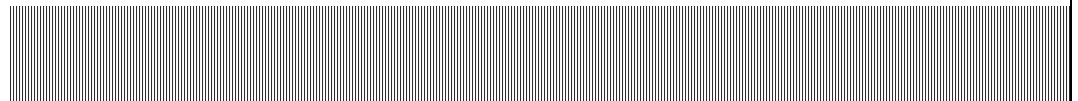


## Port of Oakland

530 Water Street • Oakland, CA 94607

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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 <sup>1</sup> Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation <sup>1</sup> (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 <sup>4</sup>	10.79	0.00	5.01
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 <sup>1</sup> Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation <sup>1</sup> (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
<b>MW-3</b>						
	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

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555 - 651 Maritime Street, Oakland, California**

Monitoring Well	Date Measured	Elevation <sup>1</sup> Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation <sup>1</sup> (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
	02/18/03	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

**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 <sup>1</sup> Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation <sup>1</sup> (feet)
MW-3 (cont)	12/21/05	15.69	8.21	8.28	0.07	NC
	03/24/06	15.69	8.20	8.82	0.62	NC
	07/28/06	15.69	9.81	9.83	0.02	NC
	11/29/06	NA	10.72	11.70	0.98	NA
	06/01/07	15.66	10.77	11.46	0.69	NC
	11/14/07	15.66	10.98	12.19	1.21	NC
	06/05/08	15.66	10.51	11.96	1.45	NC
	12/18/08	15.66	10.78	12.00	1.22	3.66
	03/04/09	15.66	9.31	9.93	0.62	5.73
	04/01/09	15.66	10.38	11.10	0.72	4.56
	06/17/09	15.66	10.79	12.30	1.51	3.36
	12/08/09	15.66	11.05	12.81	1.76	2.85
	06/17/10	15.66	10.39	12.29	1.90	3.37
<b>MW-4</b>						
	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

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Monitoring Well	Date Measured	Elevation <sup>1</sup> Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation <sup>1</sup> (feet)
MW-4 (cont)	12/21/05	12.66	NP	7.30	0.0	5.36
	03/24/06	12.66	NP	7.05	0.0	5.61
	07/28/06	12.66	NP	7.92	0.0	4.74
	11/29/06	NA	NP	11.63	0.0	NA
	06/01/07	15.91	NP	11.82	0.0	4.09
	11/14/07	15.91	NP	11.88	0.0	4.03
	06/05/08	15.91	NP	11.67	0.0	4.24
	12/18/08	15.91	NP	11.20	0.0	4.71
	03/04/09	15.91	NP	10.93	0.0	4.98
	04/01/09	15.91	NP	11.63	0.0	4.28
	06/17/09	15.91	NP	11.88	0.0	4.03
	12/08/09	15.91	NP	12.03	0.0	3.88
	06/16/10	15.91	NP	11.75	0.0	4.16
<b>MW-5</b>						
	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

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Monitoring Well	Date Measured	Elevation <sup>1</sup> Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation <sup>1</sup> (feet)
MW-5 (cont)	12/21/05	13.00	NP	5.91	0.0	7.09
	03/24/06	13.00	NP	NA <sup>2</sup>	NA <sup>2</sup>	NA
	07/28/06	13.00	NP	6.08	0.0	6.92
	11/29/06	NA	NP	9.39	0.0	NA
	06/01/07	15.39	NP	10.60	0.0	4.79
	11/14/07	15.39	NP	9.77	0.0	5.62
	06/05/08	15.39	NP	9.74	0.0	5.65
	12/18/08	15.39	NP	9.80	0.0	5.59
	03/04/09	15.39	NP	8.78	0.0	6.61
	04/01/09	15.39	NP	9.16	0.0	6.23
	06/17/09	15.39	NP	9.51	0.0	5.88
	12/08/09	15.39	NP	9.52	0.0	5.87
	06/16/10	15.39	NP	9.31	0.0	6.08
<b>MW-6</b>						
	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				
<b>MW-7</b>						
	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

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MW-7 (cont)	07/10/01	13.86	NP	8.87	0.0	4.99
	12/12/01	13.86	NP	8.39	0.0	5.47
	01/22/02	13.86	NP	7.99	0.0	5.87
	03/08/02	13.86	NP	8.51	0.0	5.35
	06/13/02	13.86	NP	8.90	0.0	4.96
	09/26/02	13.86	NP	9.00	0.0	4.86
	12/12/02	13.86	NP	9.28	0.0	4.58
	12/18/02	Monitoring well was destroyed				
MW-8 <sup>3</sup>						
	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



**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 <sup>1</sup> Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation <sup>1</sup> (feet)
<b>MW-9</b>						
	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
<b>MW-10</b>						
	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
<b>MW-11</b>						
	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
<b>MW-12</b>						
	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
	06/17/09	16.79	NP	11.83	0.0	4.96
	12/08/09	16.79	NP	12.13	0.0	4.66
	06/16/10	16.79	NP	11.31	0.0	5.48

**Notes:**

Source of data prior to December 2005: Innovative Technical Solutions, Inc. *Third Quarter of 2005 Groundwater Monitoring and Product Monitoring Report*, 8 November 2005.

NP = no product detected with the interface probe

NC = not calculated due to the presence of free-phase product in the well

btc = below top of the well casing

NA = not available

NM = not measured

-- = no measurable product.

<sup>1</sup> Wells were resurveyed on January 24, 2009. Elevation data is relative to North American Vertical Datum of 1988 (NAVD 88).

<sup>2</sup> Well could not be measured due to abundant surface water covering well head.

<sup>3</sup> Viscous product not related to the lighter product identified in other wells.

<sup>4</sup> Product not measurable, 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 <sup>8</sup>	2.9	2.05	3.2 <sup>8</sup>
	12/08/09	1,400	1,200 <sup>2</sup>	<300	120	2.9	1.8	3.0	<1.0
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 <sup>1,2</sup>	<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 <sup>2,6</sup>	<300	<0.5	<0.5	<0.5	<0.5	6.3 <sup>8,9</sup>
	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 <sup>8</sup>	<0.5	<0.5	<0.5	<0.5 <sup>10</sup>
	12/19/00	200 <sup>3,11</sup>	<50	<300	39	1.8	<0.5	2.6	<0.5 <sup>10,12</sup>
	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 <sup>14</sup>
	03/08/02	<50	<50	<500	<0.5	<0.5	<0.5	<0.5	<5.0
	06/13/02	62 <sup>15</sup>	<57	<570	<0.5	<0.5	<0.5	<0.5	<5.0
	09/26/02	69 <sup>2</sup>	<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 <sup>6,15</sup>	<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
	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

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

		Concentration (µg/L)							
MW-2 (cont)	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 <sup>2</sup>	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 <sup>2</sup>	<300	<0.5	<0.5	<0.5	<0.5	<0.5
<b>MW-3</b>									
Not sampled due to the presence of free-phase product									
<b>MW-4</b>									
	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 <sup>1,2</sup>	<250	350	3.3	1.3	1.3	NA
	03/28/97	440 <sup>2</sup>	<50	<250	190	1.2	0.64	<1.0	NA
	06/13/97	1,300	92 <sup>5</sup>	<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 <sup>1,2,3</sup>	<47	<280	110 <sup>1</sup>	1.0 <sup>1</sup>	<0.5	<1.0	NA
	04/13/98	150 <sup>2,3</sup>	<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 <sup>3,5</sup>	63 <sup>3,5</sup>	<300	280	1.5	<1.0	<1.0	<4
	11/12/99	330 <sup>3</sup>	840 <sup>2</sup>	<300	740	<2.5	<2.5	<2.5	42 <sup>9</sup>
	02/11/00	200 <sup>2</sup>	<50	<300	58	0.73	<0.5	<0.5	4.4 <sup>8</sup>
	05/22/00	240	<50	<300	500	<2.5	<2.5	<2.5	17
	09/06/00	530 <sup>2,3</sup>	<50	<300	190	0.93	0.6	0.57	<0.5 <sup>10</sup>
	12/19/00	960 <sup>3,11</sup>	70 <sup>5</sup>	<300	420	<2.5	<2.5	<2.5	<0.5 <sup>10,12</sup>
	12/19/00	1,200 <sup>3,11</sup>	<50	<300	440	<2.5	<2.5	<2.5	<0.5 <sup>10,12</sup>
	02/21/01	450 <sup>13</sup>	<50	<300	120	<0.5	<0.5	<0.5	<0.5 <sup>10</sup>
	07/10/01	<250	110 <sup>2,13</sup>	<300	620	2.6	2.9	<2.5	<0.5 <sup>8,10</sup>
	12/05/01	180	<50	<300	61	<0.5	<0.5	<0.5	3.8 <sup>14</sup>
	03/08/02	490 <sup>2</sup>	54 <sup>2</sup>	<500	180	<2.5	<2.5	<2.5	<25
	06/13/02	830 <sup>2</sup>	<50	<500	250	<5.0	<5.0	<5.0	<50
Dup.	06/13/02	820 <sup>2</sup>	<56	<560	240	<5.0	<5.0	<5.0	<50
	09/26/02	390 <sup>2</sup>	57	<500	150	2.1	<1.0	<1.0	<10
Dup.	09/26/02	500 <sup>2</sup>	<50 <sup>16</sup>	<500 <sup>16</sup>	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 <sup>15</sup>	<50	<300	320 <sup>17</sup>	<0.5	<0.5	<0.5	<0.5 <sup>10</sup>
Dup.	03/17/03	82 <sup>15</sup>	<50	<300	190	0.64 <sup>17</sup>	0.56	0.53	<0.5 <sup>10</sup>
	06/18/03	360 <sup>11, 15</sup>	<50	<300	150	<0.5	<0.5	<0.5	<2.0
Dup.	06/18/03	330 <sup>11, 15</sup>	<50	<300	140	<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**

		Concentration (µg/L)							
MW-4 (cont)	09/03/03	140 <sup>11, 15</sup>	<50	<300	240	1.3	<0.5	<0.5	<2.0
Dup.	09/03/03	83 <sup>11, 15</sup>	<50	<300	130	0.58 <sup>17</sup>	<0.5	<0.5	<2.0
	11/26/03	160 <sup>15</sup>	68 <sup>15</sup>	<300	320	0.91 <sup>17</sup>	<0.5	0.53	<2.0
Dup.	11/26/03	120 <sup>15</sup>	<50	<300	210	0.66 <sup>17</sup>	<0.5	<0.5	<2.0
	03/05/04	90 <sup>11</sup>	<50	<300	190	1.1	0.55	0.50 <sup>17</sup>	23 <sup>14,17</sup> , <0.5 <sup>10</sup>
Dup.	03/05/04	84 <sup>11</sup>	<50	<300	180	0.81	<0.5	<0.5	21 <sup>14,17</sup> , <0.5 <sup>10</sup>
	06/02/04	620 <sup>13</sup>	<50	<300	210	0.55 <sup>17</sup>	<0.5	<0.5	<2.0
Dup.	06/02/04	400 <sup>13</sup>	<50	<300	130	<0.5	<0.5	<0.5	<2.0
	09/03/04	780 <sup>13, 15</sup>	<50	<300	<0.5	1.0 <sup>17</sup>	<0.5	0.57	<2.0
Dup.	09/03/04	370 <sup>13, 15</sup>	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	12/16/04	840	<50	<300	290	1.3 <sup>17</sup>	0.69	0.75	<2.0
Dup.	12/16/04	670	<50	<300	230	1.3 <sup>17</sup>	<0.5	<0.5	<2.0
	03/29/05	440 <sup>13</sup>	<50	<300	140	0.57	<0.5	<0.5	<2.0
Dup.	03/29/05	540 <sup>13</sup>	<50	<300	170	0.72	<0.5	<0.5	<2.0
	08/10/05	500 <sup>18</sup>	<50	<250	180	<2.5	<2.5	<2.5	<2.5
	09/29/05	360 <sup>18</sup>	59 <sup>20</sup>	<250	160	<5.0	<5.0	<5.0	<5.0
Dup.	09/29/05	420 <sup>18</sup>	<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 <sup>2</sup>	<300	160	<1.3	4.3	<1.3	<1.3
Dup.	08/04/06	590	100 <sup>2</sup>	<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 <sup>13, 15</sup>	<50	<300	10	<0.5	<0.5	<0.5	<0.5
Dup.	06/01/07	100 <sup>13, 15</sup>	<50	<300	11	<0.5	<0.5	<0.5	<0.5
	11/14/07	54 <sup>15</sup>	<50	<300	2.1	<0.5	<0.5	<0.5	<0.5
Dup.	11/14/07	51 <sup>15</sup>	<50	<300	2.1	<0.5	<0.5	<0.5	<0.5
	06/05/08	67 <sup>15</sup>	<50	<300	14	<0.5	<0.5	<0.5	<0.5
Dup.	06/05/08	91 <sup>15</sup>	<50	<300	15	<0.5	<0.5	<0.5	<0.5
	12/18/08	99 <sup>2</sup>	520	<300	0.5	<0.5	<0.5	<0.5	<0.5
Dup.	12/18/08	88 <sup>2</sup>	850	<300	0.7	<0.5	0.6	<0.5	<0.5
	03/04/09	60 <sup>2</sup>	<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 <sup>2</sup>	<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

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

		Concentration (µg/L)							
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 <sup>1,2</sup>	<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 <sup>2,6</sup>	<300	<0.5	<0.5	<0.5	<0.5	5.5 <sup>9</sup>
	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 <sup>10</sup>
	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 <sup>14</sup> , <0.5 <sup>10</sup>
	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 <sup>14</sup> , <0.5 <sup>10</sup>
	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 <sup>19</sup>	<50 <sup>19</sup>	<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 <sup>15,22</sup>	<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 <sup>2</sup>	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

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

		Concentration (µg/L)							
MW-5 (cont)	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
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 <sup>7</sup>	<300 <sup>7</sup>	18	<0.5	1.0	<0.5	54
	09/28/99	130 <sup>3,5</sup>	820	<300	20	0.51	2.2	<0.5	<2
	11/12/99	150	11,000 <sup>2,6</sup>	3,000 <sup>3,6</sup>	27	<0.5	2.2	<0.5	13 <sup>9</sup>
	02/11/00	270 <sup>2</sup>	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 <sup>10</sup>
	12/19/00	130 <sup>3,11</sup>	620	<300	24	<0.5	1.6	<0.5	<2
	02/21/01	120 <sup>13</sup>	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 <sup>2</sup>	640 <sup>2</sup>	<500	30	<0.5	<0.5	<0.5	5.0 <sup>14</sup>
	06/13/02	160 <sup>2</sup>	670 <sup>2</sup>	<500	34	<0.5	<0.5	<0.5	<5.0
	09/26/02	230 <sup>2</sup>	1400 <sup>2</sup>	<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 <sup>1,2</sup>	<250	<0.5	<0.5	<0.5	<1.0	NA
	03/28/97	65 <sup>6</sup>	94 <sup>2</sup>	<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 <sup>2,3</sup>	<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 <sup>2,6</sup>	420 <sup>3</sup>	<0.5	<0.5	<0.5	<0.5	15 <sup>9</sup>
	02/11/00	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	51
	05/22/00	110	53 <sup>2</sup>	<300	<0.5	<0.5	<0.5	<0.5	75
	09/06/00	50 <sup>6</sup>	<50	<300	<0.5	<0.5	<0.5	<0.5	40 <sup>10</sup>
	12/19/00	54 <sup>11</sup>	51 <sup>5</sup>	<300	<0.5	<0.5	<0.5	<0.5	47 <sup>10,12</sup>
	02/21/01	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	66 <sup>10</sup>
Dup.	02/21/01	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	60 <sup>10</sup>
	07/10/01	<50	51 <sup>2</sup>	<300	<0.5	<0.5	<0.5	<0.5	76 <sup>10</sup>
Dup.	07/10/01	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	75 <sup>10</sup>
	12/12/01	51	<50	<300	<0.5	<0.5	<0.5	<0.5	98 <sup>14</sup>
Dup.	12/12/01	64	52 <sup>13,15</sup>	<300	<0.5	<0.5	<0.5	<0.5	96 <sup>14</sup>
	03/08/02	52 <sup>2</sup>	<50	<500	<0.5	<0.5	<0.5	<0.5	24 <sup>14</sup>

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

		Concentration (µg/L)							
MW-7 (cont)	06/13/02	87 <sup>2</sup>	54 <sup>2</sup>	<500	<0.5	<0.5	<0.5	<0.5	51
	09/26/02	83 <sup>2</sup>	84 <sup>2</sup>	<500	<0.5	<0.5	<0.5	<0.5	75 <sup>10</sup>
	12/12/02	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	58 <sup>14</sup>
	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 <sup>11,15</sup>	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	03/08/02	<50	760 <sup>2</sup>	<570	<0.5	<0.5	<0.5	<0.5	<5.0
Dup.	03/08/02	<50	350 <sup>2</sup>	<580	<0.5	<0.5	<0.5	<0.5	<5.0
	06/13/02	<50	570 <sup>2</sup>	<570	<0.5	<0.5	<0.5	<0.5	<5.0
	09/26/02	<50	410 <sup>2</sup>	<500	<0.5	<0.5	<0.5	<0.5	<5.0
	12/12/02	<50	160 <sup>15</sup>	<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 <sup>10</sup>
	06/18/03	<50	74 <sup>15</sup>	<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 <sup>14</sup> / $<0.5^{10}$
	11/26/03	<50	94 <sup>15</sup>	<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 <sup>15</sup>	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	09/03/04	<50	86 <sup>15</sup>	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	12/16/04	<50	160 <sup>6,15</sup>	<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 <sup>19</sup>	150 <sup>15,19</sup>	<250	<0.5	<0.5	<0.5	<0.5	<0.5
	09/29/05	<50	66 <sup>21</sup>	<250	<0.5	<0.5	<0.5	<0.5	<0.5
	12/21/05	<50	63 <sup>15,22</sup>	<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 <sup>15</sup>	<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 <sup>2</sup>	7,800	2,200 <sup>2</sup>	<0.5	<0.5	<0.5	<0.5	1.3
	03/04/09	<50	51 <sup>2</sup>	<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
MW-9									
	12/18/08	52 <sup>2</sup>	72	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	03/04/09	290 <sup>2</sup>	310 <sup>2</sup>	<300	44	<0.5	0.6	0.6	<0.5
	04/01/09	210 <sup>2</sup>	210 <sup>2</sup>	<300	36	<0.5	<0.5	<0.5	<0.5
	06/19/09	240 <sup>2</sup>	240 <sup>2</sup>	<300	43	<0.5	<0.5	<0.5	<0.5
	12/08/09	210 <sup>2</sup>	210 <sup>2</sup>	<300	48	<0.5	<0.5	<0.5	<0.5
	06/16/10	160 <sup>2</sup>	160 <sup>2</sup>	<300	49	<0.5	1.0	0.6	<0.5
MW-10									
	12/18/08	140 <sup>2</sup>	8,000	430 <sup>2</sup>	<0.5	<0.5	<0.5	<0.5	1.0
	03/04/09	96 <sup>2</sup>	110 <sup>2</sup>	<300	11	<0.5	0.5	<0.5	<0.5
	04/01/09	87 <sup>2</sup>	100 <sup>2</sup>	<300	14	<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**

		Concentration (µg/L)							
MW-10 (cont)	06/17/09	90 <sup>2</sup>	220 <sup>2</sup>	<300	10	<0.5	1.0	<0.5	<0.5
	12/08/09	120 <sup>2</sup>	240 <sup>2</sup>	<300	26	<0.5	0.8	<0.5	<0.5
	06/16/10	140 <sup>2</sup>	200	<300	46	<0.5	<0.5	<0.5	<0.5
<b>MW-11</b>									
	12/18/08	1,900 <sup>2</sup>	15,000	800 <sup>2</sup>	<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
<b>MW-12</b>									
	12/18/08	25,000 <sup>2</sup>	19,000	980 <sup>2</sup>	<0.5	<0.5	<0.5	<0.5	5.1
	03/04/09	150 <sup>2</sup>	550 <sup>2</sup>	<300	<0.5	<0.5	<0.5	<0.5	4.8
	04/01/09	71 <sup>2</sup>	420 <sup>2</sup>	<300	<0.5	<0.5	<0.5	<0.5	5.8
	06/17/09	64 <sup>2</sup>	310 <sup>2</sup>	<300	<0.5	<0.5	<0.5	<0.5	5.7
Dup.	06/17/09	67 <sup>2</sup>	310 <sup>2</sup>	<300	<0.5	<0.5	<0.5	<0.5	5.4
	12/08/09	90 <sup>2</sup>	320 <sup>2</sup>	<300	<0.5	<0.5	<0.5	<0.5	4.7
	06/16/10	94 <sup>2</sup>	300	<300	<0.5	<0.5	<0.5	<0.5	4.8

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

<sup>1</sup> Analyte found in the associated blank as well as in the sample.

<sup>2</sup> Hydrocarbons present do not match profile of laboratory standard.

<sup>3</sup> Low boiling point/lighter hydrocarbons are present in the sample.

<sup>4</sup> Chromatographic pattern matches known laboratory contaminant.

<sup>5</sup> Hydrocarbons are present in the requested fuel quantification range, but do not resemble pattern of available fuel standard.

<sup>6</sup> High boiling point/heavier hydrocarbons are present in sample.

<sup>7</sup> Sample did not pass laboratory QA/QC and may be biased low.

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

<sup>9</sup> Trip blank contained MTBE at a concentration of 4.2 µg/L.

<sup>10</sup> MTBE detections confirmed by EPA Test Method 8260; 8260 results displayed.

<sup>11</sup> Sample exhibits unknown single peak or peaks.

<sup>12</sup> EPA Method 8260 confirmation analyzed past holding time.

<sup>13</sup> Lighter hydrocarbons contributed to the quantitation.

<sup>14</sup> MTBE results from EPA Test Method 8021B.

<sup>15</sup> Sample exhibits fuel pattern that does not resemble standard.

<sup>16</sup> Sample extracted out of hold time.

<sup>17</sup> Presence confirmed, but Relative Percent Difference (RPD) between columns exceeds 40%.

<sup>18</sup> Unmodified or weakly modified gasoline is significant.

<sup>19</sup> Liquid sample contains greater than ~1 vol. % sediment.

<sup>20</sup> Gasoline compounds are significant.

<sup>21</sup> Diesel range compounds are significant; no recognizable pattern.

<sup>22</sup> Heavier hydrocarbons contributed to the quantitation.



**TABLE 3. Free Product Recovery System Groundwater Elevation and Free Product Data  
January 1, 2010 Through June 30, 2010  
Port of Oakland's Harbor Facilities Complex Site  
555 - 651 Maritime Street, Oakland, California**

Recovery Well	Date Measured	Elevation <sup>1</sup> Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation <sup>1</sup> (feet)
RW-1						
Well inaccessible; product and water levels not measured						
RW-2						
	03/31/10	15.56	7.53 <sup>3</sup>	7.53	0.00	8.03
	06/17/10	15.56	NP	9.54	0.00	6.02
RW-3						
	01/06/10	15.56	10.85	11.13	0.28	4.43
	01/13/10	15.56	10.89	11.11	0.22	4.45
	01/20/10	15.56	9.36	10.65	1.29	4.91
	01/27/10	15.56	9.26	13.03	3.77	2.53
	02/03/10	15.56	9.51	12.20	2.69	3.36
	02/10/10	15.56	9.44	13.11	3.67	2.45
	02/17/10	15.56	9.75	12.29	2.54	3.27
	02/24/10	15.56	8.98	14.08	5.10	1.48
	03/02/10	15.56	8.92	12.78	3.86	2.78
	03/10/10	15.56	9.54	11.53	1.99	4.03
	03/17/10	15.56	9.57	12.40	2.83	3.16
	03/24/10	15.56	9.88	11.15	1.27	4.41
	03/31/10	15.56	NM	NM	NM	NM
	04/07/10	15.56	9.74	13.21	3.47	2.35
	04/14/10	15.56	9.43	13.38	3.95	2.18
	04/21/10	15.56	9.21	13.32	4.11	2.24
	04/28/10	15.56	9.73	11.98	2.25	3.58
	05/05/10	15.56	10.07	10.90	0.83	4.66
	05/12/10	15.56	10.22	10.65	0.43	4.91
	05/19/10	15.56	10.42	10.84	0.42	4.72
	05/26/10	15.56	10.38	10.63	0.25	4.93
	06/02/10	15.56	10.28	11.79	1.51	3.77
	06/09/10	15.56	10.41	11.65	1.24	3.91
	06/17/10	15.56	10.42	12.11	1.69	3.45
	06/23/10	15.56	10.46	11.63	1.17	3.93
	06/30/10	15.56	10.51	11.64	1.13	3.92
RW-4						
	01/06/10	14.92	10.09	10.69	0.60	4.23
	01/13/10	14.92	10.16	10.81	0.65	4.11
	01/20/10	14.92	9.13	9.86	0.73	5.06
	01/27/10	14.92	9.00	9.33	0.33	5.59
	02/03/10	14.92	9.12	9.33	0.21	5.59
	02/10/10	14.92	9.19	9.40	0.21	5.52
	02/17/10	14.92	9.30	10.01	0.71	4.91
	02/24/10	14.92	9.06	9.25	0.19	5.67
	03/10/10	14.92	8.97	9.14	0.17	5.78
	03/17/10	14.92	9.07	9.23	0.16	5.69
	03/24/10	14.92	9.25	9.41	0.16	5.51
	03/31/10	14.92	9.31	9.46	0.15	5.46

**TABLE 3. Free Product Recovery System Groundwater Elevation and Free Product Data  
January 1, 2010 Through June 30, 2010  
Port of Oakland's Harbor Facilities Complex Site  
555 - 651 Maritime Street, Oakland, California**

Recovery Well	Date Measured	Elevation <sup>1</sup> Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation <sup>1</sup> (feet)
RW-4 (cont)	04/07/10	14.92	9.36	9.51	0.15	5.41
	04/14/10	14.92	9.09	9.29	0.20	5.63
	04/21/10	14.92	8.95	9.14	0.19	5.78
	04/28/10	14.92	9.21	9.42	0.21	5.50
	05/05/10	14.92	9.37	9.69	0.32	5.23
	05/12/10	14.92	9.52	9.75	0.23	5.17
	05/19/10	14.92	9.66	9.91	0.25	5.01
	05/26/10	14.92	9.65	9.92	0.27	5.00
	06/02/10	14.92	9.69	9.82	0.13	5.10
	06/09/10	14.92	9.80	10.00	0.20	4.92
	06/17/10	14.92	9.82	10.14	0.32	4.78
	06/23/10	14.92	9.88	10.09	0.21	4.83
	06/30/10	14.92	9.89	10.16	0.27	4.76
RW-5						
	01/20/10	14.79	7.54	9.37	1.83	5.42
	01/27/10	14.79	8.11	8.54	0.43	6.25
	02/03/10	14.79	6.60 <sup>3</sup>	6.60	0.00	8.19
	02/10/10	14.79	6.52 <sup>3</sup>	6.52	0.00	8.27
	06/17/10	14.79	6.70 <sup>3</sup>	6.70	0.00	8.09
	06/23/10	14.79	7.85 <sup>3</sup>	7.85	0.00	6.94
RW-6						
	01/06/10	15.75	8.70	10.74	2.04	5.01
	01/13/10	15.75	8.86	10.79	1.93	4.96
	01/20/10	15.75	8.58	10.58	2.00	5.17
	01/27/10	15.75	8.54	10.14	1.60	5.61
	02/03/10	15.75	8.55	9.81	1.26	5.94
	02/10/10	15.75	9.41	9.82	0.41	5.93
	02/17/10	15.75	8.62	9.44	0.82	6.31
	02/24/10	15.75	8.59	9.37	0.78	6.38
	03/10/10	15.75	8.53	9.14	0.61	6.61
	03/17/10	15.75	8.56	8.84	0.28	6.91
	03/24/10	15.75	8.68	8.91	0.23	6.84
	03/31/10	15.75	8.69	9.11	0.42	6.64
	04/07/10	15.75	8.59	9.21	0.62	6.54
	04/14/10	15.75	8.40	9.11	0.71	6.64
	04/21/10	15.75	8.39	8.92	0.53	6.83
	04/28/10	15.75	8.61	8.96	0.35	6.79
	05/05/10	15.75	8.62	8.94	0.32	6.81
	05/12/10	15.75	8.65	9.09	0.44	6.66
	05/19/10	15.75	8.64	9.35	0.71	6.40
	05/26/10	15.75	8.63	9.51	0.88	6.24
	06/02/10	15.75	8.56	9.55	0.99	6.20

**TABLE 3. Free Product Recovery System Groundwater Elevation and Free Product Data  
January 1, 2010 Through June 30, 2010  
Port of Oakland's Harbor Facilities Complex Site  
555 - 651 Maritime Street, Oakland, California**

Recovery Well	Date Measured	Elevation <sup>1</sup> Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation <sup>1</sup> (feet)
RW-6 (cont)	06/09/10	15.75	8.62	9.52	0.90	6.23
	06/17/10	15.75	8.65	9.62	0.97	6.13
	06/23/10	15.75	8.70	9.60	0.90	6.15
	06/30/10	15.75	8.55	9.65	1.10	6.10
<b>RW-7</b>						
	01/06/10	15.02	8.09	10.29	2.20	4.73
	01/13/10	15.02	8.00	10.56	2.56	4.46
	01/20/10	15.02	7.25	10.10	2.85	4.92
	01/27/10	15.02	7.71	9.14	1.43	5.88
	02/03/10	15.02	7.85	8.33	0.48	6.69
	02/10/10	15.02	7.89	8.45	0.56	6.57
	02/17/10	15.02	7.81	8.39	0.58	6.63
	02/24/10	15.02	7.15	8.30	1.15	6.72
	03/10/10	15.02	7.64	8.81	1.17	6.21
	03/17/10	15.02	7.79	8.05	0.26	6.97
	03/24/10	15.02	7.90	8.08	0.18	6.94
	03/31/10	15.02	7.96	8.15	0.19	6.87
	04/07/10	15.02	7.85	8.07	0.22	6.95
	04/14/10	15.02	7.78	7.99	0.21	7.03
	04/21/10	15.02	7.78	8.02	0.24	7.00
	04/28/10	15.02	7.85	8.20	0.35	6.82
	05/05/10	15.02	7.95	8.23	0.28	6.79
	05/12/10	15.02	7.60	7.92	0.32	7.10
	05/19/10	15.02	7.79	8.08	0.29	6.94
	05/26/10	15.02	7.66	7.98	0.32	7.04
	06/02/10	15.02	7.92	8.30	0.38	6.72
	06/09/10	15.02	8.01	8.45	0.44	6.57
	06/17/10	15.02	7.96	8.60	0.64	6.42
	06/23/10	15.02	8.04	8.83	0.79	6.19
	06/30/10	15.02	7.71	8.89	1.18	6.13
<b>RW-8</b>						
	01/06/10	15.91	9.46	10.30	0.84	5.61
	01/13/10	15.91	9.52	10.33	0.81	5.58
	01/20/10	15.91	9.35	9.90	0.55	6.01
	01/27/10	15.91	9.20	9.74	0.54	6.17
	02/03/10	15.91	9.26	9.84	0.58	6.07
	02/10/10	15.91	9.23	9.74	0.51	6.17
	02/17/10	15.91	9.12	9.56	0.44	6.35
	02/24/10	15.91	9.18	9.58	0.40	6.33
	03/10/10	15.91	9.10	9.41	0.31	6.50
	03/17/10	15.91	8.95	9.07	0.12	6.84
	03/24/10	15.91	9.12	9.19	0.07	6.72
	03/31/10	15.91	9.11	9.18	0.07	6.73
	04/07/10	15.91	9.10	9.15	0.05	6.76
	04/14/10	15.91	9.11	9.23	0.12	6.68

**TABLE 3. Free Product Recovery System Groundwater Elevation and Free Product Data  
January 1, 2010 Through June 30, 2010  
Port of Oakland's Harbor Facilities Complex Site  
555 - 651 Maritime Street, Oakland, California**

Recovery Well	Date Measured	Elevation <sup>1</sup> Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation <sup>1</sup> (feet)
RW-8 (cont)	04/21/10	15.91	9.07	9.24	0.17	6.67
	04/28/10	15.91	9.12	9.45	0.33	6.46
	05/05/10	15.91	9.14	9.33	0.19	6.58
	05/12/10	15.91	8.74	8.76	0.02	7.15
	05/19/10	15.91	9.23	9.31	0.08	6.60
	05/26/10	15.91	8.71	8.83	0.12	7.08
	06/02/10	15.91	9.13	10.25	1.12	5.66
	06/09/10	15.91	9.16	9.25	0.09	6.66
	06/17/10	15.91	9.13	9.24	0.11	6.67
	06/23/10	15.91	9.19	9.36	0.17	6.55
	06/30/10	15.91	9.20	9.41	0.21	6.50
<b>RW-9</b>						
	01/06/10	16.57	10.09	10.50	0.41	6.07
	01/13/10	16.57	10.70	11.29	0.59	5.28
	01/20/10	16.57	9.71	10.20	0.49	6.37
	01/27/10	16.57	9.54	9.87	0.33	6.70
	02/03/10	16.57	9.46	9.52	0.06	7.05
	02/10/10	16.57	9.52	9.59	0.07	6.98
	02/17/10	16.57	9.46	9.52	0.06	7.05
	02/24/10	16.57	9.47	9.52	0.05	7.05
	03/10/10	16.57	9.35	9.44	0.09	7.13
	03/17/10	16.57	9.32	9.39	0.07	7.18
	03/24/10	16.57	9.59	9.62	0.03	6.95
	03/31/10	16.57	9.35	9.38	0.03	7.19
	04/07/10	16.57	9.35	9.36	0.01	7.21
	04/14/10	16.57	9.32	9.35	0.03	7.22
	04/21/10	16.57	9.30	9.32	0.02	7.25
	04/28/10	16.57	9.29	9.36	0.07	7.21
	05/05/10	16.57	9.57	9.63	0.06	6.94
	05/12/10	16.57	9.34	9.39	0.05	7.18
	05/19/10	16.57	9.39	9.45	0.06	7.12
	05/26/10	16.57	9.41	9.50	0.09	7.07
	06/02/10	16.57	9.44	9.59	0.15	6.98
	06/09/10	16.57	9.49	9.56	0.07	7.01
	06/17/10	16.57	9.52	9.61	0.09	6.96
	06/23/10	16.57	9.55	9.60	0.05	6.97
	06/30/10	16.57	9.59	9.63	0.04	6.94

**TABLE 3. Free Product Recovery System Groundwater Elevation and Free Product Data  
January 1, 2010 Through June 30, 2010  
Port of Oakland's Harbor Facilities Complex Site  
555 - 651 Maritime Street, Oakland, California**

Recovery Well	Date Measured	Elevation <sup>1</sup> Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation <sup>1</sup> (feet)
MW-3						
	01/06/10	15.66	10.78	11.85	1.07	3.81
	01/13/10	15.66	10.70	11.29	0.59	4.37
	01/20/10	15.66	9.31	10.00	0.69	5.66
	01/27/10	15.66	9.44	10.34	0.90	5.32
	02/03/10	15.66	9.71	10.47	0.76	5.19
	02/10/10	15.66	9.62	10.41	0.79	5.25
	02/17/10	15.66	9.95	10.74	0.79	4.92
	02/24/10	15.66	9.11	10.56	1.45	5.1
	03/10/10	15.66	9.58	10.51	0.93	5.15
	03/17/10	15.66	9.72	10.49	0.77	5.17
	03/24/10	15.66	9.91	10.55	0.64	5.11
	03/31/10	15.66	9.97	10.50	0.53	5.16
	04/07/10	15.66	10.02	10.75	0.73	4.91
	04/14/10	15.66	9.65	10.72	1.07	4.94
	04/21/10	15.66	9.34	10.73	1.39	4.93
	04/28/10	15.66	9.82	10.68	0.86	4.98
	05/05/10	15.66	10.02	10.99	0.97	4.67
	05/12/10	15.66	10.12	11.25	1.13	4.41
	05/19/10	15.66	10.22	11.50	1.28	4.16
	05/26/10	15.66	10.23	11.80	1.57	3.86
	06/02/10	15.66	10.23	11.81	1.58	3.85
	06/09/10	15.66	10.32	12.21	1.89	3.45
	06/17/10	15.66	10.34	12.18	1.84	3.48
	06/23/10	15.66	10.39	12.29	1.90	3.37
	06/30/10	15.66	10.40	12.42	2.02	3.24
<b>Convault</b>						
	01/06/10	NA	1.99	2.41	0.42	NA
	01/13/10	NA	1.95	2.35	0.40	NA
	01/20/10	NA	1.94	2.34	0.40	NA
	01/27/10	NA	1.90	2.34	0.44	NA
	02/03/10	NA	1.86	2.33	0.47	NA
	02/10/10	NA	1.85	2.33	0.48	NA
	02/17/10	NA	1.81	2.38	0.57	NA
	02/24/10	NA	1.81	2.30	0.49	NA
	03/10/10	NA	1.71	2.23	0.52	NA
	03/17/10	NA	1.70	2.25	0.55	NA
	03/24/10	NA	1.69	2.04	0.35	NA
	03/31/10	NA	NM	NM	NM	NA
	04/07/10	NA	1.68	2.26	0.58	NA
	04/14/10	NA	1.68	2.30	0.62	NA
	04/21/10	NA	1.64	2.28	0.64	NA
	04/28/10	NA	1.65	2.23	0.58	NA
	05/05/10	NA	1.62	2.24	0.62	NA
	05/12/10	NA	1.62	2.23	0.61	NA
	05/19/10	NA	1.61	2.24	0.63	NA

**TABLE 3. Free Product Recovery System Groundwater Elevation and Free Product Data  
January 1, 2010 Through June 30, 2010  
Port of Oakland's Harbor Facilities Complex Site  
555 - 651 Maritime Street, Oakland, California**

<b>Recovery Well</b>	<b>Date Measured</b>	<b>Elevation <sup>1</sup> Top of Casing (feet)</b>	<b>Depth to Product (feet btc)</b>	<b>Depth to Water (feet btc)</b>	<b>Product Thickness (feet)</b>	<b>Groundwater Elevation <sup>1</sup> (feet)</b>
Convault	05/26/10	NA	1.60	2.28	0.68	NA
(cont)	06/02/10	NA	1.60	2.42	0.82	NA
	06/09/10	NA	1.59	2.23	0.64	NA
	06/17/10	NA	1.58	2.25	0.67	NA
	06/23/10	NA	1.55	2.24	0.69	NA
	06/30/10	NA	1.46	2.22	0.76	NA

Notes:

NP = no product detected with the interface probe  
 btc = below top of the well casing  
 NA = not available  
 NM = not measured

<sup>1</sup> Wells were resurveyed on January 24, 2009. Elevation data is relative to North American Vertical Datum of 1988 (NAVD 88).

<sup>2</sup> All measurements made before the system ran on given day.

<sup>3</sup> Product not measureable, but visible evidence of product on interface probe.

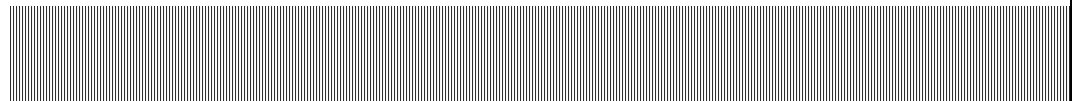


## Port of Oakland

530 Water Street • Oakland, CA 94607

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# Appendix A Groundwater Sampling Forms



# Certificate of Calibration



▲ Environmental Products for Purchase & Rental ▲

**1-800-468-8921**

[www.envirotechonline.com](http://www.envirotechonline.com)

Instrument: YSI-556 s/n: 06K1696

## Span Value / Reading

- pH..... 3pt. : 4/7/10 / 4/7/10
- mS/cm..... : 4.49 / 4.49
- DO..... : 0/100 % / 0/100 %
- Turb..... NTU : 0/100 / 0/100
- ORP..... : 465 mV / 465 mV
- Other: \_\_\_\_\_

Notes: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Calibrated by: Mark Mawp  
Print Name

[Signature]  
Signature

Date: 6/15/2016



# Certificate of Calibration



▲ Environmental Products for Purchase & Rental ▲

**1-800-468-8921**

[www.envirotechonline.com](http://www.envirotechonline.com)

Instrument: SI-556 s/n: 08C100603

## Span Value / Reading

- pH..... 3 pt. .....: 4/7/10 / 4/7/10
- mS/cm.....: 4.49 / 4.50
- DO.....: 0/100% / 0/100%
- Turb..... NTU .....: 0/100 / 0/100
- ORP.....: 465 mV / 465 mV
- Other: \_\_\_\_\_

Notes: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Calibrated by: Mark Manjin  
Print Name

[Signature]  
Signature

Date: 6/15/2010

4656016 SA SAMPLING  
6/16/10  
SC

845 Cal'd both instruments

YSI 556 #6670

Cal std	pH	DO	Cond. (mS/cm)
	4.000	amb. Set	4.49

↳ not cal'd. same elevation as cal by EmiroTech.  
see enclosed cal sheet.

YSI 556 #1696

Cal std	pH	DO	Cond. (mS/cm)
	4.00	amb. Set	4.49

↳ not cal'd. same elevation as cal by EmiroTech.  
see enclosed cal sheet.

**GROUNDWATER SAMPLING**

Well No.: **MW-1**

Project No. <u>4656016</u>	Recorded by: <u>CO</u> Date: <u>6/14/10</u>
Project Name: <u>Harbor Facilities Center</u>	Depth of well from TOC (feet): <u>17.65</u>
Location: <u>Port of Oakland</u>	Well diameter (inches): <u>2</u>
<u>651 Maritime Street, Oakland, California</u>	Screened interval from TOC (feet): <u>7.65-17.65</u>
Weather: <u>Sunny, warm, breezy</u>	TOC elevation, NAVD 88 (feet): <u>15.80</u>
Precip. in past 5 days (in.): <u>0</u>	Groundwater elevation, NAVD 88 (feet): <u>5.01</u>
Source: <u>Oakland Fire Services Agency "Ono"</u>	Water level from TOC (feet): <u>10.79</u> Time: <u>8:45</u>
Water level instrument: <u>Horn Instruments H.O.L. Interface</u>	Product level from TOC (feet): <u>-</u> Time: <u>-</u>

**CALCULATION OF WELL VOLUME:**

(17.65 ft - 0.00 ft) x (0.083 ft)<sup>2</sup> x π x 7.48 gal/ft<sup>3</sup> =  
 well depth - water level x (well radius)<sup>2</sup> x π x gal/ft<sup>3</sup> =

product not measurable  
 but probe visibly coated  
 w/ free product  
 \_\_\_\_\_ gallons in one casing volume  
 \_\_\_\_\_ total gallons removed

**CALIBRATION:**

	Time	Temperature (°C)	pH (S.U.)	DO (%)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)
Calibration Standard:							
Before Purging:							
After Purging:							

**FIELD MEASUREMENTS:**

Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)	Cumulative Gallons Removed
Not Sampled - contained free product							

Purge method: \_\_\_\_\_ Sample Time: \_\_\_\_\_

Duplicate/blank number: \_\_\_\_\_ Duplicate Sample Time: \_\_\_\_\_

Sampling equipment: \_\_\_\_\_ VOA attachment: \_\_\_\_\_

Sample containers: \_\_\_\_\_

Sample analyses: \_\_\_\_\_ Laboratory: \_\_\_\_\_

Decontamination method: \_\_\_\_\_ Rinsate disposal: \_\_\_\_\_

Comments: \_\_\_\_\_

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

**GROUNDWATER SAMPLING**

Well No.: **MW-2**

Project No.	<u>4656016</u>	Recorded by:	<u>CO</u>	Date:	<u>6/17</u>
Project Name:	<u>Harbor Facilities Center</u>	Depth of well from TOC (feet):	<u>18.06</u>	Well diameter (inches):	<u>2</u>
Location:	<u>Port of Oakland</u>	Screened interval from TOC (feet):	<u>8.06-18.06</u>	TOC elevation, NAVD 88 (feet):	<u>16.43</u>
	<u>651 Maritime Street, Oakland, California</u>	Groundwater elevation, NAVD 88 (feet):	<u>4.82</u>	Water level from TOC (feet):	<u>11.61</u>
Weather:	<u>Sunny, warm, breezy</u>	Product level from TOC (feet):	<u>—</u>	Time:	<u>810</u>
Precip. in past 5 days (in.):	<u>0</u>				
Source:	<u>Oakland Fire Services Agency "ONO"</u>				
Water level instrument:	<u>Heron Instruments H.O.L. Interface</u>				

**CALCULATION OF WELL VOLUME:** Meter

$(18.06 \text{ ft} - 0.00 \text{ ft}) \times (0.083 \text{ ft})^2 \times \pi \times 7.48 \text{ gal/ft}^3 =$  1.04 gallons in one casing volume  
 $\text{well depth} - \text{water level} \times (\text{well radius})^2 \times \pi \times \text{gal/ft}^3 =$  1.75 total gallons removed

**CALIBRATION:**

	Time	Temperature (°C)	pH (S.U.)	DO (%)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)
Calibration Standard:							
Before Purging:							
After Purging:							

see cal sheets for #4656016

**FIELD MEASUREMENTS:**

Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV)	Cond <del>µS/cm</del> mS/cm	Turbidity (NTU)	Cumulative Gallons Removed
825	18.06	6.51	8.20	95.3	1.002	nm	0
827	18.07	6.57	8.27	71.2	1.001	↓	0.1
829	18.03	6.95	2.92	54.2	0.999		0.15
831	17.99	7.01	4.75	43.6	0.992		0.25
833	17.99	7.06	5.85	37.6	0.978		0.3
835	18.01	7.09	6.33	32.7	0.959		0.4
837	18.00	7.12	6.44	28.6	0.939		0.5
839	18.01	7.15	6.58	25.3	0.920		0.6
841	18.01	7.17	could not measure				

began drawing only air

Purge method: Geopump Sample Time: 1300

Duplicate/blank number: — Duplicate Sample Time: —

Sampling equipment: — VOA attachment: none

Sample containers: 6 vials, 2 500 ml ambers

Sample analyses: 8260: BTEX, MTBE 8015M: TPHg, TPHd/mol w/Std Laboratory: C+T

Decontamination method: none - dedicated tubing Rinse disposal: —

Comments: —

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

Lowered  
tubing into  
Well further -

<u>Time</u>	<u>Temp</u>	<u>pH</u>	<u>DO</u>	<u>ORP</u>	<u>Cond</u>	<u>Gal</u>
844	18.05	7.08	11.18	28.5	0.914	0.8
846	18.08	7.12	4.15	23.5	0.924	1
848	18.10	7.18	3.08	19.5	0.911	1.1
850	18.12	7.16	2.01	19.5	0.904	1.25
852	could not measure - well dry					

1252						
1300	21.29	7.45	10.95	-26.7	1.125	0
After sampling	19.44	7.22	<del>8.15</del> 8.15	2.7	1.046	0.5

*mm*

**GROUNDWATER SAMPLING**

Well No.: **MW-2**

Project No. 4656016  
 Project Name: Harbor Facilities Center  
 Location: Port of Oakland  
651 Maritime Street, Oakland, California  
 Weather: SUNNY, ~75° F  
 Precip. in past 5 days (in.): 0  
 Source: Oakland Fire Services Agency "ONO"  
 Water level instrument: Heron Instruments H.01L

Recorded by: CO Date: 6/16  
 Depth of well from TOC (feet): 18.06  
 Well diameter (inches): 2  
 Screened interval from TOC (feet): 8.06-18.06  
 TOC elevation, NAVD 88 (feet): 16.43  
 Groundwater elevation, NAVD 88 (feet): 4.86  
 Water level from TOC (feet): 11.57 Time: 9:30  
 Product level from TOC (feet): — Time: —

**CALCULATION OF WELL VOLUME:** Interface Meter

$(18.06 \text{ ft} - 0.00 \text{ ft}) \times (0.083 \text{ ft})^2 \times \pi \times 7.48 \text{ gal/ft}^3 =$  1.04 gallons in one casing volume  
 $\text{well depth} - \text{water level} \times (\text{well radius})^2 \times \pi \times \text{gal/ft}^3 =$  1.4 total gallons removed

**CALIBRATION:**

	Time	Temperature (°C)	pH (S.U.)	DO (%)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)
Calibration Standard:							
Before Purging:							
After Purging:							

See cal sheets for #16670

**FIELD MEASUREMENTS:**

Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)	Cumulative Gallons Removed
15:04	19.30	7.61	14.84	-40.5	0.866	nm	0
1507	19.50	6.88	4.63	-29.3	0.847		0.2
1510	19.79	7.25	2.13	-43.0	0.799		0.4
1513	19.52	7.23	1.66	-36.4	0.808		0.6
1516	19.87	7.23	2.99	-28.5	0.861		0.8
1532	19.86	7.18	2.25	-21.9	0.910		1
1601	20.02	7.16	2.16	-33.4	0.947		1.2
1618	24.17	7.32	4.52	-11.1	1.082		1.3
1620	21.10	7.33	6.59	-11.6	1.052		1.4
1622	22.60	7.34	9.65	-4.2	0.998		

water flow stopped, stopped pump for 15 min  
 Still no flow after 5 min pumping, wait another 25 min

Purge method: 760 pump Sample Time: NS  
 Duplicate/blank number: \_\_\_\_\_ Duplicate Sample Time: \_\_\_\_\_  
 Sampling equipment: \_\_\_\_\_ VOA attachment: none  
 Sample containers: \_\_\_\_\_  
 Sample analyses: \_\_\_\_\_ Laboratory: \_\_\_\_\_  
 Decontamination method: \_\_\_\_\_ Rinsate disposal: \_\_\_\_\_  
 Comments: Not sampled 6/16 - well not recovered

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

Time    Temp    pH    DO    ORP    Cond    Gal rem

6/16/10 - 1724 - Well has recovered to 12.74 ft btoc.  
80% recovery is 12.26 ft btoc. Will purge  
tomorrow AM and sample when recovered

6/17/10 - 810 - WL = 11.61 ft btoc

6/17/10 - 1252 - WL = 12.15 ft btoc

~~6/16/10~~  
~~6/17/10~~

Sample when WL @ 12.26

**GROUNDWATER SAMPLING**

Well No.: **MW-3**

Project No. 4656016  
 Project Name: Harbor Facilities Center  
 Location: Port of Oakland  
651 Maritime Street, Oakland, California  
 Weather: Sunny, warm, breezy  
 Precip. in past 5 days (in.): 0  
 Source: Oakland Fire Services Agency "ONo"  
 Water level instrument: Heron Instruments H.OIL Interface

Recorded by: CO Date: 6/17/10  
 Depth of well from TOC (feet): 17.47  
 Well diameter (inches): 2  
 Screened interval from TOC (feet): 7.47-17.47  
 TOC elevation, NAVD 88 (feet): 5.46  
 Groundwater elevation, NAVD 88 (feet): 3.37  
 Water level from TOC (feet): 10.39 Time: 12:00  
 Product level from TOC (feet): 2.29 Time: 12:00

**CALCULATION OF WELL VOLUME:**

$(17.47 \text{ ft} - 0.00 \text{ ft}) \times (0.083 \text{ ft})^2 \times \pi \times 7.48 \text{ gal/ft}^3 =$  \_\_\_\_\_ gallons in one casing volume  
 well depth - water level  $\times (\text{well radius})^2 \times \pi \times \text{gal/ft}^3 =$  \_\_\_\_\_ total gallons removed

**CALIBRATION:**

	Time	Temperature (°C)	pH (S.U.)	DO (%)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)
Calibration Standard:							
Before Purging:							
After Purging:							

**FIELD MEASUREMENTS:**

Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)	Cumulative Gallons Removed
<i>Not sampled - contains free product</i>							

Purge method: \_\_\_\_\_ Sample Time: \_\_\_\_\_  
 Duplicate/blank number: \_\_\_\_\_ Duplicate Sample Time: \_\_\_\_\_  
 Sampling equipment: \_\_\_\_\_ VOA attachment: \_\_\_\_\_  
 Sample containers: \_\_\_\_\_  
 Sample analyses: \_\_\_\_\_ Laboratory: \_\_\_\_\_  
 Decontamination method: \_\_\_\_\_ Rinsate disposal: \_\_\_\_\_  
 Comments: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

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



# GROUNDWATER SAMPLING

Well No.: **MW-4**

Project No. <u>4656016</u>	Recorded by: <u>SC/CO</u>	Date: <u>6/16/10</u>
Project Name: <u>Harbor Facilities Center</u>	Depth of well from TOC (feet): <u>22.05</u>	Well diameter (inches): <u>2</u>
Location: <u>Port of Oakland</u>	Screened interval from TOC (feet): <u>11.25-22.05</u>	TOC elevation, NAVD 88 (feet): <u>15.91</u>
<u>651 Maritime Street, Oakland, California</u>	Groundwater elevation, NAVD 88 (feet): <u>4.16</u>	Water level from TOC (feet): <u>11.75</u>
Weather: <u>Sunny, warm, breezy</u>	Product level from TOC (feet): <u>-</u>	Time: <u>9:30</u>
Precip. in past 5 days (in.): <u>0</u>		
Source: <u>Oakland Fire Services Agency "ONO"</u>		
Water level instrument: <u>Heron Instruments H.OIL Interface Meter</u>		

## CALCULATION OF WELL VOLUME:

$$(22.05 \text{ ft} - 0.00 \text{ ft}) \times (0.083 \text{ ft})^2 \times \pi \times 7.48 \text{ gal/ft}^3 =$$

$$\text{well depth} - \text{water level} \times (\text{well radius})^2 \times \pi \times \text{gal/ft}^3 =$$

22.05 - 11.75

possibly a screen  
slight beep from sampler  
no odor  
1.67 gallons in one casing volume  
6.5 total gallons removed

## CALIBRATION:

	Time	Temperature (°C)	pH (S.U.)	DO (%)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)
Calibration Standard:							
Before Purging:							
After Purging:							

see cal sheets for #1196

## FIELD MEASUREMENTS:

began purging @ 9:35

Time	Temperature (°C)	pH (S.U.)	DO (mg/L)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)	Cumulative Gallons Removed
9:39	21.09	7.56	1.50	21.4	0.943	NM	0.5
9:42	20.01	7.58	0.72	11.8	0.952		0.75
9:45	19.97	7.62	0.62	-1.2	0.966		1.25
9:48	20.00	7.64	0.87	-20.6	0.967		2.00
9:51	20.03	7.62	1.42	-46.0	0.961		2.75
9:54	20.06	7.62	1.62	-66.8	0.975		3.25
9:57	20.04	7.55	1.45	-83.9	1.004		3.75
10:00	20.06	7.51	1.09	-99.1	1.032		4
10:03	20.05	7.50	0.88	-106.6	1.051		4.25

Purge method: Geopump Sample Time: 10:15

Duplicate/blank number: - Duplicate Sample Time: 10:30

Sampling equipment: - VOA attachment: -

Sample containers: 6 Vials, 2 500 ml canisters

Sample analyses: 8240: BTEX, MTBE, 8015M: TPH<sub>g</sub>, TPH<sub>d</sub>/mo (w/SG cleanup) Laboratory: CST

Decontamination method: none - dedicated tubing Rinsate disposal: -

Comments: Very turbid initially, no screen; water becoming clear after purging ~0.75 gal placed lock on well-cap

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



**GROUNDWATER SAMPLING**

Well No.: **MW-5**

Project No. 4656016  
 Project Name: Harbor Facilities Center  
 Location: Port of Oakland  
651 Maritime Street, Oakland, California  
 Weather: Sunny, warm, breezy  
 Precip. in past 5 days (in.): 0  
 Source: Oakland Fire Services Agency "ONO"  
 Water level instrument: Heon Instruments H.01L

Recorded by: SC Date: 6/16/10  
 Depth of well from TOC (feet): 20.8  
 Well diameter (inches): 2  
 Screened interval from TOC (feet): 10.4-20.8  
 TOC elevation, NAVD 88 (feet): 15.39  
 Groundwater elevation, NAVD 88 (feet): 6.08  
 Water level from TOC (feet): 9.31 Time: 9:15  
 Product level from TOC (feet): - Time: -

**CALCULATION OF WELL VOLUME:** Interface Meter possibly a sheen - solid beep but not measurable

$(20.80 \text{ ft} - 0.00 \text{ ft}) \times (0.083 \text{ ft})^2 \times \pi \times 7.48 \text{ gal/ft}^3 =$  1.86 gallons in one casing volume  
 $\text{well depth} - \text{water level} \times (\text{well radius})^2 \times \pi \times \text{gal/ft}^3 =$  8 total gallons removed  
20.80 - 9.31

**CALIBRATION:**

	Time	Temperature (°C)	pH (S.U.)	DO (%)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)
Calibration Standard:							
Before Purging:							
After Purging:							

see cal sheets for # 1196

**FIELD MEASUREMENTS:** started purging @ 11:09

Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)	Cumulative Gallons Removed
11:12	20.18	7.51	1.59	-72.6	1.602	NM	0.1
11:15	19.64	7.33	0.55	-84.9	1.556	↓	0.75
11:18	19.56	7.30	0.49	-89.8	1.389		1.0
11:21	19.49	7.27	0.46	-93.0	1.329		1.5
11:24	19.45	7.25	0.46	-95.3	1.404		2.0
11:27	19.41	7.22	0.47	-96.8	1.484		2.5
11:30	19.39	7.21	0.47	-97.7	1.518		3.0
11:33	19.38	7.19	0.47	-99.2	1.557		4.0
11:43	19.99	7.26	1.75	-94.6	1.564		4.5
11:46	19.53	7.19	0.70	-99.1	1.603		5.0

pump turned off. Restarted at 11:41

Purge method: Grpump Sample Time: 12:00  
 Duplicate/blank number: - Duplicate Sample Time: 11:40  
 Sampling equipment: - VOA attachment: -  
 Sample containers: 6 VOAS, 2 500 mL amber  
 Sample analyses: 8260: BTEX, MTBE 8015M: TPHg, TPHd/mo (sp) Laboratory: C+T  
 Decontamination method: none - dedicated tubing Rinsate disposal: -  
 Comments: no sheen on purge water  
placed lock on wellcap

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

7:30

28.5

11:49 and 11:52 - make a pH reading

28.1

Time	Temp	pH	Do	ORP	EC	Cum. Volume
11:49	19.46	7.17	0.47	1.66 -99.7	1.667	5.0
11:51	19.46	7.17	0.37	-101.8	1.684	5.5
11:54	19.42	7.16	0.28	-103.9	1.588	6.0
11:58	19.42	7.16	0.29	-104.4	1.548	6.5
11:58	19.43	7.14	0.27	-104.2	1.547	7.0
12:00	sampled					

11:58 and 12:00 - make a pH reading

# GROUNDWATER SAMPLING

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

Project No. 4656016  
 Project Name: Harbor Facilities Center  
 Location: Port of Oakland  
651 Maritime Street, Oakland, California  
 Weather: Sunny, warm, breezy  
 Precip. in past 5 days (in.): 0  
 Source: Oakland Fire Services Agency "ONO"  
 Water level instrument: Hvon Instruments Thom Interface

Recorded by: CO Date: 6/16/10  
 Depth of well from TOC (feet): 23.14  
 Well diameter (inches): 2  
 Screened interval from TOC (feet): 7.54-22.54  
 TOC elevation, NAVD 88 (feet): 14.99  
 Groundwater elevation, NAVD 88 (feet): 3.24  
 Water level from TOC (feet): 11.75 Time: 10:00  
 Product level from TOC (feet): — Time: —

## CALCULATION OF WELL VOLUME:

meter

$$(23.14 \text{ ft} - 0.00 \text{ ft}) \times (0.083 \text{ ft})^2 \times \pi \times 7.48 \text{ gal/ft}^3 =$$

$$\text{well depth} - \text{water level} \times (\text{well radius})^2 \times \pi \times \text{gal/ft}^3 =$$

1.84 gallons in one casing volume  
5.0 total gallons removed

## CALIBRATION:

	Time	Temperature (°C)	pH (S.U.)	DO (%)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)
Calibration Standard:							
Before Purging:							
After Purging:							

see cal sheets for #6670

## FIELD MEASUREMENTS:

Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)	Cumulative Gallons Removed
1045	18.84	7.29	4.28	-128.5	2.795	N/M	—
1049	18.60	7.35	2.08	-146.1	2.710	↓	0.5
1052	18.48	7.48	1.95	-182.2	2.443		0.75
1055	18.43	7.65	1.85	-209.6	2.153		1
1058	18.37	7.69	1.79	-217.9	2.056		1.5
1101	18.39	7.67	1.73	-218.8	2.024		2
1105	18.44	7.68	1.71	-219.1	2.010		2.25
1108	18.53	7.64	1.69	-205.4	2.005		2.75
1111	18.55	7.54	1.58	-189.2	2.013		3.0

Purge method: Geopump Sample Time: 1125  
 Duplicate/blank number: — Duplicate Sample Time: —  
 Sampling equipment: — VOA attachment: —  
 Sample containers: 16 Vials, 2 500 mL ambers  
 Sample analyses: 2100: BTEX+MTBE 8015M: TPHg, TPHd/mo / +SG Laboratory: CAT  
 Decontamination method: non-dedicated tubing Rinsate disposal: —  
 Comments: clean up

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

<u>Time</u>	<u>Temp</u>	<u>pH</u>	<u>DO</u>	<u>ORP</u>	<u>SC</u>	<u>Gal removed</u>
1114	18.59	7.55	1.37	-197.0	2.007	3.5
1117	18.59	7.59	1.24	-204.5	2.004	3.75
1119	18.59	7.60	1.17	-204.5	2.003	4
1122	18.62	7.57	1.09	-198.6	2.002	4.25

**GROUNDWATER SAMPLING**

Well No.: **MW-9**

Project No. <u>4656016</u>	Recorded by: <u>SC</u>	Date: <u>6/16/10</u>
Project Name: <u>Harbor Facilities Center</u>	Depth of well from TOC (feet): <u>25</u>	
Location: <u>Port of Oakland</u>	Well diameter (inches): <u>2</u>	
<u>651 Maritime Street, Oakland, California</u>	Screened interval from TOC (feet): <u>15 - 25</u>	
Weather: <u>Sunny, breezy, warm</u>	TOC elevation, NAVD 88 (feet): <u>16.33</u>	
Precip. in past 5 days (in.): <u>0</u>	Groundwater elevation, NAVD 88 (feet): <u>4.58</u>	
Source: <u>Oakland Fire Services Agency "0110"</u>	Water level from TOC (feet): <u>11.75</u>	Time: <u>9:45</u>
Water level instrument: <u>Heron Instruments H.01L Interface</u>	Product level from TOC (feet): <u>-</u>	Time: <u>-</u>

**CALCULATION OF WELL VOLUME:** meter

$(25.00 \text{ ft} - 0.00 \text{ ft}) \times (0.083 \text{ ft})^2 \times \pi \times 7.48 \text{ gal/ft}^3 =$  2.14 gallons in one casing volume  
 $\text{well depth} - \text{water level} \times (\text{well radius})^2 \times \pi \times \text{gal/ft}^3 =$  8.00 total gallons removed  
25.00 - 11.75

**CALIBRATION:**

	Time	Temperature (°C)	pH (S.U.)	DO (%)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)
Calibration Standard:							
Before Purging:							
After Purging:							

See cal sheets for #11696

**FIELD MEASUREMENTS:** Started purging @ 13:28

Time	Temperature (°C)	pH (S.U.)	DO (mg/L)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)	Cumulative Gallons Removed
13:31	20.26	7.50	1.30	-157.7	2.088	NM	0.25
13:34	20.16	7.44	0.96	-162.4	2.035	↓	0.75
13:37	20.12	7.39	0.76	-163.9	1.989		1.50
13:40	20.12	7.38	0.63	-165.9	1.956		2.25
13:43	20.12	7.37	0.53	-167.2	1.938		3.00
13:46	20.13	7.35	0.45	-167.3	1.919		3.50
13:49	20.13	7.34	0.41	-168.5	1.899		4.00
13:51	20.13	7.34	0.37	-168.9	1.894		4.50
13:54	20.11	7.33	0.32	-168.2	1.895		5.00
13:57	20.12	7.34	0.28	-167.9	1.886		5.50

Purge method: Glopump Sample Time: 14:05

Duplicate/blank number: - Duplicate Sample Time: -

Sampling equipment: 8260: MTE + BTEX; 8015M: TPHg, TPHd/mo w/ 50µ cleanup VOA attachment: -

Sample containers: 16 vials, 2 20mL ampers

Sample analyses: 8260: MTE + BTEX 8015M: TPHg, TPHd/mo w/ 50µ cleanup Laboratory: C+T

Decontamination method: none - dedicated tubing Rinsate disposal: -

Comments: no sheen

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

Time	Temp	pH	DO	ORP	EC	Cum. Vol. Removed
14:00	20.12	7.32	0.27	-168.3	1.891	6.0
14:02	20.14	7.32	0.24	-168.1	1.886	6.5



**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, breezy, warm  
 Precip. in past 5 days (in.): 0  
 Source: Oakland Fire Services Agency "ON1"  
 Water level instrument: Heron Instruments HO: HO11

Recorded by: CO Date: 6/16/10  
 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): 5.03  
 Water level from TOC (feet): 10.62 Time: 9:30  
 Product level from TOC (feet): — Time: —

**CALCULATION OF WELL VOLUME: Interface Meter**

$(25.00 \text{ ft} - 0.00 \text{ ft}) \times (0.083 \text{ ft})^2 \times \pi \times 7.48 \text{ gal/ft}^3 =$  2.32 gallons in one casing volume  
 $\text{well depth} - \text{water level} \times (\text{well radius})^2 \times \pi \times \text{gal/ft}^3 =$  5 total gallons removed

**CALIBRATION:**

	Time	Temperature (°C)	pH (S.U.)	DO (%)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)
Calibration Standard:							
Before Purging:							
After Purging:							

*See cal sheets for #6670*

**FIELD MEASUREMENTS:**

Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)	Cumulative Gallons Removed
1330	21.92	7.60	15.92	-183.9	3.627	NM	—
1333	19.33	7.27	4.85	-172.8	3.705	↓	0.2
1337	19.29	7.27	3.01	-178.9	3.706		0.4
1340	19.01	7.24	2.12	-183.5	3.695		0.6
1343	18.87	7.24	1.66	-189.9	3.677		1
1346	18.88	7.22	1.53	-192.3	3.685		1.5
1349	18.87	7.27	1.54	-198.8	3.697		2
1352	18.88	7.27	1.50	-200.3	3.707		3
1355	18.85	7.27	1.41	-202.5	3.704		3.75

Purge method: Geopump Sample Time: 1410  
 Duplicate/blank number: — Duplicate Sample Time: —  
 Sampling equipment: — VOA attachment: —  
 Sample containers: 6 vials, 2 500 ml amber  
 Sample analyses: 8015M: TPHg, TPHd/mo w/ SG clean up 820: BTEX Laboratory: C+T  
 Decontamination method: none - dedicated tubing Rinsate disposal: —  
 Comments: —

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

Time  
1358

Temp  
18.84

pH  
7.28

DO  
1.46

ORP  
-207.5

Cond  
3693

Gal rem.  
4

**GROUNDWATER SAMPLING**

Well No.: **MW-11**

Project No. <u>4656016</u>	Recorded by: <u>SC</u>	Date: <u>10/16/10</u>
Project Name: <u>Harbor Facilities Center</u>	Depth of well from TOC (feet): <u>25</u>	
Location: <u>Port of Oakland</u>	Well diameter (inches): <u>2</u>	
<u>651 Maritime Street, Oakland, California</u>	Screened interval from TOC (feet): <u>15 - 25</u>	
Weather: <u>Sunny, warm, breezy</u>	TOC elevation, NAVD 88 (feet): <u>15.47</u>	
Precip. in past 5 days (in.): <u>                    </u>	Groundwater elevation, NAVD 88 (feet): <u>                    </u>	
Source: <u>                    </u>	Water level from TOC (feet): <u>10.02</u>	Time: <u>8:00</u>
Water level instrument: <u>Heron Instruments H.OIL Interface</u>	Product level from TOC (feet): <u>                    </u>	Time: <u>                    </u>

**CALCULATION OF WELL VOLUME:**

*Meter*

$$(25.00 \text{ ft} - 10.02 \text{ ft}) \times (0.083 \text{ ft})^2 \times \pi \times 7.48 \text{ gal/ft}^3 = \underline{2.43} \text{ gallons in one casing volume}$$

$$\text{well depth - water level} \times (\text{well radius})^2 \times \pi \times \text{gal/ft}^3 = \underline{\hspace{2cm}} \text{ total gallons removed}$$

**CALIBRATION:**

	Time	Temperature (°C)	pH (S.U.)	DO (%)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)
Calibration Standard:							
Before Purging:							
After Purging:							

**FIELD MEASUREMENTS:** *began purging @ 16:29*

Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)	Cumulative Gallons Removed
16:37	21.29	7.84	0.26	-190.0	5.241	NM	1.5
16:40	21.17	7.83	0.27	-191.8	5.228	↓	2.0
16:43	21.14	7.82	0.27	-193.5	5.215		2.75
16:46	21.17	7.82	0.26	-192.9	5.202		3.5
16:49	21.16	7.81	0.25	-195.2	5.188		4.0
16:51	21.23	7.82	0.25	-195.9	5.192		4.25
16:54	21.19	7.82	0.26	-196.2	5.165		4.50

Purge method: Geo pump Sample Time: 17:00

Duplicate/blank number:                      Duplicate Sample Time:                     

Sampling equipment:                      VOA attachment:                     

Sample containers: 6 vials, 2 500 ml ambers

Sample analyses: 8240: BTEX, MTBE 8015M: TPHg, TPH d/mg w/SG Laboratory: C+T

Decontamination method: initial purge water none disposed tubing clean up Rinsate disposal:                     

Comments: initial purge water cloudy, moved end of tubing up ~ 1 foot, purge water following tubing adjustment is clear

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

None - dedicated tubing

**GROUNDWATER SAMPLING**

Well No.: **MW-12**

Project No. 4656016  
 Project Name: Harbor Facilities Center  
 Location: Port of Oakland  
651 Maritime Street, Oakland, California  
 Weather: Sunny, warm, breezy  
 Precip. in past 5 days (in.): \_\_\_\_\_  
 Source: \_\_\_\_\_  
 Water level instrument: \_\_\_\_\_

Recorded by: SC Date: 6/16/10  
 Depth of well from TOC (feet): 25  
 Well diameter (inches): 2  
 Screened interval from TOC (feet): 15 - 25  
 TOC elevation, NAVD 88 (feet): 16.79  
 Groundwater elevation, NAVD 88 (feet): 5.48  
 Water level from TOC (feet): 11.31 Time: 810  
 Product level from TOC (feet): \_\_\_\_\_ Time: \_\_\_\_\_

**CALCULATION OF WELL VOLUME:**

$(25.00 \text{ ft} - 0.00 \text{ ft}) \times (0.083 \text{ ft})^2 \times \pi \times 7.48 \text{ gal/ft}^3 =$   
 well depth - water level  $\times (\text{well radius})^2 \times \pi \times \text{gal/ft}^3 =$   
 $25.00 - 11.31$

2.22 gallons in one casing volume  
810 total gallons removed

**CALIBRATION:**

	Time	Temperature (°C)	pH (S.U.)	DO (%)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)
Calibration Standard:							
Before Purging:							
After Purging:							

*see cal sheet for #1696*

**FIELD MEASUREMENTS:** *began purging @ 14:58*

Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)	Cumulative Gallons Removed
15:03	18.67	7.32	0.78	-198.5	1.425	NM	0.75
15:06	18.54	7.30	0.64	-222.5	1.580	↓	1.50
15:09	18.50	7.30	0.58	-236.4	1.584		2.00
15:12	18.47	7.29	0.53	-248.4	1.585		2.5
15:15	18.44	7.28	0.48	-253.8	1.586		3.0
15:18	18.45	7.28	0.41	-260.5	1.585		3.5
15:21	18.41	7.28	0.34	-265.4	1.583		4.0
15:24	18.45	7.27	0.28	-272.4	1.584		4.5
15:27	18.42	7.26	0.26	-278.0	1.583		5.0
15:30	18.42	7.30	0.23	-285.5	1.584	6.0	

Purge method: Geopump Sample Time: 1542  
 Duplicate/blank number: - Duplicate Sample Time: \_\_\_\_\_  
 Sampling equipment: \_\_\_\_\_ VOA attachment: \_\_\_\_\_  
 Sample containers: 6 VOA's, 2 500 mL canisters  
 Sample analyses: B210: BTEX, MTBE 8015M: TPHg, TPHd/mo w/ SG clamp Laboratory: CPT  
 Decontamination method: \_\_\_\_\_ Rinsate disposal: \_\_\_\_\_  
 Comments: purge water has hydrocarbon odor, dark color, sulfur odor  
placed new lock on wellcap

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

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Time	Temp	pH	DO	ORP	EC	Cum. Volume removed
15:33	18.42	7.31	0.21	<del>-2</del> -289.1	1.584	6.5
15:36	18.40	7.32	0.20	-293.8	1.584	7.0
15:39	18.44	7.33	0.18	-302.4	1.584	7.5

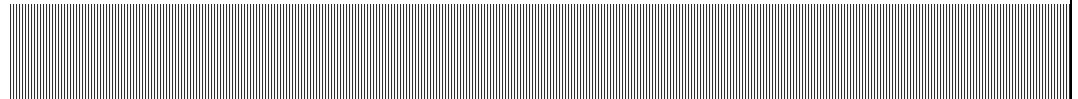


## Port of Oakland

530 Water Street • Oakland, CA 94607

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# Appendix B Laboratory Analytical Reports



## Data Validation Worksheet

Lab Report # 220775  
 Project Port Harbor Facilities Complex

DV by: CO  
 Date: 6/30/10

Lab IDs	Sample IDs	Date Collected	Parameters			
			TPHg (8015B)	TPHd/mo (8015B)	MTBE + BTEX (8260B)	
-001	MW-5	6/16/10	X	X	X	
-002	MW-4	6/16/10	X	X	X	
-003	MW-4DUP	6/16/10	X	X	X	
-004	MW-9	6/16/10	X	X	X	
-006	MW-12	6/16/10	X	X	X	
-007	MW-11	6/16/10	X	X	X	
-008	MW-8A	6/16/10	X	X	X	
-009	MW-10	6/16/10	X	X	X	
-005	Trip Blank (QCTB)	6/16/10			X	

Lab ID: C+T

**NO QUALS**

Cooler Temperature: 5.0

Chain-of-Custody: OK

Samples preservatives: OK

Parameter: **TPHg**

HTs: 14 days – analyzed 6/18/10 (2) and 6/19/10 (3)

Batch IDs: 164186

Surrogates: OK

Method Blank: OK, surrogates OK

LCS: OK, surrogates OK

MS/MSD: MS OK, surrogates OK  
 MSD OK, surrogates OK

Parameter: **TPHd/mo**

HTs: 7 days – analyzed 6/22/10 (6)

Batch IDs: 164181

Surrogates: OK

Method Blank: OK, surrogates OK

BS/BSD: BS OK, surrogates OK  
 BSD OK, surrogates OK

Parameter: **BTEX + MTBE**

HTs: 14 days – analyzed 6/22/10 (6)

Batch IDs: 164269

Surrogates: OK

Method Blank: OK, surrogates OK

BS/BSD: BS OK, surrogates OK  
 BSD OK, surrogates OK

Data Validation Worksheet

Lab Report # 220800  
 Project Port Harbor Facilities Complex

DV by: CO  
 Date: 6/30/10

Lab IDs	Sample IDs	Date Collected	Parameters			
			TPHg (8015B)	TPHd/mo (8015B)	MTBE + BTEX (8260B)	
-001	MW-2	6/17/10	X	X	X	
-002	Trip Blank (QCTB)	6/17/10			X	

Lab ID: C+T

**NO QUALS**

Cooler Temperature: 2.4

Chain-of-Custody: OK

Samples preservatives: OK

Parameter: **TPHg**

HTs: 14 days – analyzed 6/19/10 (2)

Batch IDs: 164196

Surrogates: OK

Method Blank: OK, surrogates OK

LCS: OK, surrogates OK

MS/MSD: MS OK, surrogates OK

MSD OK, surrogates OK

Parameter: **TPHd/mo**

HTs: 7 days – analyzed 6/23/10 (6)

Batch IDs: 164182

Surrogates: OK

Method Blank: OK, surrogates OK

BS/BSD: BS OK, surrogates OK

BSD OK, surrogates OK

Parameter: **BTEX + MTBE**

HTs: 14 days – analyzed 6/23/10 (6)

Batch IDs: 164317

Surrogates: OK

Method Blank: OK, surrogates OK

BS/BSD: BS OK, surrogates OK

BSD OK, surrogates OK





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2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

**Laboratory Job Number 220775  
ANALYTICAL REPORT**

Malcolm Pirnie, Inc.  
2000 Powell St.  
Emeryville, CA 94608

Project : 4656016  
Location : HFC Semi Annual  
Level : II

<u>Sample ID</u>	<u>Lab ID</u>
MW-5	220775-001
MW-4	220775-002
MW-4DUP	220775-003
MW-9	220775-004
QCTB	220775-005
MW-12	220775-006
MW-11	220775-007
MW-8A	220775-008
MW-10	220775-009

This data package has been reviewed for technical correctness and completeness. Release of this data has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature. The results contained in this report meet all requirements of NELAP and pertain only to those samples which were submitted for analysis. This report may be reproduced only in its entirety.

Signature:   
Project Manager

Date: 06/25/2010

NELAP # 01107CA

**CASE NARRATIVE**

Laboratory number: 220775  
Client: Malcolm Pirnie, Inc.  
Project: 4656016  
Location: HFC Semi Annual  
Request Date: 06/17/10  
Samples Received: 06/16/10

This data package contains sample and QC results for eight water samples, requested for the above referenced project on 06/17/10. 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.

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(510) 486-0532 Fax

# CHAIN OF CUSTODY

C & T LOGIN #: 220775

**Analysis**

Project No.: 4656016

Sampler: Sarah Carman/Caroline Orsi

Project Name: HFC Semi Annual

Report To: Todd Miller/Sarah Carman

Project P.O.:

Company: Malcolm Pirnie

Turnaround Time: Std

Telephone: 510-596-3060

Fax: 510-596-8855

Lab No.	Sample ID.	Sampling Date Time	Matrix			# of Containers	Preservative				
			Soil	Water	Waste		HCL	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	ICE	
1	MW-5	4/16/10 12:00		X		3	X			X	X
	↓	↓				3	X			X	
2	MW-4	6/16/10 10:15				3	X			X	X
	↓	↓				3	X			X	
3	MW-4 DUP	6/16/10 10:30				3	X			X	X
	↓	↓				2	X			X	
4	MW-9	6/16/10 14:05				3	X			X	X
	↓	↓				3	X			X	
95	OCTB					1				X	X

BIEX + MTBE by USEPA 8260  
 TPHg by USEPA 8015M  
 TPHd/mc by USEPA 8015M + Sg cleanup

Notes:  
Bill Jeff Rubin  
(Port of Oakland)

SAMPLE RECEIPT

Intact  Cold

On Ice  Ambient

Preservative Correct?

Yes  No  N/A

RELINQUISHED BY:

*Sarah Carman* 6/16/10 17:55  
DATE / TIME

RECEIVED BY:

*Pat Lynch* 6/16/10 17:55  
DATE / TIME

SIGNATURE





COOLER RECEIPT CHECKLIST



Curtis & Tompkins, Ltd.

Login # 220775 Date Received 6-16-10 Number of coolers 1  
 Client MALCOLM PIRNIE Project HFC SEMI ANNUAL

Date Opened 6-16-10 By (print) S. EVANS (sign) [Signature]  
 Date Logged in 6-17-10 By (print) Elmas Tsadik (sign) [Signature]

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:

Type of ice used:  Wet  Blue/Gel  None Temp(°C) 5.0

Samples Received on ice & cold without a temperature blank

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

8. Were Method 5035 sampling containers present? \_\_\_\_\_ YES (NO)

If YES, what time were they transferred to freezer? \_\_\_\_\_

9. Did all bottles arrive unbroken/unopened? (YES) NO

10. Are samples in the appropriate containers for indicated tests? (YES) NO

11. Are sample labels present, in good condition and complete? (YES) NO

12. Do the sample labels agree with custody papers? (YES) NO

13. Was sufficient amount of sample sent for tests requested? (YES) NO

14. Are the samples appropriately preserved? (YES) NO N/A

15. Are bubbles > 6mm absent in VOA samples? (YES) NO N/A

16. Was the client contacted concerning this sample delivery? \_\_\_\_\_ YES NO

If YES, Who was called? \_\_\_\_\_ By \_\_\_\_\_ Date: \_\_\_\_\_

COMMENTS

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## Batch QC Report

Total Volatile Hydrocarbons			
Lab #:	220775	Location:	HFC Semi Annual
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC549222	Batch#:	164186
Matrix:	Water	Analyzed:	06/18/10
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	1,000	1,021	102	73-127

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	98	70-140

## Batch QC Report

Total Volatile Hydrocarbons			
Lab #:	220775	Location:	HFC Semi Annual
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8015B
Field ID:	MW-5	Batch#:	164186
MSS Lab ID:	220775-001	Sampled:	06/16/10
Matrix:	Water	Received:	06/16/10
Units:	ug/L	Analyzed:	06/18/10
Diln Fac:	1.000		

Type: MS Lab ID: QC549223

Analyte	MSS Result	Spiked	Result	%REC	Limits
Gasoline C7-C12	23.02	2,000	1,927	95	68-120

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	105	70-140

Type: MSD Lab ID: QC549224

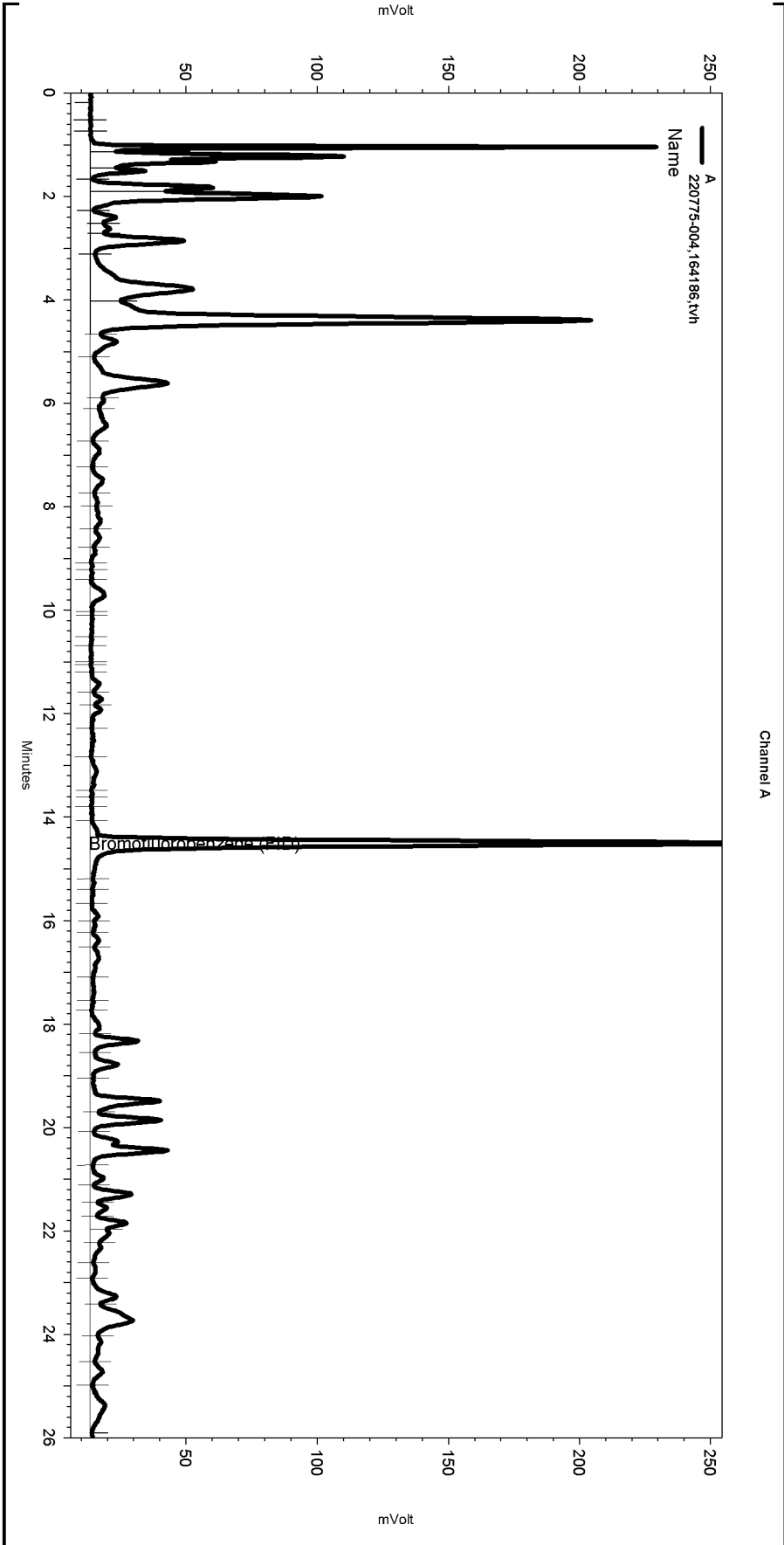
Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	2,000	2,000	99	68-120	4	20

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	103	70-140

RPD= Relative Percent Difference

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 Sample Name: 220775-004,164186,tvh  
 Data File: \\Lims\gdrive\ezchrom\Projects\GC04\Data\169\_012  
 Instrument: GC04 (Offline) Vial: N/A Operator: Tvh 2. Analyst (lims2k3\tvh2)  
 Method Name: \\Lims\gdrive\ezchrom\Projects\GC04\Method\tvhbtxe141.met

Software Version 3.1.7  
 Run Date: 6/19/2010 12:01:02 AM  
 Analysis Date: 6/19/2010 6:27:49 PM  
 Sample Amount: 5 Multiplier: 5  
 Vial & pH or Core ID: a1.0



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Integration Events

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

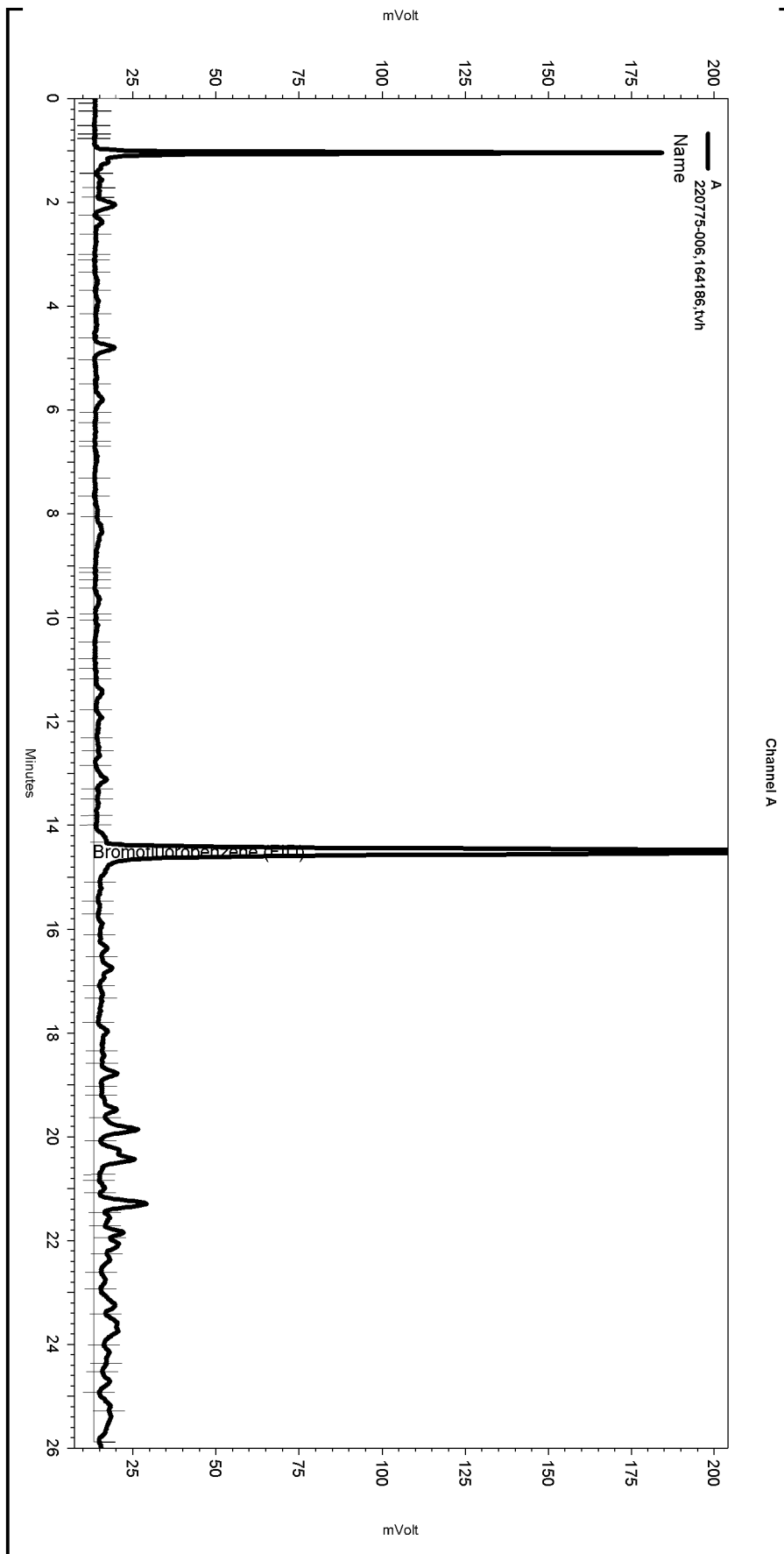
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Yes	Manual Peak	10.027	10.106	0

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 Sample Name: 220775-006,164186,tvh  
 Data File: \\Lims\gdrive\ezchrom\Projects\GC04\Data\169\_015  
 Instrument: GC04 (Offline) Vial: N/A Operator: Tvh 2. Analyst (lims2k3\tvh2)  
 Method Name: \\Lims\gdrive\ezchrom\Projects\GC04\Method\lvhbtxe141.met

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 Run Date: 6/19/2010 1:56:03 AM  
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 Vial & pH or Core ID: a1.0



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Yes	Threshold	0	0	50

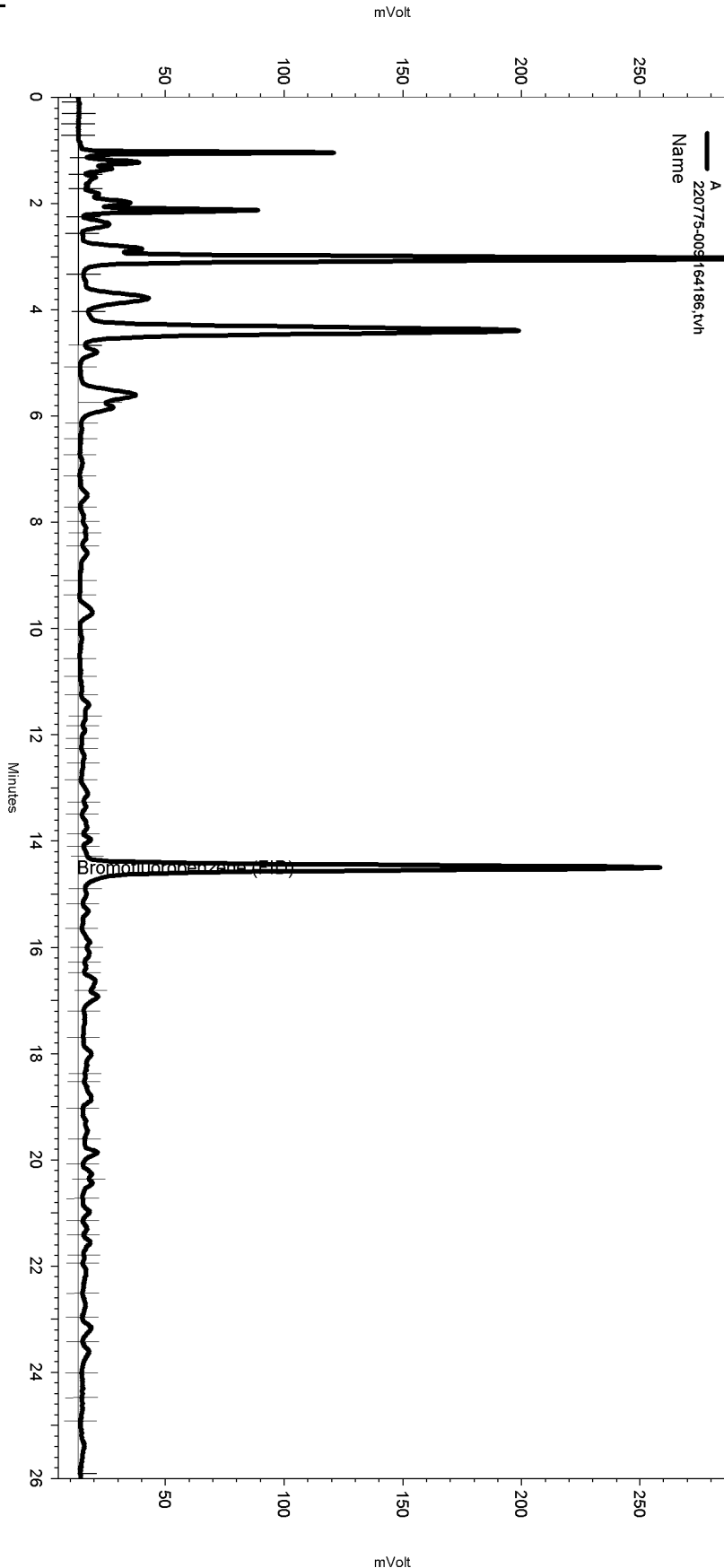
Manual Integration Fixes

Data File: \\Lims\gdrive\ezchrom\Projects\GC04\Data\169\_015

Enabled	Event Type	Start (Minutes)	Stop (Minutes)	Value
Yes	Lowest Point Horizontal Baseli	0	26.017	0
Yes	Split Peak	14.327	0	0

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 Sample Name: 220775-009,164186,tvh  
 Data File: \\Lims\gdrive\ezchrom\Projects\GC04\Data\169\_018  
 Instrument: GC04 (Offline) Vial: N/A Operator: Tvh 2. Analyst (lims2k3\tvh2)  
 Method Name: \\Lims\gdrive\ezchrom\Projects\GC04\Method\tvhbtxe141.met

Software Version 3.1.7  
 Run Date: 6/19/2010 3:50:14 AM  
 Analysis Date: 6/19/2010 6:32:18 PM  
 Sample Amount: 5 Multiplier: 5  
 Vial & pH or Core ID: a1.3



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Integration Events

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

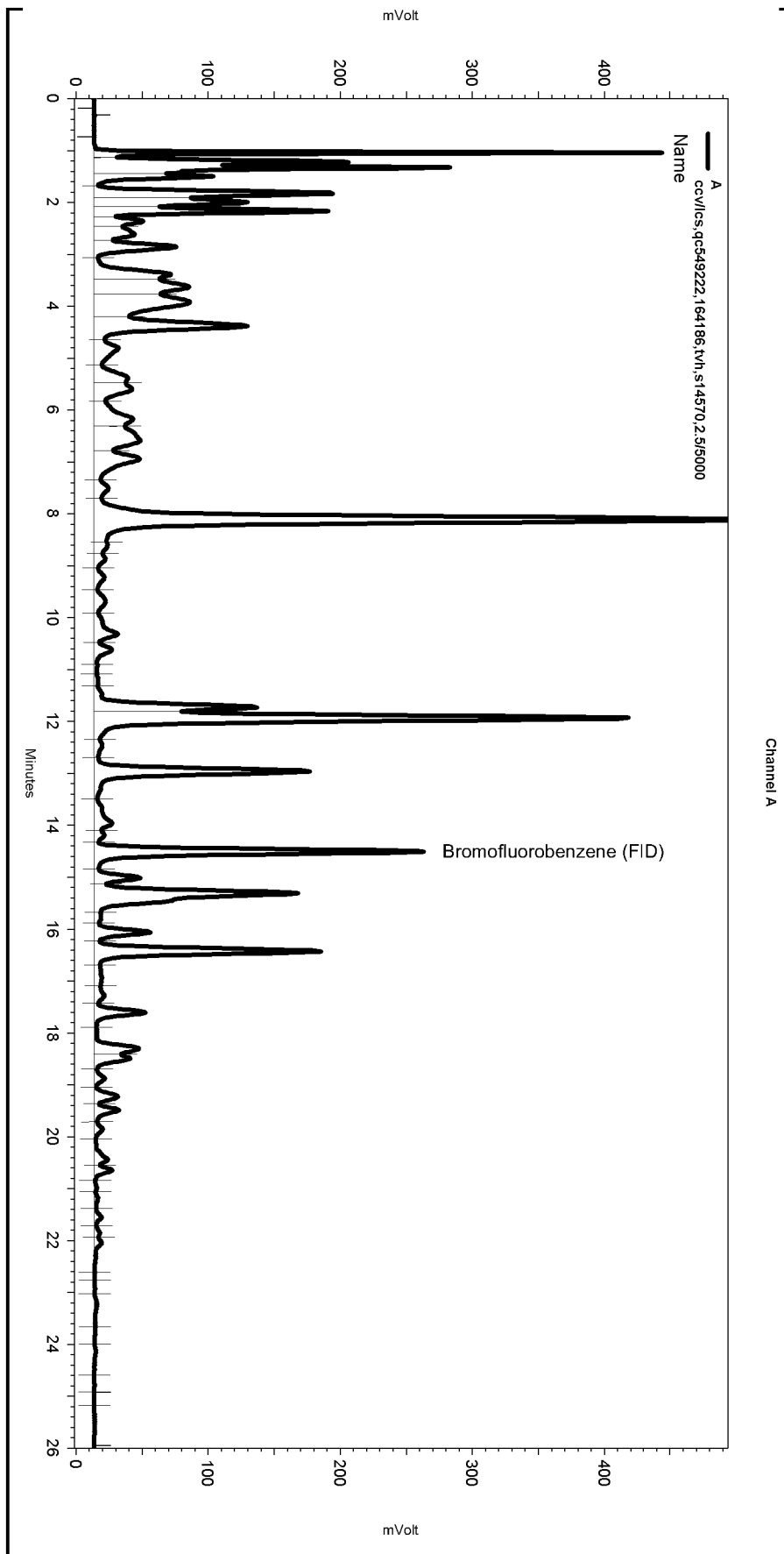
Manual Integration Fixes

Data File: \\Lims\gdrive\ezchrom\Projects\GC04\Data\169\_018

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Yes	Split Peak	14.281	0	0

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 Data File: \\Lims\gdrive\ezchrom\Projects\GC04\Data\169\_002  
 Instrument: GC04 (Offline) Vial: N/A Operator: Tvh 2. Analyst (lms2k3\tvh2)  
 Method Name: \\Lims\gdrive\ezchrom\Projects\GC04\Method\tvhbtxe141.met

Software Version 3.1.7  
 Run Date: 6/18/2010 12:03:49 PM  
 Analysis Date: 6/19/2010 6:23:22 PM  
 Sample Amount: 5 Multiplier: 5  
 Vial & pH or Core ID: {Data Description}



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Integration Events

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

Manual Integration Fixes

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







Total Extractable Hydrocarbons			
Lab #:	220775	Location:	HFC Semi Annual
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 3520C
Project#:	4656016	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	06/16/10
Units:	ug/L	Received:	06/16/10
Diln Fac:	1.000	Prepared:	06/18/10
Batch#:	164181		

Field ID: MW-8A Analyzed: 06/22/10  
 Type: SAMPLE Cleanup Method: EPA 3630C  
 Lab ID: 220775-008

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

Surrogate	%REC	Limits
o-Terphenyl	101	60-129

Field ID: MW-10 Analyzed: 06/22/10  
 Type: SAMPLE Cleanup Method: EPA 3630C  
 Lab ID: 220775-009

Analyte	Result	RL
Diesel C10-C24	200	50
Motor Oil C24-C36	ND	300

Surrogate	%REC	Limits
o-Terphenyl	98	60-129

Type: BLANK Analyzed: 06/23/10  
 Lab ID: QC549199 Cleanup Method: EPA 3630C

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

Surrogate	%REC	Limits
o-Terphenyl	84	60-129

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

Batch QC Report

Total Extractable Hydrocarbons			
Lab #:	220775	Location:	HFC Semi Annual
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 3520C
Project#:	4656016	Analysis:	EPA 8015B
Matrix:	Water	Batch#:	164181
Units:	ug/L	Prepared:	06/18/10
Diln Fac:	1.000	Analyzed:	06/23/10

Type: BS Cleanup Method: EPA 3630C  
 Lab ID: QC549200

Analyte	Spiked	Result	%REC	Limits
Diesel C10-C24	2,500	2,196	88	54-125

Surrogate	%REC	Limits
o-Terphenyl	91	60-129

Type: BSD Cleanup Method: EPA 3630C  
 Lab ID: QC549201

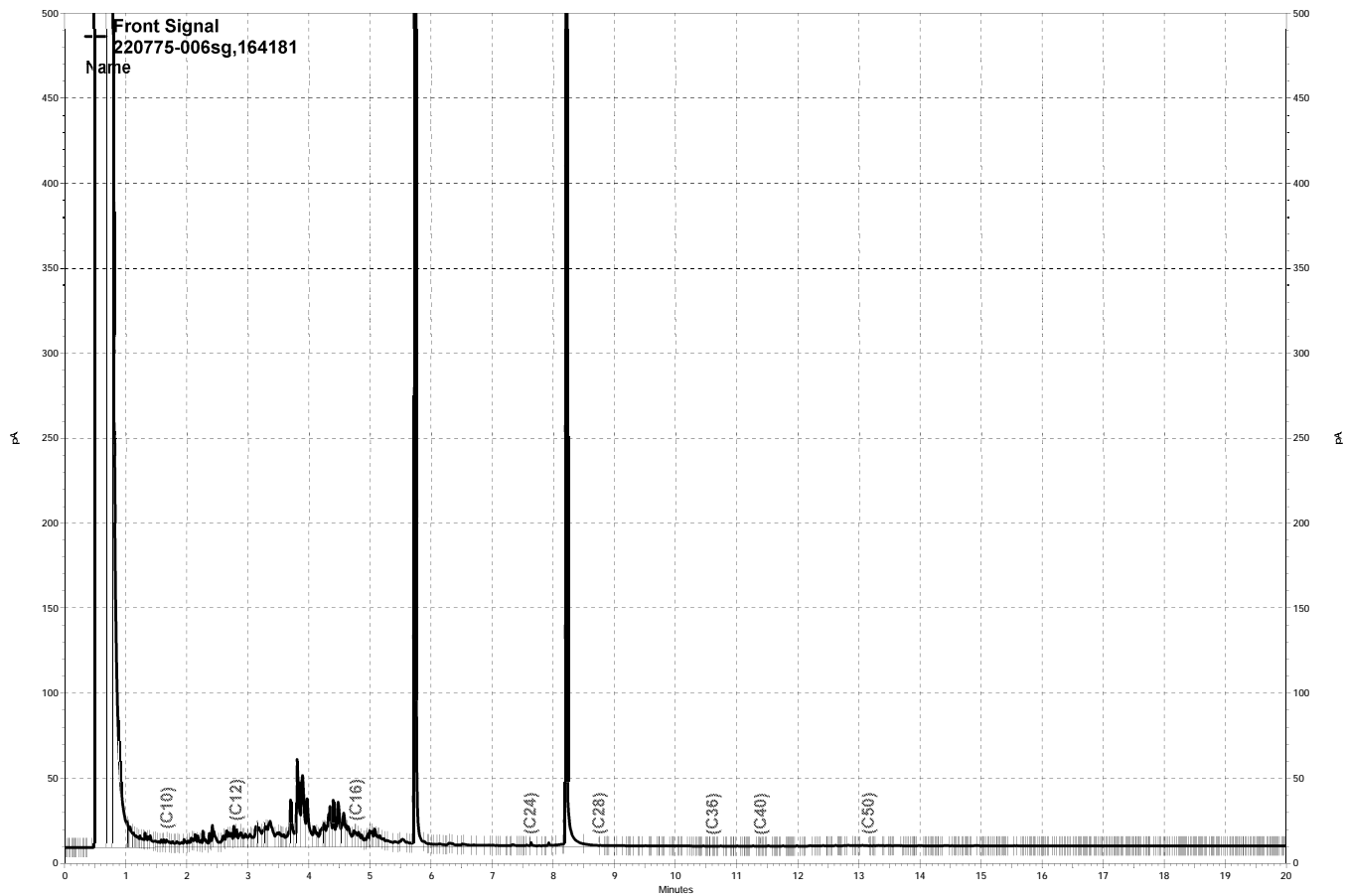
Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Diesel C10-C24	2,500	2,061	82	54-125	6	53

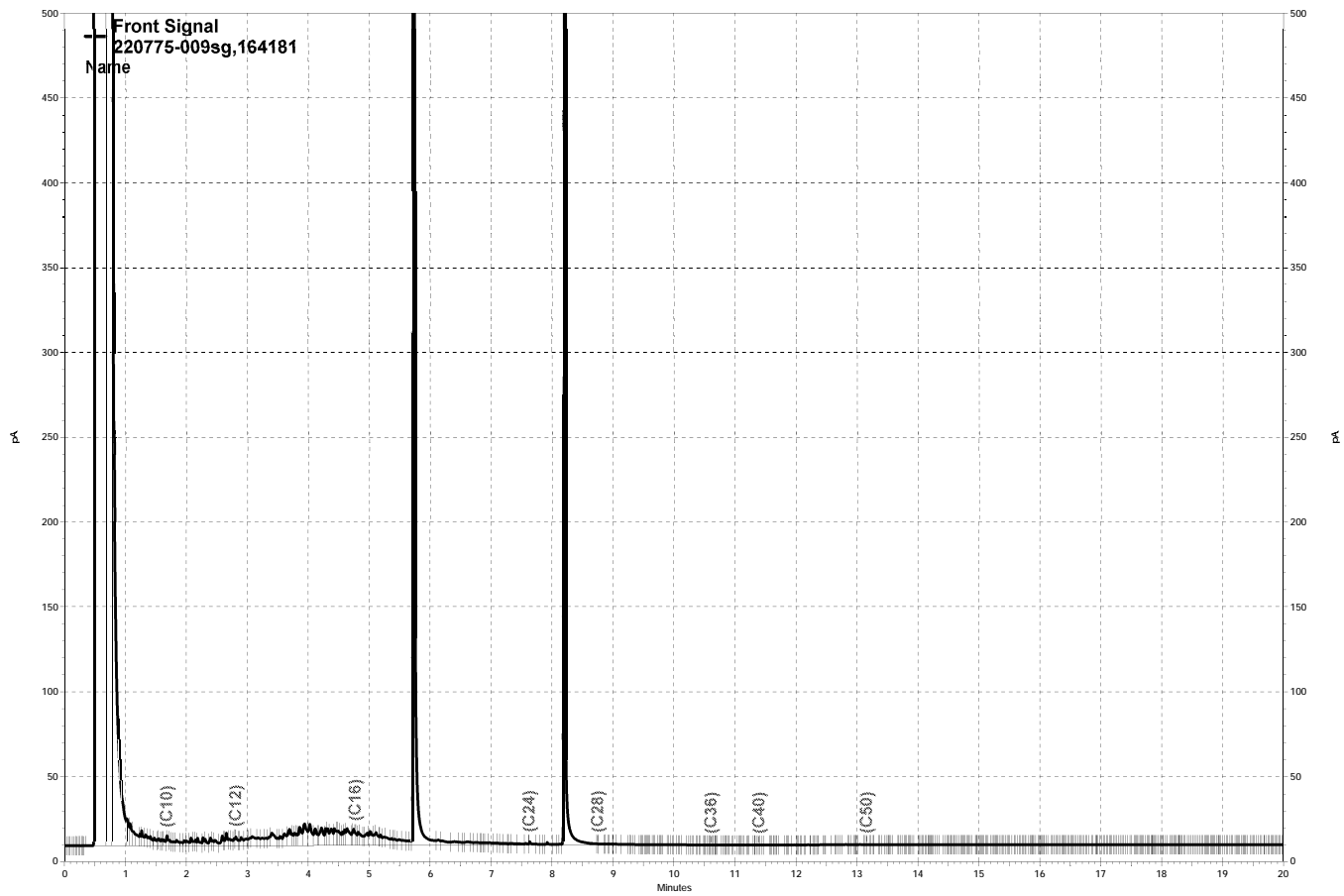
Surrogate	%REC	Limits
o-Terphenyl	85	60-129

RPD= Relative Percent Difference

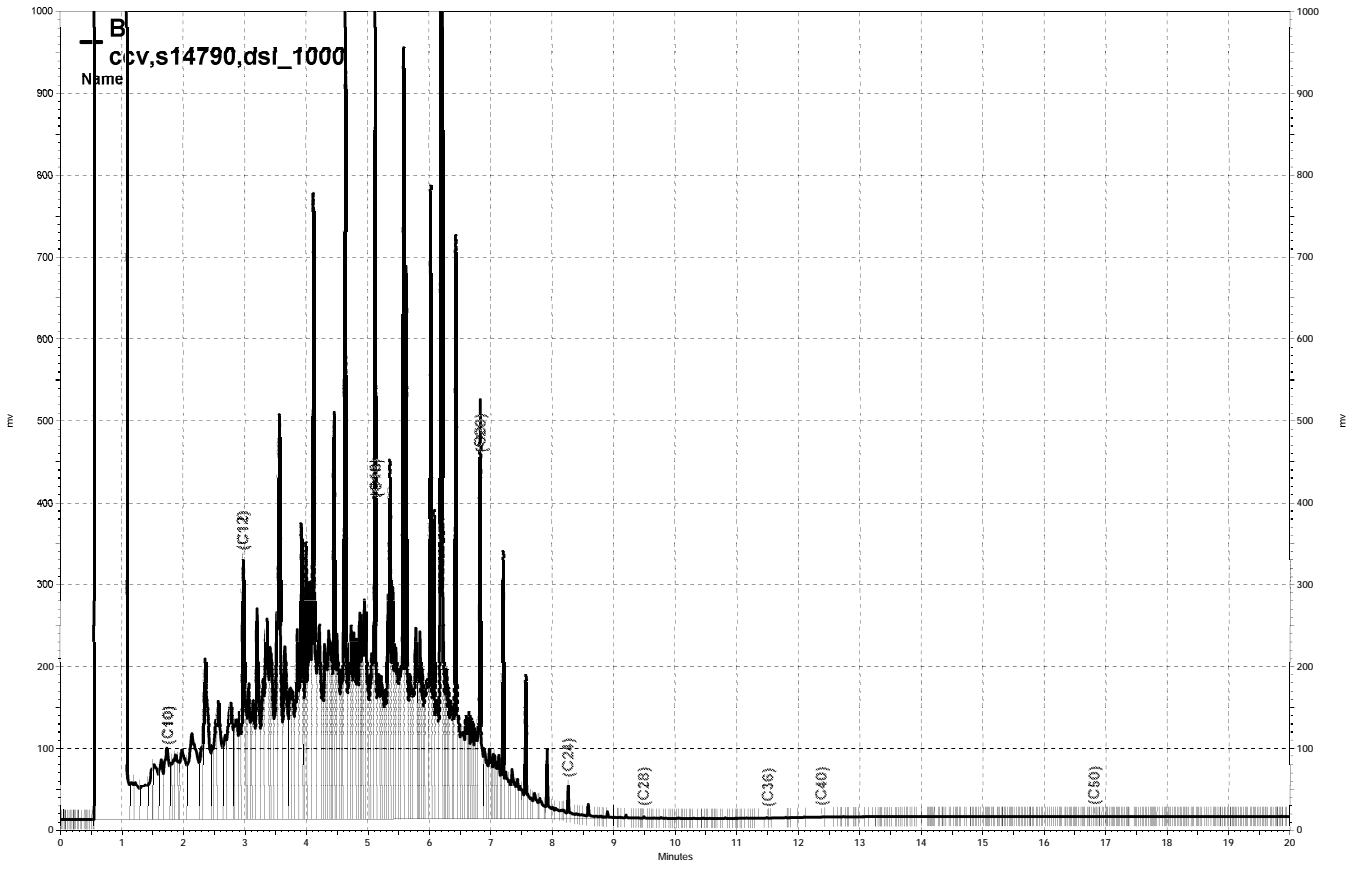




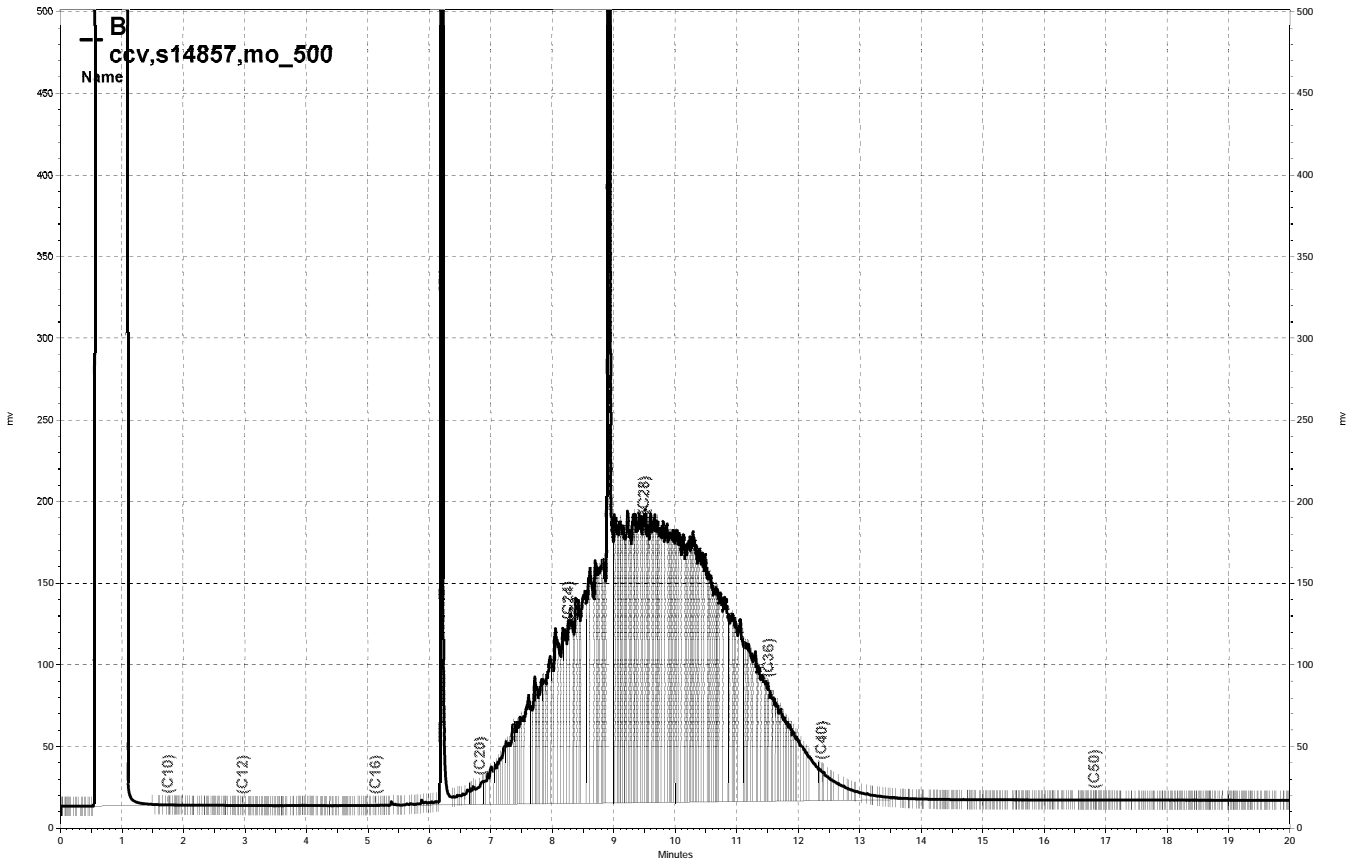
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— G:\ezchrom\Projects\GC27\Data\173a009.dat, Front Signal



— \\Lims\gdrive\ezchrom\Projects\GC15B\Data\173b024, B



— \\Lims\gdrive\ezchrom\Projects\GC15B\Data\173b023, B



**Purgeable Aromatics by GC/MS**

Lab #:	220775	Location:	HFC Semi Annual
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-5	Batch#:	164269
Lab ID:	220775-001	Sampled:	06/16/10
Matrix:	Water	Received:	06/16/10
Units:	ug/L	Analyzed:	06/22/10
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
1,2-Dichloroethane-d4	103	71-140
Toluene-d8	105	80-120
Bromofluorobenzene	99	80-121

ND= Not Detected  
 RL= Reporting Limit

**Purgeable Aromatics by GC/MS**

Lab #:	220775	Location:	HFC Semi Annual
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-4	Batch#:	164269
Lab ID:	220775-002	Sampled:	06/16/10
Matrix:	Water	Received:	06/16/10
Units:	ug/L	Analyzed:	06/22/10
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	ND	0.5
Benzene	15	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	104	71-140
Toluene-d8	108	80-120
Bromofluorobenzene	106	80-121

ND= Not Detected  
 RL= Reporting Limit

**Purgeable Aromatics by GC/MS**

Lab #:	220775	Location:	HFC Semi Annual
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-4DUP	Batch#:	164269
Lab ID:	220775-003	Sampled:	06/16/10
Matrix:	Water	Received:	06/16/10
Units:	ug/L	Analyzed:	06/22/10
Diln Fac:	1.000		

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

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	102	71-140
Toluene-d8	103	80-120
Bromofluorobenzene	103	80-121

ND= Not Detected  
 RL= Reporting Limit

**Purgeable Aromatics by GC/MS**

Lab #:	220775	Location:	HFC Semi Annual
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-9	Batch#:	164269
Lab ID:	220775-004	Sampled:	06/16/10
Matrix:	Water	Received:	06/16/10
Units:	ug/L	Analyzed:	06/22/10
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	ND	0.5
Benzene	49	0.5
Toluene	ND	0.5
Ethylbenzene	1.0	0.5
m,p-Xylenes	0.6	0.5
o-Xylene	ND	0.5

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	104	71-140
Toluene-d8	106	80-120
Bromofluorobenzene	105	80-121

ND= Not Detected  
 RL= Reporting Limit

**Purgeable Aromatics by GC/MS**

Lab #:	220775	Location:	HFC Semi Annual
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-12	Batch#:	164269
Lab ID:	220775-006	Sampled:	06/16/10
Matrix:	Water	Received:	06/16/10
Units:	ug/L	Analyzed:	06/22/10
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	4.8	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
1,2-Dichloroethane-d4	102	71-140
Toluene-d8	101	80-120
Bromofluorobenzene	104	80-121

ND= Not Detected  
 RL= Reporting Limit

**Purgeable Aromatics by GC/MS**

Lab #:	220775	Location:	HFC Semi Annual
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-11	Batch#:	164269
Lab ID:	220775-007	Sampled:	06/16/10
Matrix:	Water	Received:	06/16/10
Units:	ug/L	Analyzed:	06/22/10
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
1,2-Dichloroethane-d4	103	71-140
Toluene-d8	107	80-120
Bromofluorobenzene	100	80-121

ND= Not Detected  
 RL= Reporting Limit

**Purgeable Aromatics by GC/MS**

Lab #:	220775	Location:	HFC Semi Annual
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-8A	Batch#:	164269
Lab ID:	220775-008	Sampled:	06/16/10
Matrix:	Water	Received:	06/16/10
Units:	ug/L	Analyzed:	06/22/10
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
1,2-Dichloroethane-d4	102	71-140
Toluene-d8	98	80-120
Bromofluorobenzene	106	80-121

ND= Not Detected  
 RL= Reporting Limit

**Purgeable Aromatics by GC/MS**

Lab #:	220775	Location:	HFC Semi Annual
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-10	Batch#:	164269
Lab ID:	220775-009	Sampled:	06/16/10
Matrix:	Water	Received:	06/16/10
Units:	ug/L	Analyzed:	06/22/10
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	ND	0.5
Benzene	46	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	102	71-140
Toluene-d8	102	80-120
Bromofluorobenzene	108	80-121

ND= Not Detected  
 RL= Reporting Limit



## Batch QC Report

Purgeable Aromatics by GC/MS			
Lab #:	220775	Location:	HFC Semi Annual
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC549566	Batch#:	164269
Matrix:	Water	Analyzed:	06/22/10
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
1,2-Dichloroethane-d4	108	71-140
Toluene-d8	105	80-120
Bromofluorobenzene	105	80-121

ND= Not Detected  
 RL= Reporting Limit





**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 220800  
ANALYTICAL REPORT**

Malcolm Pirnie, Inc.  
2000 Powell St.  
Emeryville, CA 94608

Project : 4656016  
Location : HFC Semi Annual  
Level : II

Sample ID

MW-2

QCTB-1

Lab ID

220800-001

220800-002

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: \_\_\_\_\_

Project Manager

Date: 06/25/2010

NELAP # 01107CA

**CASE NARRATIVE**

Laboratory number: 220800  
Client: Malcolm Pirnie, Inc.  
Project: 4656016  
Location: HFC Semi Annual  
Request Date: 06/18/10  
Samples Received: 06/17/10

This data package contains sample and QC results for one water sample, requested for the above referenced project on 06/18/10. The sample was 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.



**COOLER RECEIPT CHECKLIST**



Curtis & Tompkins, Ltd.

Login # 220800 Date Received 6-17-10 Number of coolers 1  
 Client Malcolm Price Project HFC Semi: Annual  
 Date Opened 6-17-10 By (print) Elias Tsadik (sign) Elias Tsadik  
 Date Logged in 6 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:

Type of ice used:  Wet  Blue/Gel  None Temp(°C) 2.4

Samples Received on ice & cold without a temperature blank

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

8. Were Method 5035 sampling containers present? \_\_\_\_\_ YES  NO  
 If YES, what time were they transferred to freezer? \_\_\_\_\_

9. Did all bottles arrive unbroken/unopened? \_\_\_\_\_  YES NO

10. Are samples in the appropriate containers for indicated tests? \_\_\_\_\_  YES NO

11. Are sample labels present, in good condition and complete? \_\_\_\_\_  YES NO

12. Do the sample labels agree with custody papers? \_\_\_\_\_  YES NO

13. Was sufficient amount of sample sent for tests requested? \_\_\_\_\_  YES NO

14. Are the samples appropriately preserved? \_\_\_\_\_  YES NO N/A

15. Are bubbles > 6mm absent in VOA samples? \_\_\_\_\_  YES NO N/A

16. Was the client contacted concerning this sample delivery? \_\_\_\_\_ YES NO  
 If YES, Who was called? \_\_\_\_\_ By \_\_\_\_\_ Date: \_\_\_\_\_

COMMENTS

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Total Volatile Hydrocarbons			
Lab #:	220800	Location:	HFC Semi Annual
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8015B
Field ID:	MW-2	Batch#:	164196
Matrix:	Water	Sampled:	06/17/10
Units:	ug/L	Received:	06/17/10
Diln Fac:	1.000	Analyzed:	06/19/10

Type: SAMPLE Lab ID: 220800-001

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	94	70-140

Type: BLANK Lab ID: QC549255

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	90	70-140

ND= Not Detected  
 RL= Reporting Limit



## Batch QC Report

Total Volatile Hydrocarbons			
Lab #:	220800	Location:	HFC Semi Annual
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC549256	Batch#:	164196
Matrix:	Water	Analyzed:	06/20/10
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	2,000	1,927	96	73-127

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	101	70-140

## Batch QC Report

Total Volatile Hydrocarbons			
Lab #:	220800	Location:	HFC Semi Annual
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8015B
Field ID:	MW-2	Batch#:	164196
MSS Lab ID:	220800-001	Sampled:	06/17/10
Matrix:	Water	Received:	06/17/10
Units:	ug/L	Analyzed:	06/20/10
Diln Fac:	1.000		

Type: MS Lab ID: QC549257

Analyte	MSS Result	Spiked	Result	%REC	Limits
Gasoline C7-C12	24.83	2,000	1,900	94	68-120

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	100	70-140

Type: MSD Lab ID: QC549258

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	2,000	1,892	93	68-120	0	20

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	99	70-140

RPD= Relative Percent Difference

Total Extractable Hydrocarbons			
Lab #:	220800	Location:	HFC Semi Annual
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 3520C
Project#:	4656016	Analysis:	EPA 8015B
Field ID:	MW-2	Sampled:	06/17/10
Matrix:	Water	Received:	06/17/10
Units:	ug/L	Prepared:	06/18/10
Diln Fac:	1.000	Analyzed:	06/23/10
Batch#:	164182		

Type: SAMPLE Lab ID: 220800-001

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

Surrogate	%REC	Limits
o-Terphenyl	109	60-129

Type: BLANK Lab ID: QC549202

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

Surrogate	%REC	Limits
o-Terphenyl	109	60-129

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

## Batch QC Report

Total Extractable Hydrocarbons			
Lab #:	220800	Location:	HFC Semi Annual
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 3520C
Project#:	4656016	Analysis:	EPA 8015B
Matrix:	Water	Batch#:	164182
Units:	ug/L	Prepared:	06/18/10
Diln Fac:	1.000	Analyzed:	06/22/10

Type: BS Cleanup Method: EPA 3630C  
 Lab ID: QC549203

Analyte	Spiked	Result	%REC	Limits
Diesel C10-C24	2,500	2,095	84	54-125

Surrogate	%REC	Limits
o-Terphenyl	91	60-129

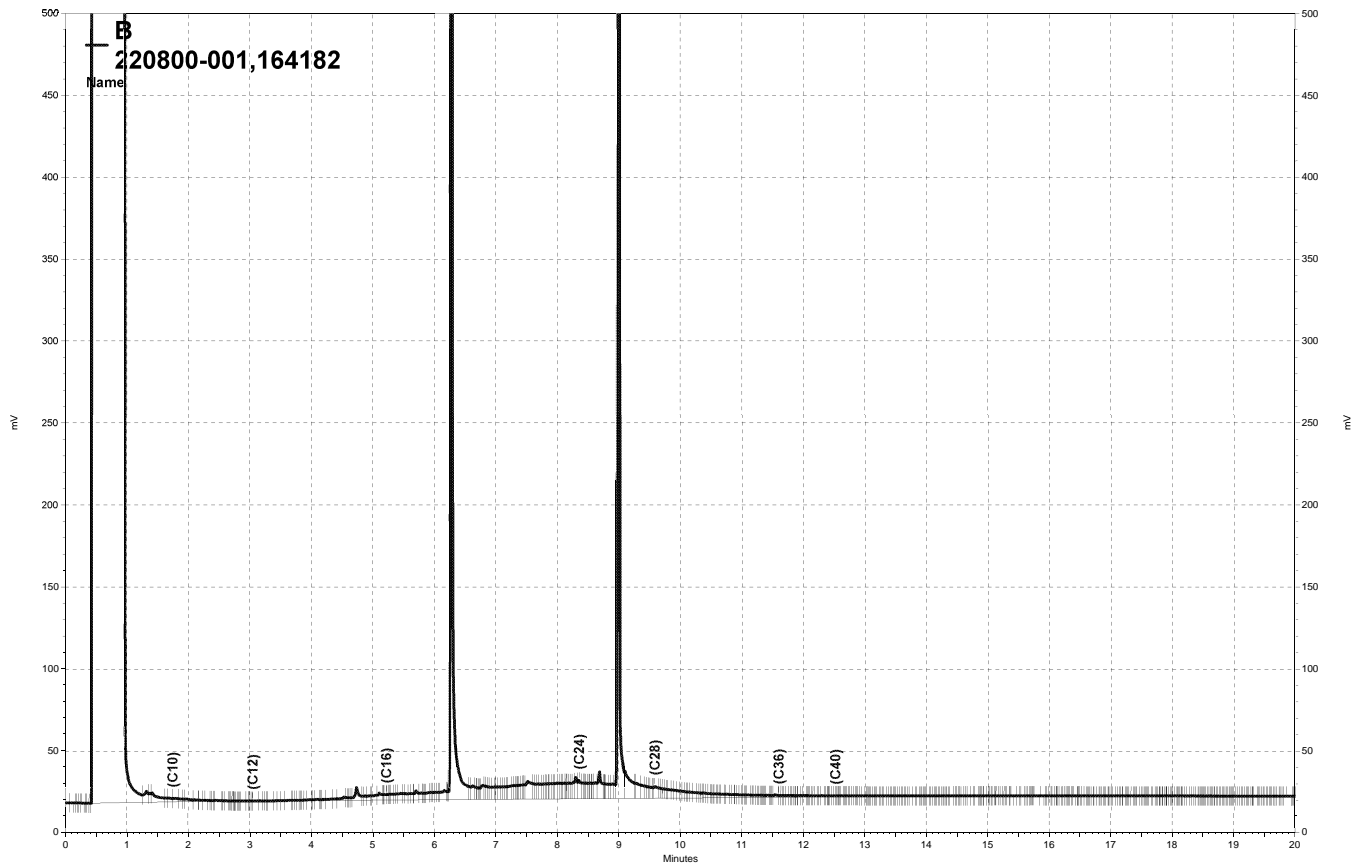
Type: BSD Cleanup Method: EPA 3630C  
 Lab ID: QC549204

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Diesel C10-C24	2,500	2,293	92	54-125	9	53

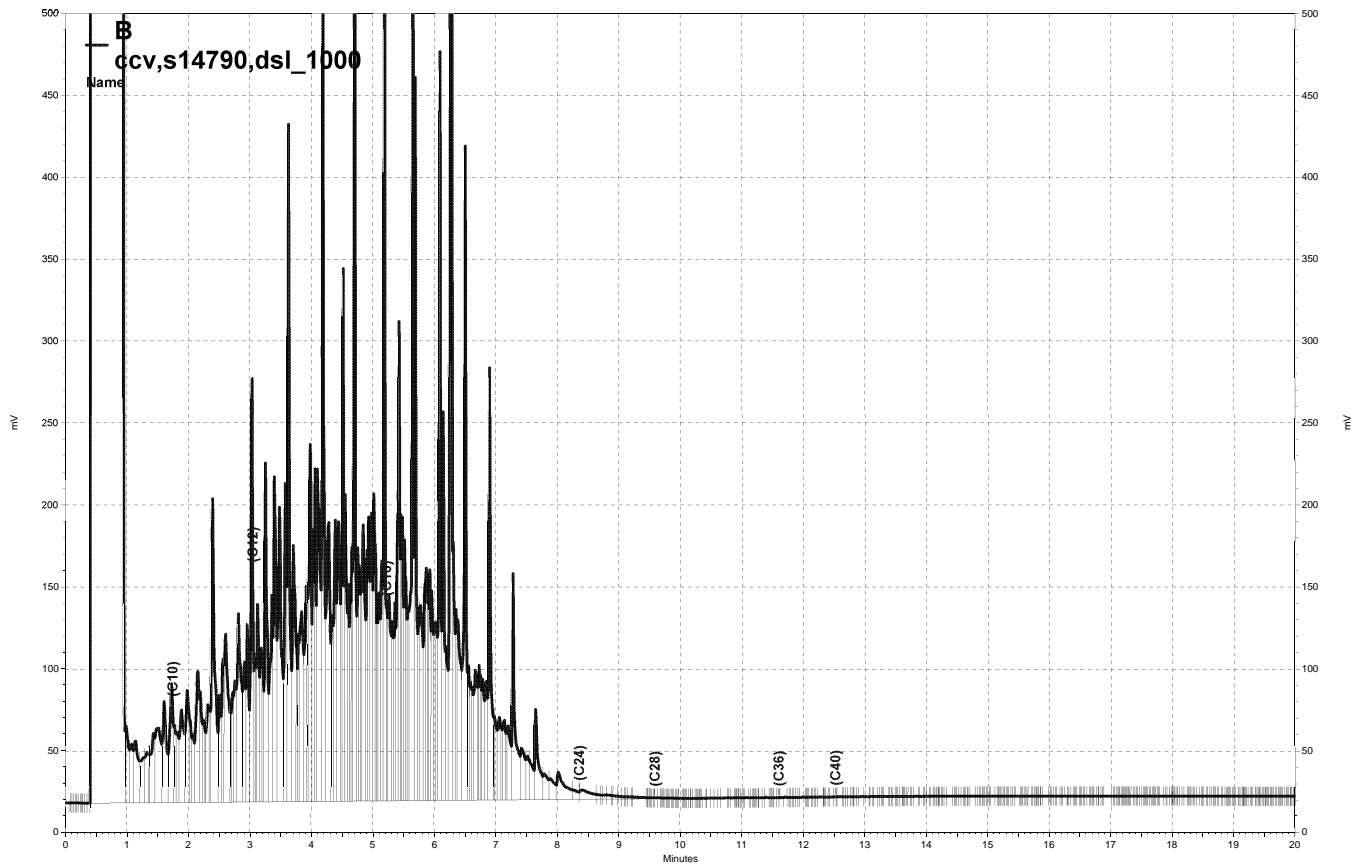
  

Surrogate	%REC	Limits
o-Terphenyl	104	60-129

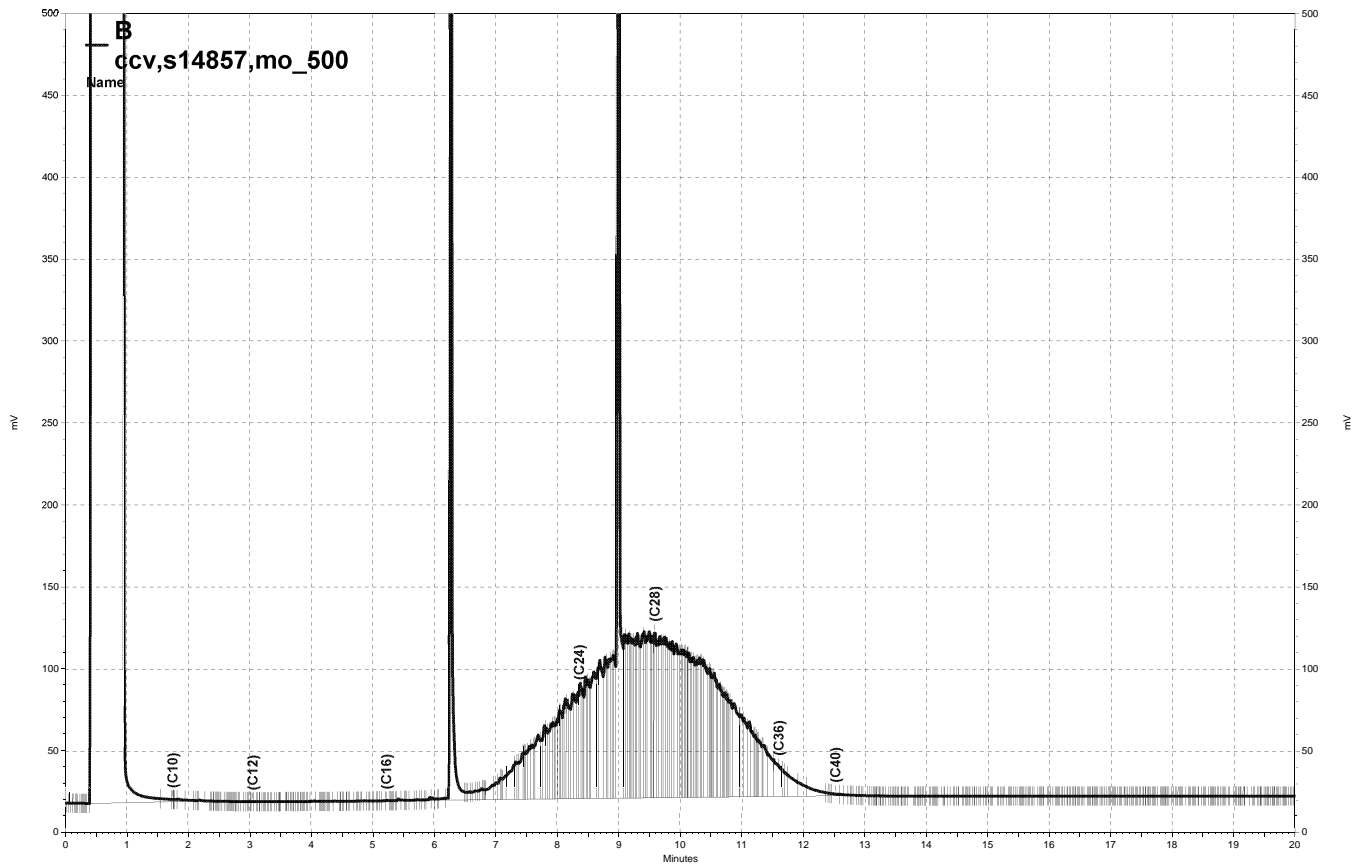
RPD= Relative Percent Difference



— \\Lims\gdrive\ezchrom\Projects\GC14B\Data\173b028, B



\\Lims\gdrive\ezchrom\Projects\GC14B\Data\173b005, B



— \\Lims\gdrive\ezchrom\Projects\GC14B\Data\173b004, B

**Purgeable Aromatics by GC/MS**

Lab #:	220800	Location:	HFC Semi Annual
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-2	Batch#:	164317
Lab ID:	220800-001	Sampled:	06/17/10
Matrix:	Water	Received:	06/17/10
Units:	ug/L	Analyzed:	06/23/10
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
1,2-Dichloroethane-d4	107	71-140
Toluene-d8	102	80-120
Bromofluorobenzene	106	80-121

ND= Not Detected  
 RL= Reporting Limit



## Batch QC Report

Purgeable Aromatics by GC/MS			
Lab #:	220800	Location:	HFC Semi Annual
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC549759	Batch#:	164317
Matrix:	Water	Analyzed:	06/23/10
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
1,2-Dichloroethane-d4	105	71-140
Toluene-d8	99	80-120
Bromofluorobenzene	107	80-121

ND= Not Detected

RL= Reporting Limit





**Port of Oakland**

530 Water Street • Oakland, CA 94607

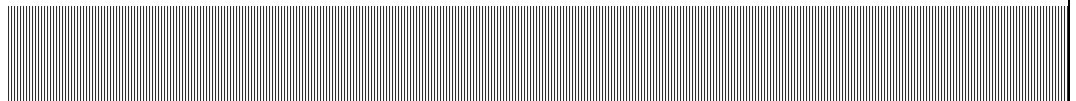
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# **Appendix C**

## **Free Product Recovery System**

### **Operation and Maintenance Field**

### **Sheets**



Site Visit Date: 01/06/10 Recorded By: CO - Before System Run

Recovery Well	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Depth to Pump (feet)	Cycles or Period Duration	Vacuum (in H2O)	Total Run Time (hr:mm)	Comments
RW-1								Inactive
RW-2								Inactive
RW-3	10.85	11.13	0.28	11.25	P=7 D=15		35:10	Product is pumping
RW-4	10.09	10.69	0.60	10.42	↓		100:15	air supply Broke tubing by dropping vault lid into well box— repaired using extra tubing Product is pumping
RW-5								Inactive
RW-6	8.70	10.74	2.04	10.0	P=7 D=20 ↓	4.9	376:00	product pumping Note: measure depth from top of cap
RW-7	8.09	10.29	2.20	8.75		2.6	440:09	Product pumping Note: measure depth from top of cap
RW-8	9.46	10.30	0.84	10.5	P=7 D=15 ↓	2.3	115:20	Product pumping Note: measure depth from top of cap
RW-9	10.09	10.50	0.41	10.0			0:30	Removed cap from valve Product pumping
MW-3	10.78	11.85	1.07				—	Approximate amount of product purged:

Elapsed Time @ Blower (hrs): 14660.11  
 Sight Column Water Level:  empty 1/4 1/2 3/4 full (empty @ 1/2 or more) *See note below*  
 Depth of product in convault (feet):  
 Approximate total volume recovered:  
 Note: blower <sup>opened</sup> condensate valve, but no water in tank  
 Compressor condensate emptied?  YES  
 Depth to interface (feet):

Site Visit Date:		01/06/10		Recorded By:		C - After system run			
Recovery Well	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Depth to Pump (feet)	Cycles or Period Duration	Vacuum (in H2O)	Total Run Time (hr:mm)	Comments	
RW-1								Inactive	
RW-2								Inactive	
RW-3	10.89	11.10	0.21	11.25	P=7 D=15 ↓		35:25		
RW-4	10.12	10.61	0.49	10.42			100:30	0.1 gal purged	
RW-5								Inactive	
RW-6	8.91	9.82	0.91	10.0	P=7 D=20 ↓	3.8	376:20	2 gal purged Note: measure depth from top of cap	
RW-7	8.31	9.06	0.75	8.75		1.8	440:29	2.5 gal purged Note: measure depth from top of cap	
RW-8	9.79	10.00	0.21	10.5	P=7 D=15 ↓	2.3	115:35	1.5 gal purged Note: measure depth from top of cap	
RW-9	9.98	10.13	0.15	10.0			0:45	Had strangled sound while pumping - E" tube broken. Reattached. 0.5 gal purged	
MW-3	11.09	11.10	0.01					Approximate amount of product purged: 1 gal	

Elapsed Time @ Blower (hrs):  
Sight Column Water Level: empty 1/4 1/2 3/4 full (empty @ 1/2 or more)  
Depth of product in convault (feet):  
Approximate total volume recovered: 31.95

Compressor condensate emptied?  
Depth to interface (feet): 2.35

Site Visit Date:		1/13/2010		Recorded By:		SC + CO			
Recovery Well	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Depth to Pump (feet)	Cycles or Period Duration	Vacuum (in H2O)	Total Run Time (hr:mm)	Product removed (gal)	Comments
RW-1									Inactive
RW-2									Inactive
RW-3	Pre-run	10.89	11.11	0.22	P=7 D=15 ↓		35:25	0.10	
	Post-run	10.93	<del>11.08</del> 11.08	0.15			35:40		
RW-4	Pre-run	10.16	10.81	0.65	↓		100:30	0.20	well box partially flooded with rainwater Replaced pump w/ rehabbed pump (before run)
	Post-run	10.19	10.65	0.46			100:45		
RW-5									Inactive
RW-6	Pre-run	8.86	10.79	1.93	P=7 D=20 ↓	3.2	376:20	2.0	
	Post-run	8.99	9.82	0.83			376:40		
RW-7	Pre-run	8.00	10.56	2.56	↓	3.1	440:29	2.5	well box partially flooded with rainwater
	Post-run	8.19	9.24	1.05			440:49		
RW-8	Pre-run	9.52	10.33	0.81	P=7 D=15 ↓	2.2	115:35	1.25	
	Post-run	9.84	10.02	0.18			2.4		
RW-9	Pre-run	9.85	10.31	0.46	↓		0:45	0.33	reconnected air hose (coupling had disconnected) after run
	Post-run	9.96	10.16	0.20			1:00		
MW-3	Pre-run	10.70	11.29	0.59	N/A	N/A	X	0.25	well box filled w/ rain water - slightly above TOC level. Prior to opening cap, pumped out excess water. Excess water into barrels of purge water
	Post-run	No Product	10.90	0					

Elapsed Time @ Blower (hrs): 14828.82  
 Sight Column Water Level: empty 1/4 1/2 3/4 full (empty @ 1/2 or more)  
 Depth of product in convault (feet): post-run: 1.94  
 Approximate total volume recovered:

Compressor condensate emptied? yes  
 Depth to interface (feet): post-run 2.34

Site Visit Date:		1/20/00		Recorded By:		SC			
Recovery Well	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Depth to Pump (feet)	Cycles or Period Duration	Vacuum (in H2O)	Total Run Time (hr:mm)	Product removed (gal)	Comments
RW-1									Inactive
RW-2									Inactive
RW-3	Pre-run	9.36	10.65	1.29	P=7 D=15		35:40	NM	Well box flooded
	Post-run	9.14	10.44	1.30			35:55		
RW-4	Pre-run	9.13	9.86	0.73	↓		100:45	NM	Well box flooded to piping level "1/2" below bottom of <del>coiled</del> or casing)
	Post-run	9.20	9.60	0.40			101:00		
RW-5									Inactive
RW-6	Pre-run	8.58	10.58	2.00	P=7 D=20	4.8	376:40	NM	emptied 4 gal from bucket into purge water Well box flooded had drained when opened for post-run measurement
	Post-run	8.63	9.96	1.33			10.0		
RW-7	Pre-run	<del>7.325</del> 7.02	10.10	2.85	↓		440:49	NM	Well box flooded to ~same level as RW-4 vac gage (same level as bottom of lid) muddy - water must have been at least that high
	Post-run	8.65	9.25	0.60			8.75		
RW-8	Pre-run	8.50	9.69	1.19	P=7 D=15	14.5 → 4.4	115:50	NM	Adjusted vacuum to 4.4
	Post-run	9.35	9.90	0.55			10.5		
RW-9	Pre-run	9.71	10.20	0.49	↓		1:00	NM	Air line splice has fallen in to well (noticed post-pumping) come early next week + replace
	Post-run	9.84	9.93	0.09			10.0		
MW-3	Pre-run	9.31	10.0	0.69				1 gal	while purging, began raining very hard/hailing. Parking lot runoff emptied into the uncapped well for ~5 min
	Post-run	NM	NM	NM					

Elapsed Time @ Blower (hrs): 1496.78

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

Depth of product in convault (feet): 1.94 (pre) 6.90 (post)

Approximate total volume recovered:

Compressor condensate emptied?

Depth to interface (feet): 2.34 (pre) (2.37 post)

Check RW-5

measure ~~of~~

consult pre-run

RW 5

pre-purging	
DTP	DTW
7.54	9.37
post-purging	
NM	NM

Notes

plumbed, has black rubber lid w/ metal cinch fitting (flat head screwdriver needed), has no pump, but is dedicated purge tubing inside

box partially flooded  
purged 2 gallons

- after brief downpour, wellbox was completely flooded. unable to measure post-purge DTW + DTP



Site Visit Date:		1/27/10		Recorded By:		SC					
Recovery Well	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Depth to Pump (feet)	Cycles or Period Duration	Vacuum (in H2O)	Total Run Time (hr:mm)	Product removed (gal)	Comments		
RW-1									Inactive		
RW-2									Inactive		
RW-3	Pre-run	9.26	13.03	3.77	11.25	P=7 D=15	35:55	1	Buckets since product so much thicker than usual		
	Post-run	9.75	12.33	2.58			36:10				
RW-4	Pre-run	9.00	9.33	0.33	10.42	↓	101:00	NM			
	Post-run	9.00	9.19	0.19			101:15				
RW-5									Inactive		
RW-6	Pre-run	8.84	10.14	1.60	10.0	D=7 D=20	4.8	377:00	NM	measuring bucket had ~3.5 gal runoff. since had contained FP, dumped into pitwater barrel	
	Post-run	8.55	9.80	1.25			4.4	377:20			
RW-7	Pre-run	7.71	9.14	1.43	8.75	↓	4.3	441:09	NM		
	Post-run	7.84	8.28	0.44			4.0	441:29			
RW-8	Pre-run	9.20	9.74	0.54	10.5	P=7 D=15	1→3.0	116:05	NM		
	Post-run	9.06	9.65	0.59			7.8	116:20			
RW-9	Pre-run	9.54	9.87	0.33	10.0	↓		1:15	NM	repaired air hose by putting in new section of spliced tubing. Photos taken.	
	Post-run	9.75	9.78	0.03				1:30			
MW-3	Pre-run	9.44	10.34	0.90	N/A	N/A			3/4 gal		
	Post-run	9.50	9.52	0.02							

Elapsed Time @ Blower (hrs): 15:44.97  
 Sight Column Water Level: empty 1/4 1/2 3/4 full (empty @ 1/2 or more)  
 Depth of product in convault (feet): 1.90 (pre) 1.88 (post)  
 Approximate total volume recovered:

Compressor condensate emptied?   
 Depth to interface (feet): 2.84 (pre) 2.35 (post)

RW5

DTP  
8.11

DTW  
8.54

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*[Faint, illegible handwritten text]*

*[Extremely faint, illegible handwritten text, possibly bleed-through from the reverse side of the page]*

Site Visit Date:		2/3/10		Recorded By:			SC			
Recovery Well	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Depth to Pump (feet)	Cycles or Period Duration	Vacuum (in H2O)	Total Run Time (hr:mm)	Product removed (gal)	Comments	
RW-1									Inactive	
RW-2									Inactive	
RW-3	Pre-run	9.51	2.69	11.25	P=7 D=15		36:10	7.5	Pump hangs by rope	
	Post-run	10.53	0.95				36:30			
RW-4	Pre-run	9.12	0.21	10.42 ↓ 9.5	↓		101:15	50 mL	Pump hangs by rope Pump moved to 9.5' measured from TOC Air in line splice came apart - pushed back together "chunky" pieces on Inactive be - similar to what we've seen come out of MW-3	
	Post-run	9.07	0.23				101:30			
RW-5		6.60								
RW-6	Pre-run	8.52	1.28	10	P=7 D=20		377:20	NM	pump hangs by rope	
	Post-run	8.55	0.26				4.8			
RW-7	Pre-run	7.93	0.57	8.75	↓		22:38	NM	pump hangs by rope	
	Post-run	7.85	0.48				4.2			
RW-8	Pre-run	9.26	0.58	10.5 ↓ 9.5"	P=7 D=15		116:05	200 mL	pump hangs by rope Pump moved to 9.5" measured from top of cap	
	Post-run	9.22	0.51				2.6			
RW-9	Pre-run	9.46	0.06	10 ↓ 10.5	P=7 D=20		1:15	NM	pump was hanging by tubing adj so that hanging by rope. New setting 10.5'. Replaced air hose return tubing	
	Post-run	NA	NA				1:30			
MW-3	Pre-run	9.71	0.76					1/3	↳ measured from TOC	
	Post-run	9.81	0.06							

Elapsed Time @ Blower (hrs): 15333.33

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

Depth of product in convault (feet): 1.86

Approximate total volume recovered:

Compressor condensate emptied? Y

Depth to interface (feet): 2.33 (pre)

~~not~~ emptied blower condensate

Site Visit Date:		2/10/10				Recorded By:		SC+CO		
Recovery Well	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Depth to Pump (feet)	Cycles or Period Duration	Vacuum (in H2O)	Total Run Time (hr:mm)	Product removed (gal)	Comments	
RW-1									Inactive	
RW-2									Inactive	
RW-3	Pre-run	9.44	13.11	3.67	11.25	P=7 D=20	36:30	NM	changed run time to 20 min	
	Post-run	9.84	12.33	2.49			36:50			
RW-4	Pre-run	9.19	9.40	0.21	9.5	P=7 D= <del>20</del> 15	101:30	50 mL	Repaired air in splice with duct tape	
	Post-run	9.15	9.34	<del>0.29</del> 0.19			101:45			
RW-5		—	6.52	—	—	—	—	—	chunky pieces on <del>separator</del> - see photos	
RW-6 cap	Pre-run	9.41	9.82	0.41	10.11	P=7 D=20	377:40	2 gal water	Replaced air filter turned pump on to be sure pumping product. was still pumping water.	
	Post-run	<del>8.75</del> 8.03	10.00	1.25			378:00			0.75 product
RW-7	Pre-run	7.89	8.45	0.56	8.75	↓	5.5	441:49	1/4	
	Post-run	7.91	8.37	0.46			3.0			4501:49
RW-8	Pre-run	9.23	9.74	0.51	9.42	P=7 D=15	2.4	116:35	1/4	
	Post-run	9.12	9.48	0.36			2.75			116:50
RW-9	Pre-run	9.52	9.59	0.07	10.5 to ↓ 9.5	P=7 D=0	1:30	—	Moved pump to 9' 6" Replaced rope Did not run pump; product too thick	
	Post-run	—	—	—			<del>1:45</del>			
MW-3	Pre-run	9.62	10.41	0.79	—	—	—	1/2		
	Post-run	9.74	9.76	0.02			—			

Elapsed Time @ Blower (hrs): 15500.58

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

Depth of product in convault (feet): 1.85

Approximate total volume recovered:

Compressor condensate emptied?   
Depth to interface (feet): 2.33

Site Visit Date:		02/17/10			Recorded By:		CO			
Recovery Well	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Depth to Pump (feet)	Cycles or Period Duration	Vacuum (in H2O)	Total Run Time (hr:mm)	Product removed (gal)	Comments	
RW-1									Inactive	
RW-2									Inactive	
RW-3	Pre-run	9.75	12.29	2.54	11.25	P=7 D=20	36:45	1.75	30 min after pump stopped: PL=10.13, WL=10.80 After manual pumping: PL=10.62 WL=10.65	
	Post-run	10.94	11.43	0.49			37:07	Manual: 0.50		
RW-4	Pre-run	9.30	10.01	0.71	9.5	P=7 D=15	101:45	0.10		
	Post-run	9.31	9.44	0.13			102:02			
RW-5	nm	nm	-Could not measure; vehicle parked on top of well box						Inactive	
RW-6	Pre-run	8.62	9.44	0.82	10.11	P=7 D=20	4.1	378:00	0.25	pumping product
	Post-run	8.63	9.23	0.60			4.2	378:22		
RW-7	Pre-run	7.81	8.39	0.58	8.75	P=7 D=20	3.8	442:09	nm	
	Post-run	7.96	8.32	0.36			3.0	442:31		
RW-8	Pre-run	9.12	9.56	0.44	9.42	P=7 D=15	4.2	116:50	nm	Does not appear that pump ran - need to verify settings Did run - final time should be 117:07 - recorded incorrectly SC 2/24/10
	Post-run	9.19	9.52	0.33			2.4	116:50		
RW-9	Pre-run	9.46	9.52	0.06	9.5	-		1:30	-	Did not run pump due to low product level
	Post-run	-	-	-				1:30		
MW-3	Pre-run	9.95	10.74	0.79	-	-			0.2	
	Post-run	<del>10.21</del> 10.32	10.32	0.11						

Elapsed Time @ Blower (hrs): 15667.41  
 Sight Column Water Level: empty 1/4 1/2 3/4 full (empty @ 1/2 or more)  
 Depth of product in convault (feet): 1.81  
 Estimate total volume recovered:

Compressor condensate emptied?   
 Depth to interface (feet): 2.38

Visit Date: 2/24/10

Recorded By: SC

Recovery Well	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Depth to Pump (feet)	Cycles or Period Duration	Vacuum (in H2O)	Total Run Time (hr:mm)	Product removed (gal)	Comments
RW-1									Inactive
RW-2									Inactive
RW-3	Pre-run 8.98	14.08	5.10	11.25	P=7 D=20		37:07	1.4	Measure <del>para</del> removal during auto-run Manually purge after system run After 3 gal manually purged: OTP 9.03 DTW 14.11 After 10 gal " " " OTP 9.03 DTW 14.03
	Post-run 9.02	14.12	5.10				37:27	Manual 10.0	
RW-4	Pre-run 9.06	9.25	0.19	9.5	P=7 D=0:0		102:02	NM	Small amt of runoff in well box Did not run pump due to low product level
	Post-run -	-	-				102:02		
RW-5	Inaccessible due to parked car								Inactive
RW-6	Pre-run <del>8.45</del> 8.59	<del>9.15</del> 9.37	0.78	10.11 ↓ 9.44	P=7 D=20	6.0	378:22	1.6 gal	Moved pump position due to high interface level over past few weeks new depth = 9.44 ft
	Post-run 8.49	8.88	0.39				6.8	378:42	
RW-7	Pre-run <del>6.83</del> 7.15	8.30	1.15	8.75	P=7 D=20	>15 → 5.2	442:31	NM	1"-2" runoff in well box
	Post-run 7.72	8.53	0.81				10 → 5.0		
RW-8	Pre-run 9.18	9.58	0.40	9.42	P=7 D=15	2.2	117:07	NM	
	Post-run 9.12	9.45	0.33				2 → 6.2		
RW-9	Pre-run 9.47	9.52	0.05	9.50	P=7 D=0		1:30	NM	Did not run pump due to low product level
	Post-run -	-	-				1:30		
MW-3	Pre-run 9.11	10.56	1.45					2/3	Wellhead contained runoff almost to TOC
	Post-run 9.23	9.28	0.05						

Elapsed Time @ Blower (hrs): 15836.31  
 Sight Column Water Level: empty 1/4 1/2 3/4 full (empty @ 1/2 or more)  
 Depth of product in convault (feet): 1.81  
 Approximate total volume recovered:

Compressor condensate emptied? Y  
 Depth to interface (feet): 2.50

\* Post-run measurements 1.5 hr post-run (RW-3 measured immediately after run)

AW

Site Visit Date: 3/10/10 Recorded By: CO

Recovery Well	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Depth to Pump (feet)	Cycles or Period Duration	Vacuum (in H2O)	Total Run Time (hr:mm)	Product removed (gal)	Comments
RW-1									Inactive
RW-2									Inactive
RW-3	Pre-run 9.54	11.53	<del>2.00</del> 1.99		P=7		41:48	nm	
	Post-run 10.22	10.40	0.18	10.71	D=0:30		41:18		
RW-4	Pre-run 8.97	9.14	0.17		P=7		102:02	nm	
	Post-run Did Not Run			9.5	D=0		102:02		
RW-5	NM - Truck parked over well								Inactive
RW-6	Pre-run 8.53	9.14	0.61	9.3	P=7	4.5	379:02	nm	
	Post-run 8.78	8.92	0.14	<del>9.44</del> 9.44	D=20	4.3	379:22		
RW-7	Pre-run 7.64	<del>8.81</del> 7.97	<del>1.17</del> 0.35		P=7	7.2	443:11	nm	vacuum gauge questionable
	Post-run 7.73	7.92	0.19	8.75	D=20	2.1	443:31		
RW-8	Pre-run 9.10	9.41	0.31		P=7	1.5 → 6.0	117:37	nm	
	Post-run 8.91	9.15	0.24	9.42	D=15	7.1	117:52		
RW-9	Pre-run 9.35	9.44	0.11	10.5	P=7		01:30	nm	
	Post-run Did Not Run			↓ 9.5	D=0		↓		
MW-3	Pre-run 9.58	10.51	0.93	-	-		X	1	
	Post-run 10.18	10.20	0.02						

Elapsed Time @ Blower (hrs): 16172.45  
 Sight Column Water Level:  empty  1/4  1/2  3/4 full (empty @ 1/2 or more)  
 Depth of product in convault (feet): 1.71  
 Approximate total volume recovered:  
 Compressor condensate emptied?   
 Depth to interface (feet): 2.23

Site Visit Date:

3/17/10

Recorded By:

CO & SC

Recovery Well	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Depth to Pump (feet)	Cycles or Period Duration	Vacuum (in H2O)	Total Run Time (hr:mm)	Product removed (gal)	Comments
RW-1									Inactive
RW-2									Inactive
RW-3	Pre-run <del>9.57</del>	12.40	2.83	10.71	P=7 D=0:30		41:18	1.6	
	Post-run 9.88	10.91	1.03				41:48		
RW-4	Pre-run 9.07	9.23	0.16	9.5	P=7 D=0		102:02	not run	Verified pump is working
	Post-run nm	nm	nm				102:02		
RW-5									Inactive
RW-6	Pre-run 8.56	8.84	0.28	9.3	P=7 D=20	4.7	379:22	-	Pumped water. Removed pump, inspected, + replaced down well. Manually tested + was pumping product + air
	Post-run 8.72	8.90	0.18				4.5		
RW-7	Pre-run 7.79	8.05	0.26	8.75	P=7 D=20	1.6	443:31	0.05	Vacuum Gage not responding. Removed. To be replaced.
	Post-run 7.91	8.10	0.19				443:51		
RW-8	Pre-run 8.95	9.07	0.12	9.42	P=7 D=15	7.5	118:52	0.1	Veri
	Post-run 8.86	8.94	0.08				8.6		
RW-9	Pre-run 9.32	9.39	0.06	9.5	P=7 D=0		1:30	-	Verified pump is working
	Post-run nm	nm	nm				1:30		
MW-3	Pre-run 9.72	10.49	0.77	-	-		-	0.5	
	Post-run 9.89	9.95	0.06				-		

Elapsed Time @ Blower (hrs): 16338.71  
 Sight Column Water Level: empty 1/4 1/2 3/4 full (empty @ 1/2 or more)  
 Depth of product in convault (feet): 1.70  
 Approximate total volume recovered:

Compressor condensate emptied? Y  
 Depth to interface (feet): 2.25

Blower condensate emptied



Site Visit Date:		3/24/10		Recorded By:		SC			
Recovery Well	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Depth to Pump (feet)	Cycles or Period Duration	Vacuum (in H2O)	Total Run Time (hr:mm)	Product removed (gal)	Comments
RW-1									Inactive
RW-2									Inactive
RW-3	Pre-run	9.88	11.15	1.27	10.71	P=7 D=15	41:48	NM	
	Post-run	10.20	10.61	0.41			42:03		
RW-4	Pre-run	9.25	9.41	0.16	9.5	P=7 D=0	102:02	NM	Did not run pump; product thickness < 0.25'
	Post-run	-	-	-			102:02		
RW-5	NM - inaccessible								Inactive
RW-6	Pre-run	8.68	8.91	0.23	9.3	P=7 D=0	379:42	NM	Did not run pump; product thickness < 0.25'
	Post-run	-	-	-			379:42		
RW-7	Pre-run	7.90	8.08	0.18	8.75	P=7 D=0	443:51	NM	Did not run pump; product thickness < 0.25 ft. In process of procuring new gage
	Post-run	-	-	-			443:51		
RW-8	Pre-run	9.12	9.19	0.07	9.42	P=7 D=0	4.2	NM	Did not run pump; product thickness < 0.25'
	Post-run	-	-	-			118:07		
RW-9	Pre-run	9.59	9.62	0.03	9.5	P=7 D=0	1:30	NM	Did not run pump; product thickness < 0.25 ft.
	Post-run	-	-	-			1:30		
MW-3	Pre-run	9.91	10.55	0.64	-	-	-	1/2	
	Post-run	10.05	10.08	0.05			-		

Elapsed Time @ Blower (hrs): 10507.89  
 Sight Column Water Level: empty 1/4 1/2 3/4 full (empty @ 1/2 or more)  
 Depth of product in convault (feet): 1.69  
 Approximate total volume recovered:

Compressor condensate emptied? Y  
 Depth to interface (feet): 2.04

Site Visit Date: 3/31		Recorded By: SC								
Recovery Well	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Depth to Pump (feet)	Cycles or Period Duration	Vacuum (in H2O)	Total Run Time (hr:mm)	Product removed (gal)	Comments	
RW-1									Inactive	
RW-2									Inactive	
RW-3	Pre-run	NM	NM	NM	P=7 D=15		42:03	NM	System ran longer than D=15 due to a change in system time during pump operation	
	Post-run	10.21	10.22	0.01			42:34			
RW-4	Pre-run	—	—	—	P=7 D=0		102:02		Did not run pump - settings from last week still in effect	
	Post-run	9.31	9.46	0.15			102:02			
RW-5									Inactive	
RW-6	Pre-run	—	—	—	P=7 D=0	—	379:42		Did not run pump - settings from last week still in effect. Set to run for 15 min next week	
	Post-run	8.69	9.11	0.42			379:42			
RW-7	Pre-run	—	—	—		—	443:51		Did not run pump - settings from last week still in effect	
	Post-run	7.96	8.15	0.19		NM - gage being replaced	443:51			
RW-8	Pre-run	—	—	—		—	118:07		Did not run pump - settings from last week still in effect.	
	Post-run	9.11	9.18	0.07			118:07			
RW-9	Pre-run	—	—	—			1:30		Did not run pump - settings from last week still in effect.	
	Post-run	9.35	9.38	0.03			1:30			
MW-3	Pre-run	9.97	10.50	0.53			—	1/2		
	Post-run	10.20	10.27	0.07			—			

Elapsed Time @ Blower (hrs): 16676.15

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

Depth of product in convault (feet): 1.63 measured post-run

Approximate total volume recovered:

Compressor condensate emptied? Y

Depth to interface (feet): 2.24 measured post-run

purge water drums + waste have been removed.  
New drums left in system enclosure

Well      DTP      DTW

RW-1      Inaccessible - covered by shipping container

RW-2      -      7.53      Not enough product to be detected by probe, but probe came up from well w/ visible diesel oil.

RW-5      Inaccessible - covered by parked truck

DO      T

MW-4      12.50mg/L      18.8°C      Note: half of PVC stick fell down well

Site Visit Date:		4/7/10		Recorded By:		SE			
Recovery Well	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Depth to Pump (feet)	Cycles or Period Duration	Vacuum (in H2O)	Total Run Time (hr:mm)	Product removed (gal)	Comments
RW-1									Inactive
RW-2									Inactive
RW-3	Pre-run	9.74	13.21	10.71	P=7 D=30		42:34	NM	Ren Pump for 30 min
	Post-run	10.73	12.13				1.40		
RW-4	Pre-run	9.26	9.51	9.5	P=7 D=0		102:02	NM	Product thickness < 0.25 ft; did not run Pump
	Post-run	—	—				—		
RW-5									Inactive
RW-6	Pre-run	8.59	9.21	9.3	P=7 D=15	4.8	379:42	NM	
	Post-run	8.59	8.98				0.39		
RW-7	Pre-run	7.85	8.07	8.75	P=7 D=0	3.83.4	443:51	NM	Replaced gage w/ new one. Note - w/ no vac, reads 1.0 Product thickness < 0.25 ft; did not run pump
	Post-run	—	—				—		
RW-8	Pre-run	9.10	9.15	9.42	P=7 D=0	3.8	118:07	NM	Product thickness < 0.25 ft; did not run pump
	Post-run	—	—				—		
RW-9	Pre-run	9.35	9.36	9.5	P=7 D=0		1:30	NM	Product thickness < 0.25 ft; did not run pump
	Post-run	—	—				—		
MW-3	Pre-run	10.02	10.75	—	—		—	1	
	Post-run	10.11	10.12				0.01		

Elapsed Time @ Blower (hrs): 11:08 43.09  
 Sight Column Water Level (empty) 1/4 1/2 3/4 full (empty @ 1/2 or more)  
 Depth of product in convault (feet): 1.68  
 Approximate total volume recovered:

Compressor condensate emptied? Y  
 Depth to interface (feet): 2.26  
 emptied KO tank

Site Visit Date:		4/14		Recorded By:			CO			
Recovery Well	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Depth to Pump (feet)	Cycles or Period Duration	Vacuum (in H2O)	Total Run Time (hr:mm)	Product removed (gal)	Comments	
RW-1									Inactive	
RW-2									Inactive	
RW-3	Pre-run	9.43	13.38	10.71	P=7 D=30		43:04	nm		
	Post-run	10.70	12.14				1.44			
RW-4	Pre-run	9.09	9.29	9.5	P=7 D=0		102:02	—	Pump not run; Product thickness < 0.25 ft	
	Post-run	—	—				—			
RW-5									Inactive	
RW-6	Pre-run	8.40	9.11	9.3	P=7 D=15	6.7	379:57	nm		
	Post-run	8.45	8.59				0.14			
RW-7	Pre-run	7.78	7.99	8.75	P=7 D=30	4.2	443:51	—	Pump not run; Product thickness < 0.25 ft	
	Post-run	—	—				—			
RW-8	Pre-run	9.11	9.23	9.42	P=7 D=0	4.1	118:07	—	Pump not run; Product thickness < 0.25 ft	
	Post-run	—	—				—			
RW-9	Pre-run	9.32	9.35	9.5	P=7 D=0		1:30	—	Pump not run; Product thickness < 0.25 ft	
	Post-run	—	—				—			
MW-3	Pre-run	9.65	10.72					1.5		
	Post-run	9.98	10.02							

Elapsed Time @ Blower (hrs): 17010.22  
 Sight Column Water Level: empty 1/4 1/2 3/4 full (empty @ 1/2 or more)  
 Depth of product in convault (feet): 1.68  
 Approximate total volume recovered:

Compressor condensate emptied? Yes  
 Depth to interface (feet): 2.30

Site Visit Date:		4/21/10		Recorded By:		CO			
Recovery Well	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Depth to Pump (feet)	Cycles or Period Duration	Vacuum (in H2O)	Total Run Time (hr:mm)	Product removed (gal)	Comments
RW-1									Inactive
RW-2									Inactive
RW-3	Pre-run	9.21	13.32	4.11	10.71 P=7 D=30		43:34	nm	
	Post-run	10.52	12.19	1.67			44:04		
RW-4	Pre-run	8.95	9.14	0.19	9.5 P=7 D=0		102:02	-	Pump not run; Product thickness < 0.25 ft
	Post-run	-	-	-			102:02		
RW-5									Inactive
RW-6	Pre-run	8.39	8.92	0.53	9.3 P=7 D=15	7.0	380:12	nm	
	Post-run	8.40	8.49	0.09			6.7		
RW-7	Pre-run	7.78	8.02	0.24	8.75 P=7 D=0	3.7	443:51	-	Pump not run; Product thickness < 0.25 ft
	Post-run	-	-	-			-		
RW-8	Pre-run	9.07	9.24	0.17	9.42 P=7 D=0	4.8	118:07	-	Pump not run; Product thickness < 0.25 ft
	Post-run	-	-	-			-		
RW-9	Pre-run	9.30	9.32	0.02	9.5 P=7 D=0		1:30	-	Pump not run; Product thickness < 0.25 ft
	Post-run	-	-	-			1:30		
MW-3	Pre-run	9.34	10.73	1.39	-	-	-	1 gal	
	Post-run	9.79	9.81	0.02			-		

Elapsed Time @ Blower (hrs): 17:178.42  
 Sight Column Water Level: empty 1/4 1/2 3/4 full (empty @ 1/2 or more)  
 Depth of product in convault (feet): 1.64  
 Approximate total volume recovered:

Compressor condensate emptied?  
 Depth to interface (feet): 2.28

Site Visit Date: 4/28/10 Recorded By: CO

Recovery Well	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Depth to Pump (feet)	Cycles or Period Duration	Vacuum (in H2O)	Total Run Time (hr:mm)	Product removed (gal)	Comments
RW-1									Inactive
RW-2									Inactive
RW-3	Pre-run 9.73	11.98	2.25	10.71	P=7 D=30		44:04	nm	
	Post-run 10.60	11.09	0.49				44:34		
RW-4	Pre-run 9.21	9.42	0.21	9.5	P=7 D=0		102:02	—	Pump not run; Product thickness < 0.25 ft Well vault had ~ 2 inches of water
	Post-run —	—	—				102:02		
RW-5									Inactive
RW-6	Pre-run 8.61	8.96	0.35	9.3	P=7 D=15	4.2	380:27	nm	
	Post-run 8.61	8.79	0.18				4.4		
RW-7	Pre-run 7.85	8.20	0.35	8.75	P=7 D=15	3.0	443:51	nm	Ran pump manually for 15 min Well vault had ~ 2 inches of water
	Post-run 7.91	8.23	0.32				2.7		
RW-8	Pre-run 9.12	9.45	0.33	9.42	P=7 D=15	3.5	118:07	nm	Ran pump manually for 15 min
	Post-run 9.18	9.31	0.13				2.1		
RW-9	Pre-run 9.29	9.36	0.07	9.5	P=7 D=0		1:30	—	Pump not run; Product thickness < 0.25 ft
	Post-run —	—	—				1:30		
MW-3	Pre-run 9.82	10.68	0.86	—	—		—	1/2 gal	
	Post-run 10.21	10.25	0.04				—		

Elapsed Time @ Blower (hrs): 17346.23  
 Sight Column Water Level (empty) 1/4 1/2 3/4 full (empty @ 1/2 or more)  
 Depth of product in convault (feet): 1.65  
 Approximate total volume recovered:  
 Compressor condensate emptied?   
 Depth to interface (feet): 2.23

Site Visit Date:		5/5/2010			Recorded By:		CO			
Recovery Well	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Depth to Pump (feet)	Cycles or Period Duration	Vacuum (in H2O)	Total Run Time (hr:mm)	Product removed (gal)	Comments	
RW-1									Inactive	
RW-2									Inactive	
RW-3	Pre-run	10.07	10.90	0.83	10.71	P=7	44:34	nm	Reset pump duration to 15 min	
	Post-run	10.32	10.55	0.23	—	D=30	45:04			
RW-4	Pre-run	9.37	9.69	0.32	9.5	P=7	102:02	nm	Ran for 15 min manually	
	Post-run	9.39	9.60	0.21	—	D=15	102:02			
RW-5									Inactive	
RW-6	Pre-run	8.62	8.94	0.32	9.3	P=7	4.2	380:42	nm	
	Post-run	8.62	8.85	0.23	—	D=15	4.2	380:57		
RW-7	Pre-run	7.95	8.23	0.28	8.75	P=7	1.8 → 5.0	443:51	nm	
	Post-run	7.77	7.85	0.08	—	D=15	4.8	444:06		
RW-8	Pre-run	9.14	9.33	0.19	9.42	P=7	1.6 → 5.2	118:67	—	Did not run pump product thickness < 0.25 ft
	Post-run	—	—	—	—	D=0	—	118:22		
RW-9	Pre-run	9.57	9.63	0.06	9.5	P=7		1:30	—	Did not run pump product thickness < 0.25 ft
	Post-run	—	—	—	—	D=0		1:30		
MW-3	Pre-run	10.02	10.99	0.97					2	
	Post-run	10.33	10.34	0.01						

Elapsed Time @ Blower (hrs): 17514.34  
 Sight Column Water Level: empty 1/4 1/2 3/4 full (empty @ 1/2 or more)  
 Depth of product in convault (feet): 1.62  
 Approximate total volume recovered:

Compressor condensate emptied?   
 Depth to interface (feet): 2.24



Site Visit Date:		5/12/10		Recorded By:		SC			
Recovery Well	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Depth to Pump (feet)	Cycles or Period Duration	Vacuum (in H2O)	Total Run Time (hr:mm)	Product removed (gal)	Comments
RW-1									Inactive
RW-2									Inactive
RW-3	Pre-run	10.22	0.43	10.71	P=7 D=15		45:04	NM	Pump run from 12:15 → 12:30 System time last run <del>5/12 12:15</del> 5/12 12:15
	Post-run	10.31	0.27				45:19		
RW-4	Pre-run	9.52	0.23	9.5	P=7 D=0		102:17	-	Did not run pump; product thickness < 0.25 ft. last run 5/9 12:00
	Post-run	-	-				102:17		
RW-5									Inactive
RW-6	Pre-run	8.65	0.44	9.3	P=7 D=15	3.6	380:57	NM	last run 5/12 12:00 <del>5/9 12:00</del>
	Post-run	8.64	0.42				3.6		
RW-7	Pre-run	7.60	0.32	8.75	P=7 D=15	7.8 → 5.2	444:06	NM	last run 5/12 12:00
	Post-run	7.80	0.25				4.2		
RW-8	Pre-run	<del>8.34</del> 8.55	<del>8.36</del> P=5.0	9.42	P=7 D=0	>15 → 5.0	118:22	-	Did not run pump Product thickness < 0.25 ft last run 5/12 12:15 <del>12:00</del>
	Post-run	-	-				-		
RW-9	Pre-run	9.84	0.05	9.5	P=7 D=0		1:30	-	Did not run pump Product thickness < 0.25 ft last run 5/12 12:00
	Post-run	-	-				-		
MW-3	Pre-run	10.12	1.13					1	
	Post-run	10.37	0.04						

Elapsed Time @ Blower (hrs): 17682.42

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

Depth of product in convault (feet): 1.02

Approximate total volume recovered:

Compressor condensate emptied? Y

Depth to interface (feet): 2.23

emptied blower condensate

Site Visit Date:		5/19/10		Recorded By:		CO			
Recovery Well	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Depth to Pump (feet)	Cycles or Period Duration	Vacuum (in H2O)	Total Run Time (hr:mm)	Product removed (gal)	Comments
RW-1									Inactive
RW-2									Inactive
RW-3	Pre-run	10.42	10.84	0.42	P=7		45:19	nm	
	Post-run	10.48	10.65	0.17	D=15		45:34		
RW-4	Pre-run	9.66	9.91	0.25	P=7		102:17	nm	
	Post-run	9.69	9.93	0.24	D=15				
RW-5									Inactive
RW-6	Pre-run	8.64	9.35	0.71	P=7	3.8	381:12	nm	Verified pump is running properly
	Post-run	8.65	9.30	0.65	D=15	3.6	381:27		
RW-7	Pre-run	7.79	8.08	0.29	P=7	5.1	444:21	nm	
	Post-run	7.86	8.05	0.19	D=15	4.2	444:36		
RW-8	Pre-run	9.23	9.31	0.08	P=7	0.3 → 6.0	118:22	—	Did not run pump Product thickness < 0.25 ft
	Post-run	—	—	—	D=0	—	118:22		
RW-9	Pre-run	9.39	9.45	0.06	P=7		1:30	—	Did not run pump Product thickness < 0.25 ft
	Post-run	—	—	—	D=0		1:30		
MW-3	Pre-run	10.22	11.50	1.28				1.5	
	Post-run	10.69	10.75	0.06					

Elapsed Time @ Blower (hrs): 17850.42  
 Sight Column Water Level: empty 1/4 1/2 3/4 full (empty @ 1/2 or more)  
 Depth of product in convault (feet): 1.01  
 Approximate total volume recovered:

Compressor condensate emptied?   
 Depth to interface (feet): 2.24

Site Visit Date:		5/26/10		Recorded By:			CO		
Recovery Well	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Depth to Pump (feet)	Cycles or Period Duration	Vacuum (in H2O)	Total Run Time (hr:mm)	Product removed (gal)	Comments
RW-1									Inactive
RW-2									Inactive
RW-3	Pre-run	10.38	0.25	10.71	P=7		45:34	nm	
	Post-run	10.44	0.24		D=15				
RW-4	Pre-run	9.65	0.27	9.5	P=7		102:32	nm	Repaired tubing @ RW-4
	Post-run	9.63	0.37		D=15				
RW-5									Inactive
RW-6	Pre-run	8.63	0.88	9.3	P=7	3.8	381:27	nm	
	Post-run	8.64	0.84		D=15	3.6			
RW-7	Pre-run	7.66	0.32	8.75 ↓ 7.75	P=7	6.6	444:36	nm	
	Post-run	7.91	0.24		D=15	3.2			
RW-8	Pre-run	8.71	0.12	9.42	P=7	11.6 → 6.5	118:22	nm	Did not run pump; product thickness < 0.25
	Post-run	—	—		D=0	—			
RW-9	Pre-run	9.41	0.09	9.5	P=7		1:30	nm	Did not run pump Product thickness < 0.25
	Post-run	—	—		D=0				
MW-3	Pre-run	10.23	1.57					1.5	
	Post-run	10.78	0.05						

Elapsed Time @ Blower (hrs): 19618.38  
 Sight Column Water Level: empty 1/4 1/2 3/4 full (empty @ 1/2 or more)  
 Depth of product in convault (feet): 1.60  
 Approximate total volume recovered:

Compressor condensate emptied?   
 Depth to interface (feet): 2.28

Site Visit Date:		10/02/10				Recorded By:		CO		
Recovery Well	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Depth to Pump (feet)	Cycles or Period Duration	Vacuum (in H2O)	Total Run Time (hr:mm)	Product removed (gal)	Comments	
RW-1									Inactive	
RW-2									Inactive	
RW-3	Pre-run	10.28	1.51		P=7		45:49		Ran pump manually for add'l 15 min (30 min total) following measurement P=10.62 WL: 11.42	
	Post-run	10.34	1.04	10.71	D=15		46:04			
RW-4	Pre-run	9.69	0.13		P=7		103:04		Did not run pump Product thickness < 0.25 ft	
	Post-run	—	—	9.5	D=0		—	—		
RW-5									Inactive	
RW-6	Pre-run	8.56	0.99		P=7	4.3	381:42		Pump running poorly; checked/tightend tubing + filter → improved	
	Post-run	8.83	0.23	9.3	D=15	4.0	381:57			
RW-7	Pre-run	7.92	0.38		P=7	3.1	444:51			
	Post-run	7.98	0.30	7.75	D=15	2.9	445:06			
RW-8	Pre-run	9.13	1.12		P=7	2.3 → 5.0	118:22		Replaced filter	
	Post-run	9.20	0.13	9.42 9.5	D=15	4.3	118:37			
RW-9	Pre-run	9.44	0.14		P=7		01:30		Did not run Product thickness < 0.25 ft	
	Post-run	—	—	9.5	D=0		—	—		
MW-3	Pre-run	10.23 <del>10.28</del>	1.58						2.5	
	Post-run	10.78	0.05							

Elapsed Time @ Blower (hrs): 18186.50

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

Depth of product in convault (feet): 1.60

Approximate total volume recovered:

Compressor condensate emptied?

Depth to interface (feet): 2.42

Site Visit Date:		6/9/10					Recorded By:		SC	
Recovery Well	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Depth to Pump (feet)	Cycles or Period Duration	Vacuum (in H2O)	Total Run Time (hr:mm)	Product removed (gal)	Comments	
RW-1									Inactive	
RW-2									Inactive	
RW-3	Pre-run	10.41	11.65	1.24	10:71	P=7 D=15	46:04	NM		
	Post-run	10.60	11.36	0.76			46:19			
RW-4	Pre-run	9.80	10.00	0.20	9.5	P=7 D=0	103:04	<del>NM</del> —	Product thickness < 0.25 ft; Did not run pump.	
	Post-run	—	—	—			103:04			
RW-5									Inactive	
RW-6	Pre-run	8.62	9.52	0.90	9.3	P=7 D=15	4.0	NM		
	Post-run	8.76	8.98	0.22			4.0			
RW-7	Pre-run	8.01	8.45	0.44	7.75	P=7 D=15	2.8	NM		
	Post-run	8.02	8.41	0.39			2.6			
RW-8	Pre-run	9.16	9.25	0.09	9.5	P=7 D=0	2.9	<del>NM</del> —	Product thickness < 0.25 ft; did not run pump.	
	Post-run	—	—	—			118:37			
RW-9	Pre-run	9.49	9.56	0.07	9.5	P=7 D=0	1:30	<del>NM</del> —	Product thickness < 0.25 ft; did not run pump	
	Post-run	—	—	—			1:30			
MW-3	Pre-run	10.32	12.26	1.89				2.5		
	Post-run	10.72	10.79	0.07						

Elapsed Time @ Blower (hrs): ~~18:54~~ 18:54.37

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

Depth of product in convault (feet): 1.59

Approximate total volume recovered:

Compressor condensate emptied?

Depth to interface (feet): 2.23

emptied blower condensate

Visit Date: 6/17/10

Recorded By: SC/CO

Recovery Well	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Depth to Pump (feet)	Cycles or Period Duration	Vacuum (in H2O)	Total Run Time (hr:mm)	Product removed (gal)	Comments
RW-1	inaccessible - covered by shipping containers								Inactive
RW-2	—	9.54	—	—	—	—	—	—	Inactive
RW-3	Pre-run	10.42	12.11	1.69	P=7 D=30		46:19	0.5	
	Post-run	10.53	11.22	0.69			46:49		
RW-4	Pre-run	9.82	10.14	0.32	P=7 D=15		103:04	100mL	Replaced product line because no product was coming out during pumping, moved pump, observed product pumping. ran manually for 15 min
	Post-run	9.78	9.96	0.18			9.5 ↓ 10.38		
RW-5	—	6.70	—	—	—	—	—	—	probe covered in diesel/water emulsion
RW-6	Pre-run	8.65	9.62	0.97	P=7 D=15	4.2	382:12	1.5	
	Post-run	8.75	8.93	0.18			9.3		
RW-7	Pre-run	7.96	8.60	0.64	P=7 D=15	3.3	445:21	nm	
	Post-run	8.03	8.60	0.57			7.75 ↓ 8.17		
RW-8	Pre-run	9.13	9.24	0.11	P=7 D=0	4.8	118:37	—	Did not run
	Post-run	—	—	—			9.5		
RW-9	Pre-run	9.52	9.61	0.09	P=7 D=0		01:30	—	Did not run
	Post-run	—	—	—			9.5		
MW-3	Pre-run	10.34	12.18	1.84				2.5	
	Post-run	10.78	10.83	NOS					

Elapsed Time @ Blower (hrs): 18:54.5

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

Depth of product in convault (feet): 1.58

Approximate total volume recovered:

Compressor condensate emptied?

Depth to interface (feet): 2.25

Site Visit Date:		6/23/10			Recorded By:		CO			
Recovery Well	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Depth to Pump (feet)	Cycles or Period Duration	Vacuum (in H2O)	Total Run Time (hr:mm)	Product removed (gal)	Comments	
RW-1									Inactive	
RW-2									Inactive	
RW-3	Pre-run	10.46	11.63	1.17	10.71	P=7 D=30	46:49	nm		
	Post-run	10.74	11.36	0.72			47:19			
RW-4	Pre-run	9.88	16.09	0.21	16.38	P=7 D=0	103:19	-	Did not run pump	
	Post-run	-	-	-			103:19			
RW-5		7.85							Inactive	
RW-6	Pre-run	8.70	9.60	0.90	9.3	P=7 D=15	3.8	382:27		
	Post-run	8.92	8.99	0.07			3.8 → 6.0			
RW-7	Pre-run	8.04	8.83	0.79	8.7	P=7 D=15	2.1	445:36		
	Post-run	8.02	8.66	0.64			2.2 → 6.0			
RW-8	Pre-run	9.19	9.36	0.17	9.5	P=7 D=0	3.1	118:37	Did not run pump	
	Post-run	-	-	-			-			
RW-9	Pre-run	9.55	9.40	0.05	9.5	P=7 D=0		1:30	Did not run pump	
	Post-run	-	-	-						
MW-3	Pre-run	10.39	12.29	1.90				7	Well recovering fast after purging. PL <del>increased</del> 0.10 ft higher after 3 min product thickness <del>1.55</del> # after 10 min PL = 10.59 WL = 11.32 → 0.60 ft	
	Post-run	11.07	11.10	0.03						

Elapsed Time @ Blower (hrs): 18696.37  
 Sight Column Water Level empty 1/4 1/2 3/4 full (empty @ 1/2 or more)  
 Depth of product in con vault (feet): 1.55  
 Approximate total volume recovered:

Compressor condensate emptied?   
 Depth to interface (feet): 2.24

Site Visit Date:

6/30/10

Recorded By:

OO

Recovery Well	Depth to Product (feet)	Depth to Water (feet)	Product Thickness (feet)	Depth to Pump (feet)	Cycles or Period Duration	Vacuum (in H2O)	Total Run Time (hr:mm)	Product removed (gal)	Comments
RW-1									
RW-2									Inactive
RW-3	Pre-run	10.51	11.64	10.71	P=7 D=30		47:19		
	Post-run	10.80	11.41				0.61		
RW-4	Pre-run	9.89	10.16	10.38	P=7 D=15		103:19		
	Post-run	9.91	10.16				0.25		
RW-5	NM - truck parked above well								Inactive
RW-6	Pre-run	8.55	9.65	9.3	P=7 D=15	6.0	382:42		
	Post-run	8.77	9.05				0.28		
RW-7	Pre-run	7.71	8.89	8.7	P=7 D=30	6.2	445:51		
	Post-run	7.93	8.39				0.46		
RW-8	Pre-run	9.20	9.41	9.5	P=7 D=0	3.0 → 6.2	118:37	—	Did not run
	Post-run	—	—			—	118:37		
RW-9	Pre-run	9.59	9.63	9.5	P=7 D=0		1:30	—	Did not run
	Post-run	—	—				—		
MW-3	Pre-run	10.40	12.42					12	
	Post-run	11.01	11.10						

Elapsed Time @ Blower (hrs): 18858.31  
 Sight Column Water Level:  empty 1/4 1/2 3/4 full (empty @ 1/2 or more)  
 Depth of product in convault (feet): 1.53  
 Approximate total volume recovered: 1.46

Compressor condensate emptied?   
 Depth to interface (feet): 2.22  
~~2.22~~



