



PORT OF OAKLAND

July 21, 2011

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

RECEIVED

11:47 am, Jul 26, 2011

Alameda County
Environmental Health

RE: RO#0000010_2011 First Semi-Annual Groundwater Monitoring and Remediation System Operation and Maintenance Report - Port of Oakland, 651 Maritime Street, Oakland, CA_2011-07-21

Dear Mr. Khatri:

Please find enclosed the report entitled *2011 First Semi-Annual Groundwater Monitoring and Remediation System Operation and Maintenance Report - Port of Oakland, 651 Maritime Street, Oakland, CA* ("Report") dated July 2011, prepared by Malcolm Pirnie, Inc. ("Malcolm Pirnie") on behalf of the Port of Oakland ("Port")¹. This Report is being submitted in accordance with Alameda County Health Care Services Agency ("County") requirements, as specified in County letters dated March 23, 2006², January 19, 2007³, September 30, 2008⁴, and June 23, 2011.⁵

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

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

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

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

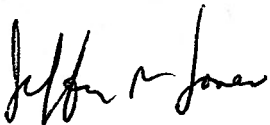
⁵ Letter from Mr. Paresh Khatri (County) to Messrs. Jeffrey Jones and Jeffrey Rubin (Port) regarding *Feasibility Study Evaluation for Fuel Leak Case No. RO0000010 & RO0000187 (GeoTracker Global ID# T0600100892), Port of Oakland, 651 Maritime Street, Oakland, CA*, dated June 23, 2011.

July 21, 2011

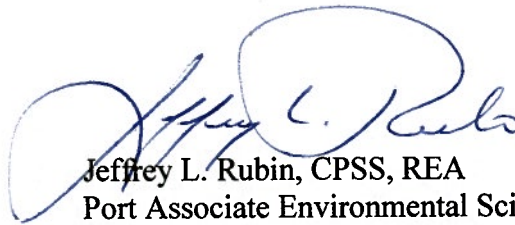
The Port has retained Malcolm Pirnie to perform groundwater monitoring and maintenance of the remediation system. Results of the first 2011 semi-annual sampling event are contained in the enclosed report. The next monitoring event will be performed during the November/December 2011 time frame. If you 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)
James Strandberg (Malcolm Pirnie)
Yane Nordhav (Baseline Environmental)



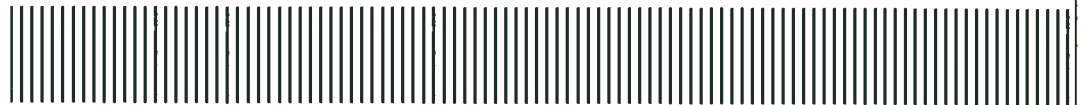
Port of Oakland

530 Water Street • Oakland, CA 94607

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

***Port of Oakland
651 Maritime Street
Oakland, California***

July 2011



Report Prepared By:

Malcolm Pirnie, Inc.

2000 Powell Street, 7th Floor
Emeryville, CA 94608
(510) 652-4500

4656016

**MALCOLM
PIRNIE**

July 21, 2011

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

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

Dear Mr. Rubin:

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

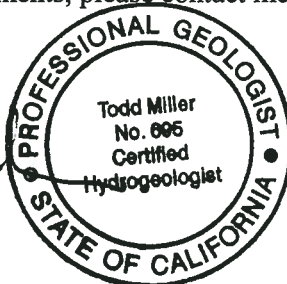
Malcolm Pirnie assumed responsibility for implementing the groundwater monitoring program and operation of the free product recovery system on May 1, 2009. The enclosed report documents the groundwater sampling event conducted at the subject site in June 2011 by Malcolm Pirnie. This report also presents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

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

Sincerely,



Todd Miller, CHG
Project Manager



Enclosure

Contents

1. Introduction	1-1
2. Groundwater Sampling Activities	2-1
3. Results	3-1
3.1. Groundwater Flow Direction.....	3-1
3.2. Product Thickness.....	3-1
3.3. Analytical Results	3-1
3.3.1. TPHg.....	3-2
3.3.2. BTEX and MTBE	3-2
3.3.3. TPHd and TPHmo	3-2
3.3.4. Monitored Natural Attenuation Parameters	3-3
3.4. ORC Use	3-4
3.5. Quality Assurance / Quality Control	3-4
4. Free Product Recovery System	4-1
5. Conclusions	5-1

Figures

Figure 1	Site Location Map
Figure 2	Harbor Facilities Complex Layout
Figure 3	Site Plan
Figure 4	Groundwater Elevation Isocontour Map – June 2011
Figure 5	Shallow Groundwater Sample Results - June 2011
Figure 6	TPHg Concentration versus Time
Figure 7	Benzene Concentration versus Time
Figure 8	MTBE Concentration versus Time
Figure 9	TPHd Concentration versus Time

Tables

Table 1	Historical Groundwater Elevation and Free Product Data
Table 2	Groundwater Analytical Results Summary
Table 3	Groundwater Analytical Results Summary: Monitored Natural Attenuation Parameters
Table 4	Free Product Recovery System Groundwater Elevation and Free Product Data, January 1, 2011 Through June 7, 2011

Appendices

A	Groundwater Sampling Forms
B	Laboratory Analytical Reports
C	Free Product Recovery System Operation and Maintenance Field Sheets
D	Free Product Recovery System Shutdown Field Notes

Acronyms Used in the Report

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

1. Introduction

This 2011 First Semi-Annual Groundwater Monitoring and Remediation System Operation and Maintenance Report (Report) for 651 Maritime Street, Oakland, California (Site)¹ has been prepared by Malcolm Pirnie on behalf of the Port of Oakland (Port). This Report includes the period from January through 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 Site related to petroleum releases from two former underground storage tank (UST) sites located at 2277 Seventh Street and 2225 Seventh Street. A brief history of the two sites is provided below.

Former 2277 Seventh Street Site

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

Former 2225 Seventh Street Site

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

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

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

651 Maritime Site

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

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

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

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

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

² Letter from ACHCS to Dongary Investments dated July 26, 1994.

³ Letter from ACHCS to Port of Oakland dated March 27, 2003.

⁴ February 2009, *Second Semi-Annual 2008 Groundwater Monitoring and Remediation System Operation and Maintenance Report*.

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

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

On September 30, 2008, ACHCS approved a plan to install four additional groundwater monitoring wells, MW-9 through MW-12 (Figure 3), to enhance the existing monitoring well network and to replace wells removed during Site redevelopment.⁶ The wells were installed by MSE Group (MSE) and sampled in December 2008, along with the remaining Site wells. Well installation activities and sample results were reported by MSE in February 2009.⁴

⁵ Letter from ACHCS to Port of Oakland dated March 23, 2006.

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

2. Groundwater Sampling Activities

Malcolm Pirnie conducted the 2011 first semi-annual groundwater monitoring event at the Site from June 21 to 23, 2011. The June 2011 groundwater monitoring event consisted of measuring the depth to groundwater and free-phase product thickness, where present, in the 10 groundwater monitoring wells on-site and collecting groundwater samples from the wells without free-phase product. The depth to groundwater and free-phase product thickness was measured to the nearest one-hundredth of a foot from the top of the well casing using a dual-phase interface probe where free product was anticipated or a water level meter where free product was not anticipated. The dual-phase interface probe and water level meter were decontaminated before each measurement by washing in a Liquinox solution then rinsing with water. Field observations and instrument readings indicated that there was a detectable amount of free-phase product in monitoring well MW-3 (Table 1); hence, this well was neither purged nor sampled. Water level measurements for the June 2011 monitoring event are summarized in Table 1 and included on the groundwater sampling forms in Appendix A.

Malcolm Pirnie purged wells MW-1, MW-2, MW-4, MW-5, MW-8A, MW-9, MW-10, MW-11, and MW-12 using a peristaltic pump equipped with dedicated silicone and polyethylene tubing. Malcolm Pirnie monitored field water quality parameters (including temperature, pH, oxidation/reduction potential (ORP), DO concentration, and electrical conductivity) of the purge water using portable field instruments calibrated to manufacturer's specifications. Purging continued until water quality parameters stabilized as recharge rates permitted. If parameters did not stabilize after one hour of purging, a sample was collected. Slow recharge of well MW-2 did not allow for parameter stabilization before the well dewatered. After purging, the water level in well MW-2 was allowed to recover to approximately 80 percent of the initial water level before collecting a sample. Field-measured groundwater quality information collected during the June 2011 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.
- Total dissolved solids (TDS) in accordance with USEPA Method 160.1;
- Dissolved metals and cations (sodium, potassium, calcium, magnesium, manganese, and iron) in accordance with USEPA Method 6010B;
- Major anions (sulfate, chloride, nitrate, and nitrite) in accordance with USEPA Method 300.0;
- Alkalinity (bicarbonate and carbonate) in accordance with Standard Method 2320B;
- Orthophosphate in accordance with Standard Method 4500P-E;
- Dissolved sulfide in accordance with Standard Method 4500S2-D;
- Methane and carbon dioxide in accordance with AM20GAX (equivalent to USEPA RSK-175);

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

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 analyses.

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

Under approval from the 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. The ORC socks installed during a previous monitoring event were removed on June 15, 2011, 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 13.52 mg/L. Water purged from well MW-4 during the sampling event contained a DO concentration of 0.09 mg/L. Following the monitoring event the ORC socks were not replaced.

Approximately 50 gallons of purge and decontamination water were generated during the June 2011 monitoring event. Malcolm Pirnie placed the water in a properly labeled 55-gallon drum, which was stored in the free product recovery system enclosure located

within the Harbor Facilities Complex. The Port's environmental services contractor will dispose of the water in accordance with applicable laws and regulations.

3. Results

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

3.1. Groundwater Flow Direction

Based on the depth-to-water measurements collected, groundwater levels beneath the Site in June 2011 are approximately comparable to those observed in December 2010. In December 2010, groundwater elevations ranged from 4.24 feet above mean sea level (amsl) to 6.38 feet amsl. In June 2011, groundwater elevations ranged from 4.35 feet amsl to 6.33 feet amsl. The groundwater flow direction was judged to range from the northeast to northwest. Groundwater gradients at the Site ranged from 0.018 to 0.0019 feet per foot. A shallow groundwater elevation 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 well MW-3 during the June 2011 monitoring event. The product thickness in well MW-3 was measured to be 0.46 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 December 2010 and May 25, 2011 using a peristaltic pump and placed in the 500-gallon concrete-encased aboveground storage tank (Convault) located within the system enclosure. Historically, MW-1 has also contained free-phase product, ranging in thickness from non-detectable to 1.30 feet since April 2000 (Table 1). Free-phase product was not detected in well MW-1 during this monitoring event.

3.3. Analytical Results

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

3.3.1. TPHg

The laboratory reported TPHg in the groundwater samples collected from wells MW-1, MW-4, MW-9, MW-10, and MW-12 at concentrations ranging from 100 micrograms per liter ($\mu\text{g/L}$) to 1,100 $\mu\text{g/L}$. The laboratory also reported that chromatograms resulting from the TPHg analyses exhibited patterns that do not match the gasoline standard. Chromatograms are included in the laboratory reports in Appendix B.

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

3.3.2. BTEX and MTBE

The laboratory reported benzene in the groundwater samples collected from wells MW-1 (46 $\mu\text{g/L}$), MW-4 (30 $\mu\text{g/L}$), MW-9 (25 $\mu\text{g/L}$), and MW-10 (54 $\mu\text{g/L}$). Xylenes were reported in the sample collected from well MW-1 at 2.0 $\mu\text{g/L}$. MTBE was reported in the sample collected from well MW-12 at 3.2 $\mu\text{g/L}$. Ethylbenzene and toluene were reported to be below the analytical method reporting limit in the samples analyzed.

Figures 7 and 8 illustrate the benzene and MTBE concentrations over time for those wells where the constituents have been reported above their respective analytical method reporting limits in at least 10 percent of the samples (except MW-1, which historically contains free product). Figure 7 shows that except for well MW-10, benzene concentrations beneath the Site are stable and/or decreasing. The concentrations reported in well MW-10 show an increasing trend with time. The increase may be related to the location of the well relative to the free product plume. The reported concentration in MW-10 is above the Site remedial goal of 46 $\mu\text{g/L}$ ⁷. The remaining reported benzene concentrations are at or below the Site remedial goal. Figure 8 shows MTBE concentrations beneath the site are stable and/or decreasing, with the reported concentrations being below the Site remedial goal of 1,800 $\mu\text{g/L}$ ⁷. Total xylenes were reported in the sample collected from well MW-1 at a concentration of 2.0 $\mu\text{g/L}$, which is below the Site remedial goal of 100 $\mu\text{g/L}$ ⁷.

3.3.3. TPHd and TPHmo

The laboratory reported TPHd in the groundwater samples collected from wells MW-1, MW-9, MW-10, and MW-12 at concentrations ranging from 160 $\mu\text{g/L}$ to 890 $\mu\text{g/L}$. The

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

laboratory also reported that the chromatograms for the samples collected from wells MW-9 and MW-12 exhibited patterns that do not match the diesel standard. The laboratory reported TPHmo in the groundwater sample collected from MW-2 at 1,100 µg/L; however, the laboratory reported that the chromatogram did not match the laboratory standard and exhibited a single unidentified peak comprising the majority of the reported concentration. The sample extract was re-analyzed using USEPA Method 8270 and the peak was identified as bis(2-ethylhexyl)phthalate, a common plasticizer, at a concentration of 680 µg/L. This compound is known to be a laboratory contaminant and is used in the manufacturing of polyvinyl chloride and other plastic products. Bis(2-ethylhexyl)phthalate is not associated with refined petroleum fuels or their degradation by-products. Malcolm Pirnie requested the laboratory re-extracted the sample, outside of holding times, and analyzed it for TPHmo. Results showed no detectable compounds above the method reporting limit in the re-extracted sample indicating the initial detection was from laboratory cross-contamination. Chromatograms are included in the laboratory reports in Appendix B.

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

3.3.4. Monitored Natural Attenuation Parameters

In accordance with the *Feasibility Study/Corrective Action Plan (FS/CAP)*,⁷ samples were analyzed for monitored natural attenuation (MNA) parameters. Methane was detected in the wells sampled at concentrations ranging from 0.69 µg/L to 10,000 µg/L. DO was below 1 mg/L in nine of the 10 wells. Ferrous iron was detected in eight of the 10 wells (not detected in wells MW-2 and MW-4), at concentrations ranging from 0.46 mg/L to 7.8 mg/L. Dissolved sulfide was detected in the samples collected from wells MW-1, MW-9, MW-10, and MW-12 at concentrations of 0.09 mg/L to 0.24 mg/L.

Groundwater conditions beneath the site are consistent with a reduced environment. The presence of methane indicates strongly reducing conditions across the site, with areas of moderately reducing conditions near wells MW-4 and MW-2. Ferrous iron in the wells nearest the free product plume also indicate strongly reducing conditions appear to collocate with areas of greater hydrocarbon impact. MW-2 appears to be in the least reducing area of the site, with oxygen levels greater than 1 mg/L and low concentration of methane (0.69 µg/L). These results may have been impacted by the sampling methods employed at MW-2 due to low recharge rates. In general, the results indicate that

anaerobic degradation of the petroleum hydrocarbon constituents is occurring, resulting from depressed oxygen levels and low ORP.

3.4. ORC Use

On June 15, six days before groundwater monitoring was performed at the Site, Malcolm Pirnie removed the ORC socks from well MW-4.

3.5. Quality Assurance / Quality Control

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

The laboratory reported benzene in sample MW-4 and duplicate sample MW-4DUP at concentrations of 30 µg/L and 28 µg /L. The relative percent difference (RPD) between the two samples is calculated below:

$$\text{Benzene RPD } |30-28| / [(30+28)/2] = 7\%$$

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

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

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

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

4. Free Product Recovery System

The Port installed the active 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. 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 first semi-annual monitoring period in 2011. Typical operation and maintenance (O&M) tasks include bi-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 were adjusted as necessary to optimize recovery. In addition, pump functionality was checked, and filters checked and changed as necessary. Bi-weekly free-phase product thickness measurements for the June 2011 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 July 2007, the free-phase 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 effluent containing petroleum vapors. The air effluent is treated using a series of two vessels, each containing 1,000 pounds of vapor-phase granular activated carbon (GAC). Treatment and discharge conditions are provided in a Permit-to-Operate from the Bay Area Air Quality Management District.

On June 7, 2011, in accordance with the FS/CAP and the letter submitted to the Alameda County Health Care Services Agency on May 16, 2011, Malcolm Pirnie shut down the free-phase product recovery system. The skimmer pumps were removed from the wells. The low vacuum system was also shut down, and removal of the GAC vessels is pending

waste characterization. Free product and water level measurements were collected from monitoring and recovery wells on June 7, 2011 and June 21, 2011 to confirm stability of the free-phase product. As indicated in the FS/CAP, free product and water level measurements will be conducted on a quarterly basis to confirm the stability of the free-phase product.

Prior to enhancement of the free-phase 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, 1,298 gallons of product has been recovered in 41 months (August 2007 through June 7, 2011). A total of 1,476 gallons of product have been recovered during operation of the active free product recovery system.

5. Conclusions

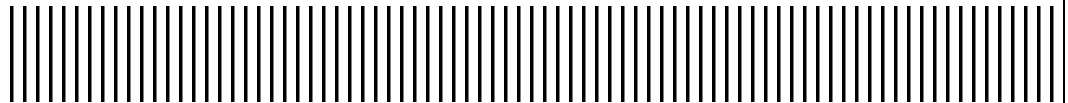
The results of the June 2011 monitoring and free product recovery system O&M tasks indicate that the free-phase product plume is stable, and groundwater concentrations are generally stable and/or decreasing (Figures 6 through 9). Results of the MNA assessment indicate that petroleum hydrocarbons are actively being reduced through anaerobic degradation. Remedial goals for the Site were derived following the RWQCB's Environmental Screening Level program and are based on: (1) dissolved constituents are not migrating off-Site at concentrations that would impact ecological receptors in the San Francisco Bay; and (2) groundwater beneath the Site is considered non-potable and risks are managed through implementation of institutional controls and deed restrictions. The historical data indicate that dissolved constituents of concern reported in the various monitoring wells beneath the Site are below their respective Site-specific remedial goals, signifying that active remediation of groundwater is not warranted. The detection of bis(2-ethylhexyl)phthalate in the sample collected from well MW-2 was the result of laboratory cross-contamination.



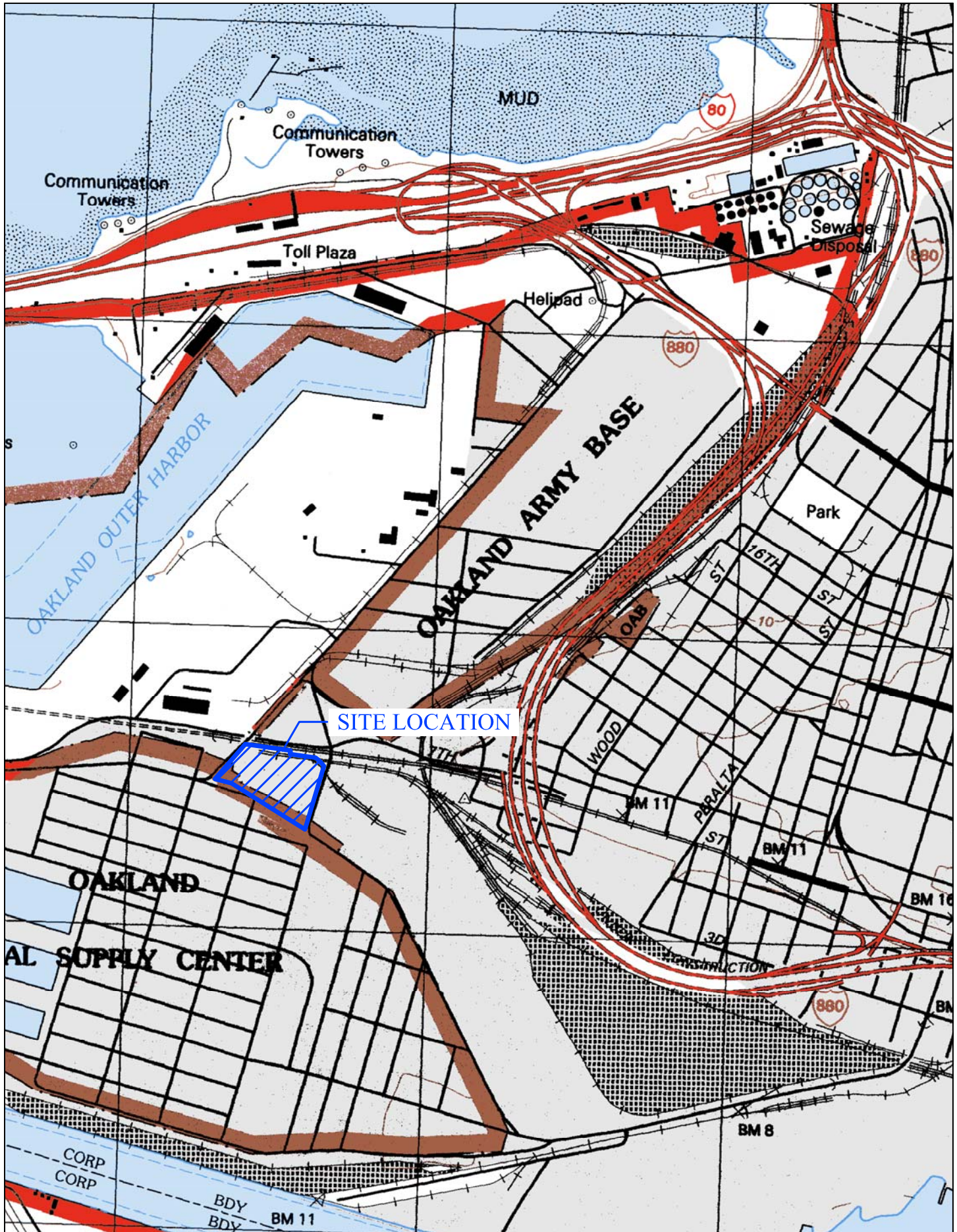
Port of Oakland

530 Water Street • Oakland, CA 94607

Figures



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

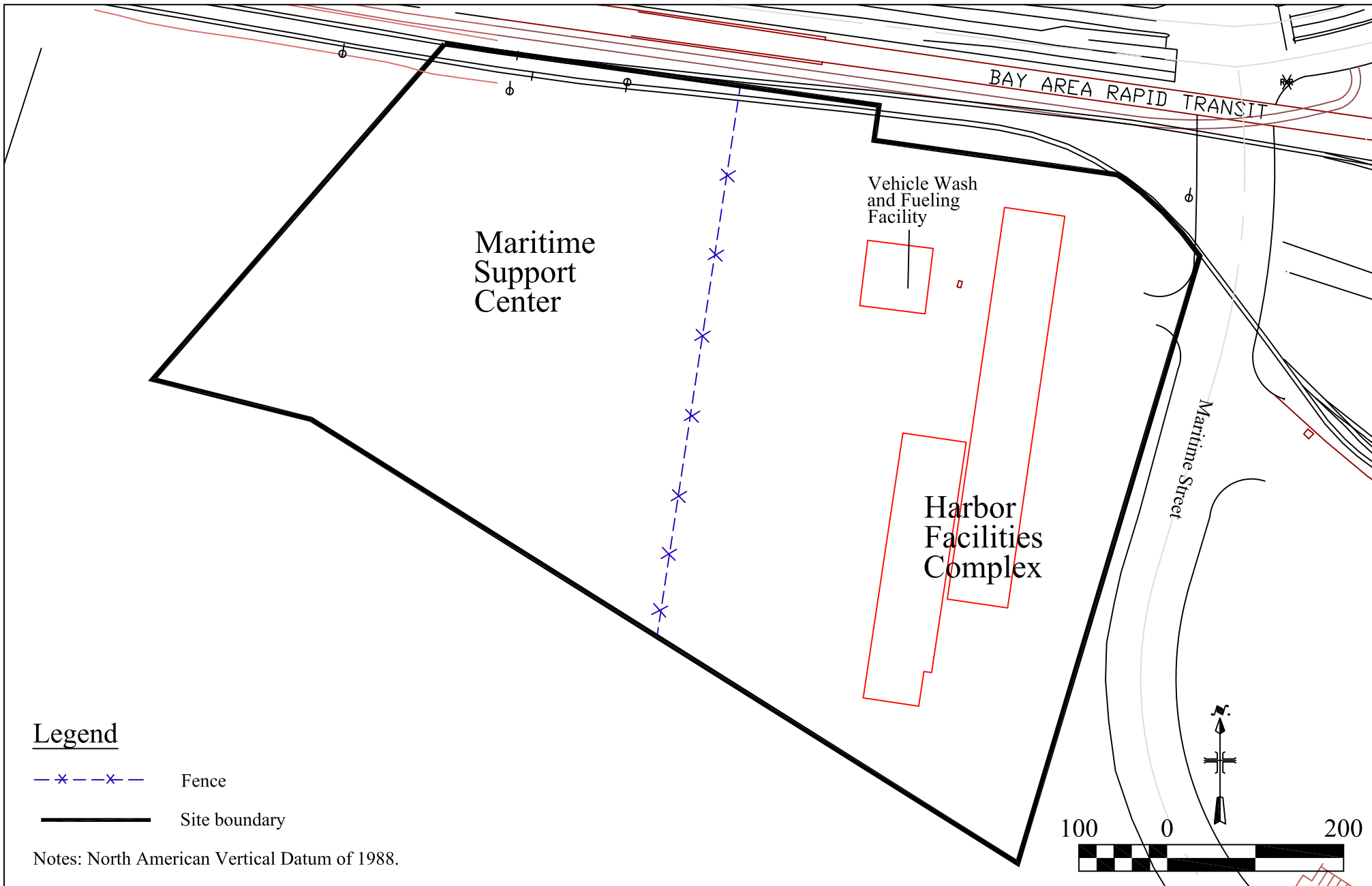


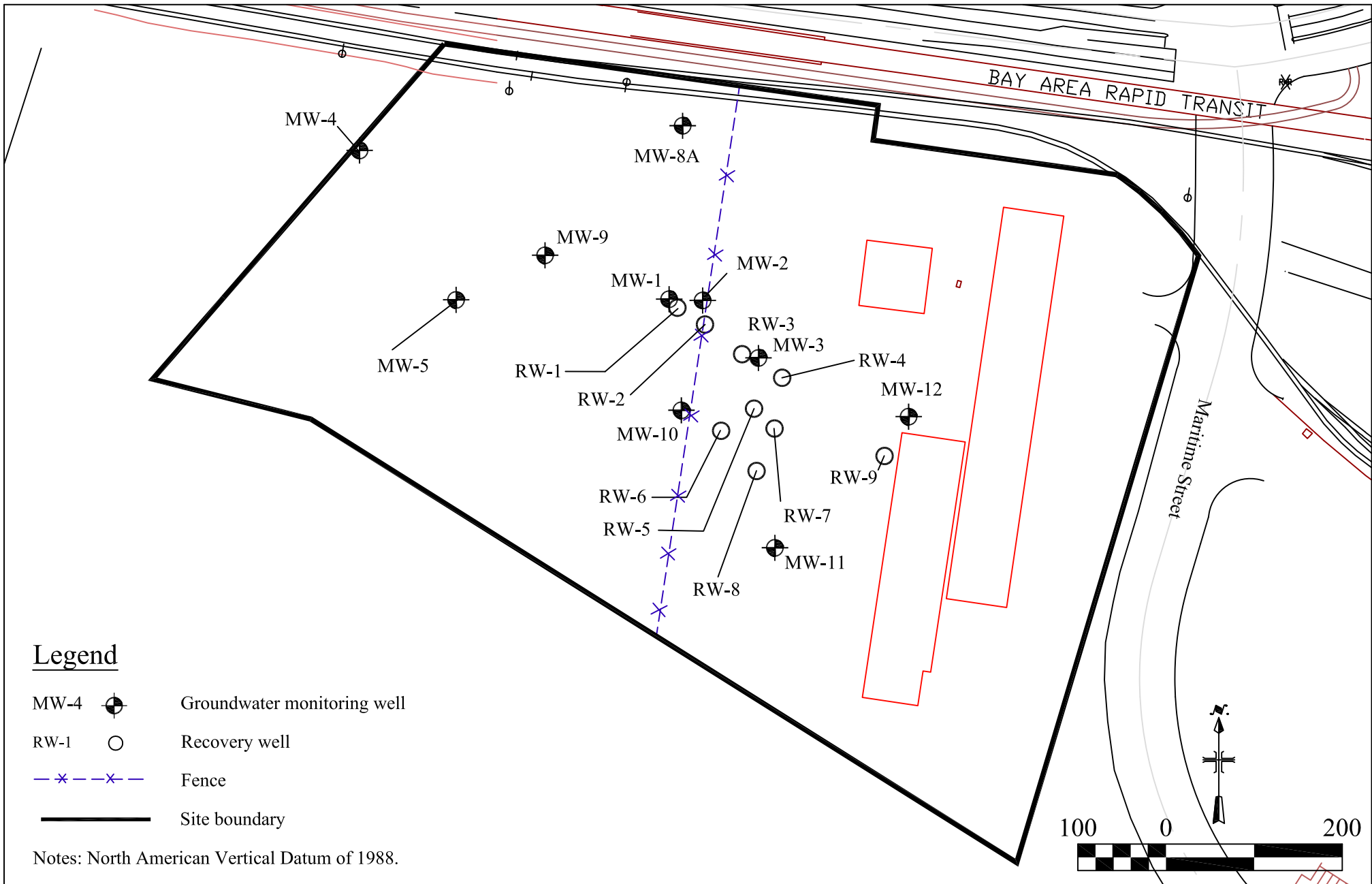
PORT OF OAKLAND
 HARBOR FACILITIES
 COMPLEX
 651 MARITIME STREET

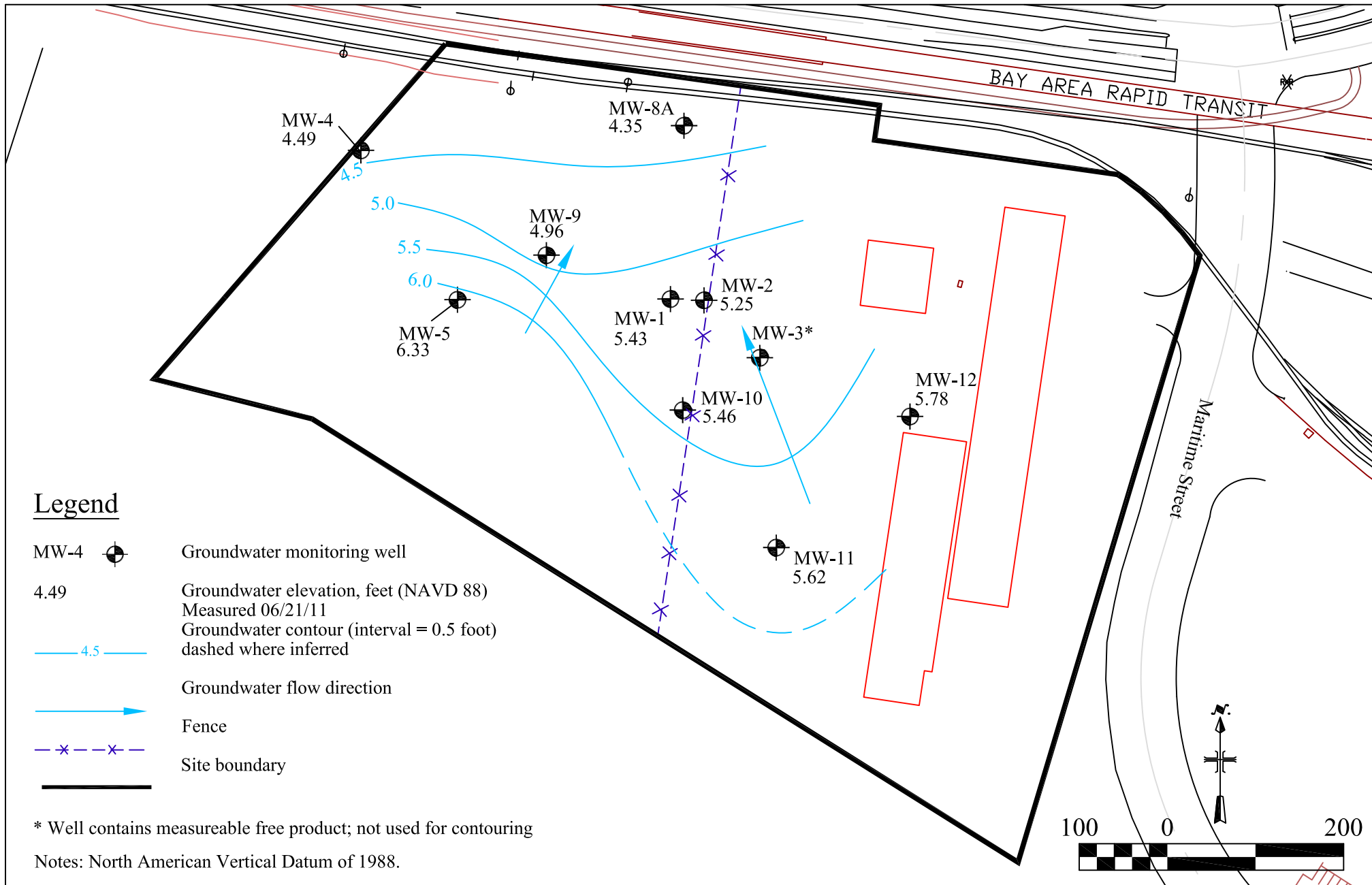
SITE LOCATION MAP

MALCOLM PIRNIE, INC.

JULY 2011
 FIGURE 1







MW-4	6/21/2011	Duplicate
TPHg	160	84
TPHd	<56	<53
TPHmo	<330	<320
Benzene	30	28
Toluene	<0.5	<0.5
Ethylbenzene	<0.5	<0.5
Total Xylenes	<0.5	<0.5
MTBE	<0.5	<0.5





MW-1	6/22/2011
TPHg	1,100
TPHd	890
TPHmo	<300
Benzene	46
Toluene	1.9
Ethylbenzene	2.6
Total Xylenes	2.0
MTBE	<0.5

MW-9	6/22/2011
TPHg	200
TPHd	160
TPHmo	<300
Benzene	25
Toluene	<0.5
Ethylbenzene	<0.5
Total Xylenes	<0.5
MTBE	<0.5

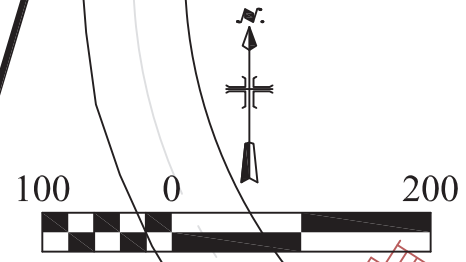
MW-10	6/22/2011
TPHg	320
TPHd	630
TPHmo	<300
Benzene	54
Toluene	<0.5
Ethylbenzene	2.2
Total Xylenes	<0.5
MTBE	<0.5

MW-12	6/23/2011
TPHg	100
TPHd	270
TPHmo	<300
Benzene	<0.5
Toluene	<0.5
Ethylbenzene	<0.5
Total Xylenes	<0.5
MTBE	3.2

Legend

- MW-4  Groundwater monitoring well
-  Fence
-  Site boundary
- TPHg Total Petroleum Hydrocarbons as gasoline
- TPHd Total Petroleum Hydrocarbons as diesel fuel
- TPHmo Total Petroleum Hydrocarbons as motor oil
- MTBE Methyl Tert-Butyl Ether
- (FP) Free-phase product in well - well not sampled
- (ND) Non-detect for constituents analyzed
-  Extent of free-phase product

Note: Concentrations are in micrograms per liter



MALCOLM PIRNIE	PORT OF OAKLAND	SHALLOW GROUNDWATER	MALCOLM PIRNIE, INC.
	HARBOR FACILITIES COMPLEX 651 MARITIME STREET	SAMPLE RESULTS - JUNE 2011	JULY 2011 FIGURE 5

Figure 6
TPHg Concentration versus Time

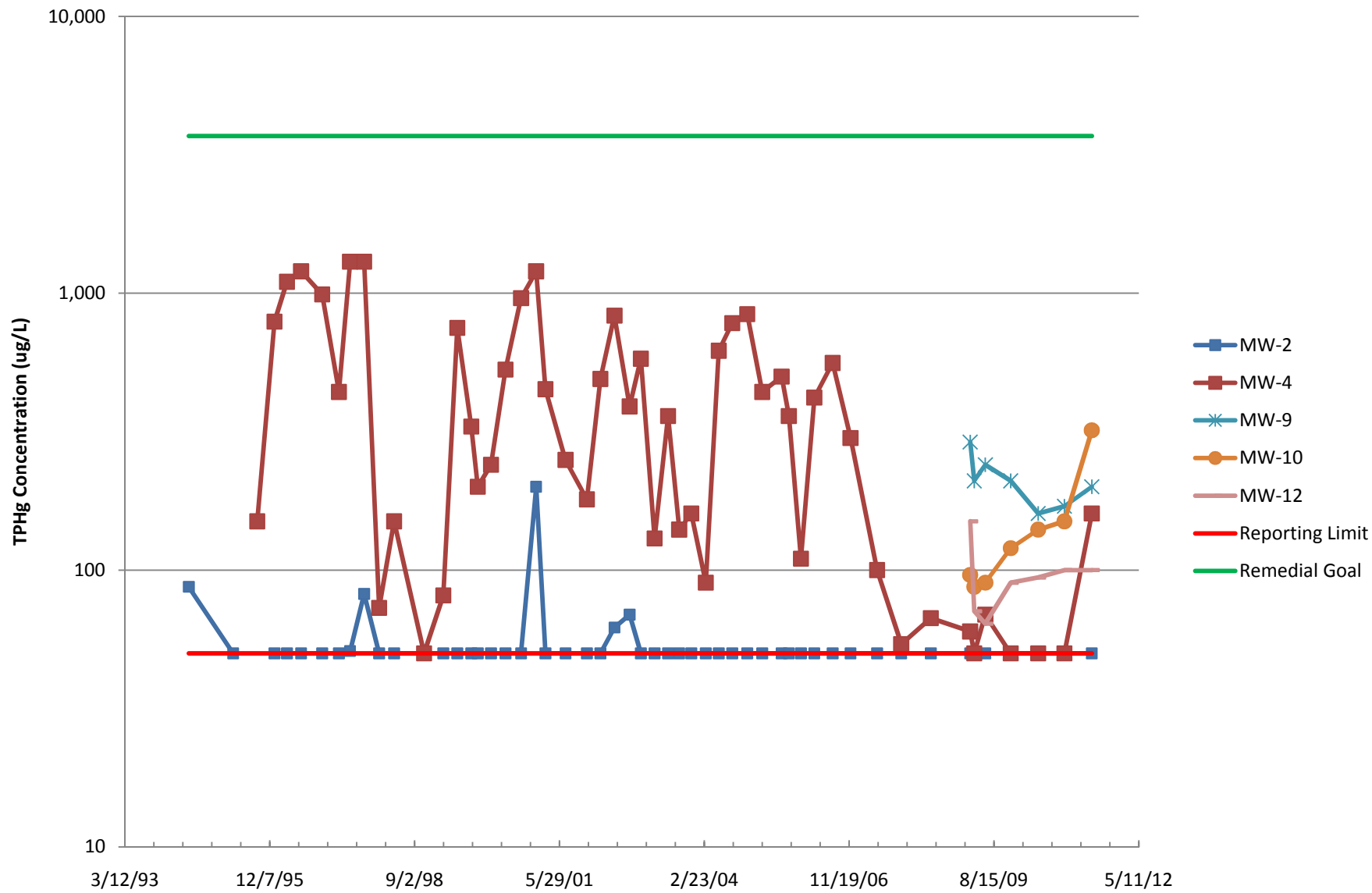


Figure 7
Benzene Concentration versus Time

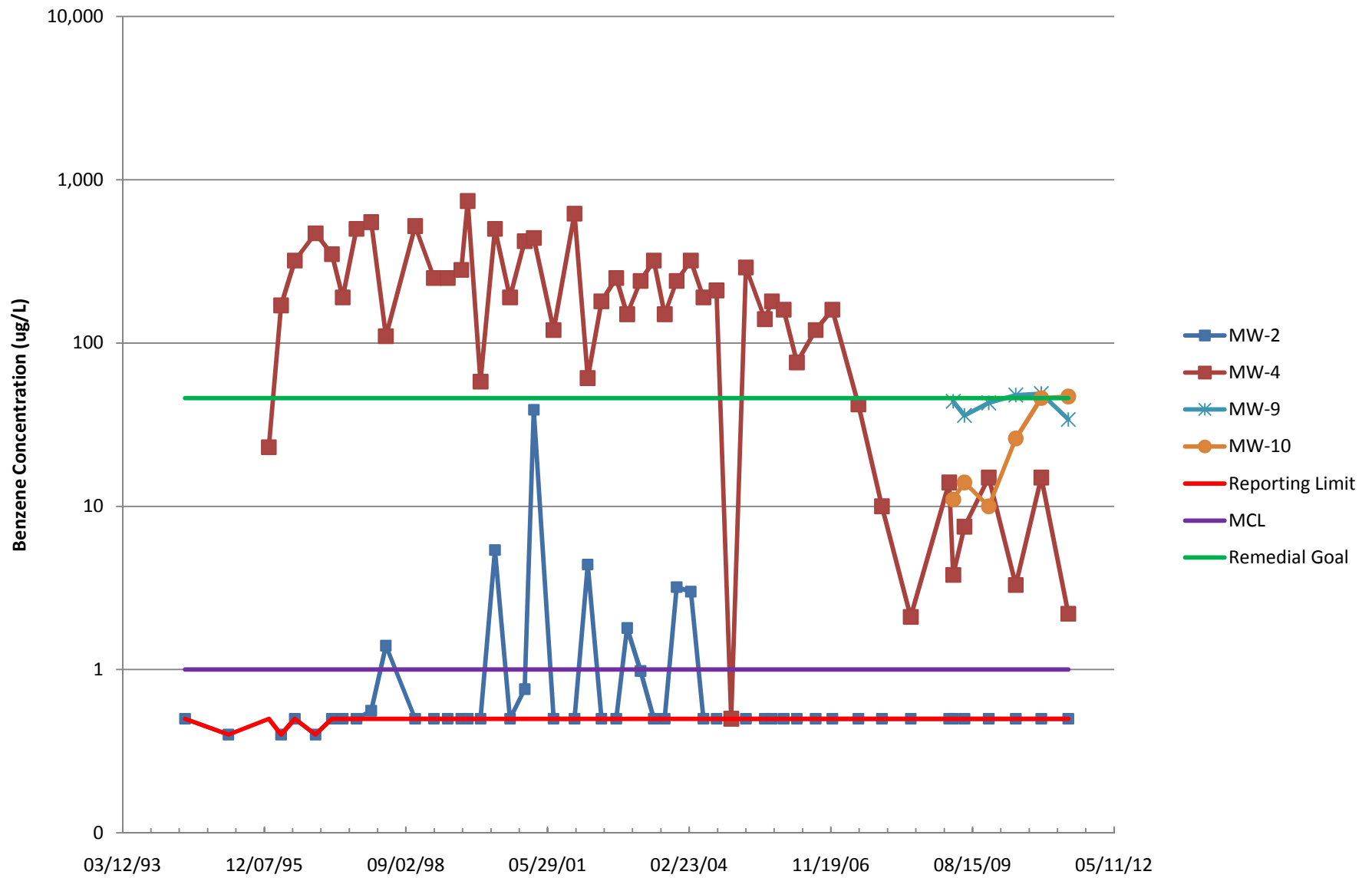


Figure 8
MTBE Concentration versus Time

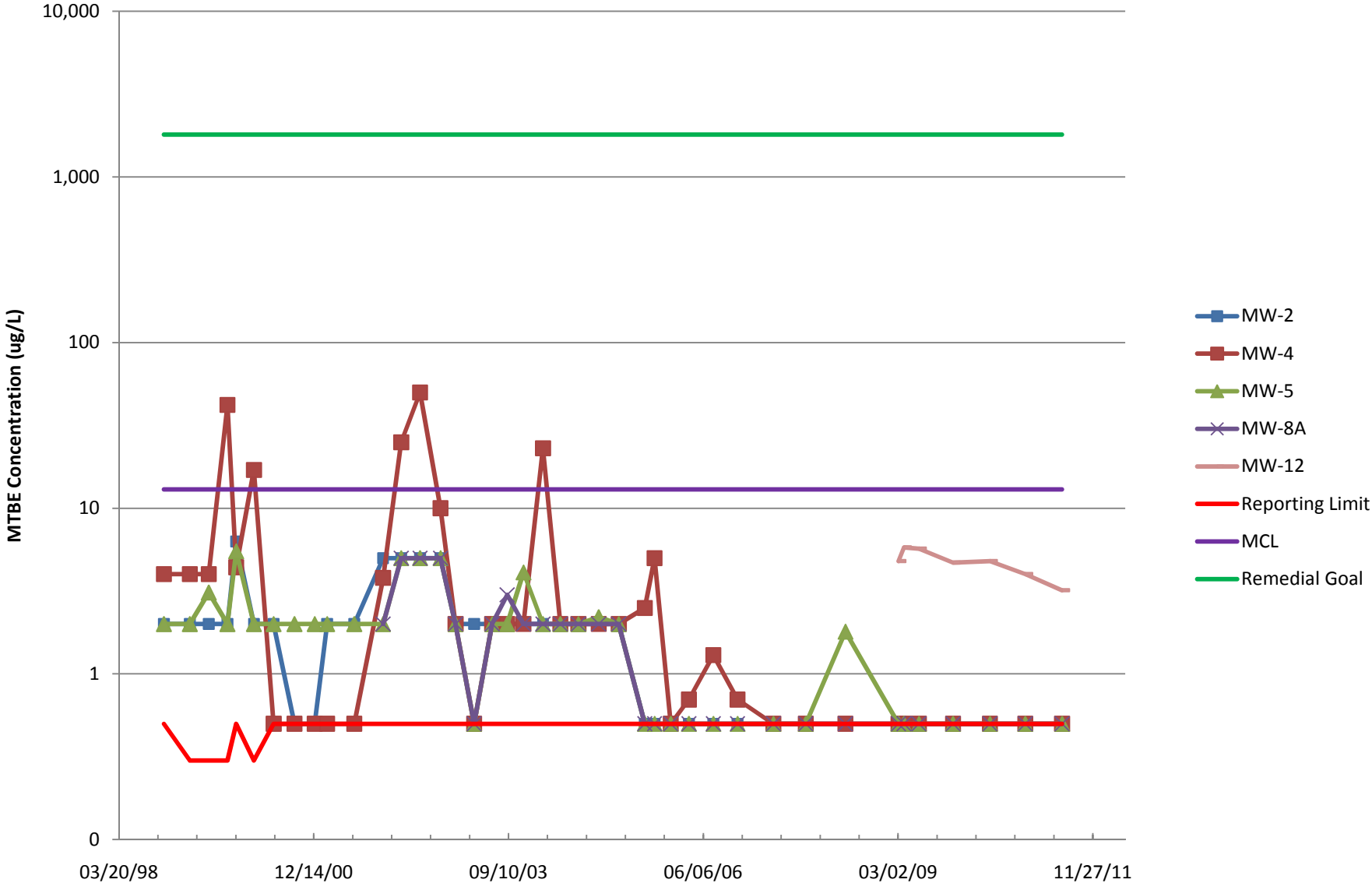
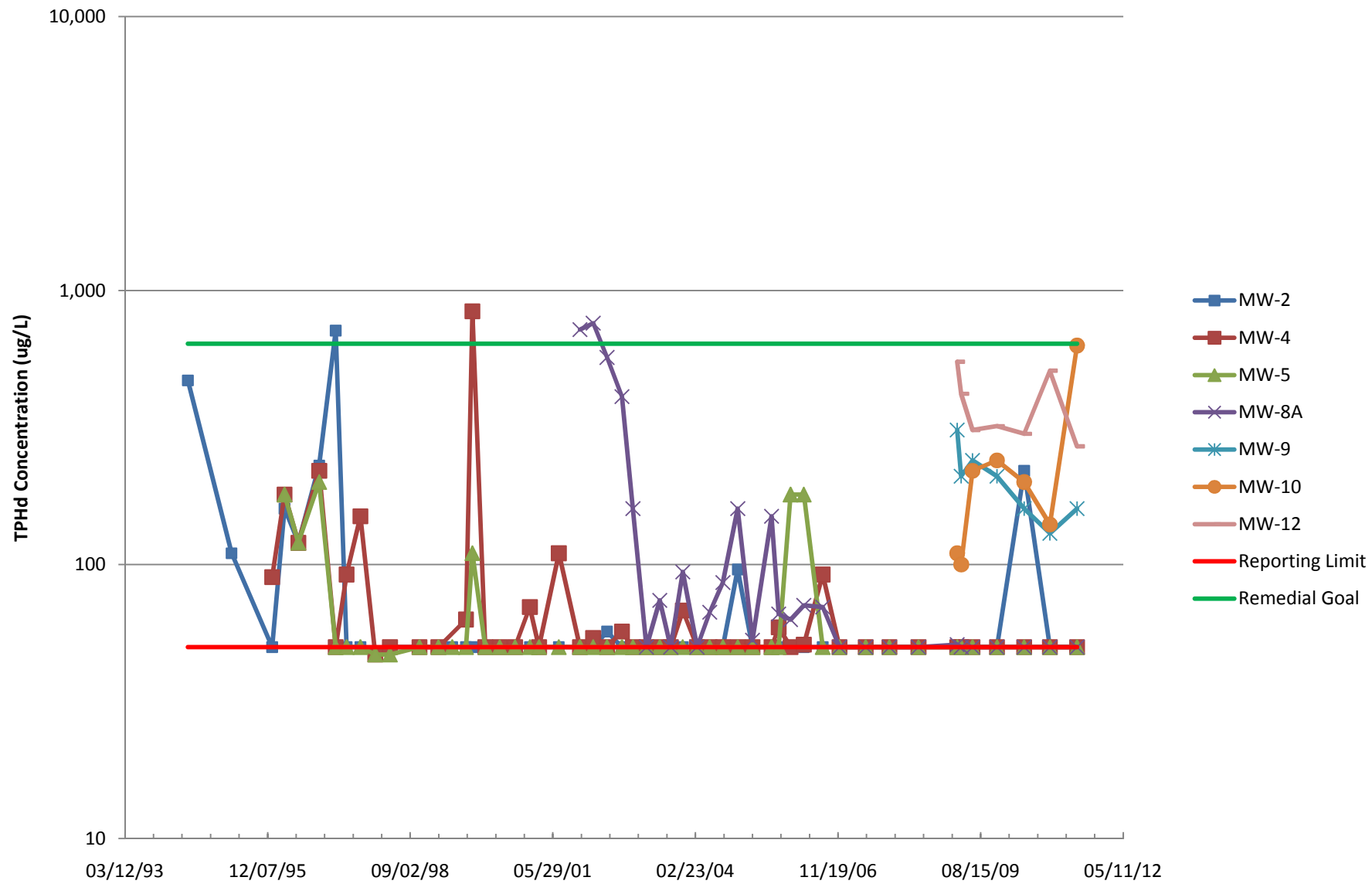


Figure 9
TPHd Concentration versus Time

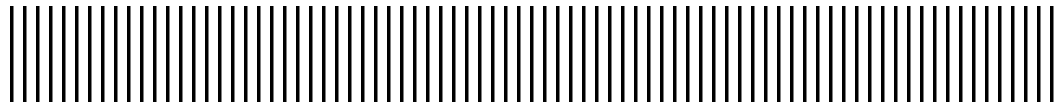




Port of Oakland

530 Water Street • Oakland, CA 94607

Tables



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

Monitoring Well	Date Measured	Elevation ¹ Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation ¹ (feet)
MW-1						
	04/18/00	13.65	NM	8.21	0.0	5.44
	05/22/00	13.65	NM	8.51	0.0	5.14
	07/10/01	13.65	8.8	10.00	1.20	3.65
	12/12/01	13.65	NM	NA	NA	NA
	03/08/02	13.65	NM	NA	NA	NA
	06/13/02	13.65	8.70	10.00	1.30	3.65
	09/26/02	13.65	8.60	9.50	0.90	4.15
	03/17/03	13.65	7.61	8.88	1.27	4.77
	06/18/03	13.65	8.20	9.44	1.24	4.21
	09/03/03	13.65	8.50	9.40	0.90	4.25
	11/26/03	13.65	8.85	9.25	0.40	4.40
	03/05/04	13.65	6.76	7.07	0.31	6.58
	06/02/04	13.65	8.26	8.71	0.45	4.94
	09/03/04	13.65	8.70	9.11	0.41	4.54
	12/16/04	13.65	7.75	7.92	0.17	5.73
	03/29/05	13.65	6.21	6.38	0.17	7.27
	06/14/05	13.65	7.41	7.61	0.20	6.04
	08/10/05	13.65	8.05	8.55	0.50	5.10
	09/29/05	13.65	8.28	8.95	0.67	4.70
	12/21/05	13.65	5.70	5.90	0.20	7.75
	03/24/06	13.65	5.98	6.27	0.29	7.38
	07/28/06	13.65	7.88	8.35	0.47	5.30
	11/29/06	NA	10.58	10.81	0.23	NA
	06/01/07	15.80	11.11	11.45	0.34	4.35
	11/14/07	15.80	10.87	10.93	0.06	4.87
	06/05/08	15.80	11.36	11.46	0.10	4.34
	12/18/08	15.80	10.82	10.89	0.07	4.91
	03/04/09	15.80	9.38	9.52	0.14	6.28
	04/01/09	15.80	10.65	10.67	0.02	5.13
	06/17/09	15.80	11.21	11.28	0.07	4.52
	12/08/09	15.80	NP	10.79	0.00	5.01
	06/17/10	15.80	10.79 ⁴	10.79	0.00	5.01
	12/14/10	15.80	9.42 ⁴	9.42	0.00	6.38
	06/07/11	15.80	NP	10.77	0.00	5.03
	06/21/11	15.80	NP	10.37	0.00	5.43
MW-2						
	12/31/97	13.87	NP	8.73	0.0	5.14
	04/13/98	13.87	NP	7.72	0.0	6.15
	11/06/98	13.87	NP	9.43	0.0	4.44
	03/19/99	13.87	NP	8.21	0.0	5.66
	06/24/99	13.87	NP	8.91	0.0	4.96
	09/28/99	13.87	NP	9.42	0.0	4.45
	11/12/99	13.87	NP	9.63	0.0	4.24
	02/11/00	13.87	NP	8.54	0.0	5.33
	05/22/00	13.87	NP	8.10	0.0	5.77
	09/06/00	13.87	NP	8.79	0.0	5.08
	12/19/00	13.87	NP	9.19	0.0	4.68
	02/21/01	13.87	NP	7.99	0.0	5.88
	04/03/01	13.87	NP	8.23	0.0	5.64
	07/10/01	13.87	NP	8.70	0.0	5.17
	12/12/01	13.87	NP	8.16	0.0	5.71
	01/22/02	13.87	NP	7.64	0.0	6.23
	03/08/02	13.87	NP	8.31	0.0	5.56

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

Monitoring Well	Date Measured	Elevation ¹ Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation ¹ (feet)
MW-2 (cont)	06/13/02	13.87	NP	8.64	0.0	5.23
	09/26/02	13.87	NP	8.95	0.0	4.92
	12/12/02	13.87	NP	9.17	0.0	4.70
	03/17/03	13.87	NP	7.77	0.0	6.10
	06/18/03	13.87	NP	8.44	0.0	5.43
	09/03/03	13.87	NP	8.98	0.0	4.89
	11/26/03	16.72	NP	12.01	0.0	4.71
	03/05/04	16.72	NP	9.75	0.0	6.97
	06/02/04	16.72	NP	11.22	0.0	5.50
	09/03/04	16.72	NP	11.62	0.0	5.10
	12/16/04	16.72	NP	10.80	0.0	5.92
	03/29/05	16.72	NP	9.67	0.0	7.05
	06/14/05	16.72	NP	10.68	0.0	6.04
	08/10/05	16.72	NP	11.05	0.0	5.67
	09/29/05	16.72	NP	11.32	0.0	5.40
	12/21/05	16.47	NP	9.57	0.0	6.90
	03/24/06	16.47	NP	9.55	0.0	6.92
	07/28/06	16.47	NP	10.85	0.0	5.62
	11/29/06	NA	NP	11.69	0.0	NA
	06/01/07	16.43	NP	11.72	0.0	4.71
	11/14/07	16.43	NP	12.28	0.0	4.15
	06/05/08	16.43	NP	12.01	0.0	4.42
	12/18/08	16.43	NP	12.20	0.0	4.23
	03/04/09	16.43	NP	10.19	0.0	6.24
	04/01/09	16.43	NP	11.34	0.0	5.09
	06/17/09	16.43	NP	11.90	0.0	4.53
	12/09/09	16.43	NP	12.13	0.0	4.30
	06/16/10	16.43	NP	11.57	0.0	4.86
	12/14/10	16.43	NP	11.04	0.0	5.39
	06/07/11	16.43	NP	10.70	0.0	5.73
	06/21/11	16.43	NP	11.18	0.0	5.25
MW-3						
	11/06/98	13.73	8.84	9.94	1.10	NC
	03/19/99	13.73	7.52	8.05	0.53	NC
	06/24/99	13.73	8.38	8.56	0.18	NC
	11/12/99	13.73	9.14	9.23	0.09	NC
	02/11/00	13.73	7.97	8.37	0.40	NC
	03/01/00	13.73	6.59	7.24	0.65	NC
	03/21/00	13.73	6.50	6.56	0.06	NC
	05/22/00	13.73	7.51	8.05	0.54	NC
	06/26/00	13.73	7.82	8.20	0.38	NC
	07/25/00	13.73	7.90	8.92	1.02	NC
	08/31/00	13.73	8.15	9.50	1.35	NC
	09/06/00	13.73	8.21	9.42	1.21	NC
	09/21/00	13.73	8.30	8.88	0.58	NC
	12/19/00	13.73	8.60	9.65	1.05	NC
	02/22/01	13.73	6.36	8.15	1.79	NC
	04/03/01	13.73	7.48	8.88	1.40	NC
	04/23/01	13.73	7.85	9.10	1.25	NC
	05/30/01	13.73	7.75	9.10	1.35	NC
	07/10/01	13.73	8.10	9.60	1.50	NC
	03/08/02	13.73	7.80	8.00	0.20	NC
	04/03/02	13.73	7.60	7.70	0.10	NC

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

Monitoring Well	Date Measured	Elevation ¹ Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation ¹ (feet)
MW-3 (cont)	04/23/02	13.73	7.90	8.40	0.50	NC
	04/25/02	13.73	7.90	8.80	0.90	NC
	05/10/02	13.73	8.10	8.20	0.10	NC
	05/24/02	13.73	8.05	8.10	0.05	NC
	06/13/02	13.73	8.10	8.70	0.60	NC
	07/05/02	13.73	8.10	8.95	0.85	NC
	07/19/02	13.73	8.10	8.90	0.80	NC
	07/30/02	13.73	8.10	8.90	0.80	NC
	08/14/02	13.73	8.10	8.90	0.80	NC
	09/13/02	13.73	8.30	9.30	1.00	NC
	09/26/02	13.73	8.30	9.00	0.70	NC
	10/14/02	13.73	8.60	9.50	0.90	NC
	11/04/02	13.73	8.75	9.99	1.24	NC
	11/21/02	13.73	8.59	11.29	2.70	NC
	12/06/02	13.73	8.56	9.30	0.74	NC
	12/18/02	13.73	7.35	8.43	1.08	NC
	12/30/02	13.73	6.50	7.15	0.65	NC
	01/02/03	13.73	6.20	6.20	0.00	7.53
	01/03/03	13.73	6.21	6.21	0.00	7.52
	01/14/03	13.73	6.20	6.21	0.01	7.52
	01/30/03	13.73	6.81	6.85	0.04	6.88
	02/18/02	13.73	7.09	7.15	0.06	NC
	02/26/03	13.73	7.04	7.11	0.07	NC
	03/13/03	13.73	7.22	8.11	0.89	NC
	03/17/03	13.73	7.15	7.50	0.35	NC
	04/16/03	13.73	7.27	8.25	0.98	NC
	06/18/03	13.73	7.78	9.00	1.22	NC
	09/03/03	13.73	8.31	9.96	1.65	NC
	11/26/03	15.69	10.79	12.85	2.06	NC
	03/05/04	15.69	8.39	9.85	1.46	NC
	06/02/04	15.69	10.03	11.35	1.32	NC
	09/03/04	15.69	10.46	12.06	1.60	NC
	12/16/04	15.69	9.41	10.38	0.97	NC
	03/29/05	15.69	8.17	9.01	0.84	NC
	06/14/05	15.69	9.59	10.55	0.96	NC
	08/10/05	15.69	9.91	11.15	1.24	NC
	09/29/05	15.69	10.21	11.61	1.40	NC
	12/21/05	15.69	8.21	8.28	0.07	NC
	03/24/06	15.69	8.20	8.82	0.62	NC
	07/28/06	15.69	9.81	9.83	0.02	NC
	11/29/06	NA	10.72	11.70	0.98	NA
	06/01/07	15.66	10.77	11.46	0.69	NC
	11/14/07	15.66	10.98	12.19	1.21	NC
	06/05/08	15.66	10.51	11.96	1.45	NC
	12/18/08	15.66	10.78	12.00	1.22	3.66
	03/04/09	15.66	9.31	9.93	0.62	5.73
	04/01/09	15.66	10.38	11.10	0.72	4.56
	06/17/09	15.66	10.79	12.30	1.51	3.36
	12/08/09	15.66	11.05	12.81	1.76	2.85
	06/17/10	15.66	10.39	12.29	1.90	3.37
	12/15/10	15.66	10.13	10.74	0.61	4.92
	06/07/11	15.66	9.91	10.95	1.04	4.71
	06/21/11	15.66	10.74	11.20	0.46	4.46

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

Monitoring Well	Date Measured	Elevation ¹ Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation ¹ (feet)
MW-4						
	12/31/97	12.66	NP	7.09	0.0	5.57
	04/13/98	12.66	NP	7.71	0.0	4.95
	11/06/98	12.66	NP	8.69	0.0	3.97
	03/19/99	12.66	NP	8.00	0.0	4.66
	06/24/99	12.66	NP	8.45	0.0	4.21
	09/28/99	12.66	NP	8.73	0.0	3.93
	11/12/99	12.66	NP	8.83	0.0	3.83
	02/11/00	12.66	NP	7.71	0.0	4.95
	05/22/00	12.66	NP	8.09	0.0	4.57
	09/06/00	12.66	NP	8.32	0.0	4.34
	12/19/00	12.66	NP	8.47	0.0	4.19
	02/21/01	12.66	NP	7.51	0.0	5.15
	04/03/01	12.66	NP	8.13	0.0	4.53
	07/10/01	12.66	NP	8.12	0.0	4.54
	12/12/01	12.66	NP	7.65	0.0	5.01
	01/22/02	12.66	NP	7.60	0.0	5.06
	03/08/02	12.66	NP	7.96	0.0	4.70
	06/13/02	12.66	NP	8.20	0.0	4.46
	09/26/02	12.66	NP	8.21	0.0	4.45
	12/12/02	12.66	NP	8.38	0.0	4.28
	03/17/03	12.66	NP	7.72	0.0	4.94
	06/18/03	12.66	NP	8.02	0.0	4.64
	09/03/03	12.66	NP	8.29	0.0	4.37
	11/26/03	12.66	NP	8.69	0.0	3.97
	03/05/04	12.66	NP	7.45	0.0	5.21
	06/02/04	12.66	NP	8.25	0.0	4.41
	09/03/04	12.66	NP	8.31	0.0	4.35
	12/16/04	12.66	NP	7.96	0.0	4.70
	03/29/05	12.66	NP	7.11	0.0	5.55
	06/14/05	12.66	NP	7.90	0.0	4.76
	08/10/05	12.66	NP	7.86	0.0	4.80
	09/29/05	12.66	NP	8.00	0.0	4.66
	12/21/05	12.66	NP	7.30	0.0	5.36
	03/24/06	12.66	NP	7.05	0.0	5.61
	07/28/06	12.66	NP	7.92	0.0	4.74
	11/29/06	NA	NP	11.63	0.0	NA
	06/01/07	15.91	NP	11.82	0.0	4.09
	11/14/07	15.91	NP	11.88	0.0	4.03
	06/05/08	15.91	NP	11.67	0.0	4.24
	12/18/08	15.91	NP	11.20	0.0	4.71
	03/04/09	15.91	NP	10.93	0.0	4.98
	04/01/09	15.91	NP	11.63	0.0	4.28
	06/17/09	15.91	NP	11.88	0.0	4.03
	12/08/09	15.91	NP	12.03	0.0	3.88
	06/16/10	15.91	NP	11.75	0.0	4.16
	12/14/10	15.91	NP	11.62	0.0	4.29
	06/07/11	15.91	NP	11.80	0.0	4.11
	06/21/11	15.91	NP	11.42	0.0	4.49

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

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

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

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

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

Monitoring Well	Date Measured	Elevation ¹ Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation ¹ (feet)
MW-8A						
	12/12/01	12.45	NP	7.20	0.0	NA
	01/22/02	12.45	NP	7.20	0.0	5.25
	03/08/02	12.45	NP	7.70	0.0	4.75
	06/13/02	12.45	NP	7.72	0.0	4.73
	09/26/02	12.45	NP	7.91	0.0	4.54
	12/12/02	12.45	NP	8.15	0.0	4.30
	03/17/03	12.45	NP	7.28	0.0	5.17
	06/18/03	12.45	NP	7.72	0.0	4.73
	09/03/03	12.45	NP	8.18	0.0	4.27
	11/26/03	12.45	NP	8.55	0.0	3.90
	03/05/04	12.45	NP	6.92	0.0	5.53
	06/02/04	12.45	NP	7.92	0.0	4.53
	09/03/04	12.45	NP	8.16	0.0	4.29
	12/16/04	12.45	NP	7.62	0.0	4.83
	03/29/05	12.45	NP	6.63	0.0	5.82
	06/14/05	12.45	NP	7.60	0.0	4.85
	08/10/05	12.45	NP	7.50	0.0	4.95
	09/29/05	12.45	NP	7.76	0.0	4.69
	12/21/05	12.45	NP	6.90	0.0	5.55
	03/24/06	12.45	NP	6.65	0.0	5.80
	07/28/06	12.45	NP	7.34	0.0	5.11
	11/29/06	NA	NP	11.41	0.0	NA
	06/01/07	14.99	NP	11.26	0.0	3.73
	11/14/07	14.99	NP	11.40	0.0	3.59
	06/05/08	14.99	NP	11.45	0.0	3.54
	12/18/08	14.99	NP	11.30	0.0	3.69
	03/04/09	14.99	NP	10.07	0.0	4.92
	04/01/09	14.99	NP	10.92	0.0	4.07
	06/17/09	14.99	NP	11.40	0.0	3.59
	12/08/09	14.99	NP	11.64	0.0	3.35
	06/16/10	14.99	NP	11.75	0.0	3.24
	12/14/10	14.99	NP	10.75	0.0	4.24
	06/07/11	14.99	NP	10.51	0.0	4.48
	06/21/11	14.99	NP	10.64	0.0	4.35
MW-9						
	12/18/08	16.33	NP	12.88	0.0	3.45
	03/04/09	16.33	NP	11.04	0.0	5.29
	04/01/09	16.33	NP	11.51	0.0	4.82
	06/17/09	16.33	NP	11.95	0.0	4.38
	12/08/09	16.33	NP	12.30	0.0	4.03
	06/16/10	16.33	NP	11.75	0.0	4.58
	12/14/10	16.33	NP	11.51	0.0	4.82
	06/07/11	16.33	NP	11.32	0.0	5.01
	06/21/11	16.33	NP	11.37	0.0	4.96
MW-10						
	12/18/08	15.65	NP	14.34	0.0	1.31
	03/04/09	15.65	NP	9.78	0.0	5.87
	04/01/09	15.65	NP	10.33	0.0	5.32
	06/17/09	15.65	NP	10.79	0.0	4.86
	12/08/09	15.65	NP	10.96	0.0	4.69
	06/16/10	15.65	NP	10.62	0.0	5.03
	12/14/10	15.65	NP	10.31	0.0	5.34
	06/07/11	15.65	NP	10.11	0.0	5.54
	06/21/11	15.65	NP	10.19	0.0	5.46

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

Monitoring Well	Date Measured	Elevation ¹ Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation ¹ (feet)
MW-11						
	12/18/08	15.47	NP	13.42	0.0	2.05
	03/04/09	15.47	NP	9.57	0.0	5.90
	04/01/09	15.47	NP	9.94	0.0	5.53
	06/17/09	15.47	NP	10.40	0.0	5.07
	12/09/09	15.47	NP	10.68	0.0	4.79
	06/16/10	15.47	NP	10.02	0.0	5.45
	12/01/10	15.47	NP	10.02	0.0	5.45
	06/07/11	15.47	NP	10.00	0.0	5.47
	06/21/11	15.47	NP	9.85	0.0	5.62
MW-12						
	12/18/08	16.79	NP	12.75	0.0	4.04
	03/04/09	16.79	NP	10.60	0.0	6.19
	04/01/09	16.79	NP	11.23	0.0	5.56
	6/17/2009	16.79	NP	11.83	0.0	4.96
	12/8/2009	16.79	NP	12.13	0.0	4.66
	6/16/2010	16.79	NP	11.31	0.0	5.48
	12/14/2010	16.79	NP	11.15	0.0	5.64
	6/7/2011	16.79	NP	10.81	0.0	5.98
	6/21/2011	16.79	NP	11.01	0.0	5.78

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.

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

² Well could not be measured due to abundant surface water covering well head.

³ Viscous product not related to the lighter product identified in other wells.

⁴ Product not 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 ⁸	2.9	2.05	3.2 ⁸
	12/08/09	1,400	1,200 ²	<300	120	2.9	1.8	3.0	<1.0
	06/22/11	1,100 ²	890	<300	46	1.9	2.6	2.0	<0.5
MW-2									
	05/27/94	87	470	NA	<0.5	<0.5	<0.5	<0.5	NA
	03/29/95	<50	110	1,400	<0.4	<0.3	<0.3	<0.4	NA
	09/06/95	<50	NA	NA	<0.4	<0.3	<0.3	<0.4	NA
	01/08/96	<50	<50	1200	<0.4	<0.3	<0.3	<0.4	NA
	04/04/96	<50	160	320	<0.5	<0.5	<0.5	<1.0	NA
	07/10/96	<50	120	1400	<0.4	<0.3	<0.3	<0.4	NA
	12/03/96	<50	230 ^{1,2}	<250	<0.5	<0.5	<0.5	<1.0	NA
	03/28/97	<50	714	<250	<0.5	<0.5	<0.5	<1.0	NA
	06/13/97	51	<50	<250	<0.5	<0.5	<0.5	<1.0	NA
	09/18/97	82	<50	<250	0.56	<0.5	<0.5	<1.0	NA
	12/31/97	<50	<47	<280	1.4	<0.5	<0.5	<1.0	NA
	04/13/98	<50	<50	<300	<0.5	<0.5	<0.5	<1.0	NA
	11/06/98	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	03/19/99	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	06/24/99	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	09/28/99	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	11/12/99	<50	120 ^{2,6}	<300	<0.5	<0.5	<0.5	<0.5	6.3 ^{8,9}
	02/11/00	<50	<50	<300	5.4	<0.5	<0.5	<0.5	<2
	05/22/00	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2
	09/06/00	<50	<50	<300	0.76 ⁸	<0.5	<0.5	<0.5	<0.5 ¹⁰
	12/19/00	200 ^{3,11}	<50	<300	39	1.8	<0.5	2.6	<0.5 ^{10,12}
	02/21/01	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	07/10/01	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	12/05/01	<50	<50	<300	4.4	<0.5	<0.5	<0.5	5.0 ¹⁴
	03/08/02	<50	<50	<500	<0.5	<0.5	<0.5	<0.5	<5.0
	06/13/02	62 ¹⁵	<57	<570	<0.5	<0.5	<0.5	<0.5	<5.0
	09/26/02	69 ²	<50	<500	1.8	<0.5	<0.5	<0.5	<5.0
	12/12/02	<50	<50	<300	0.98	<0.5	<0.5	<0.5	<2.0
	03/17/03	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	06/18/03	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	09/03/03	<50	<50	<300	3.2	<0.5	<0.5	<0.5	<2.0
	11/26/03	<50	<50	<300	3	<0.5	<0.5	<0.5	<2.0
	03/05/04	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	06/02/04	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	09/03/04	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	12/16/04	<50	96 ^{6,15}	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	03/29/05	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	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

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

Monitoring Well	Date Sampled	Concentration (µg/L)							
		TPH-G	TPH-D	TPH-MO	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE
MW-2 (cont)	12/21/05	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	03/24/06	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	07/28/06	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	11/29/06	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/01/07	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	11/14/07	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/05/08	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	12/18/08	390 ²	840	<300	1.1	<0.5	0.9	<0.5	<0.5
	03/04/09	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	04/01/09	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/17/09	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	12/09/09	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/17/10	<50	220 ²	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	12/15/10	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/22/11	<50	<50	<300 ²³	<0.5	<0.5	<0.5	<0.5	<0.5
MW-3									
	Not sampled due to the presence of free-phase product								
MW-4									
	09/11/95	150	<200	500	23	<0.3	<0.3	<0.4	NA
	01/08/96	790	90	400	170	1.2	0.6	0.6	NA
	04/04/96	1,100	180	300	320	1.6	1.1	1.2	NA
	07/10/96	1,200	120	300	470	1.5	0.8	0.8	NA
	12/03/96	990	220 ^{1,2}	<250	350	3.3	1.3	1.3	NA
	03/28/97	440 ²	<50	<250	190	1.2	0.64	<1.0	NA
	06/13/97	1,300	92 ⁵	<250	500	5.5	3.4	2.8	NA
	09/18/97	1,300	150	<250	550	4.9	2.1	2.00	NA
	12/31/97	73 ^{1,2,3}	<47	<280	110 ¹	1.0 ¹	<0.5	<1.0	NA
	04/13/98	150 ^{2,3}	<50	<300	520	2.9	<2.5	<5.0	NA
	11/06/98	<50	<50	<300	250	1.7	<1.0	<1.0	<4
	03/19/99	81	<50	<300	250	<1	1.2	<1.0	<4
Dup.	06/24/99	190	<50	<300	360	1.4	2.2	1.0	24
	09/28/99	750 ^{3,5}	63 ^{3,5}	<300	280	1.5	<1.0	<1.0	<4
	11/12/99	330 ³	840 ²	<300	740	<2.5	<2.5	<2.5	42 ⁹
	02/11/00	200 ²	<50	<300	58	0.73	<0.5	<0.5	4.4 ⁸
	05/22/00	240	<50	<300	500	<2.5	<2.5	<2.5	17
	09/06/00	530 ^{2,3}	<50	<300	190	0.93	0.6	0.57	<0.5 ¹⁰
	12/19/00	960 ^{3,11}	70 ⁵	<300	420	<2.5	<2.5	<2.5	<0.5 ^{10,12}
	12/19/00	1,200 ^{3,11}	<50	<300	440	<2.5	<2.5	<2.5	<0.5 ^{10,12}
	02/21/01	450 ¹³	<50	<300	120	<0.5	<0.5	<0.5	<0.5 ¹⁰
	07/10/01	<250	110 ^{2,13}	<300	620	2.6	2.9	<2.5	<0.5 ^{8,10}
	12/05/01	180	<50	<300	61	<0.5	<0.5	<0.5	3.8 ¹⁴
	03/08/02	490 ²	54 ²	<500	180	<2.5	<2.5	<2.5	<25
	06/13/02	830 ²	<50	<500	250	<5.0	<5.0	<5.0	<50
Dup.	06/13/02	820 ²	<56	<560	240	<5.0	<5.0	<5.0	<50

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

Monitoring Well	Date Sampled	Concentration (µg/L)							
		TPH-G	TPH-D	TPH-MO	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE
MW-4 (cont.)	09/26/02	390 ²	57	<500	150	2.1	<1.0	<1.0	<10
Dup.	09/26/02	500 ²	<50 ¹⁶	<500 ¹⁶	200	1.5	<1.0	<1.0	<10
	12/12/02	580	<50	<300	240	1.4	0.56	<0.5	<2.0
Dup.	12/12/02	2,400	<50	<300	680	5.0	2.3	1.4	<2.0
	03/17/03	130 ¹⁵	<50	<300	320 ¹⁷	<0.5	<0.5	<0.5	<0.5 ¹⁰
Dup.	03/17/03	82 ¹⁵	<50	<300	190	0.64 ¹⁷	0.56	0.53	<0.5 ¹⁰
	06/18/03	360 ^{11, 15}	<50	<300	150	<0.5	<0.5	<0.5	<2.0
Dup.	06/18/03	330 ^{11, 15}	<50	<300	140	<0.5	<0.5	<0.5	<2.0
	09/03/03	140 ^{11, 15}	<50	<300	240	1.3	<0.5	<0.5	<2.0
Dup.	09/03/03	83 ^{11, 15}	<50	<300	130	0.58 ¹⁷	<0.5	<0.5	<2.0
	11/26/03	160 ¹⁵	68 ¹⁵	<300	320	0.91 ¹⁷	<0.5	0.53	<2.0
Dup.	11/26/03	120 ¹⁵	<50	<300	210	0.66 ¹⁷	<0.5	<0.5	<2.0
	03/05/04	90 ¹¹	<50	<300	190	1.1	0.55	0.50 ¹⁷	23 ^{14,17} , <0.5 ¹⁰
Dup.	03/05/04	84 ¹¹	<50	<300	180	0.81	<0.5	<0.5	21 ^{14,17} , <0.5 ¹⁰
	06/02/04	620 ¹³	<50	<300	210	0.55 ¹⁷	<0.5	<0.5	<2.0
Dup.	06/02/04	400 ¹³	<50	<300	130	<0.5	<0.5	<0.5	<2.0
	09/03/04	780 ^{13, 15}	<50	<300	<0.5	1.0 ¹⁷	<0.5	0.57	<2.0
Dup.	09/03/04	370 ^{13, 15}	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	12/16/04	840	<50	<300	290	1.3 ¹⁷	0.69	0.75	<2.0
Dup.	12/16/04	670	<50	<300	230	1.3 ¹⁷	<0.5	<0.5	<2.0
	03/29/05	440 ¹³	<50	<300	140	0.57	<0.5	<0.5	<2.0
Dup.	03/29/05	540 ¹³	<50	<300	170	0.72	<0.5	<0.5	<2.0
	08/10/05	500 ¹⁸	<50	<250	180	<2.5	<2.5	<2.5	<2.5
	09/29/05	360 ¹⁸	59 ²⁰	<250	160	<5.0	<5.0	<5.0	<5.0
Dup.	09/29/05	420 ¹⁸	<50	<250	150	<5.0	<5.0	<5.0	<5.0
	12/21/05	110	<50	<300	76	<0.5	<0.5	<0.5	<0.5
Dup.	12/21/05	160	<50	<300	76	<0.5	<0.5	<0.5	<0.5
	03/24/06	420	51	<300	120	0.8	<0.7	<0.7	<0.7
Dup.	03/24/06	440	<50	<300	130	<0.7	<0.7	<0.7	<0.7
	08/04/06	560	92 ²	<300	160	<1.3	4.3	<1.3	<1.3
Dup.	08/04/06	590	100 ²	<300	150	<1.3	4.5	<1.3	<1.3
	11/29/06	300	<50	<300	42	<0.7	1.0	<0.7	<0.7
Dup.	11/29/06	300	<50	<300	60	<0.7	<0.7	<0.7	<0.7
	06/01/07	100 ^{13, 15}	<50	<300	10	<0.5	<0.5	<0.5	<0.5
Dup.	06/01/07	100 ^{13, 15}	<50	<300	11	<0.5	<0.5	<0.5	<0.5
	11/14/07	54 ¹⁵	<50	<300	2.1	<0.5	<0.5	<0.5	<0.5
Dup.	11/14/07	51 ¹⁵	<50	<300	2.1	<0.5	<0.5	<0.5	<0.5
	06/05/08	67 ¹⁵	<50	<300	14	<0.5	<0.5	<0.5	<0.5
Dup.	06/05/08	91 ¹⁵	<50	<300	15	<0.5	<0.5	<0.5	<0.5
	12/18/08	99 ²	520	<300	0.5	<0.5	<0.5	<0.5	<0.5
Dup.	12/18/08	88 ²	850	<300	0.7	<0.5	0.6	<0.5	<0.5
	03/04/09	60 ²	<50	<300	3.8	<0.5	<0.5	<0.5	<0.5
Dup.	03/04/09	<50	<50	<300	4.4	<0.5	<0.5	<0.5	<0.5

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

Monitoring Well	Date Sampled	Concentration (µg/L)							
		TPH-G	TPH-D	TPH-MO	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE
MW-4 (cont)	04/01/09	<50	<50	<300	7.5	<0.5	<0.5	<0.5	<0.5
Dup.	04/01/09	<50	<50	<300	7.8	<0.5	<0.5	<0.5	<0.5
	06/19/09	69 ²	<50	<300	15	<0.5	<0.5	<0.5	<0.5
	12/08/09	<50	<50	<300	3.3	<0.5	<0.5	<0.5	<0.5
Dup.	12/08/09	<50	<50	<300	3.5	<0.5	<0.5	<0.5	<0.5
	06/16/10	<50	<50	<300	15	<0.5	<0.5	<0.5	<0.5
Dup.	06/16/10	<50	<50	<300	18	<0.5	<0.5	<0.5	<0.5
	12/14/10	<50	<50	<300	2.2	<0.5	<0.5	<0.5	<0.5
Dup.	12/14/10	<50	<50	<300	2.7	<0.5	<0.5	<0.5	<0.5
	06/21/11	160 ²	<56	<330	30	<0.5	<0.5	<0.5	<0.5
Dup.	06/21/11	84 ²	<53	<320	28	<0.5	<0.5	<0.5	<0.5
MW-5									
	09/11/95	90	<300	2,500	3.3	<0.3	<0.3	<0.4	NA
	04/04/96	<50	180	520	<0.5	<0.5	<0.5	<1.0	NA
	07/10/96	<50	120	1,500	<0.4	<0.3	<0.3	<0.4	NA
	12/03/96	<50	200 ^{1,2}	<250	<0.5	<0.5	<0.5	<1.0	NA
	03/28/97	<50	<50	<250	<0.5	<0.5	<0.5	<1.0	NA
	06/13/97	<50	<50	<250	<0.5	<0.5	<0.5	<1.0	NA
	09/18/97	<50	<50	<250	<0.5	<0.5	<0.5	<1.0	NA
	12/31/97	<50	<47	<280	<0.5	<0.5	<0.5	<1.0	NA
	04/13/98	<50	<47	<280	<0.5	<0.5	<0.5	<1.0	NA
	11/06/98	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	03/19/99	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	06/24/99	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	3.1
	09/28/99	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	11/12/99	<50	110 ^{2,6}	<300	<0.5	<0.5	<0.5	<0.5	5.5 ⁹
	02/11/00	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	05/22/00	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	09/06/00	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	12/19/00	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	02/21/01	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	07/10/01	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	12/05/01	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	03/08/02	<50	<50	<500	<0.5	<0.5	<0.5	<0.5	<5.0
	06/13/02	<50	<50	<500	<0.5	<0.5	<0.5	<0.5	<5.0
	09/26/02	<50	<50	<500	<0.5	<0.5	<0.5	<0.5	<5.0
	12/12/02	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	03/17/03	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5 ¹⁰
	06/18/03	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	09/03/03	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	11/26/03	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	4.1 ¹⁴ , <0.5 ¹⁰
	03/05/04	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	06/02/04	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
ry it	09/03/04	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0

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

Monitoring Well	Date Sampled	Concentration (µg/L)							
		TPH-G	TPH-D	TPH-MO	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE
MW-5 (cont)	12/16/04	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	2.2 ¹⁴ , <0.5 ¹⁰
	03/29/05	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	08/10/05	<50	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5
Dup.	08/10/05	<50 ¹⁹	<50 ¹⁹	<250	<0.5	<0.5	<0.5	<0.5	<0.5
	09/29/05	<50	<50	<250	<0.5	<0.5	<0.5	<0.5	<0.5
	12/21/05	<50	180 ^{15,22}	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	07/28/06	<50	180	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	11/29/06	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/01/07	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	11/14/07	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/05/08	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	12/18/08	3,100 ²	3,600	<300	0.5	<0.5	<0.5	<0.5	1.8
	03/04/09	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	04/01/09	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	04/01/09	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/19/09	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	12/08/09	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/16/10	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	12/14/10	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/22/11	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
MW-6									
	11/06/98	120	12,000	1,200	19	0.65	1.8	<0.5	<2
	03/19/99	170	3,800	580	21	0.86	1.5	2.9	<2
	06/24/99	120	1,700 ⁷	<300 ⁷	18	<0.5	1.0	<0.5	54
	09/28/99	130 ^{3,5}	820	<300	20	0.51	2.2	<0.5	<2
	11/12/99	150	11,000 ^{2,6}	3,000 ^{3,6}	27	<0.5	2.2	<0.5	13 ⁹
	02/11/00	270 ²	2,300	<300	23	0.51	2.7	<0.5	5.8
	05/22/00	350	3,000	<300	18	0.51	<0.5	<0.5	7.7
	09/06/00	190	610	<300	26	<0.5	1.7	<0.5	<0.5 ¹⁰
	12/19/00	130 ^{3,11}	620	<300	24	<0.5	1.6	<0.5	<2
	02/21/01	120 ¹³	440	<300	21	<0.5	0.96	<0.5	<2
	07/10/01	120	560	<300	29	<0.5	0.99	<0.5	<2
	12/12/01	53	550	<300	27	<0.5	1.3	<0.5	<2.0
	03/08/02	160 ²	640 ²	<500	30	<0.5	<0.5	<0.5	5.0 ¹⁴
	06/13/02	160 ²	670 ²	<500	34	<0.5	<0.5	<0.5	<5.0
	09/26/02	230 ²	1400 ²	<500	40	0.64	0.8	<0.5	<5.0
	12/12/02	53	110	<300	43	<0.5	<0.5	<0.5	<2.0
	12/18/02	Monitoring well was destroyed							

**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-7									
	09/06/95	<50	<300	800	<0.4	<0.3	<0.3	<0.4	NA
	01/08/96	<50	410	110	<0.4	<0.3	<0.3	<0.4	NA
	04/04/96	<50	530	340	<0.5	<0.5	<0.5	<1.0	NA
	07/10/96	80	840	1,700	<0.4	<0.3	<0.3	<0.4	NA
	12/03/96	<50	280 ^{1,2}	<250	<0.5	<0.5	<0.5	<1.0	NA
	03/28/97	65 ⁶	94 ²	<250	<0.5	<0.5	<0.5	<1.0	NA
	06/13/97	<50	100	<250	<0.5	<0.5	<0.5	<1.0	NA
	09/18/97	<50	240	<250	<0.5	<0.5	<0.5	<1.0	NA
	12/31/97	<50	53 ^{2,3}	<280	<0.5	<0.5	<0.5	<1.0	NA
	04/13/98	<50	<48	<290	<0.5	<0.5	<0.5	<1.0	NA
	11/06/98	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2
	03/19/99	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	5.3
	06/24/99	73	<50	<300	<0.5	<0.5	<0.5	<0.5	12
	09/28/99	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	14
	11/12/99	<50	600 ^{2,6}	420 ³	<0.5	<0.5	<0.5	<0.5	15 ⁹
	02/11/00	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	51
	05/22/00	110	53 ²	<300	<0.5	<0.5	<0.5	<0.5	75
	09/06/00	50 ⁶	<50	<300	<0.5	<0.5	<0.5	<0.5	40 ¹⁰
	12/19/00	54 ¹¹	51 ⁵	<300	<0.5	<0.5	<0.5	<0.5	47 ^{10,12}
	02/21/01	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	66 ¹⁰
Dup.	02/21/01	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	60 ¹⁰
	07/10/01	<50	51 ²	<300	<0.5	<0.5	<0.5	<0.5	76 ¹⁰
Dup.	07/10/01	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	75 ¹⁰
	12/12/01	51	<50	<300	<0.5	<0.5	<0.5	<0.5	98 ¹⁴
Dup.	12/12/01	64	52 ^{13,15}	<300	<0.5	<0.5	<0.5	<0.5	96 ¹⁴
	03/08/02	52 ²	<50	<500	<0.5	<0.5	<0.5	<0.5	24 ¹⁴
	06/13/02	87 ²	54 ²	<500	<0.5	<0.5	<0.5	<0.5	51
	09/26/02	83 ²	84 ²	<500	<0.5	<0.5	<0.5	<0.5	75 ¹⁰
	12/12/02	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	58 ¹⁴
	12/18/02	Monitoring well was destroyed							
MW-8									
	Not sampled due to the presence of free-phase product								
MW-8A									
	12/12/01	68	720 ^{11,15}	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	03/08/02	<50	760 ²	<570	<0.5	<0.5	<0.5	<0.5	<5.0
Dup.	03/08/02	<50	350 ²	<580	<0.5	<0.5	<0.5	<0.5	<5.0
	06/13/02	<50	570 ²	<570	<0.5	<0.5	<0.5	<0.5	<5.0
	09/26/02	<50	410 ²	<500	<0.5	<0.5	<0.5	<0.5	<5.0
	12/12/02	<50	160 ¹⁵	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	03/17/03	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5 ¹⁰
	06/18/03	<50	74 ¹⁵	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	09/03/03	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	3.0 ¹⁴ / <0.5 ¹⁰
	11/26/03	<50	94 ¹⁵	<300	<0.5	<0.5	<0.5	<0.5	<2.0

**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	Ethylbenzene	Total Xylenes	MTBE
MW-8A (cont)	03/05/04	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	06/02/04	<50	67 ¹⁵	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	09/03/04	<50	86 ¹⁵	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	12/16/04	<50	160 ^{6,15}	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	03/29/05	<50	53	<300	<0.5	<0.5	<0.5	<0.5	<2.0
	08/10/05	<50 ¹⁹	150 ^{15,19}	<250	<0.5	<0.5	<0.5	<0.5	<0.5
	09/29/05	<50	66 ²¹	<250	<0.5	<0.5	<0.5	<0.5	<0.5
	12/21/05	<50	63 ^{15,22}	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	03/24/06	<50	71	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	07/28/06	<50	70 ¹⁵	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	11/29/06	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/01/07	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	11/14/07	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/05/08	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	12/18/08	350 ²	7,800	2,200 ²	<0.5	<0.5	<0.5	<0.5	1.3
	03/04/09	<50	51 ²	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	04/01/09	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/17/09	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	12/08/09	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/16/10	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	12/14/10	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/23/11	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
MW-9									
	12/18/08	52 ²	72	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	03/04/09	290 ²	310 ²	<300	44	<0.5	0.6	0.6	<0.5
	04/01/09	210 ²	210 ²	<300	36	<0.5	<0.5	<0.5	<0.5
	06/19/09	240 ²	240 ²	<300	43	<0.5	<0.5	<0.5	<0.5
	12/08/09	210 ²	210 ²	<300	48	<0.5	<0.5	<0.5	<0.5
	06/16/10	160 ²	160 ²	<300	49	<0.5	1.0	0.6	<0.5
	12/14/10	170 ²	130 ²	<300	34	<0.5	<0.5	0.6	<0.5
	06/22/11	200 ²	160 ²	<300	25	<0.5	<0.5	<0.5	<0.5
MW-10									
	12/18/08	140 ²	8,000	430 ²	<0.5	<0.5	<0.5	<0.5	1.0
	03/04/09	96 ²	110 ²	<300	11	<0.5	0.5	<0.5	<0.5
	04/01/09	87 ²	100 ²	<300	14	<0.5	0.5	<0.5	<0.5
	06/17/09	90 ²	220 ²	<300	10	<0.5	1.0	<0.5	<0.5
	12/08/09	120 ²	240 ²	<300	26	<0.5	0.8	<0.5	<0.5
	06/16/10	140 ²	200	<300	46	<0.5	<0.5	<0.5	<0.5
	12/14/10	150 ²	140 ²	<300	47	<0.5	<0.5	<0.5	<0.5
	06/22/11	320 ²	630	<300	54	<0.5	2.2	<0.5	<0.5
MW-11									
	12/18/08	1,900 ²	15,000	800 ²	<0.5	<0.5	<0.5	<0.5	5.0
	03/04/09	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	04/01/09	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/19/09	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	12/09/09	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5

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

Monitoring Well	Date Sampled	Concentration (µg/L)							
		TPH-G	TPH-D	TPH-MO	Benzene	Toluene	Ethyl-benzene	Total Xylenes	MTBE
MW-11 (Cont)	06/16/10	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	12/14/10	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
	06/21/11	<50	<50	<300	<0.5	<0.5	<0.5	<0.5	<0.5
MW-12									
	12/18/08	25,000 ²	19,000	980 ²	<0.5	<0.5	<0.5	<0.5	5.1
	03/04/09	150 ²	550 ²	<300	<0.5	<0.5	<0.5	<0.5	4.8
	04/01/09	71 ²	420 ²	<300	<0.5	<0.5	<0.5	<0.5	5.8
	06/17/09	64 ²	310 ²	<300	<0.5	<0.5	<0.5	<0.5	5.7
Dup.	06/17/09	67 ²	310 ²	<300	<0.5	<0.5	<0.5	<0.5	5.4
	12/08/09	90 ²	320 ²	<300	<0.5	<0.5	<0.5	<0.5	4.7
	06/16/10	94 ²	300	<300	<0.5	<0.5	<0.5	<0.5	4.8
	12/14/10	100 ²	510	<300	<0.5	<0.5	<0.5	<0.5	4.0
	06/23/11	100 ²	270 ²	<300	<0.5	<0.5	<0.5	<0.5	3.2

Notes:

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

µg/L = micrograms per liter

Dup. = duplicate sample

NA = not analyzed

TPHg = total petroleum hydrocarbons in gasoline range.

TPHd = total petroleum hydrocarbons in diesel range.

TPHmo = total petroleum hydrocarbons in motor oil range.

MTBE = methyl tert-butyl ether

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

² Hydrocarbons present do not match profile of laboratory standard.

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

⁴ Chromatographic pattern matches known laboratory contaminant.

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

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

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

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

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

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

¹¹ Sample exhibits unknown single peak or peaks.

¹² EPA Method 8260 confirmation analyzed past holding time.

¹³ Lighter hydrocarbons contributed to the quantitation.

¹⁴ MTBE results from EPA Test Method 8021B.

¹⁵ Sample exhibits fuel pattern that does not resemble standard.

¹⁶ Sample extracted out of hold time.

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

¹⁸ Unmodified or weakly modified gasoline is significant.

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

²⁰ Gasoline compounds are significant.

²¹ Diesel range compounds are significant; no recognizable pattern.

²² Heavier hydrocarbons contributed to the quantitation.

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

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

Monitoring Well	Date Sampled	Field Parameters				Analytical Concentrations																	Total Dissolved Solids (mg/L)
		DO (mg/L)	ORP (mV)	Iron (II) (mg/L)	Carbon Dioxide (mg/L)	Methane (µg/L)	Iron (II) (mg/L)	Manganese (II) (mg/L)	Calcium (mg/L)	Magnesium (mg/L)	Potassium (mg/L)	Sodium (mg/L)	Sulfide (Dissolved, mg/L)	Nitrate (as N, mg/L)	Nitrite (as N, mg/L)	Sulfate (mg/L)	Chloride (mg/L)	Orthophosphate (as P, mg/L)	Carbonate (mg/L)	Bicarbonate (mg/L)	Alkalinity, Total (as CaCO ₃ , mg/L)		
MW-1	06/22/11	0.04	-99.7	0.91	17	6,300	0.84	0.52	25	16	1.0	48	0.24	<0.05	<0.05	<0.50	11	0.13	<6.7	250	250	270	
MW-2	06/22/11	3.27	27.3	0.00	23	0.69	<0.10	0.077	26	27	1.1	150	<0.04	0.25	<0.05	31	19	0.13	<6.7	500	500	610	
MW-3	6/21/2011	Not sampled due to the presence of free-phase product																					
MW-4	06/21/11	0.09	-32.0	0.05	2.5 J	3,400	<0.10	0.18	21	57	14	340	<0.04	<0.05	<0.05	5.3	280	0.64	<6.7	800	800	1,280	
Dup.	06/21/11	0.09	-32.0	0.04	3.1	3,500	<0.10	0.18	20	58	14	340	<0.04	<0.05	<0.05	5.5	280	0.64	<6.7	770	770	1,270	
MW-5	06/22/11	0.24	-52.5	0.30	27	74	0.46	0.67	48	21	16	230	<0.04	<0.05	<0.05	69	300	0.35	<6.7	360	360	960	
MW-6	12/18/02	Monitoring well was destroyed																					
MW-7	12/18/02	Monitoring well was destroyed																					
MW-8	11/21/98	Monitoring well was destroyed and replaced with well MW-8A																					
MW-8A	06/23/11	0.44	-203.1	1.85	5.0	400	2.3	0.67	46	58	15	230	<0.04	<0.05	<0.05	38	140	1.3	<6.7	760	760	1,060	
MW-9	06/22/11	0.14	-130.1	3.30*	71	10,000	6.3	0.87	70	46	14	280	0.09	<0.05	<0.05	0.54	290	1.3	<6.7	750	750	1,240	
MW-10	06/22/11	0.03	-118	3.30*	160	7,300	7.8	4.2	130	67	30	420	0.09	<0.05	<0.10	4.1	530	0.46	<6.7	1,100	1,100	2,030	
MW-11	06/21/11	0.06	-178.4	0.93	44	7,900	1.4	0.39	25	52	46	970	<0.04	<0.10	<0.10	<1.0	970	9.6	<6.7	1,500	1,500	3,140	
MW-12	06/23/11	0.18	-253.8	0.41	85	5,100	0.46	1.3	93	43	15	160	4.7	<0.05	<0.05	2.4	180	0.76	<6.7	620	620	940	

Notes:

- * Sample iron (II) concentration exceeded range of instrument.
- DO = dissolved oxygen
- ORP = oxidation-reduction potential
- mg/L = milligrams per liter
- µg/L = microgram per Liter
- N = nitrogen
- P = phosphorus
- CaCO₃ = calcium carbonate
- J = estimated value

**TABLE 4. Free Product Recovery System Groundwater Elevation and Free Product Data
January 1, 2011 Through June 7, 2011
Port of Oakland's Harbor Facilities Complex Site
555 - 651 Maritime Street, Oakland, California**

Recovery Well	Date Measured	Elevation ¹ Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation ¹ (feet)
RW-1						
Well inaccessible; product and water levels not measured						
RW-2						
	06/07/11	15.56	NP	7.19	0.00	8.37
	06/21/11	15.56	NP	9.02	0.00	6.54
RW-3						
	01/12/11	15.56	9.87	11.04	1.17	4.52
	01/26/11	15.56	10.28	10.43	0.15	5.13
	02/10/11	15.56	10.45	10.90	0.45	4.66
	02/24/11	15.56	9.42	12.13	2.71	3.43
	03/09/11	15.56	9.45	13.04	3.60	2.52
	03/23/11	15.56	8.63	12.18	3.55	3.38
	04/06/11	15.56	9.10	11.49	2.39	4.07
	04/20/11	15.56	9.70	10.88	1.18	4.68
	05/04/11	15.56	10.05	10.47	0.42	5.09
	05/18/11	15.56	9.95	10.17	0.22	5.39
	06/07/11	15.56	9.73	13.52	3.79	2.04
	06/21/11	15.56	10.10	11.20	1.10	4.36
RW-4						
	01/12/11	14.92	9.12	9.20	0.08	5.72
	01/26/11	14.92	9.39	9.89	0.50	5.03
	02/10/11	14.92	9.52	10.54	1.02	4.38
	02/24/11	14.92	8.80	9.10	0.30	5.82
	03/09/11	14.92	8.93	8.96	0.03	5.96
	03/23/11	14.92	8.39	8.43	0.04	6.49
	04/06/11	14.92	8.46	8.50	0.04	6.42
	04/14/11	14.92	8.88	8.91	0.03	6.01
	05/04/11	14.92	9.13	9.17	0.04	5.75
	05/18/11	14.92	9.18	9.20	0.02	5.72
	06/07/11	14.92	NP	8.95	0.00	5.97
	06/21/11	14.92	9.33 ³	9.33	0.00	5.59
RW-5						
	04/14/11	14.79	6.74	9.72	2.98	5.07
	05/18/11	14.79	6.78 ³	6.78	0.00	8.01
	06/07/11	14.79	7.38	7.47	0.09	7.32

**TABLE 4. Free Product Recovery System Groundwater Elevation and Free Product Data
January 1, 2011 Through June 7, 2011
Port of Oakland's Harbor Facilities Complex Site
555 - 651 Maritime Street, Oakland, California**

Recovery Well	Date Measured	Elevation ¹ Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation ¹ (feet)
RW-6						
	01/12/11	15.75	8.51	9.68	1.17	6.07
	01/26/11	15.75	8.65	9.55	0.90	6.20
	02/10/11	15.75	8.44	9.74	1.30	6.01
	02/24/11	15.75	8.15	9.82	1.67	5.93
	03/09/11	15.75	8.25	9.37	1.12	6.38
	03/23/11	15.75	8.18	8.96	0.78	6.79
	04/06/11	15.75	8.19	8.95	0.76	6.80
	04/20/11	15.75	8.43	8.54	0.11	7.21
	05/04/11	15.75	8.51	8.62	0.11	7.13
	05/18/11	15.75	8.53	8.70	0.17	7.05
	06/07/11	15.75	8.82	9.05	0.23	6.70
	06/21/11	15.75	8.89	9.20	0.31	6.55
RW-7						
	01/12/11	15.02	7.86	7.91	0.05	7.11
	01/26/11	15.02	7.55	7.64	0.09	7.38
	02/10/11	15.02	7.50	7.68	0.18	7.34
	02/24/11	15.02	7.82	8.92	1.10	6.10
	03/09/11	15.02	7.42	7.53	0.11	7.49
	03/23/11	15.02	NP	7.24	0.00	7.78
	04/06/11	15.02	7.73	7.73	0.00	7.29
	04/20/11	15.02	7.54	7.56	0.02	7.46
	05/04/11	15.02	7.68	7.74	0.06	7.28
	05/18/11	15.02	7.35 ³	7.35	0.00	7.67
	06/07/11	15.02	7.98 ³	7.98	0.00	7.04
	06/21/11	15.02	8.07	8.09	0.00	6.93
RW-8						
	01/12/11	15.91	9.07	9.21	0.14	6.70
	01/26/11	15.91	9.23	9.31	0.08	6.60
	02/10/11	15.91	9.13	9.33	0.20	6.58
	02/24/11	15.91	8.86	9.23	0.37	6.68
	03/09/11	15.91	8.78	9.01	0.23	6.90
	03/23/11	15.91	8.42	8.70	0.28	7.21
	04/06/11	15.91	8.55	8.80	0.25	7.11
	04/20/11	15.91	8.92	9.14	0.22	6.77
	05/04/11	15.91	9.04	9.20	0.16	6.71
	05/18/11	15.91	8.85	9.10	0.25	6.81
	06/07/11	15.91	10.23	10.34	0.11	5.57
	06/21/11	15.91	9.27	9.41	0.14	6.50

**TABLE 4. Free Product Recovery System Groundwater Elevation and Free Product Data
 January 1, 2011 Through June 7, 2011
 Port of Oakland's Harbor Facilities Complex Site
 555 - 651 Maritime Street, Oakland, California**

Recovery Well	Date Measured	Elevation ¹ Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation ¹ (feet)
RW-9						
	01/12/11	16.57	9.26	9.45	0.19	7.12
	01/26/11	16.57	9.32	9.53	0.21	7.04
	02/10/11	16.57	9.42	9.63	0.21	6.94
	02/24/11	16.57	9.24	9.43	0.19	7.14
	03/09/11	16.57	9.16	9.35	0.19	7.22
	03/23/11	16.57	9.07	9.23	0.16	7.34
	04/06/11	16.57	9.00	9.16	0.16	7.41
	04/20/11	16.57	9.10	9.29	0.19	7.28
	05/04/11	16.57	9.19	9.40	0.21	7.17
	05/18/11	16.57	9.26	9.46	0.20	7.11
	06/07/11	16.57	9.35	9.56	0.21	7.01
	06/21/11	16.57	9.30	9.50	0.20	7.07

**TABLE 4. Free Product Recovery System Groundwater Elevation and Free Product Data
January 1, 2011 Through June 7, 2011
Port of Oakland's Harbor Facilities Complex Site
555 - 651 Maritime Street, Oakland, California**

Recovery Well	Date Measured	Elevation ¹ Top of Casing (feet)	Depth to Product (feet btc)	Depth to Water (feet btc)	Product Thickness (feet)	Groundwater Elevation ¹ (feet)
MW-3						
	01/05/11	15.66	9.58	9.67	0.09	5.99
	01/12/11	15.66	9.85	10.39	0.54	5.27
	01/21/11	15.66	10.03	10.97	0.94	4.69
	01/26/11	15.66	9.32	9.53	0.21	6.13
	02/02/11	15.66	10.28	11.43	1.94	4.23
	02/10/11	15.66	10.35	11.50	1.15	4.16
	02/24/11	15.66	9.53	10.74	1.21	4.92
	03/09/11	15.66	9.63	10.79	2.94	4.87
	03/16/11	15.66	9.26	10.43	1.17	5.23
	03/23/11	15.66	8.71	9.07	0.36	6.59
	03/30/11	15.66	8.87	9.54	3.94	6.12
	04/06/11	15.66	9.16	10.42	1.26	5.24
	04/14/11	15.66	9.65	10.53	0.88	5.13
	04/20/11	15.66	9.69	10.61	4.94	5.05
	04/27/11	15.66	9.88	11.07	1.19	4.59
	05/04/11	15.66	9.95	11.14	1.19	4.52
	05/13/11	15.66	10.16	11.45	5.94	4.21
	05/18/11	15.66	9.78	11.60	1.82	4.06
	06/07/11	15.66	9.91	10.95	1.04	4.71
	06/21/11	15.66	10.74	11.20	0.46	4.46
Convault						
	01/12/11	NA	1.75	2.24	0.49	NA
	01/26/11	NA	1.72	2.22	0.50	NA
	02/10/11	NA	1.71	2.01	0.30	NA
	02/24/11	NA	1.68	2.19	0.51	NA
	03/09/11	NA	1.58	2.12	0.54	NA
	03/23/11	NA	1.57	2.13	0.56	NA
	04/06/11	NA	1.54	2.15	0.61	NA
	04/20/11	NA	1.49	2.12	0.63	NA
	05/04/11	NA	1.48	2.12	0.64	NA
	05/18/11	NA	1.48	2.08	0.60	NA
	06/07/11	NA	1.43	2.07	0.64	NA

Notes:

NP = no product detected with the interface probe

btc = below top of the well casing

NA = not available

NM = not measured

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

² All measurements made before the system ran on given day unless otherwise noted.

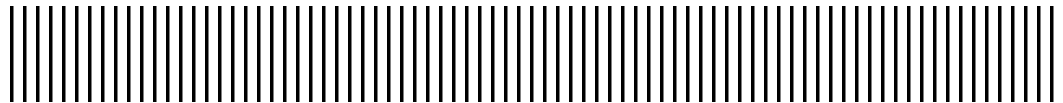
³ Product not measureable, but visible evidence of product on interface probe.



Port of Oakland

530 Water Street • Oakland, CA 94607

Appendix A Groundwater Sampling Forms



GROUNDWATER SAMPLING

Well No.: **MW-1**

Project No: <u>4656016</u>	Recorded by: <u>CO/SC</u>	Date: <u>6/24/11</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>Warm, Sunny</u>	TOC elevation, NAVD 88 (feet): <u>15.80</u>	
Precip. in past 5 days (in.): <u>0.00</u>	Groundwater elevation, NAVD 88 (feet): <u>5.43</u>	
Source: <u>Oakland Fire Services Agency (ONO)</u>	Water level from TOC (feet): <u>10.37</u>	Time: <u>0913</u>
Water level instrument: <u>Heron Dipper-T</u>	Product level from TOC (feet): <u>-</u>	Time: <u>-</u>

CALCULATION OF WELL VOLUME:

$(17.65 \text{ ft} - 10.37 \text{ ft}) \times (0.083 \text{ ft})^2 \times \pi \times 7.48 \text{ gal/ft}^3 =$ 1.18 gallons in one casing volume
 $\text{well depth} - \text{water level} \times (\text{well radius})^2 \times \pi \times \text{gal/ft}^3 =$ 3 total gallons removed

CALIBRATION: See cal sheets for R8740

FIELD MEASUREMENTS: 6/22

Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)	Depth to Water (ft btoc)	Cumulative Gallons Removed
1108	Began pumping					NM	10.76	
1110						↓	10.89	
300 1113	19.33	7.30	1.35	-144.5	6.828		10.99	
1115	19.10	7.29	0.31	-132.7	0.864		11.10	
250 1119	19.37	7.29	0.25	-114.9	0.834		11.13	
1122	19.42	7.28	0.17	-118.1	0.790		11.12	
1126	19.82	7.27	0.17	-123.1	0.764		11.12	0.5
1131	19.79	7.17	0.17	-105.2	0.722		11.15	
1135	19.67	7.07	0.10	-100.9	0.688		11.19	0.75
1140	19.64	7.07	0.08	-95.0	0.657		11.20	
1144	19.79	7.09	0.06	-84.8	0.620		11.19	1.0
1148	19.70	7.11	0.05	-96.7	0.608		11.21	
1152	19.81	7.14	0.04	-99.8	0.568		11.22	1.5
300 1156	19.69	7.17	0.07	-108.4	0.529		11.24	
1200	19.63	7.21	0.05	-114.9	0.510		11.25	2.0
1204	19.66	7.22	0.05	-107.5	0.506		11.27	
1207	19.64	7.24	0.04	-99.7	0.485	11.28	2.5	
1210	Collected sample							

Purge method: Peri pump Sample Time: 1210

Duplicate/blank number: - Duplicate Sample Time: -

Sampling equipment: N/A VOA attachment: N/A

Sample containers: 8 40 mL vials, 2 0.5 L ambers, 2 0.5 L poly, 1 250 mL poly

Sample analyses: TPH-g, TPH-d/mo, BTEX, MTBE, TDS, alkalinity, amms, sulfide, cat ions, Mn, Fe, Co₂ ethy

Laboratory: CT, MicroSeeps (sub)

Decontamination method: none - disposable dedicated tubing Rinsate disposal: N/A

Comments: Sheen on water in purge bucket

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

$$\text{Fe}^{+2} = 0.91 \text{ mg/L}$$

GROUNDWATER SAMPLING

Well No.: **MW-2**

Project No. 4656016
 Project Name: Harbor Facilities Center
 Location: Port of Oakland
651 Maritime Street, Oakland, California
 Weather: Warm, Sunny
 Precip. in past 5 days (in.): 0.00
 Source: Oakland Fire Services Agency (ONO)
 Water level instrument: Heron Dipper-T

Recorded by: CS/SC Date: 6/2/11
 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): 5.25
 Water level from TOC (feet): 11.18 Time: 0931
 Product level from TOC (feet): — Time: —

CALCULATION OF WELL VOLUME:

$(18.06 \text{ ft} - 11.18 \text{ ft}) \times (0.083 \text{ ft})^2 \times \pi \times 7.48 \text{ gal/ft}^3 = 1.11 \text{ gallons in one casing volume}$
 $\text{well depth} - \text{water level} \times (\text{well radius})^2 \times \pi \times \text{gal/ft}^3 = 7 \text{ total gallons removed (total)}$

CALIBRATION:

See cal sheets for R8740

FIELD MEASUREMENTS:

Flow Rate	Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)	Depth to Water (ft btoc)	Cumulative Gallons Removed
	10:10							11.39	
	10:15	Began purging							
700 mL/min	10:16							11.39	
300 mL/min	10:18	19.07	7.51	3.29	143.5	0.571	NM	11.97	1
200	10:21	19.36	7.57	1.36	126.1	0.619		12.17	1.3
	10:24	20.37	7.86	0.93	113.2	0.643		12.31	1.5
	10:27	20.95	7.54	1.07	98.0	0.697		12.52	2
	10:33	20.44	7.49	0.58	97.1	0.787		12.88	
500	10:38	20.54	7.52	0.29	75.3	0.804		13.13	2.5
	10:43	19.48	7.52	0.27	59.1	0.809		13.52	3
	10:48	19.56	7.49	0.19	46.0	0.856		13.95	
	10:53	19.71	7.48	0.20	35.6	0.906		14.41	3.5
	10:58	19.62	7.46	0.12	45.8	0.937		14.82	4
250	11:03	19.66	7.45	0.25	34.0	0.955		15.28	4.5
	11:09	20.80	7.45	0.60	-69.0	0.978		15.08	
	11:13	20.69	7.45	0.43	72.3	0.979			
	11:17	20.78	7.44	0.22	65.3	0.982		15.58	
250	11:22	20.75	7.45	0.21	73.7	0.981		15.85	
	11:27	20.51	7.44	0.38	45.7	0.979		16.18	6

Purge method: Pumping air - tubing at bottom Sample Time: 1620 on 6/22
 Duplicate/blank number: — Duplicate Sample Time: —
 Sampling equipment: N/A VOA attachment: none
 Sample containers: 8 40 mL vials, 2 0.5 L amber sq, 2 0.5 L polys, 1 250 mL poly
 Sample analyses: TPH-g, TPH-d/mo, BTEX, MTBE, TDS, alkalinity, anions, sulfide, cations, Fe, Mn, Co, Cr, G-T, MicroSeeds (sub)
 Laboratory: G-T, MicroSeeds (sub)
 Decontamination method: none - disposable dedicated tubing Rinsate disposal: N/A
 Comments: —

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

6/22/11

	<u>Time</u>	<u>Temp</u>	<u>pH</u>	<u>DO</u>	<u>ORP</u>	<u>EC</u>	<u>DTW</u>	
Flow rate mL/min	1609	Began	pumping				11.28	
	1610						11.39	
200	1613	21.24	7.45	7.59	23.3	0.989	11.52	
	1616	20.91	7.43	3.27	27.3	0.936	11.65	
	1620	Sample collected						

Fe⁺² 0.00 mg/L

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, hot
 Precip. in past 5 days (in.): 0.00
 Source: Oakland Fire Services Agency (ONo)
 Water level instrument: Heron Instruments H-01W

Recorded by: Co/SC Date: 6/21/11
 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): 15.166
 Groundwater elevation, NAVD 88 (feet): 4.46
 Water level from TOC (feet): 10.74 Time: 930
 Product level from TOC (feet): 11.20 Time: 930

CALCULATION OF WELL VOLUME:

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

CALIBRATION:

FIELD MEASUREMENTS:

Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)	Depth to Water (ft btoc)	Cumulative Gallons Removed
Not Sampled - well 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-4**

Project No. 4656016
 Project Name: Harbor Facilities Center
 Location: Port of Oakland
651 Maritime Street, Oakland, California
 Weather: Not, Sunny
 Precip. in past 5 days (in.): 0.00
 Source: Oakland Fire Services Agency (ONO)
 Water level instrument: Heron Dipper-T

Recorded by: CS/SC Date: 4/21/11
 Depth of well from TOC (feet): 22.05
 Well diameter (inches): 2
 Screened interval from TOC (feet): 11.25-22.05
 TOC elevation, NAVD 88 (feet): 15.91
 Groundwater elevation, NAVD 88 (feet): 4.49
 Water level from TOC (feet): 11.42 Time: 0856
 Product level from TOC (feet): - Time: -

CALCULATION OF WELL VOLUME:

$$(22.05 \text{ ft} - 11.42 \text{ ft}) \times (0.083 \text{ ft})^2 \times \pi \times 7.48 \text{ gal/ft}^3 =$$

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

1.72 gallons in one casing volume
3.5 total gallons removed

CALIBRATION: See cal sheets for R 8740

Flow rate	Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV)	MS/cm EC (µmho/cm)	Turbidity (NTU)	Depth to Water (ft btoc)	Cumulative Gallons Removed
	1238	Began	Purging				NM	11.40	
	1241	23.92	10.96	4.54	-52.0	1.540		12.50	0.25
200	1244	24.49	10.58	4.18	-57.2	1.570		12.48	0.50
	1249	24.80	10.08	1.58	-53.2	1.616		12.25	
								12.29	
								12.29	1
200	1253	25.82	9.44	1.04	-34.4	1.771	NM	12.47	1.25
	1256	24.30	9.07	0.38	-21.8	1.851		12.54	
	1300	24.11	9.13	0.31	-23.1	1.886		12.56	2
	1303	24.10	9.14	0.17	-20.7	1.889		12.50	
	1306	24.44	9.04	0.47	-15.1	1.910		12.44	2.5
	1309	24.99	9.00	0.32	-16.5	1.956		12.42	
150	1312	25.28	8.97	0.30	-12.6	1.981		12.49	
175	1315	25.29	8.94	0.51	-17.1	1.984		12.58	
200	1318	24.41	8.91	0.16	-22.8	1.955		12.50	
	1321	24.19	8.91	0.11	-27.6	1.949		12.41	3
	1324	24.91	8.89	0.20	-32.5	1.981		12.36	
	1327	25.49	8.85	0.18	-33.2	1.998		12.50	
	1330	24.32	8.84	0.18	-34.8	1.978		12.54	3.5
	1333	29.99	8.82	0.09	-32.0	1.974			
	1335								

Purge method: Peri Pump

Duplicate/blank number: Per MW-4DUP

Sampling equipment: N/A

Sample containers: 8 40ml vials, 2 0.5L amber, 2 0.5L poly, 1 250 ml poly

Sample analyses: TPH-g, TPH-d/mo, BTEX, MTBE, TDS, alkalinity, anions, sulfide, cations, Fe, Mn, Co, Cr, Hg

Laboratory: C+T, MicroSeeps (Sub)

Decontamination method: non-disposable, dedicated tubing

Comments:

VOA attachment: N/A

Rinsate disposal: N/A

Sample Time: 1335

Duplicate Sample Time: 1335

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

MALCOLM PIRNIE • 2000 Powell Street, 7th Floor • Emeryville, CA 94608 • (510) 596-9500

MW-4 Fe²⁺ 0.05 mg/L

MW-4DUP Fe²⁺ 0.04 mg/L

GROUNDWATER SAMPLING

Well No.: **MW-5**

Project No. 4656016
 Project Name: Harbor Facilities Center
 Location: Port of Oakland
651 Maritime Street, Oakland, California
 Weather: Warm, Sunny
 Precip. in past 5 days (in.): 0.00
 Source: Oakland Fire Services Agency (and)
 Water level instrument: Huron Dipper-T

Recorded by: SL/CO Date: 6/21/11
 Depth of well from TOC (feet): 20.8
 Well diameter (inches): 2
 Screened interval from TOC (feet): 10.4-20.8
 TOC elevation, NAVD 88 (feet): 15.39
 Groundwater elevation, NAVD 88 (feet): 16.33
 Water level from TOC (feet): 9.06 Time: 900
 Product level from TOC (feet): — Time: —

CALCULATION OF WELL VOLUME:

$(20.80 \text{ ft} - 9.06 \text{ ft}) \times (0.083 \text{ ft})^2 \times \pi \times 7.48 \text{ gal/ft}^3 =$ 1.88 gallons in one casing volume
 $\text{well depth} - \text{water level} \times (\text{well radius})^2 \times \pi \times \text{gal/ft}^3 =$ 3.5 total gallons removed

CALIBRATION:

see cal sheets for YSI-556.29

FIELD MEASUREMENTS: 6/22

Flow Rate	Time	Temperature (°C) %	pH ^{0.1} S.U.	DO (mg/L)	ORP (mV)	EC ²⁵ (µmho/cm)	Turbidity (NTU)	Depth to Water (ft btoc)	Cumulative Gallons Removed
	911	Began	Purging				NM	9.05	
250	916	19.62	6.94	0.46	-14.1	1.527	↓	9.83	
200	919	19.63	6.90	0.35	-21.1	1.516		9.91	0.5
	922	19.66	7.23	0.31	-30.4	1.493		9.92	
200	925	19.66	7.23	0.30	-37.5	1.457		9.91	1.0
200	928	19.68	7.13	0.29	-39.4	1.414		9.90	
	931	19.68	7.43	0.26	-42.2	1.426		9.92	1.5
	934	19.66	7.58	0.24	-44.2	1.458		9.93	
	937	19.61	7.59	0.23	-46.0	1.483		9.92	2.0
	940	19.68	7.65	0.26	-47.3	1.513		9.92	
	943	19.59	7.68	0.27	-44.8	1.522		9.92	
200	946	19.60	7.77	0.25	-50.7	1.534		9.92	2.5
	949	19.54	7.64	0.25	-52.4	1.545		9.91	
	952	19.63	7.64	0.25	-52.8	1.553		9.90	3.0
	955	19.70	7.68	0.24	-52.5	1.561		9.90	

Purge method: Puri Pump Sample Time: 1000
 Duplicate/blank number: — Duplicate Sample Time: —
 Sampling equipment: N/A VOA attachment: N/A
 Sample containers: 8 40 mL vials, 2 0.5 L ambers, 2 0.5 L polys, 1 250 mL poly
 Sample analyses: TPH-g, TPH-d/mo, BTEX, MTBE, TDS, alkalinity, anions, sulfide, cations, Fe, Mn, Co2, CH4
 Laboratory: (FT), Microscreps (sub)
 Decontamination method: none - disposable dedicated tubing Rinsate disposal: N/A
 Comments: _____

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

Hach colorimeter DR 890.06

$Fe^{2+} = 0.30 \text{ mg/L}$

GROUNDWATER SAMPLING

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

Project No. 4656016
 Project Name: Harbor Facilities Center
 Location: Port of Oakland
651 Maritime Street, Oakland, California
 Weather: warm, sunny
 Precip. in past 5 days (in.): Oakland Fire Services, 0.00
 Source: Oakland Fire Services Agency (cont)
 Water level instrument: Heron Dipper-T

Recorded by: CO/SC Date: 6/11/11
 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): 4.35
 Water level from TOC (feet): 10.64 Time: 0925
 Product level from TOC (feet): — Time: —

CALCULATION OF WELL VOLUME:

$(23.14 \text{ ft} - 10.64 \text{ ft}) \times (0.083 \text{ ft})^2 \times \pi \times 7.48 \text{ gal/ft}^3 =$
 well depth - water level $\times (\text{well radius})^2 \times \pi \times \text{gal/ft}^3 =$

2.00 gallons in one casing volume
3.5 total gallons removed
 (on day of sampling)

CALIBRATION: 6/22: YSI 556.29 6/23: see cal sheets for YSI 556.18

FIELD MEASUREMENTS: 6/22

Flow Rate (ml/min)	Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)	Depth to Water (ft btoc)	Cumulative Gallons Removed	
	11:12	Began purging					NM	10.72	0	
	11:14							10.78		
	11:16	19.83	5.07	1.55	-92.2	2.544		10.80		
100	11:19	19.78	4.32	1.43	-95.3	2.549		10.80		
	11:22	19.47	3.35	1.28	-112.6	2.408		10.82		
	pH low; check stop pumping to check 7.00 standard; 7.60 std reading as 5.06; call Equipco - may be a wiring issue; jostling cable seems to rectify; recal pH (3 pt) after jostling wiring such that 7.00 std reads ~7									
	11:56	Resume purging						10.72		
	11:59	20.70	7.32	6.51	-133.5	2.255	NM	10.81		
	12:02	19.98	7.31	6.05	-143.8	2.164		10.83		
180	12:05	19.61	7.26	5.86	-144.7	2.010		10.83	1	
200	12:06	19.47	7.18	4.77	-142.7	1.932		10.84		
	12:11	19.35	7.01	4.34	-140.2	1.862		10.85		
	12:14	19.30	7.00	3.97	-139.3	1.827		10.85		
	12:17	19.28	7.04	3.76	-139.7	1.790		10.85	2	
	12:20	19.31	7.10	3.35	-141.2	1.777		10.85		
	12:23	pH jump to 8.11 when unit picked up - call Equipco								
	12:26	19.29	8.11	8.11	-143.2	1.754				

Purge method: peri pump Sample Time: 10:55
 Duplicate/blank number: — Duplicate Sample Time: on 6/23
 Sampling equipment: N/A VOA attachment: N/A
 Sample containers: 8 40 mL vials, 2 0.5 L ambers, 2 0.5 L polys, 1 250 mL poly
 Sample analyses: TPH-g, TPH-d/mo, BTEX, MTBE, TDS, alkalinity, anions, sulfide, cations, Fe, Mn, Cu, Cr, Cd, Microseeps (sub)
 Laboratory: City
 Decontamination method: none - disposable dedicated tubing Rinsate disposal: N/A
 Comments: —

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

$$\text{Fe}^{+2} = 1.85 \text{ mg/L}$$

Now YSI: Equipos unit 18 6/23/11

Flow	Time	0.1 Temp	3% pH	(mg/L) DO	ORP	3% EC (mS/cm)	DTW	Cum. Gallons Removed
	9:48	Begin	Purging				10.78	
	9:53	Begin	Purging				10.75	
	9:54						10.79	
	9:56						10.81	
	9:59	20.63	6.98	2.14	19.8	2.560	10.82	
100	10:02	20.56	7.14	1.47	0.8	2.550	10.82	
150	10:05	20.57	7.07	1.13	-14.2	2.499	10.84	
150	10:08	20.60	7.13	0.91	-38.9	2.426	10.85	0.25
~180	10:11	20.47	7.19	0.78	-64.9	2.298	10.86	
200	10:14	20.22	7.19	0.68	-85.3	2.176	10.87	0.50
	10:17	19.97	7.17	0.64	-99.7	2.058	10.87	
	10:20	19.99	7.19	0.59	-107.4	1.978	10.88	1.0
	10:23	20.11	7.23	0.63	-173.9	1.906	10.89	
	10:26	20.02	7.26	0.53	-165.9	1.843	10.89	
	10:29	20.17	7.28	0.51	-176.8	1.797	10.88	1.5
	10:32	20.22	7.29	0.52	-178.4	1.773	10.89	
	10:35	20.22	7.29	0.53	-187.3	1.745	10.89	2.0
	10:38	20.41	7.29	0.48	-192.9	1.726	10.90	
	10:41	20.50	7.30	0.49	-193.3	1.729	10.90	
	10:44	20.52	7.30	0.47	-195.4	1.721	10.90	2.5
	10:47	20.27	7.30	0.46	-196.7	1.700	10.90	
	10:50	20.42	7.31	0.45	-200.3	1.697	10.90	
	10:53	20.74	7.32	0.44	-203.1	1.851	10.90	3.0

10:55 sample collected

GROUNDWATER SAMPLING

Well No.: **MW-9**

Project No. 4656016
 Project Name: Harbor Facilities Center
 Location: Port of Oakland
651 Maritime Street, Oakland, California
 Weather: Warm, sunny
 Precip. in past 5 days (in.): 0.00
 Source: Oakland Fire Services Agency (ONS)
 Water level instrument: Heron Dipper T

Recorded by: CO/CC Date: 5/21/11
 Depth of well from TOC (feet): 25
 Well diameter (inches): 2
 Screened interval from TOC (feet): 15 - 25
 TOC elevation, NAVD 88 (feet): 16.33
 Groundwater elevation, NAVD 88 (feet): 4.96
 Water level from TOC (feet): 11.37 Time: 0907
 Product level from TOC (feet): — Time: —

CALCULATION OF WELL VOLUME:

$(25.00 \text{ ft} - 11.37 \text{ ft}) \times (0.083 \text{ ft})^2 \times \pi \times 7.48 \text{ gal/ft}^3 =$
 $\text{well depth} - \text{water level} \times (\text{well radius})^2 \times \pi \times \text{gal/ft}^3 =$

2.18 gallons in one casing volume
2 total gallons removed

CALIBRATION: see cal sheets for R 8740

FIELD MEASUREMENTS:

Pumping rate	Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)	Depth to Water (ft btoc)	Cumulative Gallons Removed
	0910	Began purging					NM	11.37	
350 ml/m	0912	20.40	7.13	7.06	-140.2	2.064		11.52	
400 ml/min	0916	19.85	7.16	0.74	-145.5	2.079		11.55	
	Pump failed momentarily - had to fix and restart								
300	0922	19.99	7.17	0.32	-146.3	2.085		11.54	0.5
	0926	19.85	7.17	0.37	-112.5	2.079		11.54	
	0929	19.85	7.17	0.29	-111.8	2.074		11.55	
300	0933	19.88	7.18	0.22	-126.0	2.061		11.55	
	0937	19.85	7.18	0.19	-120.9	2.042		11.56	1.5
300	0941	19.76	7.17	0.15	-126.9	2.029		11.57	
	0944	19.78	7.17	0.13	-122.8	2.021		11.55	
	0947	19.75	7.17	0.14	-130.1	2.005		11.56	2.0
	0950	Collected sample							

Purge method: per pump Sample Time: 0950
 Duplicate/blank number: — Duplicate Sample Time: —
 Sampling equipment: N/A VOA attachment: N/A
 Sample containers: 8 40 mL vials, 2 0.5 L amber, 2 0.5L poly, 1 250 mL poly
 Sample analyses: TPH-g, TPH-d/mo, BTEX, MTBE, TDS, alkalinity, anions, dissolved sulfide, cations, Fe, Mn, Coz, CH4
 Laboratory: C&T, Microselefs (sub)
 Decontamination method: none - disposable/dedicated tubing Rinsate disposal: N/A
 Comments: —

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

$$\text{Fe}^{2+} = 3.30 \text{ mg/L}$$

GROUNDWATER SAMPLING

Well No.: **MW-10**

Project No. 4656016
 Project Name: Harbor Facilities Center
 Location: Port of Oakland
651 Maritime Street, Oakland, California
 Weather: WARM, SUNNY
 Precip. in past 5 days (in.): 0.00
 Source: Oakland Fire Services Agency (CONSO)
 Water level instrument: Heron Dipper-T

Recorded by: CO/SC Date: 6/21/11
 Depth of well from TOC (feet): 25
 Well diameter (inches): 2
 Screened interval from TOC (feet): 15 - 25
 TOC elevation, NAVD 88 (feet): 15.65
 Groundwater elevation, NAVD 88 (feet): 5.46
 Water level from TOC (feet): 10.19 Time: 0919
 Product level from TOC (feet): - Time: -

CALCULATION OF WELL VOLUME:

$(25.00 \text{ ft} - 6.19 \text{ ft}) \times (0.083 \text{ ft})^2 \times \pi \times 7.48 \text{ gal/ft}^3 = 2.37 \text{ gallons in one casing volume}$
 $\text{well depth} - \text{water level} \times (\text{well radius})^2 \times \pi \times \text{gal/ft}^3 = 1.5 \text{ total gallons removed}$

CALIBRATION: see cal sheets for YSI R8740

FIELD MEASUREMENTS: 6/22

Pump rate (ml/min)	Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)	Depth to Water (ft btoc)	Cumulative Gallons Removed
	1408	Began	pumping				NM	10.18	
250	1410	20.05	6.87	5.33	-117.6	3.087	↓	10.42	
	1414	20.02	6.89	0.60	-118.7	3.087		10.43	
225	1418	19.86	6.88	0.32	-118.4	3.076		10.42	
250	1422	19.90	6.89	0.15	-108.9	3.080		10.42	
	1426	19.84	6.89	0.08	-107.5	3.076		10.42	
	1430	19.86	6.90	0.05	-114.4	3.076		10.42	0.75
	1434	19.65	6.90	0.04	-117.2	3.065		10.43	
	1438	19.46	6.90	0.03	-119.3	3.052		10.44	
	1442	19.28	6.90	0.03	-120.3	3.045		10.43	1
	1446	19.25	6.90	0.03	-118.0	3.042		10.43	

Purge method: peri pump Sample Time: 1450
 Duplicate/blank number: _____ Duplicate Sample Time: _____
 Sampling equipment: N/A VOA attachment: N/A
 Sample containers: 8 40 mL vials, 2 0.5 L ambers, 2 0.5 L poly, 1 250 mL poly
 Sample analyses: TPH-g, TPH-d/mo, BTEX, MTBE, TDS, alkalinity, anions, dissolved sulfide cations, Mn, Fe, CH₄, CO₂
 Laboratory: C&T, MicroSeeps (sub)
 Decontamination method: none - disposable dedicated tubing Rinsate disposal: N/A
 Comments: _____

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

$$\text{Fe}^{+2} = 3.30 \text{ mg/L (limit)}$$

Bl 2

01

GROUNDWATER SAMPLING

Well No.: **MW-11**

Project No. 4656016
 Project Name: Harbor Facilities Center
 Location: Port of Oakland
651 Maritime Street, Oakland, California
 Weather: warm, sunny
 Precip. in past 5 days (in.): 0.00
 Source: Oakland Fire Services Agency (OAFSA)
 Water level instrument: Heron Dipper-T

Recorded by: CO/SC Date: 6/21/11
 Depth of well from TOC (feet): 25
 Well diameter (inches): 2
 Screened interval from TOC (feet): 15 - 25
 TOC elevation, NAVD 88 (feet): 15.47
 Groundwater elevation, NAVD 88 (feet): 5.62
 Water level from TOC (feet): 9.85 Time: 845
 Product level from TOC (feet): - Time: -

CALCULATION OF WELL VOLUME:

$$(25.00 \text{ ft} - 9.85 \text{ ft}) \times (0.083 \text{ ft})^2 \times \pi \times 7.48 \text{ gal/ft}^3 = 2.42 \text{ gallons in one casing volume}$$

$$\text{well depth} - \text{water level} \times (\text{well radius})^2 \times \pi \times \text{gal/ft}^3 = 3.5 \text{ total gallons removed}$$

CALIBRATION: See cal sheets for YSI⁵⁵⁶ R8740

FIELD MEASUREMENTS:

Flow Rate	Time	Temperature	pH	DO	ORP	MS/CM ³	Turbidity	Depth to Water	Cumulative Gallons Removed
		(°C)	S.U.	(mg/L)	(mV)	EC (µmho/cm)			
250	1504	Began purging					NM	9.74	0.74
	1507	23.24	7.54	2.31	-181.3	5.444	↓	10.00	
	1510	23.11	7.57	0.34	-185.2	5.415		10.03	
	1513	22.45	7.57	0.07	-148.1	5.367		10.05	1
	1516	22.26	7.57	0.09	-138.1	5.339		10.06	
	1519	22.38	7.57	0.09	-131.1	5.332		10.08	1.5
	1522	22.23	7.59	0.11	-141.7	5.321		10.08	
	1525	22.35	7.60	0.13	-134.2	5.328		10.09	2
	1528	22.33	7.60	0.12	-154.9	5.325		10.09	
	1531	22.59	7.60	0.11	-171.6	5.348		10.10	
	1534	22.60	7.59	0.09	-175.6	5.345		10.10	
	1537	22.60	7.57	0.07	-177.7	5.345		10.11	3
1540	22.61	7.58	0.06	-178.4	5.340	10.11			

Purge method: Peri Pump Sample Time: 1545
 Duplicate/blank number: - Duplicate Sample Time: -
 Sampling equipment: N/A VOA attachment: N/A
 Sample containers: 8 40 mL vials, 2 0.5L ambers, 2 0.5L polys, 1 250 mL poly
 Sample analyses: TPH-G, TPH-d/mo, BTEX, MTBE, TDS, alkalinity, anions, dissolved sulfide, cations, Mn, Fe, CH₄, CO₂
 Laboratory: CFT, MicroSeps (sub)
 Decontamination method: none - disposable dedicated tubing Rinsate disposal: N/A
 Comments: _____

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

$$\text{Fe}^{+2} = 0.93 \text{ mg/L}$$

GROUNDWATER SAMPLING

Well No.: **MW-12**

Project No. <u>4656016</u>	Recorded by: <u>CO/SC</u>	Date: <u>6/21/11</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>Warm, Sunny</u>	TOC elevation, NAVD 88 (feet): <u>16.79</u>	
Precip. in past 5 days (in.): <u>0.00</u>	Groundwater elevation, NAVD 88 (feet): <u>5.78</u>	
Source: <u>Oakland Fire Services Agency (ONO)</u>	Water level from TOC (feet): <u>11.01</u>	Time: <u>835</u>
Water level instrument: <u>Heron Dipper-T</u>	Product level from TOC (feet): <u>—</u>	Time: <u>—</u>

CALCULATION OF WELL VOLUME:

$$(25.00 \text{ ft} - 11.01 \text{ ft}) \times (0.083 \text{ ft})^2 \times \pi \times 7.48 \text{ gal/ft}^3 = 2.24 \text{ gallons in one casing volume}$$

$$\text{well depth} - \text{water level} \times (\text{well radius})^2 \times \pi \times \text{gal/ft}^3 = 1.5 \text{ total gallons removed}$$

CALIBRATION:

see cal sheets for YSI 556 R 0740

FIELD MEASUREMENTS:

6/23

MS/cm

Time	Temperature (°C)	pH S.U.	DO (mg/L)	ORP (mV)	EC (µmho/cm)	Turbidity (NTU)	Depth to Water (ft btoc)	Cumulative Gallons Removed
0905	Begin	pumping				NM	11.08	
350 mL/min 0908	17.97	6.86	10.59	-144.4	1.538	↓	11.18	
0912	17.84	6.83	2.73	-169.2	1.540		11.19	
0916	17.68	6.84	0.90	-185.3	1.539		11.19	
0920	17.68	6.85	0.39	-187.3	1.538		11.19	0.5
0924	17.66	6.85	0.31	-208.0	1.539		11.19	
0928	17.69	6.85	0.27	-239.8	1.541		11.19	1.0
0932	17.68	6.85	0.21	-247.2	1.541		11.19	
0936	17.66	6.86	0.18	-253.8	1.541		11.19	1.5

Purge method: Peri Pump Sample Time: 0940

Duplicate/blank number: — Duplicate Sample Time: —

Sampling equipment: N/A VOA attachment: N/A

Sample containers: 8 40 mL vials, 2 0.5 L ambers, 1 0.5 L poly, 1 250 mL NaOH-preserved poly, 1 500 mL HNO₃ poly

Sample analyses: TPH-a, TPH-d/m, BTEX, MTBE, TDS, alkalinity, anions, dissolved sulfide, cations, Mn, Fe, CH₄, CO₂

Laboratory: CFT, MicroSeeps (sub)

Decontamination method: none - disposable dedicated tubing Rinsate disposal: N/A

Comments: Strong sulfur smell

TOC = top of casing

NAVD 88 = North American Vertical Datum of 1988.

$$\text{Fe}^{+2} = 0.41 \text{ mg/L}$$



Calibration Certificate

Asset No: **R8740**
Description: **YSI 556 WITH 10/M CABLE**
Serial No: **07M100157**
Manufacturer: **YSI**
Calibration Date: **17 June 2011**
Next Calibration: **Refer to Manufacturers Instructions**
Accuracy of Unit Under Test:
Adjustments made: **None**
Calibration Technician: **Kabilan Krishna**

Details of any limitations to the use of the equipment
None

The following measurement equipment used during the calibration procedure is traceable to National Standards.

Measurement Equipment/Standards

VAISALA HM70 - F4250028/F4330003
AutoCal - 8483
PH 7.00 BUFFER - P999172
Sodium sulfite - 104936
Zobell Solution - 11B102018

Reference

F4330003
C144699
Lot # 1639
EC-231-821-4
11B102018

Calibrated By:

A handwritten signature in black ink, appearing to read "Kabilan Krishna", is written over a solid horizontal line.

Kabilan Krishna

Test Results

<u>Question</u>	<u>Result</u>
Enter into "logging setup" Is the logging interval at 1min?	Yes
Are all the listed sensors activated?	Yes
Record the pH mV in pH 7.0 buffer solution for future reference	-3.7 mV
Record the pH mV value for the second pH point for future reference. (NOTE: For pH 4.0 buffer, the mV reading should be about a 165 counts from the pH 7.0 mV in the positive range. For pH 10.0 buffer, the mV reading should be about a 165 counts from the pH 7.0 mV in the negative range. [I.E. if pH 7.0 reads 0mV then pH 4.0 should be about 165mV and pH 10.0 should be about -165mV.]	169 mV
What is the conductivity reading? Ensure value recorded from instrument is within the manufacturer's tolerance. Accuracy $\pm 0.5\%$ of reading or ± 0.001 mS/cm; whichever is greater - 4 meter cable $\pm 1.0\%$ of reading or ± 0.001 mS/cm; whichever is greater - 20 meter cable (Tolerances listed 0.000 - 10.000 are not accurate but only to allow the system to enter a range of values throughout)	4.490 mS/cm
What is the DO reading?	9.06 As previously indicated
What is the ORP reading? Ensure ORP reading from instrument is within manufacturers tolerance. Accuracy ± 20 mV	237.50 mV



RENTALS

**YSI 556MPS RENTAL
CALIBRATION CERTIFICATE**

SERVICE TECHNICIAN: LM

DATE: 6/21/2011

INSTRUMENT INFORMATION

RENTAL I.D. NUMBER: YSI-556. 29
SERIAL#: 0201213AA
CUSTOMER.

CALIBRATION INFORMATION

PARAMETERS:	STANDARDS:	PASS ()	LOT#
1. CONDUCTIVITY	<u>1000</u> μ Mhos	<u>X</u>	<u>8534</u>
2. pH ZERO	pH 7	<u>X</u>	<u>8822</u>
3. pH SLOPE	pH 4	<u>X</u>	<u>8747</u>
pH SLOPE	pH 10	<u>X</u>	<u>8748</u>
4. DISSOLVED OXYGEN	Air Calibration Barometric pressure = 760mmHg	<u>X</u>	N/A
5. REDOX (ORP)	<u>231</u> mV (YSI Zobell solution)	<u>X</u>	<u>041511</u>

YSI 556MPS RENTAL CALIBRATION CERTIFICATE

SERVICE TECHNICIAN: VM

DATE: 6/22/2011

INSTRUMENT INFORMATION

RENTAL I.D. NUMBER: YSI-556. 18

SERIAL#:

CUSTOMER.

CALIBRATION INFORMATION

PARAMETERS:	STANDARDS:	PASS ()	LOT#
1. CONDUCTIVITY	<u>1000</u> μ Mhos	<u>X</u>	<u>8534</u>
2. pH ZERO	pH 7	<u>X</u>	<u>8822</u>
3. pH SLOPE	pH 4	<u>X</u>	<u>8747</u>
pH SLOPE	pH 10	<u>X</u>	<u>8748</u>
4. DISSOLVED OXYGEN	Air Calibration Barometric pressure = 760mmHg	<u>X</u>	N/A
5. REDOX (ORP)	<u>231</u> mV (YSI Zobell solution)	<u>X</u>	<u>041511</u>

0930 - Calibrated (R8740) YSI 556 w/:

pH calibration buffer 10:00
pH 7.00
pH 4.00

pH 4.00
Cond 4.49 mS/cm

1700 - checked parameters w/ cal solution

pH 4.00 solution: pH 4.03
Cond 3.164
DO: ~~7.85~~ 7.85 mg/L

pH 7.00 solution: pH 6.95

pH 10.00 solution: pH 9.91

0800 Calibrated YSIs (556.29) and (R8740)

1700 Checking pH for drift - YSI (R8740)

pH 10 standard = 10.04

pH 7 standard = ~~7.13~~ 7.13

pH 4 standard = 4.08

Conductivity = 0.025 mS/cm (standard is 1.0)

0815 Calibrated pH (4,7,10), conductivity (1 mS/cm), + DO
on YSI 556.18 + R8470

1230 Verified pH + cond readings for drift on both units

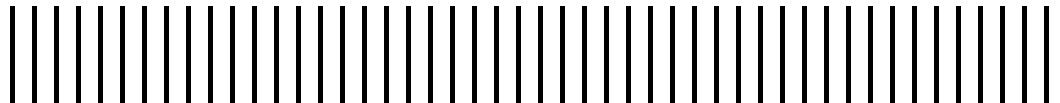


Port of Oakland

530 Water Street • Oakland, CA 94607

Appendix B

Laboratory Analytical Reports



Data Validation Worksheet

Lab Report # 228896
 Project Port Harbor Facilities Complex

DV by: SC
 Date: 07/11/11

Lab IDs	Sample IDs	Date Collected	Parameters								
			TPHg (8015B)	TPHd/mo (8015B)	MTBE BTEX (8260B)	Anions (300.0)	Metals (6010B)	Diss SO ₄ ⁻² (SM4500P -E)	Alk (2320B)	Orth-P (SM4500 P)	Gases (AM20 GAX)
-001	MW-4	6/21/11	X	X	X	X	X	X	X	X	X
-002	MW-4DUP	6/21/11	X	X	X	X	X	X	X	X	X
-003	MW-11	6/21/11	X	X	X	X	X	X	X	X	X
-004	QCTB	6/21/11			X + TPHg						

Lab ID: C+T, gases subbed to MicroSeeps
 Cooler Temperature: 8.0
 Chain-of-Custody: OK
 Samples preservatives: MW-11 pH =2.5 for 8260 analysis, reduced HT to 7 days

NO QUALS

Parameter: **TPHg**

HTs: 14 days – analyzed 6/22/11 (1)
 Batch IDs: 176130
 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: 176176: 7 days – extracted 6/23/11 (2) analyzed 6/27/11 (6)
 Batch IDs: 176176
 Surrogates: OK
 Method Blank: OK, surrogates OK
 LCS: OK, surrogates OK
 MS/MSD: MS OK, surrogates OK
 MSD OK, surrogates OK

Parameter: **BTEX + MTBE**

HTs: 7 days – analyzed 6/23/11 (2)
 Batch IDs: 176142
 Surrogates: OK
 Method Blank: OK, surrogates OK
 BS/BSD: BS OK, surrogates OK
 BSD OK, surrogates OK

Parameter: **Anions**

HTs: 28 days – analyzed 6/22/11 (1)
Batch IDs: 176109
Method Blank: OK
LCS: OK
MS/MSD: MS OK
MSD OK

Parameter: **Metals**

HTs: 6 months – analyzed 6/23/11 (2)
Batch IDs: 176183
Method Blank: OK
BS/BSD: BS OK
BSD OK
MS/MSD: MS out of range, sample concentration >4x spike concentration → NO QUAL
MSD out of range, sample concentration >4x spike concentration → NO QUAL

Parameter: **Alkalinity**

HTs: 14 days – analyzed 6/24/11 (2)
Batch IDs: 176199
Method Blank: OK
LCS: OK
MS/MSD: MS OK
MSD OK

Parameter: **Dissolved Sulfide**

HTs: 7 days – analyzed 6/28/11 (5)
Batch IDs: 176144
Method Blank: OK
LCS: OK
MS/MSD: MS OK
MSD OK

Parameter: **Orthophosphate**

HTs: 48 hrs – analyzed 6/22/11 (1)
Batch IDs: 176108
Method Blank: OK
LCS: OK
MS/MSD: MS OK
MSD OK

Parameter: **TDS**

HTs: 7 days – extracted 6/24/11 (1)
Batch IDs: 176195
Method Blank: OK
BS/BSD: BS OK
BSD OK
SDUP: OK

Parameter: **Gases**

HTs: 14 days – analyzed 6/27/11 (6)

Method Blank: OK

LCS/LCSD: LCS OK

LCSD OK



Curtis & Tompkins, Ltd.
Analytical Laboratories, Since 1878





Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878

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

Laboratory Job Number 228896
ANALYTICAL REPORT

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

Project : 4656016
Location : Port Of Oakland - HFC
Level : II

<u>Sample ID</u>	<u>Lab ID</u>
MW-4	228896-001
MW-4DUP	228896-002
MW-11	228896-003
QCTB	228896-004

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

Signature: 
Project Manager

Date: 07/14/2011

NELAP # 01107CA

CASE NARRATIVE

Laboratory number: 228896
Client: Malcolm Pirnie, Inc.
Project: 4656016
Location: Port Of Oakland - HFC
Request Date: 06/21/11
Samples Received: 06/21/11

This data package contains sample and QC results for four water samples, requested for the above referenced project on 06/21/11. The samples were received cold and intact.

TPH-Purgeables and/or BTXE by GC (EPA 8015B):

No analytical problems were encountered.

TPH-Extractables by GC (EPA 8015B):

No analytical problems were encountered.

Volatile Organics by GC/MS (EPA 8260B):

MW-11 (lab # 228896-003) had pH greater than 2. No other analytical problems were encountered.

Metals (EPA 6010B):

No analytical problems were encountered.

Ion Chromatography (EPA 300.0):

MW-11 (lab # 228896-003) was diluted due to high chloride concentration. No other analytical problems were encountered.

Alkalinity (SM2320B):

No analytical problems were encountered.

Dissolved Sulfide (SM4500S2-D):

No analytical problems were encountered.

Total Dissolved Solids (TDS) (SM2540C):

No analytical problems were encountered.

Orthophosphate Phosphorous (SM4500P-E):

No analytical problems were encountered.

AM20GAX (AM20GAX):

Microseeps, Inc. in Pittsburgh, PA performed the analysis (NELAP certified). Please see the Microseeps, Inc. case narrative.

ID#:

Curtis + Tompkins 7788910

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Lab Work Order #

Send Results to:	Contact & Company Name: Todd Miller, ARCADIS		Telephone: 510-516-9195		Preservative: HCL HCL				NaOH HNO₃ BAK		Keys Preservation Key: A. H ₂ SO ₄ B. HCL C. HNO ₃ D. NaOH E. None F. Other: _____ G. Other: _____ H. Other: _____ Matrix Key: SO - Soil W - Water T - Tissue SE - Sediment SL - Sludge A - Air NL - NAPL/Oil SW - Sample Wipe Other: _____		
	Address: 2000 Powell St, 7th floor		Fax: 510-652-4906		# of Containers: 3-ea 3-2ea 2-ea 1-ea 1-ea 1-ea 2 ea		Container Information: VAs VAs 500ml-Am 500ml-Pol 150-Pol 500-Pol VAs						
	City State Zip: Emeryville CA 94608		E-mail Address: todd.miller@arcadis-us.com										
Project Name/Location (City, State): Port HFC / Oakland CA					Project #: 046516016.0000		PARAMETER ANALYSIS & METHOD						
Sampler's Printed Name: Sarah Carmon					Sampler's Signature: <i>Sarah Carmon</i>		TPH-C SO _{15B} BEN-MBE SO _{15B} TPH-D-MO w/ silica gel SO _{15B} TDS, Ca, Alkalinity, Ammonia, O ₂ -Req Dis: Sulphide 376.2 Dis: Cations, Mn, Fe (acid blank) Membrane, CO ₂						
Sample ID		Collection		Type (✓)									
		Date	Time	Comp	Grab	Matrix							
MW-4		6/21/11	1335			W	X	X	X	X	X	X	
MW-4 DUP		↓	1335			↓	↓	↓	↓	↓	↓	↓	
MW-11		↓	1945			↓	↓	↓	↓	↓	↓	↓	
QCTB							X	X					

REMARKS

For BAK preserved VAs, had preservative reacted with sample. Submitted 3 VAs. please analyze "MW-11 extra" if insufficient preservative remains in the 2 VAs labeled "MW-11"

Special Instructions/Comments: Special QA/QC Instructions (✓):

Please Bill Port of Oakland directly

Laboratory Information and Receipt		Relinquished By		Received By		Relinquished By		Laboratory Received By	
Lab Name: C&T	Cooler Custody Seal (✓) <input checked="" type="checkbox"/> Intact <input type="checkbox"/> Not Intact	Printed Name: Sarah Carmon	Signature: <i>Sarah Carmon</i>	Printed Name: F. Gonzalez	Signature: <i>F. Gonzalez</i>	Printed Name:	Signature:	Printed Name:	Signature:
<input checked="" type="checkbox"/> Cooler packed with ice (✓)	Sample Receipt: on ice, ps.	Firm: ARCADIS	Date/Time: 6/21/11 1800	Firm/Courier: C&T	Date/Time: 6/21/11 1800	Firm/Courier:	Date/Time:	Firm:	Date/Time:
Specify Turnaround Requirements: SH	Condition/Cooler Temp: _____								

3 of 97

COOLER RECEIPT CHECKLIST



Login # 228896 Date Received 6/21/11 Number of coolers 6-1
Client Arcadis Project Port HFC/Oakland, CA

Date Opened 6/21/11 By (print) Vidia Oishi (sign) [Signature]
Date Logged in 6/22/11 By (print) [Signature] (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: * Notify PM if temperature exceeds 6°C
Type of ice used: Wet Blue/Gel None Temp(°C) 8.0

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. Did you check preservatives for all bottles for each sample? YES NO N/A

16. Did you document your preservative check? YES NO N/A

17. Did you change the hold time in LIMS for unpreserved VOAs? YES NO N/A

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

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

COMMENTS

Curtis & Tompkins Sample Preservation for 228896

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

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

Analyst: VO
 Date: 6/22/11

Batch QC Report

Total Volatile Hydrocarbons			
Lab #:	228896	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC597481	Batch#:	176130
Matrix:	Water	Analyzed:	06/22/11
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	1,000	896.9	90	80-120

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

Batch QC Report

Total Volatile Hydrocarbons			
Lab #:	228896	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8015B
Field ID:	ZZZZZZZZZZ	Batch#:	176130
MSS Lab ID:	228879-002	Sampled:	06/21/11
Matrix:	Water	Received:	06/21/11
Units:	ug/L	Analyzed:	06/22/11
Diln Fac:	1.000		

Type: MS Lab ID: QC597483

Analyte	MSS Result	Spiked	Result	%REC	Limits
Gasoline C7-C12	10.89	2,000	1,696	84	66-120

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	107	78-123

Type: MSD Lab ID: QC597484

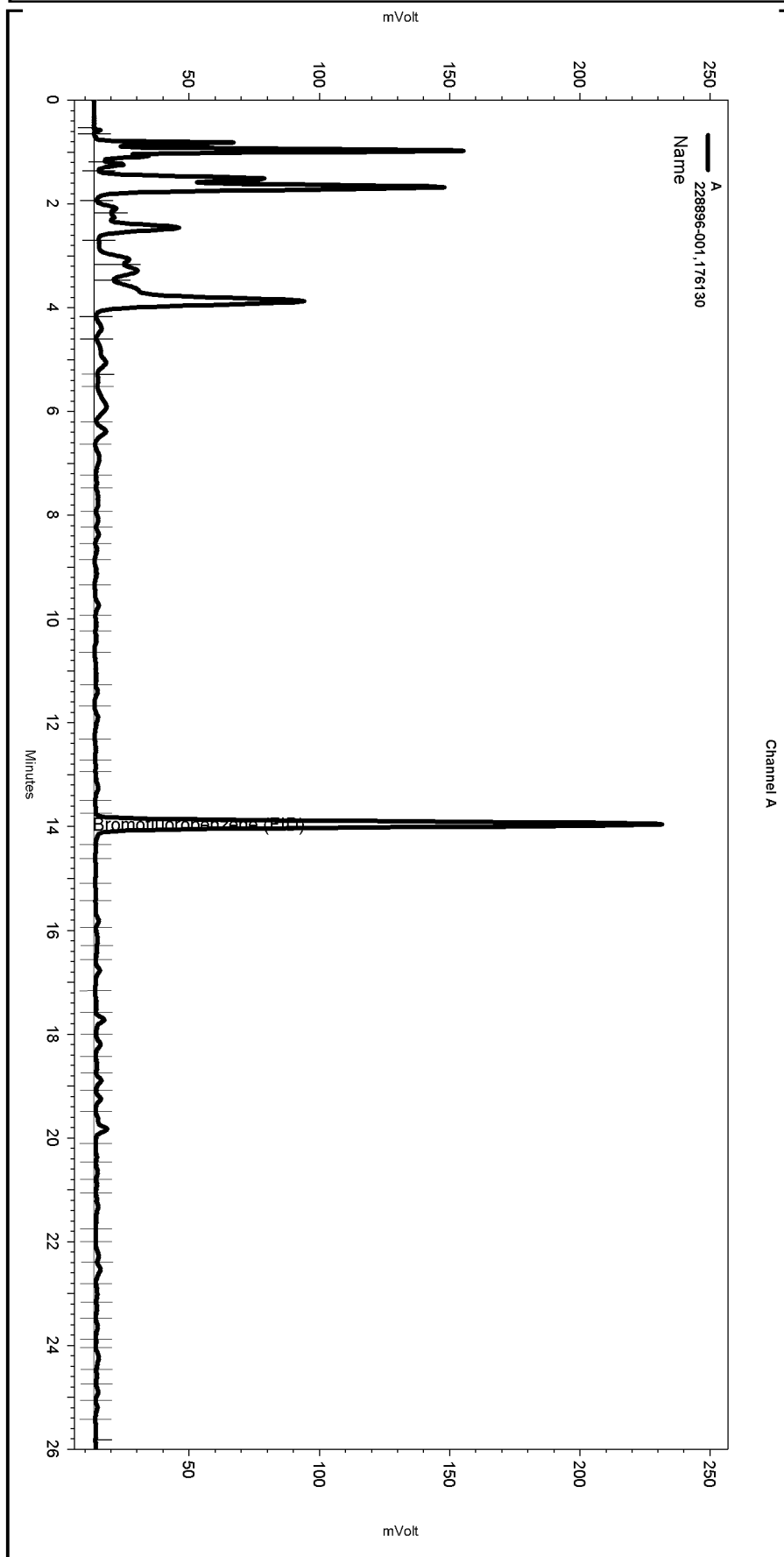
Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	2,000	1,679	83	66-120	1	25

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	105	78-123

RPD= Relative Percent Difference

Sequence File: \\Lims\gdrive\ezchrom\Projects\GC19\Sequence\173.seq
 Sample Name: 228896-001,176130
 Data File: \\Lims\gdrive\ezchrom\Projects\GC19\Data\173-011
 Instrument: GC19 (Offline) Vial: N/A Operator: Tvh 2. Analyst (lims2k3\tvh2)
 Method Name: \\Lims\gdrive\ezchrom\Projects\GC19\Method\TVHBTXE159.MET

Software Version 3.1.7
 Run Date: 6/22/2011 9:42:12 PM
 Analysis Date: 6/23/2011 11:07:09 AM
 Sample Amount: 5 Multiplier: 5
 Vial & pH or Core ID: a1.0



---< General Method Parameters >---

No items selected for this section

---< A >---

No items selected for this section

Integration Events

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

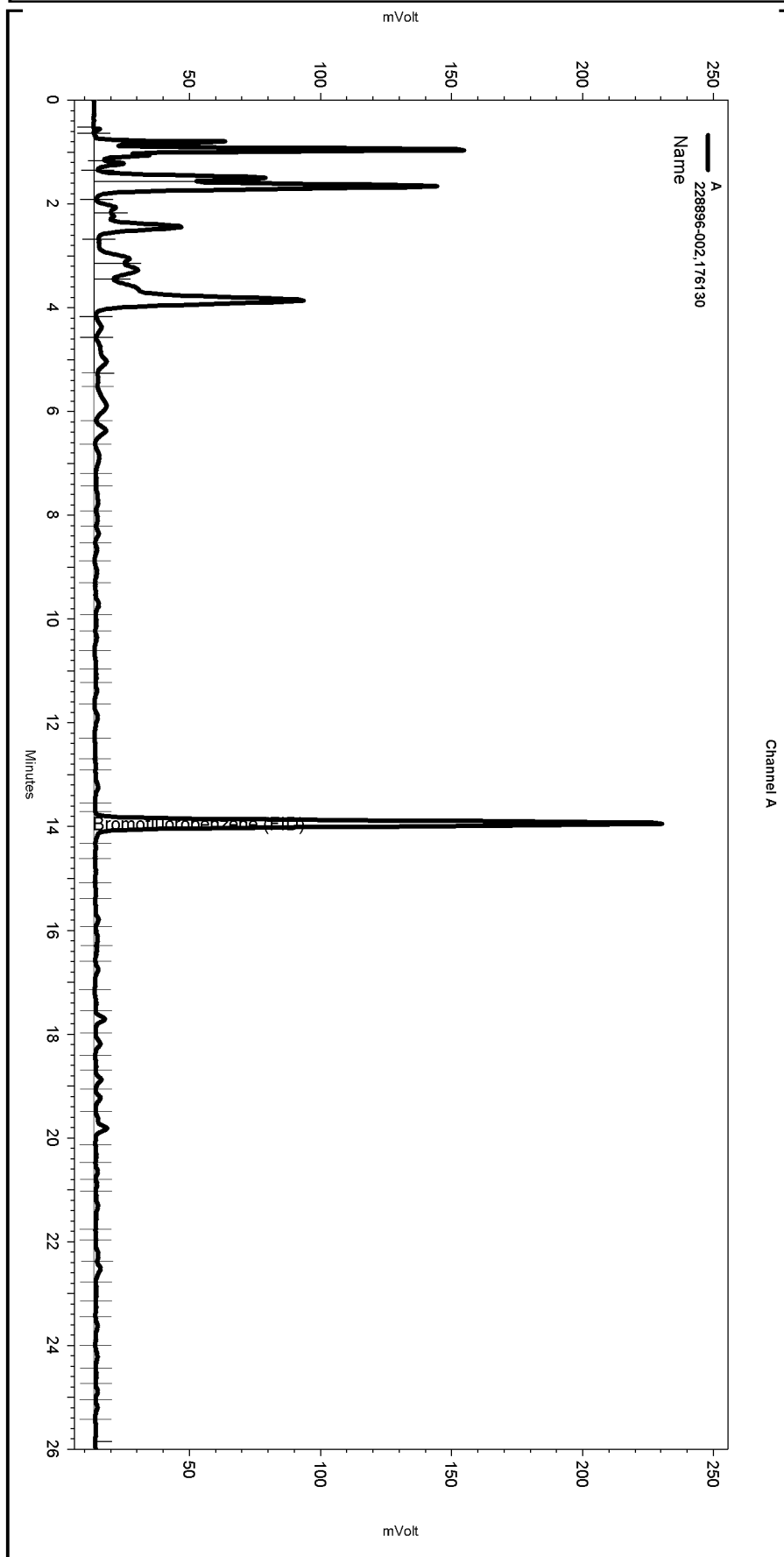
Manual Integration Fixes

Data File: \\Lims\gdrive\ezchrom\Projects\GC19\Data\173-011

Enabled	Event Type	Start (Minutes)	Stop (Minutes)	Value
Yes	Lowest Point Horizontal Baseline	0	26.017	0
Yes	Split Peak	13.746	0	0

Sequence File: \\Lims\gdrive\ezchrom\Projects\GC19\Sequence\173.seq
 Sample Name: 228896-002,176130
 Data File: \\Lims\gdrive\ezchrom\Projects\GC19\Data\173-012
 Instrument: GC19 (Offline) Vial: N/A Operator: Tvh 2. Analyst (lims2k3\tvh2)
 Method Name: \\Lims\gdrive\ezchrom\Projects\GC19\Method\TVHBTXE159.MET

Software Version 3.1.7
 Run Date: 6/22/2011 10:19:53 PM
 Analysis Date: 6/23/2011 11:08:32 AM
 Sample Amount: 5 Multiplier: 5
 Vial & pH or Core ID: a1.0



---< General Method Parameters >---

No items selected for this section

---< A >---

No items selected for this section

Integration Events

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

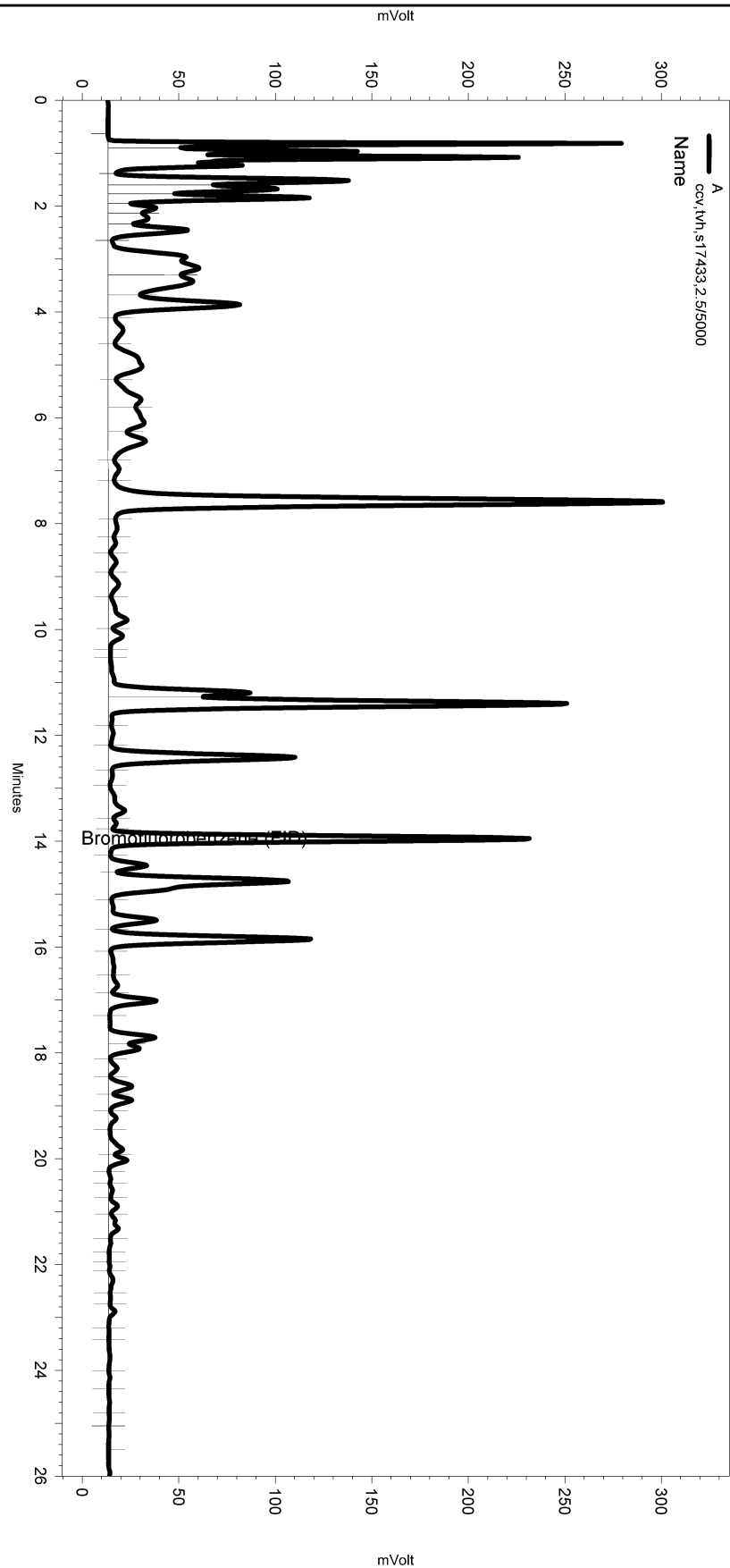
Manual Integration Fixes

Data File: \\Lims\gdrive\ezchrom\Projects\GC19\Data\173-012

Enabled	Event Type	Start (Minutes)	Stop (Minutes)	Value
Yes	Lowest Point Horizontal Baseline	0	26.017	0
Yes	Split Peak	13.723	0	0

Sequence File: \\Lims\gdrive\ezchrom\Projects\GC19\Sequence\173.seq
 Sample Name: ccv,tvh,s17433,2.5/5000
 Data File: \\Lims\gdrive\ezchrom\Projects\GC19\Data\173-002
 Instrument: GC19 Vial: N/A Operator: lims2k3\tvh3
 Method Name: \\Lims\gdrive\ezchrom\Projects\GC19\Method\tvhbx159.met

Software Version 3.1.7
 Run Date: 6/22/2011 1:41:55 PM
 Analysis Date: 6/22/2011 2:11:04 PM
 Sample Amount: 5 Multiplier: 5
 Vial & pH or Core ID: {Data Description}



---< General Method Parameters >---

No items selected for this section

---< A >---

No items selected for this section

Integration Events

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

Manual Integration Fixes

Data File: C:\Documents and Settings\All Users\Application Data\ChromatographySystem\Recovery Data\Instrument.10050\173-002_18CB.tmp

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

Channel A

Batch QC Report

Total Extractable Hydrocarbons			
Lab #:	228896	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 3520C
Project#:	4656016	Analysis:	EPA 8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC597680	Batch#:	176176
Matrix:	Water	Prepared:	06/23/11
Units:	ug/L	Analyzed:	06/27/11

Cleanup Method: EPA 3630C

Analyte	Spiked	Result	%REC	Limits
Diesel C10-C24	2,500	2,482	99	61-120

Surrogate	%REC	Limits
o-Terphenyl	111	68-120

Batch QC Report

Total Extractable Hydrocarbons			
Lab #:	228896	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 3520C
Project#:	4656016	Analysis:	EPA 8015B
Field ID:	ZZZZZZZZZZ	Batch#:	176176
MSS Lab ID:	228925-007	Sampled:	06/20/11
Matrix:	Water	Received:	06/23/11
Units:	ug/L	Prepared:	06/23/11
Diln Fac:	1.000	Analyzed:	06/27/11

Type: MS Lab ID: QC597681

Analyte	MSS Result	Spiked	Result	%REC	Limits
Diesel C10-C24	417.9	2,500	2,726	92	33-140

Surrogate	%REC	Limits
o-Terphenyl	111	68-120

Type: MSD Lab ID: QC597682

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Diesel C10-C24	2,500	2,984	103	33-140	9	30

Surrogate	%REC	Limits
o-Terphenyl	112	68-120

RPD= Relative Percent Difference

Purgeable Aromatics by GC/MS

Lab #:	228896	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-4	Batch#:	176142
Lab ID:	228896-001	Sampled:	06/21/11
Matrix:	Water	Received:	06/21/11
Units:	ug/L	Analyzed:	06/23/11
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	ND	0.5
Benzene	30	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5

Surrogate	%REC	Limits
Dibromofluoromethane	105	80-127
1,2-Dichloroethane-d4	107	73-145
Toluene-d8	97	80-120
Bromofluorobenzene	104	80-120

ND= Not Detected
 RL= Reporting Limit

Purgeable Aromatics by GC/MS

Lab #:	228896	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-4DUP	Batch#:	176142
Lab ID:	228896-002	Sampled:	06/21/11
Matrix:	Water	Received:	06/21/11
Units:	ug/L	Analyzed:	06/23/11
Diln Fac:	1.000		

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

Surrogate	%REC	Limits
Dibromofluoromethane	106	80-127
1,2-Dichloroethane-d4	106	73-145
Toluene-d8	99	80-120
Bromofluorobenzene	101	80-120

ND= Not Detected
 RL= Reporting Limit

Purgeable Aromatics by GC/MS

Lab #:	228896	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-11	Batch#:	176142
Lab ID:	228896-003	Sampled:	06/21/11
Matrix:	Water	Received:	06/21/11
Units:	ug/L	Analyzed:	06/23/11
Diln Fac:	1.000		

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

Surrogate	%REC	Limits
Dibromofluoromethane	104	80-127
1,2-Dichloroethane-d4	107	73-145
Toluene-d8	98	80-120
Bromofluorobenzene	102	80-120

ND= Not Detected
 RL= Reporting Limit

Gasoline by GC/MS			
Lab #:	228896	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	QCTB	Batch#:	176244
Matrix:	Water	Sampled:	06/21/11
Units:	ug/L	Received:	06/21/11
Diln Fac:	1.000	Analyzed:	06/27/11

Type: SAMPLE Lab ID: 228896-004

Analyte	Result	RL
Gasoline C7-C12	ND	50
MTBE	ND	0.50
Benzene	ND	0.50
Toluene	ND	0.50
Ethylbenzene	ND	0.50
m,p-Xylenes	ND	0.50
o-Xylene	ND	0.50

Surrogate	%REC	Limits
Dibromofluoromethane	96	80-127
1,2-Dichloroethane-d4	104	73-145
Toluene-d8	104	80-120
Bromofluorobenzene	99	80-120

Type: BLANK Lab ID: QC597964

Analyte	Result	RL
Gasoline C7-C12	ND	50
MTBE	ND	0.50
Benzene	ND	0.50
Toluene	ND	0.50
Ethylbenzene	ND	0.50
m,p-Xylenes	ND	0.50
o-Xylene	ND	0.50

Surrogate	%REC	Limits
Dibromofluoromethane	104	80-127
1,2-Dichloroethane-d4	99	73-145
Toluene-d8	100	80-120
Bromofluorobenzene	105	80-120

ND= Not Detected
 RL= Reporting Limit

Batch QC Report

Purgeable Aromatics by GC/MS			
Lab #:	228896	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC597547	Batch#:	176142
Matrix:	Water	Analyzed:	06/23/11
Units:	ug/L		

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

Surrogate	%REC	Limits
Dibromofluoromethane	105	80-127
1,2-Dichloroethane-d4	107	73-145
Toluene-d8	99	80-120
Bromofluorobenzene	104	80-120

ND= Not Detected

RL= Reporting Limit

Batch QC Report

Dissolved Metals Analytical Report

Lab #:	228896	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 6010B
Matrix:	Filtrate	Batch#:	176183
Units:	ug/L	Prepared:	06/23/11
Diln Fac:	1.000	Analyzed:	07/06/11

Type: BS Lab ID: QC597707

Analyte	Spiked	Result	%REC	Limits
Calcium	20,000	19,650	98	78-120
Iron	1,000	973.7	97	73-124
Magnesium	20,000	20,010	100	76-120
Manganese	50.00	50.98	102	80-120
Potassium	10,000	9,643	96	69-120
Sodium	20,000	19,610	98	75-120

Type: BSD Lab ID: QC597708

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Calcium	20,000	19,230	96	78-120	2	20
Iron	1,000	924.5	92	73-124	5	25
Magnesium	20,000	19,370	97	76-120	3	20
Manganese	50.00	49.99	100	80-120	2	21
Potassium	10,000	9,381	94	69-120	3	20
Sodium	20,000	18,800	94	75-120	4	20

RPD= Relative Percent Difference

Batch QC Report

Dissolved Metals Analytical Report

Lab #:	228896	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 6010B
Field ID:	MW-4	Batch#:	176183
MSS Lab ID:	228896-001	Sampled:	06/21/11
Matrix:	Filtrate	Received:	06/21/11
Units:	ug/L	Prepared:	06/23/11
Diln Fac:	1.000	Analyzed:	07/06/11

Type: MS Lab ID: QC597709

Analyte	MSS Result	Spiked	Result	%REC	Limits
Calcium	20,910	20,000	38,830	90	53-134
Iron	37.04	1,000	985.4	95	61-129
Magnesium	56,980	20,000	74,820	89	62-127
Manganese	183.9	50.00	231.5	95	64-128
Potassium	13,850	10,000	23,030	92	62-129
Sodium	340,900	20,000	371,900 >LR	155 NM	55-132

Type: MSD Lab ID: QC597710

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Calcium	20,000	38,190	86	53-134	2	20
Iron	1,000	986.4	95	61-129	0	32
Magnesium	20,000	72,540	78	62-127	3	23
Manganese	50.00	227.3	87	64-128	2	26
Potassium	10,000	22,840	90	62-129	1	24
Sodium	20,000	368,300 >LR	137 NM	55-132	NC	29

NC= Not Calculated

NM= Not Meaningful: Sample concentration > 4X spike concentration

>LR= Response exceeds instrument's linear range

RPD= Relative Percent Difference

Batch QC Report

Curtis & Tompkins Laboratories Analytical Report

Lab #:	228896	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 300.0
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC597401	Batch#:	176109
Matrix:	Water	Analyzed:	06/22/11 10:58
Units:	mg/L		

Analyte	Spiked	Result	%REC	Limits
Chloride	4.000	4.003	100	80-120
Nitrogen, Nitrite	1.000	1.004	100	80-120
Nitrogen, Nitrate	1.000	1.032	103	80-120
Sulfate	10.00	10.07	101	80-120

Batch QC Report
Curtis & Tompkins Laboratories Analytical Report

Lab #:	228896	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 300.0
Field ID:	ZZZZZZZZZZ	Diln Fac:	1.020
MSS Lab ID:	228879-002	Batch#:	176109
Matrix:	Water	Sampled:	06/21/11 17:05
Units:	mg/L	Received:	06/21/11

Type: MS Analyzed: 06/22/11 16:00
 Lab ID: QC597402

Analyte	MSS Result	Spiked	Result	%REC	Limits
Chloride	10.33	2.040	12.05	84 NM	80-120
Nitrogen, Nitrite	<0.01287	0.5100	0.6082	119	80-121
Nitrogen, Nitrate	<0.01127	0.5100	0.5249	103	80-120
Sulfate	1.569	5.100	6.941	105	80-120

Type: MSD Analyzed: 06/22/11 16:17
 Lab ID: QC597403

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Chloride	2.040	12.02	83 NM	80-120	0	20
Nitrogen, Nitrite	0.5100	0.6158	121	80-121	1	20
Nitrogen, Nitrate	0.5100	0.5382	106	80-120	3	20
Sulfate	5.100	6.951	106	80-120	0	20

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

Batch QC Report
Curtis & Tompkins Laboratories Analytical Report

Lab #:	228896	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 300.0
Field ID:	ZZZZZZZZZZ	Diln Fac:	500.0
MSS Lab ID:	228915-007	Batch#:	176109
Matrix:	Water	Sampled:	06/22/11 09:05
Units:	mg/L	Received:	06/22/11

Type: MS Analyzed: 06/23/11 00:09
 Lab ID: QC597577

Analyte	MSS Result	Spiked	Result	%REC	Limits
Chloride	6,233	1,000	7,169	94 NM	80-120
Nitrogen, Nitrite	<0.2574	250.0	284.8	114	80-121
Nitrogen, Nitrate	<0.2255	250.0	261.4	105	80-120
Sulfate	<0.5261	2,500	2,562	102	80-120

Type: MSD Analyzed: 06/23/11 00:27
 Lab ID: QC597578

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Chloride	1,000	7,167	93 NM	80-120	0	20
Nitrogen, Nitrite	250.0	287.8	115	80-121	1	20
Nitrogen, Nitrate	250.0	261.8	105	80-120	0	20
Sulfate	2,500	2,607	104	80-120	2	20

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

Batch QC Report

Alkalinity			
Lab #:	228896	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM2320B
Analyte:	Alkalinity, Total as CaCO3	Units:	mg/L
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC597761	Batch#:	176199
Matrix:	Water	Analyzed:	06/24/11

Spiked	Result	%REC	Limits
200.0	188.4	94	90-110

Batch QC Report

Alkalinity			
Lab #:	228896	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM2320B
Analyte:	Alkalinity, Total as CaCO3	Diln Fac:	1.000
Field ID:	MW-11	Batch#:	176199
MSS Lab ID:	228896-003	Sampled:	06/21/11
Matrix:	Water	Received:	06/21/11
Units:	mg/L	Analyzed:	06/24/11

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
MS	QC597762	1,499	333.0	1,793	88 NM	80-120		
MSD	QC597763		333.0	1,789	87 NM	80-120	0	25

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

Dissolved Sulfide			
Lab #:	228896	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM4500S2-D
Analyte:	Dissolved Sulfide	Batch#:	176144
Matrix:	Water	Sampled:	06/21/11
Units:	mg/L	Received:	06/21/11
Diln Fac:	1.000	Analyzed:	06/23/11

Field ID	Type	Lab ID	Result	RL
MW-4	SAMPLE	228896-001	ND	0.04
MW-4DUP	SAMPLE	228896-002	ND	0.04
MW-11	SAMPLE	228896-003	ND	0.04
	BLANK	QC597552	ND	0.04

ND= Not Detected
 RL= Reporting Limit

Batch QC Report

Dissolved Sulfide			
Lab #:	228896	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM4500S2-D
Analyte:	Dissolved Sulfide	Diln Fac:	1.000
Field ID:	MW-2	Batch#:	176144
MSS Lab ID:	228920-005	Sampled:	06/22/11
Matrix:	Water	Received:	06/22/11
Units:	mg/L	Analyzed:	06/23/11

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
MS	QC597553	<0.04000	0.6670	0.6316	95	64-123		
MSD	QC597554		0.6670	0.6169	93	64-123	2	20
LCS	QC597555		0.6670	0.6827	102	80-120		

RPD= Relative Percent Difference

Orthophosphate Phosphorous			
Lab #:	228896	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM4500P-E
Analyte:	Orthophosphate (as P)	Batch#:	176108
Matrix:	Water	Received:	06/21/11
Units:	mg/L	Analyzed:	06/22/11 11:38

Field ID	Type	Lab ID	Result	RL	Diln Fac	Sampled
MW-4	SAMPLE	228896-001	0.64	0.030	1.000	06/21/11 13:35
MW-4DUP	SAMPLE	228896-002	0.64	0.030	1.000	06/21/11 13:35
MW-11	SAMPLE	228896-003	9.6	0.75	25.00	06/21/11 15:45
	BLANK	QC597398	ND	0.030	1.000	

ND= Not Detected
 RL= Reporting Limit

Batch QC Report

Orthophosphate Phosphorous			
Lab #:	228896	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM4500P-E
Analyte:	Orthophosphate (as P)	Batch#:	176108
Field ID:	MW-4	Sampled:	06/21/11 13:35
MSS Lab ID:	228896-001	Received:	06/21/11
Matrix:	Water	Analyzed:	06/22/11 11:38
Units:	mg/L		

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim	Diln	Fac
LCS	QC597399		0.4000	0.4081	102	80-120			1.000	
MS	QC597446	0.6387	0.4000	1.049	103	76-120			5.000	
MSD	QC597447		0.4000	1.042	101	76-120	1	20	5.000	

RPD= Relative Percent Difference

Total Dissolved Solids (TDS)			
Lab #:	228896	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM2540C
Analyte:	Total Dissolved Solids	Sampled:	06/21/11
Matrix:	Water	Received:	06/21/11
Units:	mg/L	Prepared:	06/24/11
Batch#:	176195	Analyzed:	06/27/11

Field ID	Type	Lab ID	Result	RL	Diln Fac
MW-4	SAMPLE	228896-001	1,280	13	1.250
MW-4DUP	SAMPLE	228896-002	1,270	11	1.111
MW-11	SAMPLE	228896-003	3,140	20	2.000
	BLANK	QC597744	ND	10	1.000

ND= Not Detected
 RL= Reporting Limit

Batch QC Report

Total Dissolved Solids (TDS)			
Lab #:	228896	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM2540C
Analyte:	Total Dissolved Solids	Batch#:	176195
Field ID:	ZZZZZZZZZZ	Sampled:	06/23/11
MSS Lab ID:	228946-002	Received:	06/23/11
Matrix:	Water	Prepared:	06/24/11
Units:	mg/L	Analyzed:	06/27/11

Type	Lab ID	MSS Result	Spiked	Result	RL	%REC	Limits	RPD	Lim	Diln	Fac
BS	QC597745		104.0	114.0		110	75-120				1.000
BSD	QC597746		104.0	116.0		112	75-120	2	5		1.000
SDUP	QC597747	1,630		1,635	12.50			0	5		1.250

RL= Reporting Limit

RPD= Relative Percent Difference

Laboratory Job Number 228896

Subcontracted Products

Microseeps, Inc.



Client Name: Curtis & Tompkins, Ltd.
Contact: Desiree Tetrault
Address: 2323 Fifth St
Berkeley, CA 94710

Page: Page 1 of 6
Lab Proj #: P1106207
Report Date: 06/30/11
Client Proj Name: Port of Oakland-HFC
Client Proj #: 228896

Laboratory Results

Total pages in data package: 57

<u>Lab Sample #</u>	<u>Client Sample ID</u>
P1106207-01	MW-4
P1106207-02	MW-4DUP
P1106207-03	MW-11

Microseeps test results meet all the requirements of the NELAC standards or provide reasons and/or justification if they do not.

Approved By: Heather Hauser (DH) **Date:** 7-5-2011

Project Manager: Heather Hauser

The analytical results reported here are reliable and usable to the precision expressed in this report. As required by some regulating authorities, a full discussion of the uncertainty in our analytical results can be obtained at our web site or through customer service. Unless otherwise specified, all results are reported on a wet weight basis.

*As a valued client we would appreciate your comments on our service.
Please call customer service at (412)826-5245 or email customerservice@microseeps.com.*

Case Narrative:

Client Name: Curtis & Tompkins, Ltd.
 Contact: Desiree Tetrault
 Address: 2323 Fifth St
 Berkeley, CA 94710

Page: Page 2 of 6
 Lab Proj #: P1106207
 Report Date: 06/30/11
 Client Proj Name: Port of Oakland-HFC
 Client Proj #: 228896

<u>Sample Description</u>	<u>Matrix</u>	<u>Lab Sample #</u>	<u>Sampled Date/Time</u>	<u>Received</u>			
MW-4	Water	P1106207-01	21 Jun. 11 13:35	23 Jun. 11 13:13			
<u>Analyte(s)</u>	<u>Flag</u>	<u>Result</u>	<u>PQL</u>	<u>Units</u>	<u>Method #</u>	<u>Analysis Date</u>	<u>By</u>
RiskAnalysis							
N Carbon dioxide	J	2.50	5.00	mg/L	AM20GAX	6/27/11	gt
N Methane		3400.000	0.100	ug/L	AM20GAX	6/27/11	gt



Data Qualifiers: J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis

Client Name: Curtis & Tompkins, Ltd.
 Contact: Desiree Tetrault
 Address: 2323 Fifth St
 Berkeley, CA 94710

Page: Page 3 of 6
 Lab Proj #: P1106207
 Report Date: 06/30/11
 Client Proj Name: Port of Oakland-HFC
 Client Proj #: 228896

<u>Sample Description</u>	<u>Matrix</u>	<u>Lab Sample #</u>	<u>Sampled Date/Time</u>	<u>Received</u>			
MW-4DUP	Water	P1106207-02	21 Jun. 11 13:35	23 Jun. 11 13:13			
<u>Analyte(s)</u>	<u>Flag</u>	<u>Result</u>	<u>PQL</u>	<u>Units</u>	<u>Method #</u>	<u>Analysis Date</u>	<u>By</u>
RiskAnalysis							
N Carbon dioxide	J	3.10	5.00	mg/L	AM20GAX	6/27/11	gt
N Methane		3500.000	0.100	ug/L	AM20GAX	6/27/11	gt



Data Qualifiers: J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis

Client Name: Curtis & Tompkins, Ltd.
 Contact: Desiree Tetrault
 Address: 2323 Fifth St
 Berkeley, CA 94710

Page: Page 4 of 6
 Lab Proj #: P1106207
 Report Date: 06/30/11
 Client Proj Name: Port of Oakland-HFC
 Client Proj #: 228896

<u>Sample Description</u>	<u>Matrix</u>	<u>Lab Sample #</u>	<u>Sampled Date/Time</u>	<u>Received</u>			
MW-11	Water	P1106207-03	21 Jun. 11 15:45	23 Jun. 11 13:13			
<u>Analyte(s)</u>	<u>Flag</u>	<u>Result</u>	<u>PQL</u>	<u>Units</u>	<u>Method #</u>	<u>Analysis Date</u>	<u>By</u>
RiskAnalysis							
N Carbon dioxide		44.00	5.00	mg/L	AM20GAX	6/27/11	gt
N Methane		7900.000	0.100	ug/L	AM20GAX	6/27/11	gt



Data Qualifiers: J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis

Client Name: Curtis & Tompkins, Ltd.
 Contact: Desiree Tetrault
 Address: 2323 Fifth St
 Berkeley, CA 94710

Page: Page 5 of 6
 Lab Proj #: P1106207
 Report Date: 06/30/11
 Client Proj Name: Port of Oakland-HFC
 Client Proj #: 228896

Prep Method: In House Dissolved Gas Sample Preparation
Analysis Method: Analysis of Dissolved Permanent Gases in Water

M110627005-MB

	<u>Result</u>	<u>TrueSpikeConc.</u>	<u>RDL</u>	<u>%Recovery</u>	<u>Ctl Limits</u>
Carbon dioxide	< 5.00 mg/L		5.00		- NA

M110627005-LCS

	<u>Result</u>	<u>TrueSpikeConc.</u>	<u>%Recovery</u>	<u>Ctl Limits</u>
Carbon dioxide	140.00 mg/L	129.30	108.00	80 - 120

M110627005-LCSD

	<u>Result</u>	<u>TrueSpikeConc.</u>	<u>%Recovery</u>	<u>Ctl Limits</u>	<u>RPD</u>	<u>RPD Ctl Limits</u>
Carbon dioxide	140.00 mg/L	129.30	108.00	80 - 120	0.00	0 - 20

Outlined Results indicate results outside of Control limits



Data Qualifiers: J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis

Client Name: Curtis & Tompkins, Ltd.
 Contact: Desiree Tetrault
 Address: 2323 Fifth St
 Berkeley, CA 94710

Page: Page 6 of 6
 Lab Proj #: P1106207
 Report Date: 06/30/11
 Client Proj Name: Port of Oakland-HFC
 Client Proj #: 228896

Prep Method: In House Dissolved Gas Sample Preparation
Analysis Method: Light Hydrocarbons (C1-C4) in Water

M110627025-MB

	<u>Result</u>	<u>TrueSpikeConc.</u>	<u>RDL</u>	<u>%Recovery</u>	<u>Ctl Limits</u>
Methane	< 0.100 ug/L		0.100		- NA

M110627025-LCS

	<u>Result</u>	<u>TrueSpikeConc.</u>	<u>%Recovery</u>	<u>Ctl Limits</u>
Methane	850.000 ug/L	825.00	103.00	80 - 120

M110627025-LCSD

	<u>Result</u>	<u>TrueSpikeConc.</u>	<u>%Recovery</u>	<u>Ctl Limits</u>	<u>RPD</u>	<u>RPD Ctl Limits</u>
Methane	910.000 ug/L	825.00	110.00	80 - 120	6.82	0 - 20

Outlined Results indicate results outside of Control limits



Data Qualifiers: J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis

Curtis & Tompkins, Ltd.
 Analytical Laboratories, Since 1878
 2323 Fifth Street
 Berkeley, CA 94710
 (510) 486-0900
 (510) 486-0532

P1106207

Project Number: 228896
 Site: Port Of Oakland - HFC

Subcontract Laboratory:
 Microseeps, Inc.
 220 William Pitt Way
 Pittsburgh, PA 15238
 (412) 826-5245
 ATTN: Heather Hauser

Results due: Report Level: II
 Desiree N. Tetrauit (desiree.tetrauit@ctberk.com)
 Please send report to: ~~Tracy Babjar (tracy.babjar@ctberk.com)~~ *vs*
 *** Please report using Sample ID rather than C&T Lab #.

Sample ID	Sampled	Matrix	Analysis	C&T Lab #	Comments
MW-4	06/21 13:35	Water	AM20GAX	228896-001	Methane and CO2
MW-4DUP	06/21 13:35	Water	AM20GAX	228896-002	Methane and CO2
MW-11	06/21 15:45	Water	AM20GAX	228896-003	Methane and CO2; Please analyze "MW-11 extra" if insufficient preservative remains in the 2 VOAs labeled "MW-11"

Notes:	Relinquished By:	Received By:
	Date/Time: 6/22/11 13:00	Date/Time: 6/23/11 1400

y. N. 6/23

Signature on this form constitutes a firm Purchase Order for the services requested above.

Method File: WATER
Operator: slyon

Title: Dissolved Gases AM20GAX
Datasource: BIOREM11_local
Location: BIOREM14\2011 WATER 1.SEQ

Created: 5/5/2004 12:45:44 PM by bcarnicelli
Last Update: 2/27/2011 7:22:38 PM by slyon

P1106207

Peak Table:

Use Recently Detected Retention Times: Off
Peak Retention Time Determination: Absolute
Dead time:
Delay Time of 2'nd Detector: <None>
Delay Time of 3'rd Detector: <None>

No.	Peak Name	Ret.Time	Ret.Time FID	Ret.Time TCD	Ret.Time RGD	Window	Standard	Int.Type	Cal.Type
1	Methane	0.635 min	0.635 min			0.200 AN	External	Area	Lin
2	Ethane	0.906 min	0.906 min			0.200 AN	External	Area	Lin
3	Ethene	1.169 min	1.169 min			0.200 AN	External	Area	Lin
4	Propane	1.833 min	1.833 min			0.200 AN	External	Area	Lin
5	Hydrogen	3.210 min			3.210 min	0.200 AN	External	Area	Lin
6	Propene	3.466 min	3.466 min			0.200 AN	External	Area	Lin
7	Carbon Dioxide	3.993 min		3.993 min		0.500 AN	External	Area	Lin
8	iso-Butane	4.835 min	4.835 min			0.500 AN	External	Area	Lin
9	n-Butane	5.645 min	5.645 min			0.500 AN	External	Area	Lin
10	Oxygen	5.918 min		5.918 min		0.300 AN	External	Area	Lin
11	Nitrogen	6.330 min		6.330 min		0.300 AN	External	Area	Lin
12	Acetylene	6.866 min	6.866 min			0.500 AN	External	Area	Lin
13	Methane	7.586 min		7.586 min		0.400 AN	External	Area	Lin
14	Carbon Monoxide	8.486 min		8.486 min		0.400 AN	External	Area	Lin

Method File: WATER
 Operator: slyon

Title: Dissolved Gases AM20GAX
 Datasource: BIOREM11_local
 Location: BIOREM14\2011 WATER 1.SEQ

Created: 5/5/2004 12:45:44 PM by bcarnicelli
 Last Update: 2/27/2011 7:22:38 PM by slyon

Peak Table:

Use Recently Detected Retention Times: Off
 Peak Retention Time Determination: Absolute
 Dead time:
 Delay Time of 2'nd Detector: <None>
 Delay Time of 3'rd Detector: <None>

No.	Peak Name	Ret. Time	Peak Type	Group	Comment
1	Methane	0.635 min	Auto		
2	Ethane	0.906 min	Auto		
3	Ethene	1.169 min	Auto		
4	Propane	1.833 min	Auto		
5	Hydrogen	3.210 min	Auto		
6	Propene	3.466 min	Auto		
7	Carbon Dioxide	3.993 min	Auto		
8	iso-Butane	4.835 min	Auto		
9	n-Butane	5.645 min	Auto		
10	Oxygen	5.918 min	Auto		
11	Nitrogen	6.330 min	Auto		
12	Acetylene	6.866 min	Auto		
13	Methane	7.586 min	Auto		
14	Carbon Monoxide	8.486 min	Auto		

Method File: WATER
Operator: slyon

Title: Dissolved Gases AM20GAX
Datasource: BIOREM11_local
Location: BIOREM14\2011 WATER 1.SEQ

Created: 5/5/2004 12:45:44 PM by bcarnicelli
Last Update: 2/27/2011 7:22:38 PM by slyon

Amount Table:

Dimension of Amounts:
Reference volume for amounts: Use inject volume of first standard
Number of Amount Columns: 21
Sample column used for amount column assignment: Sample Name

No.	Peak Name	Ret.Time	Ret.Time FID	Ret.Time TCD	Ret.Time RGD	Amount ICAL FID L8	Amount ICAL FID L7	Amount ICAL FID L6
1	Methane	0.635 min	0.635 min			0.011000	0.054000	0.134000
2	Ethane	0.906 min	0.906 min			0.021000	0.104000	0.260000
3	Ethene	1.169 min	1.169 min			0.023000	0.113000	0.284000
4	Propane	1.833 min	1.833 min			0.030000	0.152000	0.379000
5	Hydrogen	3.210 min			3.210 min	0.031000	0.157000	0.393000
6	Propene	3.466 min	3.466 min					
7	Carbon Dioxide	3.993 min		3.993 min		0.035000	0.176000	0.440000
8	iso-Butane	4.835 min	4.835 min			0.037000	0.186000	0.466000
9	n-Butane	5.645 min	5.645 min					
10	Oxygen	5.918 min		5.918 min				
11	Nitrogen	6.330 min		6.330 min			0.313000	0.782000
12	Acetylene	6.866 min	6.866 min					
13	Methane	7.586 min		7.586 min				
14	Carbon Monoxide	8.486 min		8.486 min				

Method File: WATER
Operator: slyon

Title: Dissolved Gases AM20GAX
Datasource: BIOREM11_local
Location: BIOREM14\2011 WATER 1.SEQ

Created: 5/5/2004 12:45:44 PM by bcarnicelli
Last Update: 2/27/2011 7:22:38 PM by slyon

Amount Table:

Dimension of Amounts:

Reference volume for amounts: Use inject volume of first standard

Number of Amount Columns: 21

Sample column used for amount column assignment: Sample Name

No.	Peak Name	Ret.Time	Amount ICAL FID L5	Amount ICAL FID L4	Amount ICAL FID L3	Amount ICAL FID L2	Amount ICAL FID L1	Amount ICAL H2 L7	Amount ICAL H2 L6
1	Methane	0.635 min	0.537000	2.687000	10.750000	33.590000	134.360000		
2	Ethane	0.906 min	1.040000	5.200000	20.800000	65.000000	259.980000		
3	Ethene	1.169 min	1.134000	5.671000	22.680000	70.880000	283.530000		
4	Propane	1.833 min	1.516000	7.579000	30.320000	94.740000	378.950000	2.940000	7.350000
5	Hydrogen	3.210 min							
6	Propene	3.466 min	1.571000	7.856000	31.420000	98.200000	392.810000		
7	Carbon Dioxide	3.993 min							
8	iso-Butane	4.835 min	1.760000	8.798000	35.190000	109.970000	439.890000		
9	n-Butane	5.645 min	1.864000	9.320000	37.280000	116.500000	465.990000		
10	Oxygen	5.918 min							
11	Nitrogen	6.330 min							
12	Acetylene	6.866 min	3.126000	15.630000	62.520000	195.380000	781.500000		
13	Methane	7.586 min							
14	Carbon Monoxide	8.486 min							

Method File: WATER
 Operator: slyon

Title: Dissolved Gases AM20GAx
 Datasource: BIOREM11_local
 Location: BIOREM14\2011 WATER 1.SEQ

Created: 5/5/2004 12:45:44 PM by bcarnicelli
 Last Update: 2/27/2011 7:22:38 PM by slyon

Amount Table:

Dimension of Amounts:

Reference volume for amounts: Use inject volume of first standard

Number of Amount Columns: 21

Sample column used for amount column assignment: Sample Name

No.	Peak Name	Ret.Time	Amount ICAL H2 L5	Amount ICAL H2 L4	Amount ICAL H2 L3	Amount ICAL H2 L2	Amount ICAL H2 L1	Amount ICAL TCD L6	Amount ICAL TCD L5
1	Methane	0.635 min							
2	Ethane	0.906 min							
3	Ethene	1.169 min							
4	Propane	1.833 min							
5	Hydrogen	3.210 min	29.400000	73.500000	147.000000	294.000000	735.000000		
6	Propene	3.466 min						1.278000	3.195000
7	Carbon Dioxide	3.993 min							
8	iso-Butane	4.835 min							
9	n-Butane	5.645 min						0.077600	0.194000
10	Oxygen	5.918 min						1.128680	2.821700
11	Nitrogen	6.330 min							
12	Acetylene	6.866 min							109.800000
13	Methane	7.586 min							0.290500
14	Carbon Monoxide	8.486 min							

Method File: WATER
Operator: slyon

Title: Dissolved Gases AM20GAx
Datasource: BIOREM11_local
Location: BIOREM14\2011 WATER 1.SEQ

Created: 5/5/2004 12:45:44 PM by bcarnicelli
Last Update: 2/27/2011 7:22:38 PM by slyon

Amount Table:

Dimension of Amounts:
Reference volume for amounts: Use inject volume of first standard
Number of Amount Columns: 21
Sample column used for amount column assignment: Sample Name

No.	Peak Name	Ret.Time	Amount			
			ICAL TCD L4	ICAL TCD L3	ICAL TCD L2	ICAL TCD L1
1	Methane	0.635 min				
2	Ethane	0.906 min				
3	Ethene	1.169 min				
4	Propane	1.833 min				
5	Hydrogen	3.210 min				
6	Propene	3.466 min				
7	Carbon Dioxide	3.993 min	6.390000	31.950000	159.750000	319.500000
8	iso-Butane	4.835 min				
9	n-Butane	5.645 min				
10	Oxygen	5.918 min	0.388000	1.940000	9.700000	19.400000
11	Nitrogen	6.330 min	5.643000	28.217000	141.085000	282.170000
12	Acetylene	6.866 min				
13	Methane	7.586 min	219.600000	1098.000000	5490.000000	10980.000000
14	Carbon Monoxide	8.486 min	0.581000	2.905000	14.525000	29.050000

Method File: WATER
 Operator: slyon

Title: Dissolved Gases AM20GAx
 Datasource: BIOREM11_local
 Location: BIOREM14\2011 WATER 1.SEQ

Created: 5/5/2004 12:45:44 PM by bcarnicelli
 Last Update: 2/27/2011 7:22:38 PM by slyon

Calibration:

Calibration Mode: Total
 Auto Recalibrate: On
 Curve Fitting Model: Normal
 Dual-Column Separate Calibration: Off

No.	Enabled	Name	Smp.No.	Pos.	Inj. Vol.	Weight	ISTD Amount	Dil. Factor	Inj. Date/Time
1	<input checked="" type="checkbox"/>	ICAL TCD L6	1	1	1.0	1.0000	1.0000	1.0000	12/8/2010 3:39:38 PM
2	<input checked="" type="checkbox"/>	ICAL TCD L5	2	2	1.0	1.0000	1.0000	1.0000	12/8/2010 3:54:49 PM
3	<input checked="" type="checkbox"/>	ICAL TCD L4	3	3	1.0	1.0000	1.0000	1.0000	12/8/2010 4:13:17 PM
4	<input checked="" type="checkbox"/>	ICAL TCD L3	4	4	1.0	1.0000	1.0000	1.0000	12/8/2010 4:26:21 PM
5	<input checked="" type="checkbox"/>	ICAL TCD L2	5	5	1.0	1.0000	1.0000	1.0000	12/8/2010 4:42:41 PM
6	<input checked="" type="checkbox"/>	ICAL TCD L1	6	6	1.0	1.0000	1.0000	1.0000	12/8/2010 4:54:54 PM
7	<input checked="" type="checkbox"/>	ICAL FID L8	9	9	1.0	1.0000	1.0000	1.0000	2/27/2011 1:05:04 PM
8	<input checked="" type="checkbox"/>	ICAL FID L7	10	10	1.0	1.0000	1.0000	1.0000	2/27/2011 1:17:20 PM
9	<input checked="" type="checkbox"/>	ICAL FID L6	11	11	1.0	1.0000	1.0000	1.0000	2/27/2011 1:32:41 PM
10	<input checked="" type="checkbox"/>	ICAL FID L5	12	12	1.0	1.0000	1.0000	1.0000	2/27/2011 1:45:08 PM
11	<input checked="" type="checkbox"/>	ICAL FID L4	13	13	1.0	1.0000	1.0000	1.0000	2/27/2011 1:57:23 PM
12	<input checked="" type="checkbox"/>	ICAL FID L3	14	14	1.0	1.0000	1.0000	1.0000	2/27/2011 2:12:00 PM
13	<input checked="" type="checkbox"/>	ICAL FID L2	15	15	1.0	1.0000	1.0000	1.0000	2/27/2011 2:24:18 PM
14	<input checked="" type="checkbox"/>	ICAL FID L1	16	16	1.0	1.0000	1.0000	1.0000	2/27/2011 2:36:33 PM

Light Hydrocarbons

Method AM20GAX

2/27/2011

No.	Ret.Time min	Peak Name	Cal.Type	Points	R-Square %	Offset	Slope	Curve
1	0.64	Methane	Lin	8	99.993	0.00000	0.68018	0.00000
2	0.92	Ethane	Lin	8	99.992	0.00000	0.63526	0.00000
3	1.18	Ethene	Lin	8	99.991	0.00000	0.57092	0.00000
4	1.86	Propane	Lin	8	99.990	0.00000	0.66556	0.00000
5	3.55	Propene	Lin	8	99.988	0.00000	0.60387	0.00000
6	4.92	iso-Butane	Lin	8	99.989	0.00000	0.72658	0.00000
7	5.76	n-Butane	Lin	8	99.987	0.00000	0.70879	0.00000
8	7.03	Acetylene	Lin	7	99.971	0.00000	0.21754	0.00000

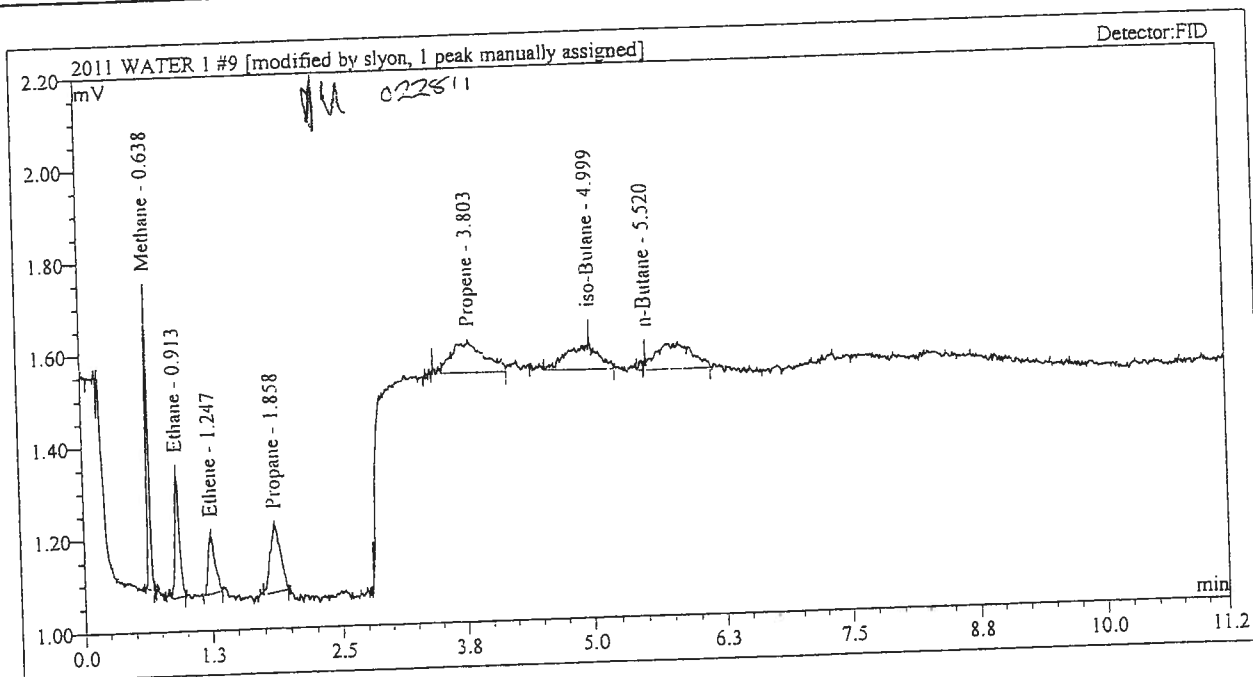
MICROSEEPS

Sample Analysis Report

Sample Name:	ICAL FID L8	Sequence No:	9
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	2/27/2011 13:05	Analytical Method:	AM20GAx/PM01
System Operator:	slyon	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Methane	0.638	0.017	0.664	BMB*	0.0250
2	Ethane	0.913	0.015	0.287	BMB*	0.0232
3	Ethene	1.247	0.010	0.139	BMB*	0.0175
4	Propane	1.858	0.017	0.153	BMB*	0.0251
5	Propene	3.803	0.025	0.073	BMB**	0.0418
6	iso-Butane	4.999	0.020	0.108	BMB*	0.0274
7	n-Butane	5.520	0.023	0.067	BMB*	0.0327

FID UNITS (Methane thru Acetylene ug/L)
TCD UNITS (Methane ug/L, CO₂, O₂, N₂, CO mg/L)
RGD UNITS (Hydrogen nM)



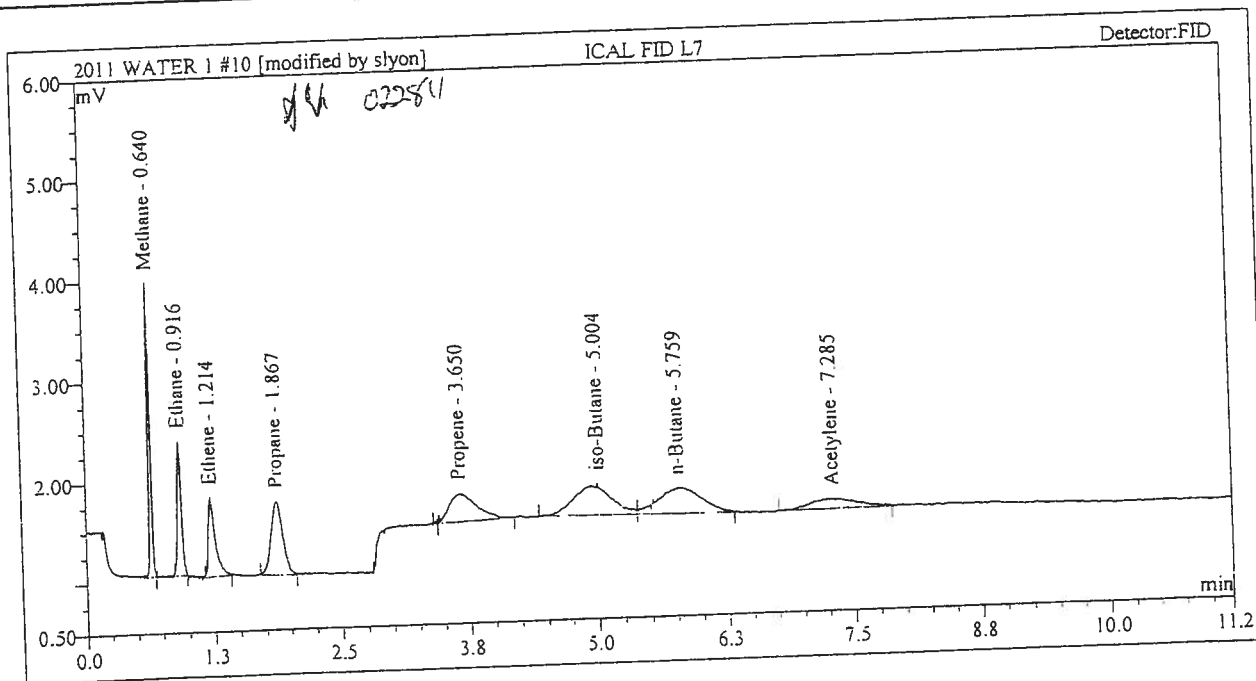
MICROSEEPS

Sample Analysis Report

Sample Name:	ICAL FID L7	Sequence No:	10
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	2/27/2011 13:17	Analytical Method:	AM20GAX/PM01
System Operator:	slyon	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Methane	0.640	0.080	2.927	BMB*	0.1173
2	Ethane	0.916	0.068	1.346	BMB*	0.1069
3	Ethene	1.214	0.064	0.796	BMB*	0.1121
4	Propane	1.867	0.104	0.742	BMB*	0.1569
5	Propene	3.650	0.088	0.294	BMB*	0.1453
6	iso-Butane	5.004	0.127	0.322	BM *	0.1748
7	n-Butane	5.759	0.125	0.263	MB*	0.1770
8	Acetylene	7.285	0.052	0.104	BMB*	0.2386

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



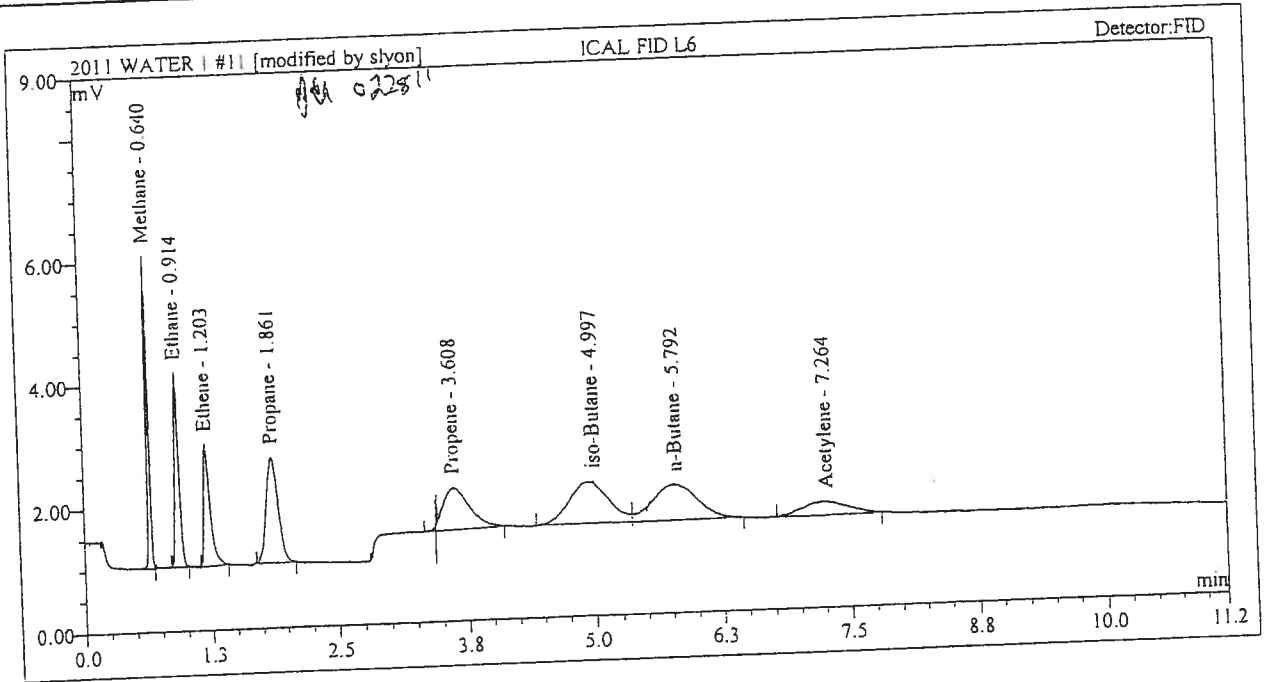
MICROSEEPS

Sample Analysis Report

Sample Name:	ICAL FID L6	Sequence No:	11
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	2/27/2011 13:32	Analytical Method:	AM20GAX/PM01
System Operator:	slyon	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Methane	0.640	0.138	5.086	BMB*	0.2030
2	Ethane	0.914	0.162	3.163	BMB*	0.2558
3	Ethene	1.203	0.152	1.975	BMB*	0.2658
4	Propane	1.861	0.237	1.712	BMB*	0.3554
5	Propene	3.608	0.204	0.697	BMB*	0.3370
6	iso-Butane	4.997	0.293	0.678	BM *	0.4027
7	n-Butane	5.792	0.297	0.580	MB*	0.4197
8	Acetylene	7.264	0.114	0.228	BMB*	0.5237

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



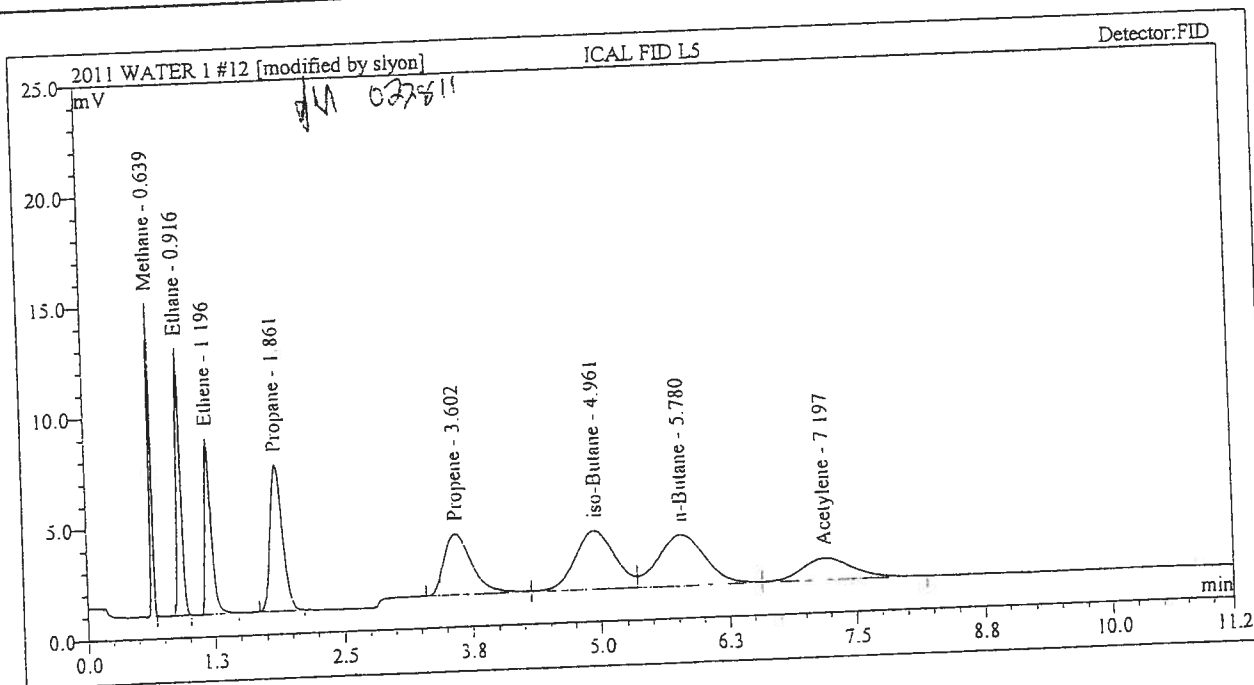
MICROSEEPS

Sample Analysis Report

Sample Name:	ICAL FID L5	Sequence No:	12
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	2/27/2011 13:45	Analytical Method:	AM20GAX/PM01
System Operator:	slyon	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Methane	0.639	0.381	14.143	BMB*	0.5602
2	Ethane	0.916	0.616	12.070	BMB	0.9704
3	Ethene	1.196	0.595	7.932	BMB*	1.0416
4	Propane	1.861	0.932	6.629	BMB*	1.3999
5	Propene	3.602	0.866	2.778	BM *	1.4348
6	iso-Butane	4.961	1.198	2.657	M *	1.6494
7	n-Butane	5.780	1.237	2.323	M *	1.7456
8	Acetylene	7.197	0.585	1.007	MB*	2.6886

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



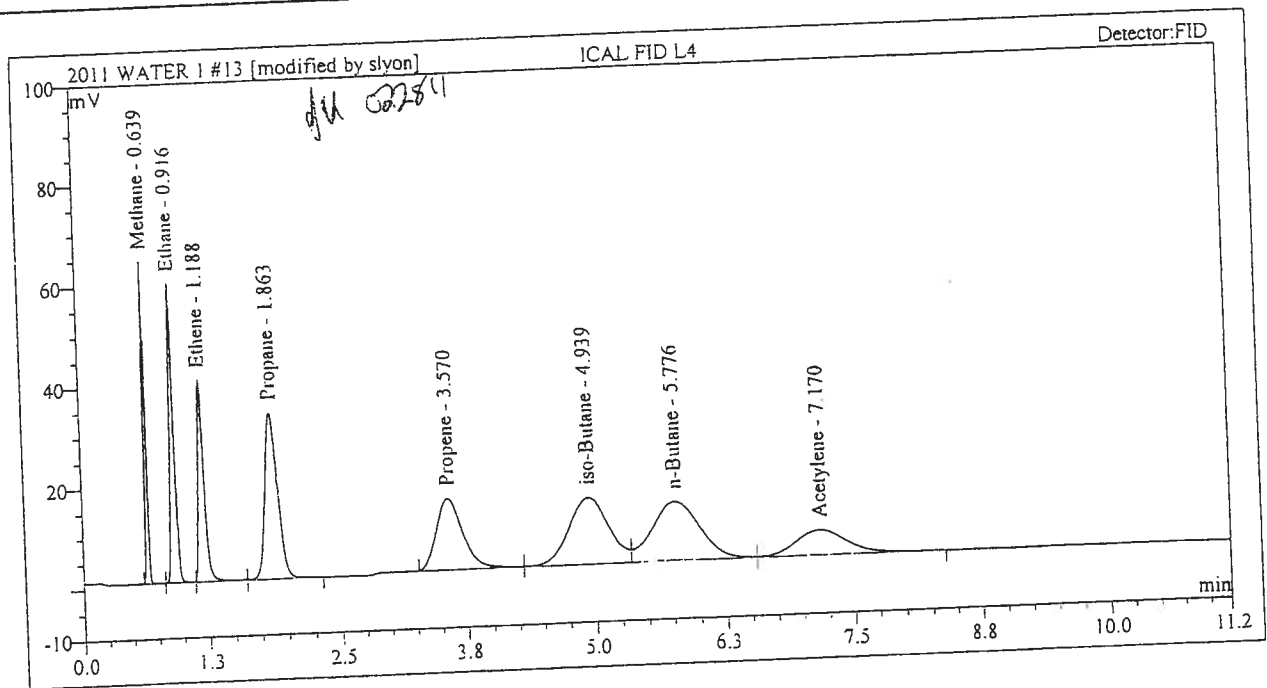
MICROSEEPS

Sample Analysis Report

Sample Name:	ICAL FID L4	Sequence No:	13
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	2/27/2011 13:57	Analytical Method:	AM20GAX/PM01
System Operator:	slyon	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Methane	0.639	1.737	63.898	BM *	2.5544
2	Ethane	0.916	3.049	59.260	M *	4.8000
3	Ethene	1.188	2.967	40.075	M *	5.1960
4	Propane	1.863	4.652	33.012	MB*	6.9899
5	Propene	3.570	4.321	14.169	BM *	7.1550
6	iso-Butane	4.939	5.886	13.216	M *	8.1008
7	n-Butane	5.776	6.178	11.716	M *	8.7167
8	Acetylene	7.170	2.904	4.988	MB*	13.3513

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



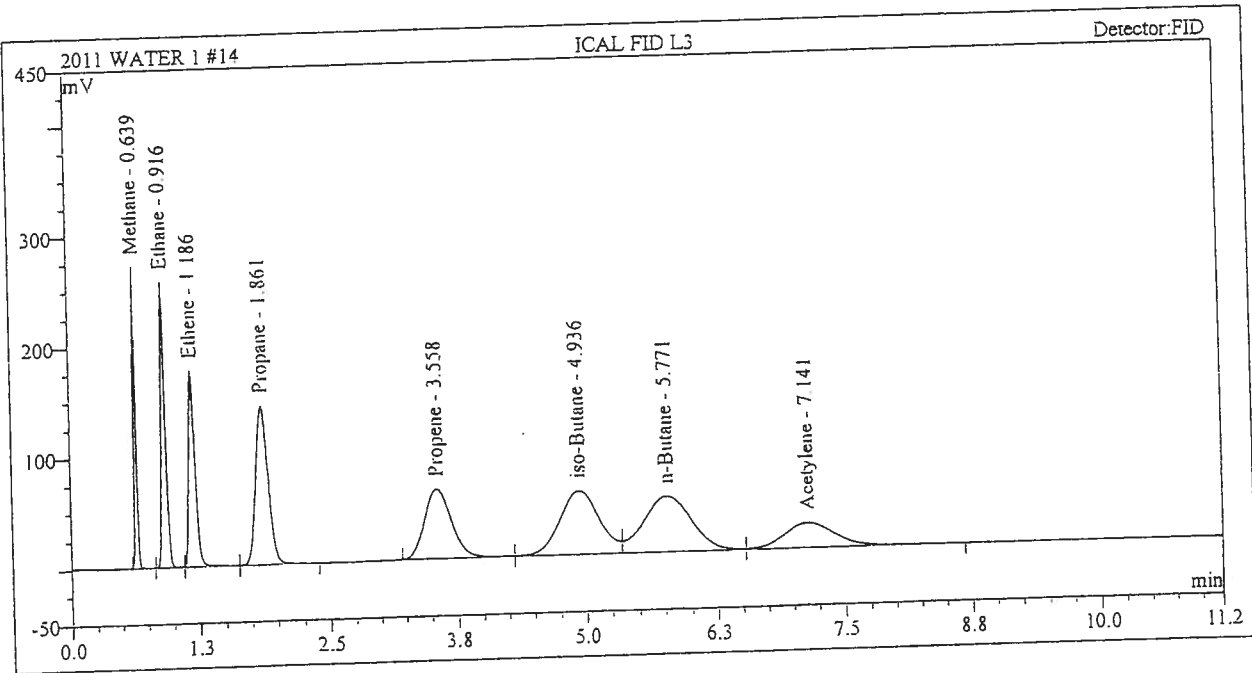
MICROSEEPS

Sample Analysis Report

Sample Name:	ICAL FID L3	Sequence No:	14
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	2/27/2011 14:12	Analytical Method:	AM20GAx/PM01
System Operator:	slyon	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Methane	0.639	7.380	271.997	BM	10.8506
2	Ethane	0.916	13.239	257.730	M	20.8395
3	Ethene	1.186	12.926	176.732	M	22.6400
4	Propane	1.861	20.111	142.962	MB	30.2163
5	Propene	3.558	18.822	62.336	BM	31.1683
6	iso-Butane	4.936	25.463	57.196	M	35.0454
7	n-Butane	5.771	26.307	50.251	M	37.1162
8	Acetylene	7.141	13.031	22.447	MB	59.9005

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



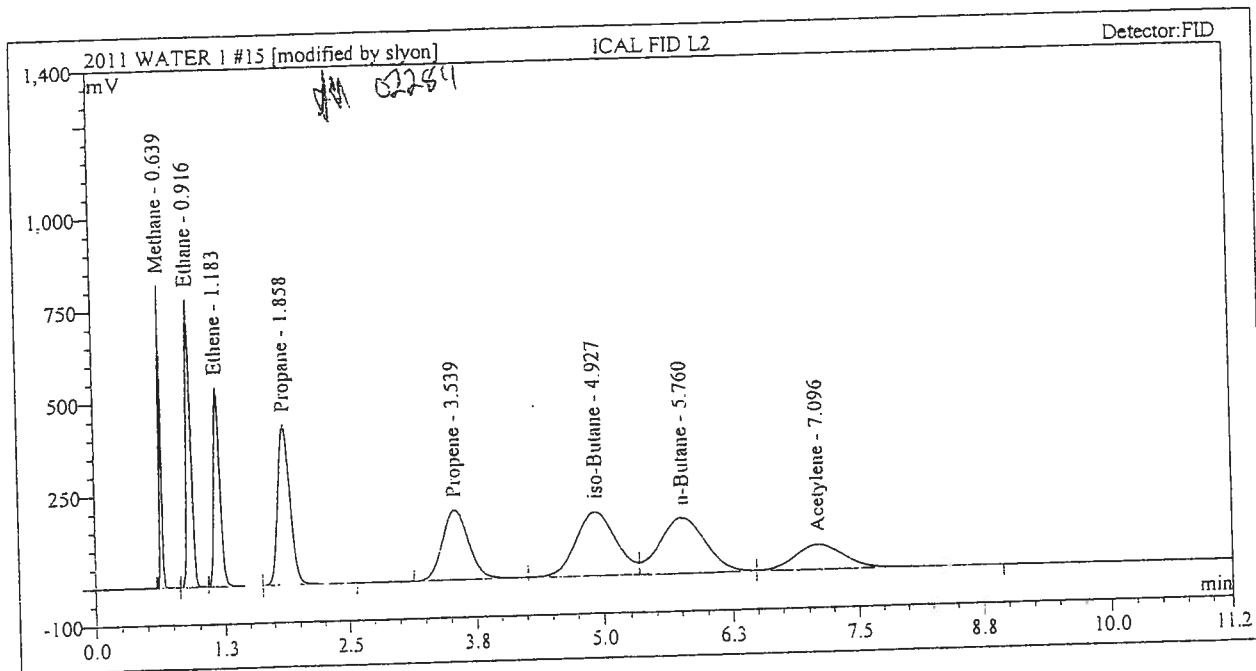
MICROSEEPS

Sample Analysis Report

Sample Name:	ICAL FID L2	Sequence No:	15
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	2/27/2011 14:24	Analytical Method:	AM20GAx/PM01
System Operator:	slyon	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Methane	0.639	22.201	816.969	BM	32.6397
2	Ethane	0.916	40.035	778.837	M	63.0213
3	Ethene	1.183	39.134	538.157	M	68.5460
4	Propane	1.858	60.888	433.288	MB	91.4848
5	Propene	3.539	57.030	189.999	BM *	94.4412
6	iso-Butane	4.927	76.913	172.926	M *	105.8559
7	n-Butane	5.760	79.222	151.452	M *	111.7711
8	Acetylene	7.096	40.095	69.323	MB*	184.3134

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



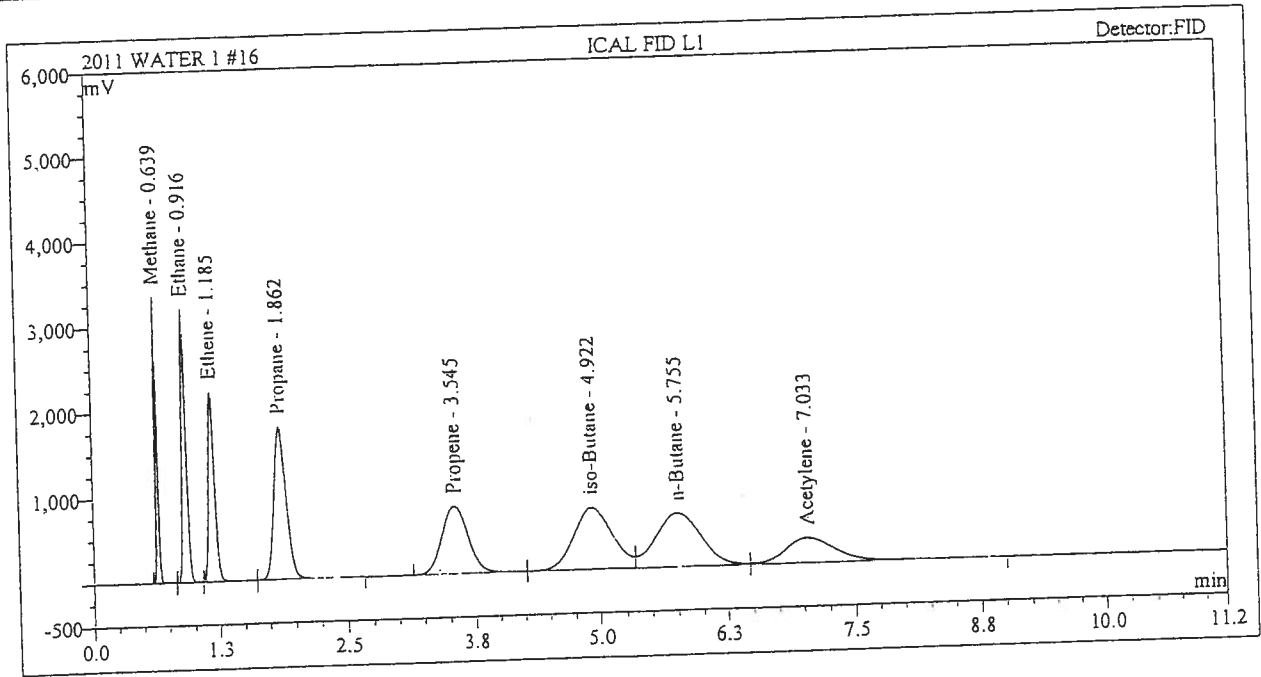
MICROSEEPS

Sample Analysis Report

Sample Name:	ICAL FID L1	Sequence No:	16
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	2/27/2011 14:36	Analytical Method:	AM20GAX/PM01
System Operator:	slyon	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Methane	0.639	91.547	3356.828	BM	134.5920
2	Ethane	0.916	165.472	3204.878	M	260.4798
3	Ethene	1.185	162.214	2225.253	M	284.1266
4	Propane	1.862	252.768	1790.788	MB	379.7844
5	Propene	3.545	237.795	795.669	BM	393.7844
6	iso-Butane	4.922	320.384	727.582	M	440.9445
7	n-Butane	5.755	331.144	633.284	M	467.1979
8	Acetylene	7.033	170.662	297.350	MB	784.5239

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



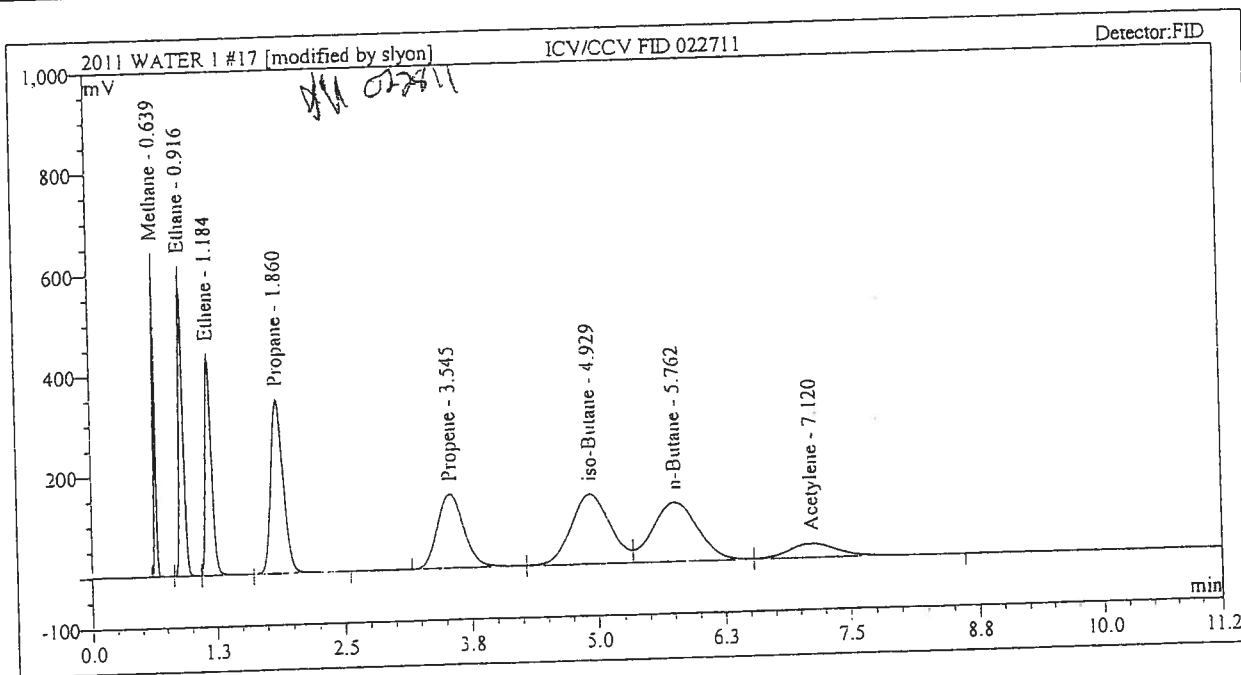
MICROSEEPS

Sample Analysis Report

Sample Name:	ICV/CCV FID 022711	Sequence No:	17
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	2/27/2011 14:48	Analytical Method:	AM20GAX/PM01
System Operator:	slyon	Comment:	RA-08-11 1X

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount TV
1	Methane	0.639	17.469	642.190	BM	23.959 25.6824
2	Ethane	0.916	31.671	616.358	M	46.61 49.8557
3	Ethene	1.184	32.089	441.192	M	52.67 56.2051
4	Propane	1.860	48.681	346.254	MB	66.76 73.1425
5	Propene	3.545	43.985	146.472	BM*	73.91 72.8392
6	iso-Butane	4.929	61.392	138.416	M*	83.33 84.4936
7	n-Butane	5.762	61.768	117.946	M*	86.34 87.1464
8	Acetylene	7.120	16.575	28.622	MB*	74.87 76.1942

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



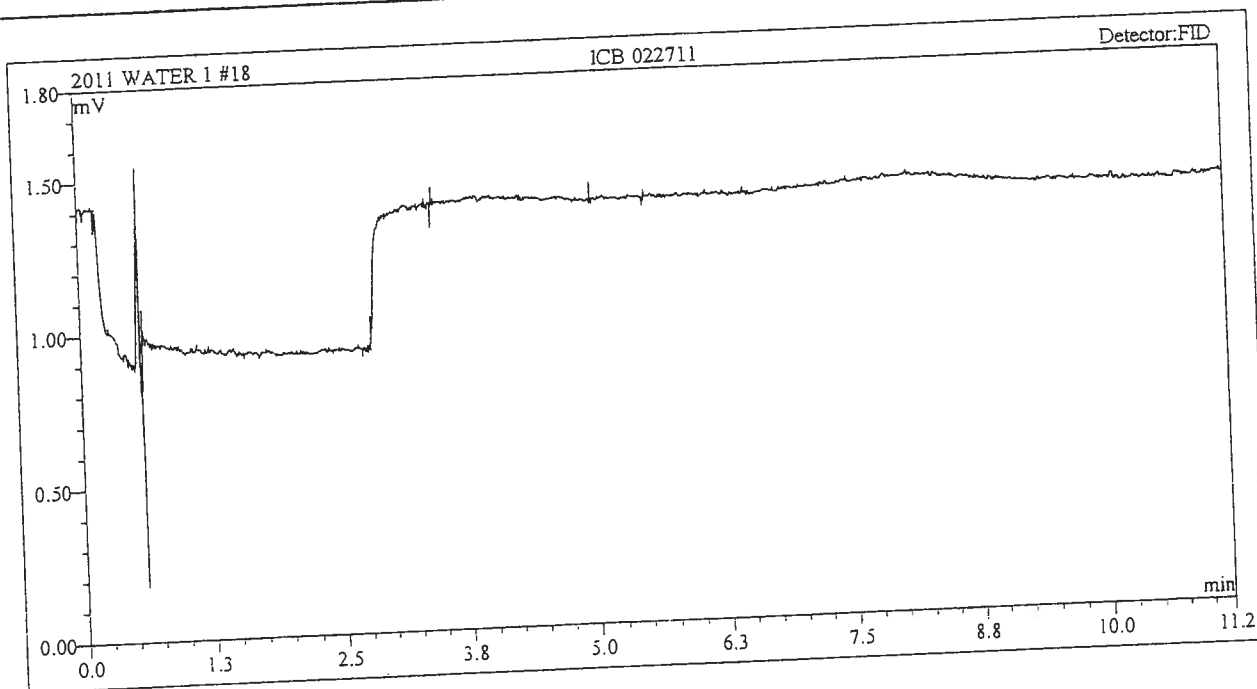
MICROSEEPS

Sample Analysis Report

Sample Name:	ICB 022711	Sequence No:	18
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	2/27/2011 15:09	Analytical Method:	AM20GAX/PM01
System Operator:	slyon	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
----------	----------------	----------------	-------------	-----------	------	--------

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



Permenant Gases

Method AM20GAX

12/8/2010

No.	Ret.Time min	Peak Name	Cal.Type	Points	R-Square %	Offset	Slope	Curve
1	4.01	Carbon Dioxide	Lin	6	99.895	0.00000	0.19574	0.00000
2	5.81	Oxygen	Lin	6	99.927	0.00000	0.27188	0.00000
3	6.15	Nitrogen	Lin	6	99.943	0.00000	0.34163	0.00000
4	7.63	Methane	Lin	5	99.931	0.00000	0.00051	0.00000
5	8.45	Carbon Monoxide	Lin	5	99.905	0.00000	0.33844	0.00000

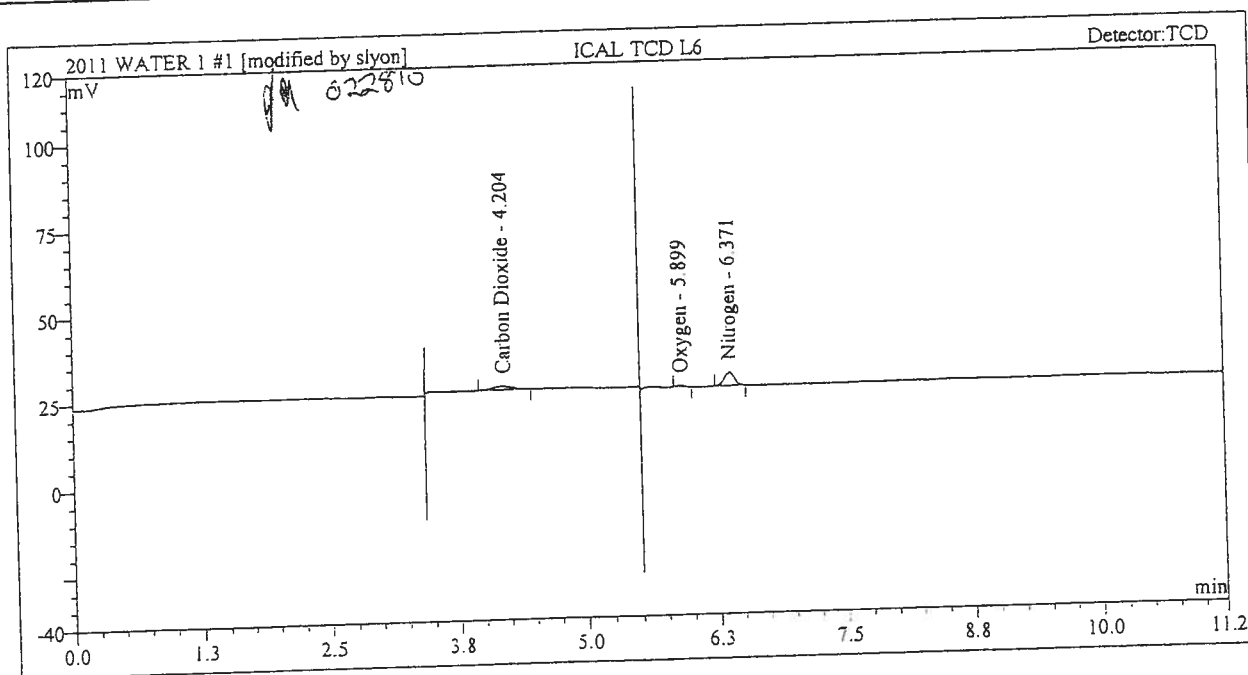
MICROSEEPS

Sample Analysis Report

Sample Name:	ICAL TCD L6	Sequence No:	1
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	12/8/2010 15:39	Analytical Method:	AM20GAX/PM01
System Operator:	slyon	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Carbon Dioxide	4.204	0.237	1.052	BMB*	1.2114
2	Oxygen	5.899	0.045	0.580	BMB*	0.1657
3	Nitrogen	6.371	0.482	3.994	BMB*	1.4105

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane.ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)

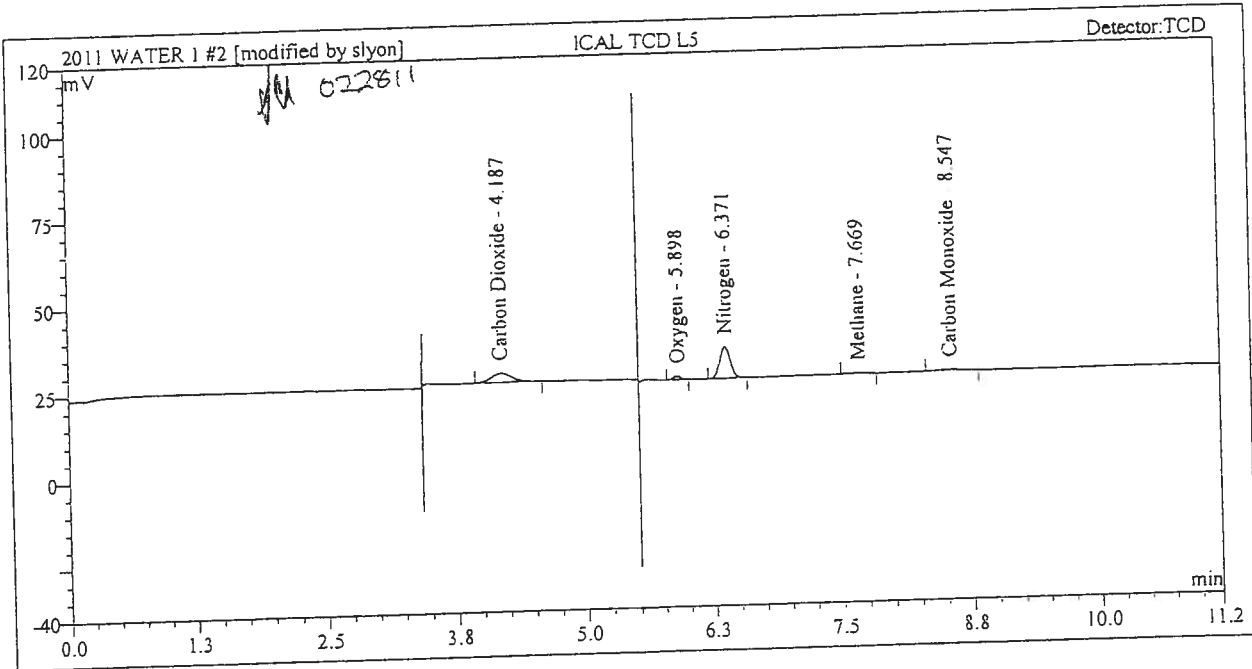


MICROSEEPS
Sample Analysis Report

Sample Name:	ICAL TCD L5	Sequence No:	2
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	12/8/2010 15:54	Analytical Method:	AM20GAx/PM01
System Operator:	slyon	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Carbon Dioxide	4.187	0.619	2.671	BMB	3.1635
2	Oxygen	5.898	0.093	1.046	BMB*	0.3437
3	Nitrogen	6.371	1.140	9.261	BMB*	3.3365
4	Methane	7.669	0.055	0.302	BMB*	106.9470
5	Carbon Monoxide	8.547	0.100	0.398	BMB*	0.2952

FID UNITS (Methane thru Acetylene ug/L)
TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
RGD UNITS (Hydrogen nM)



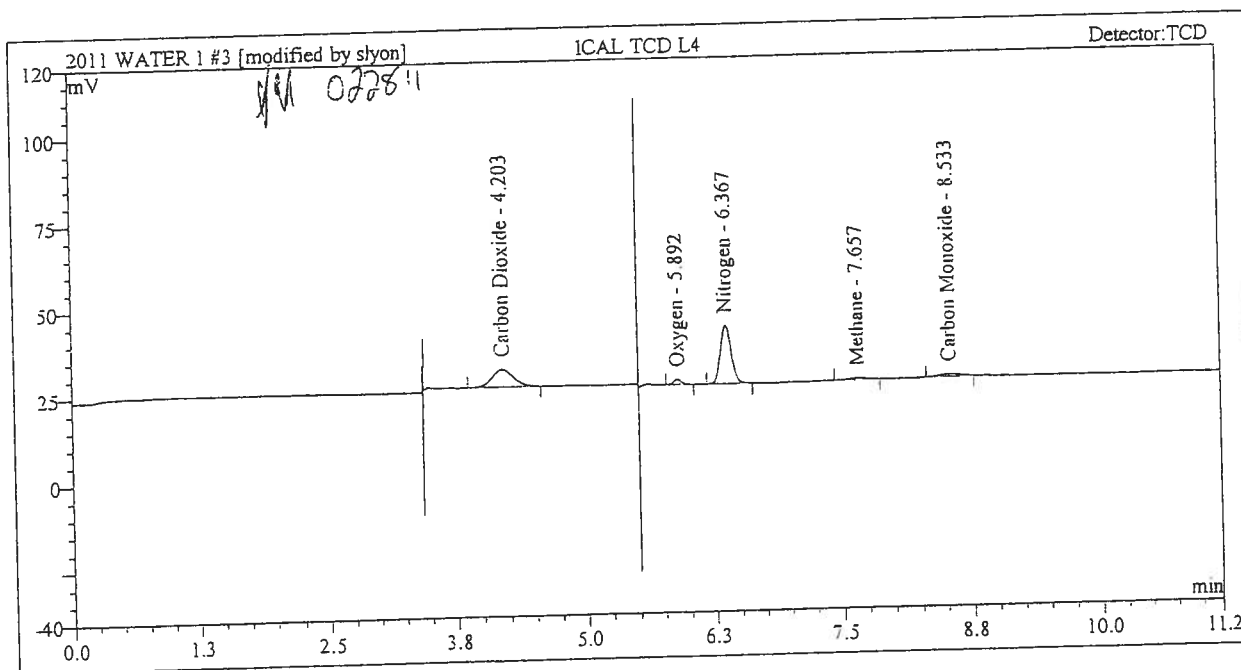
MICROSEEPS

Sample Analysis Report

Sample Name:	ICAL TCD L4	Sequence No:	3
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	12/8/2010 16:13	Analytical Method:	AM20GAX/PM01
System Operator:	slyon	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Carbon Dioxide	4.203	1.217	5.148	BMB	6.2172
2	Oxygen	5.892	0.146	1.624	BMB	0.5379
3	Nitrogen	6.367	2.117	17.025	BMB	6.1964
4	Methane	7.657	0.099	0.535	BMB	193.4061
5	Carbon Monoxide	8.533	0.171	0.757	BMB*	0.5041

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



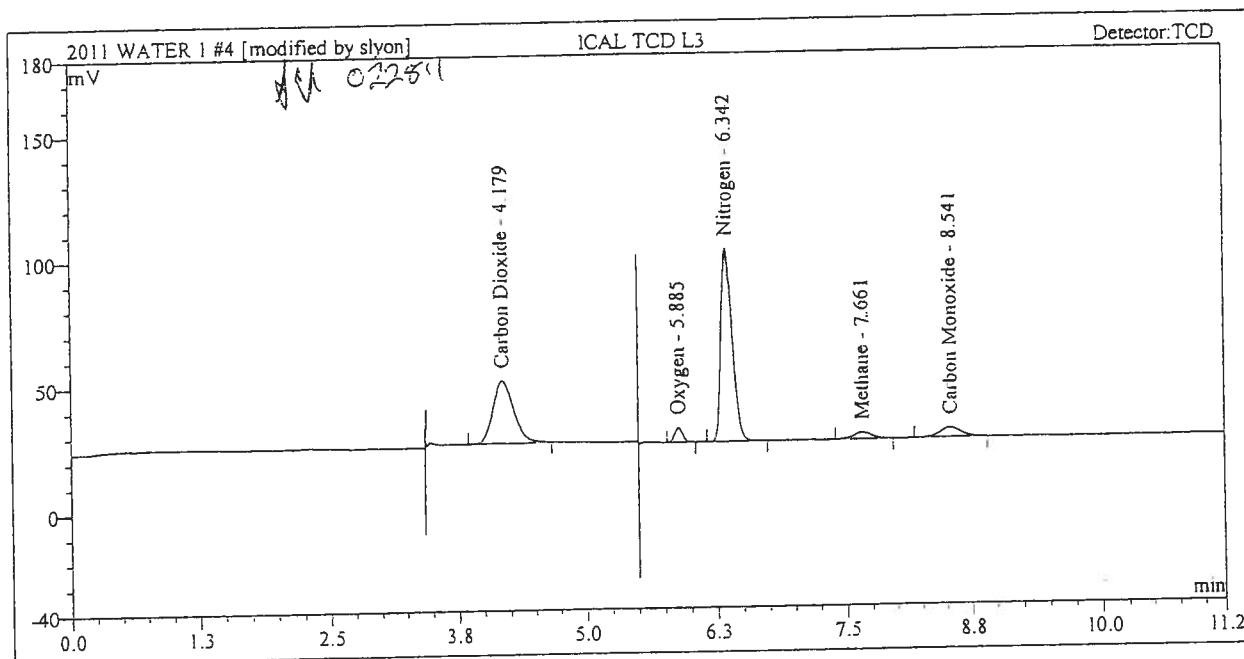
MICROSEEPS

Sample Analysis Report

Sample Name:	ICAL TCD L3	Sequence No:	4
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	12/8/2010 16:26	Analytical Method:	AM20GAX/PM01
System Operator:	slyon	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Carbon Dioxide	4.179	5.865	24.846	BMB	29.9643
2	Oxygen	5.885	0.536	5.886	BMB*	1.9731
3	Nitrogen	6.342	9.592	76.472	BMB*	28.0779
4	Methane	7.661	0.559	2.682	BMB	1092.9680
5	Carbon Monoxide	8.541	0.964	3.898	BMB*	2.8479

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



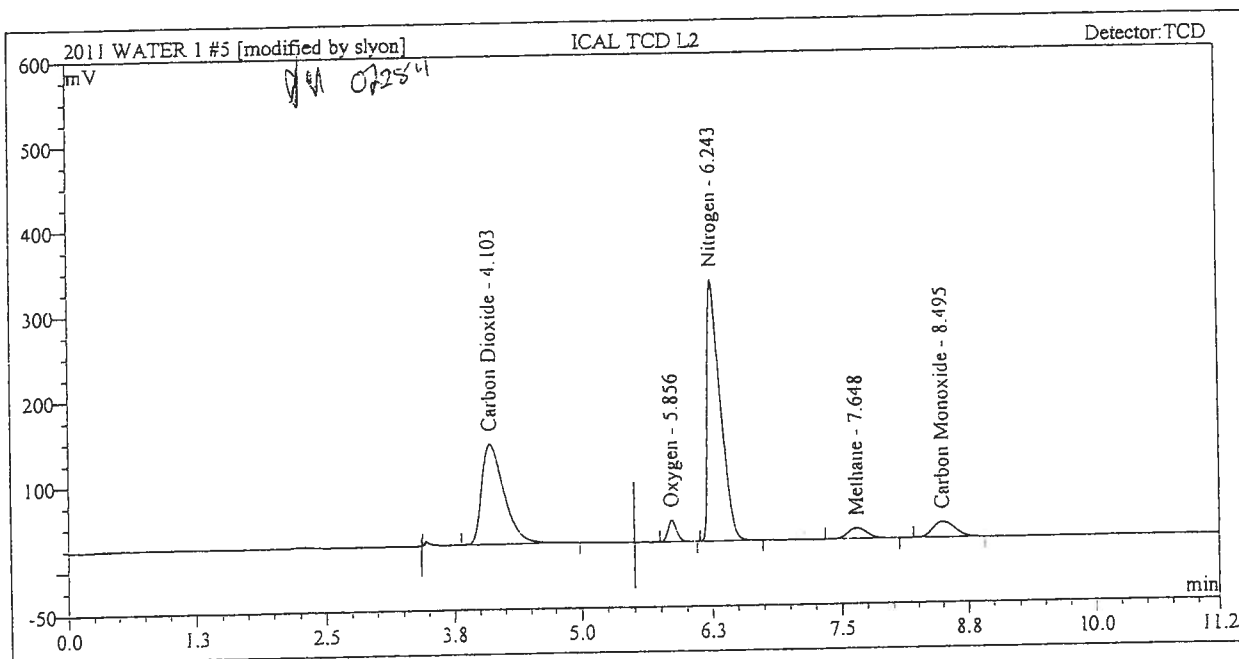
MICROSEEPS

Sample Analysis Report

Sample Name:	ICAL TCD L2	Sequence No:	5
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	12/8/2010 16:42	Analytical Method:	AM20GAX/PM01
System Operator:	slyon	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Carbon Dioxide	4.103	29.676	117.535	BMB	151.6092
2	Oxygen	5.856	2.536	25.826	BMB	9.3278
3	Nitrogen	6.243	46.350	306.963	BMB*	135.6723
4	Methane	7.648	2.696	12.833	BMB*	5269.5814
5	Carbon Monoxide	8.495	4.686	18.527	BMB*	13.8461

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



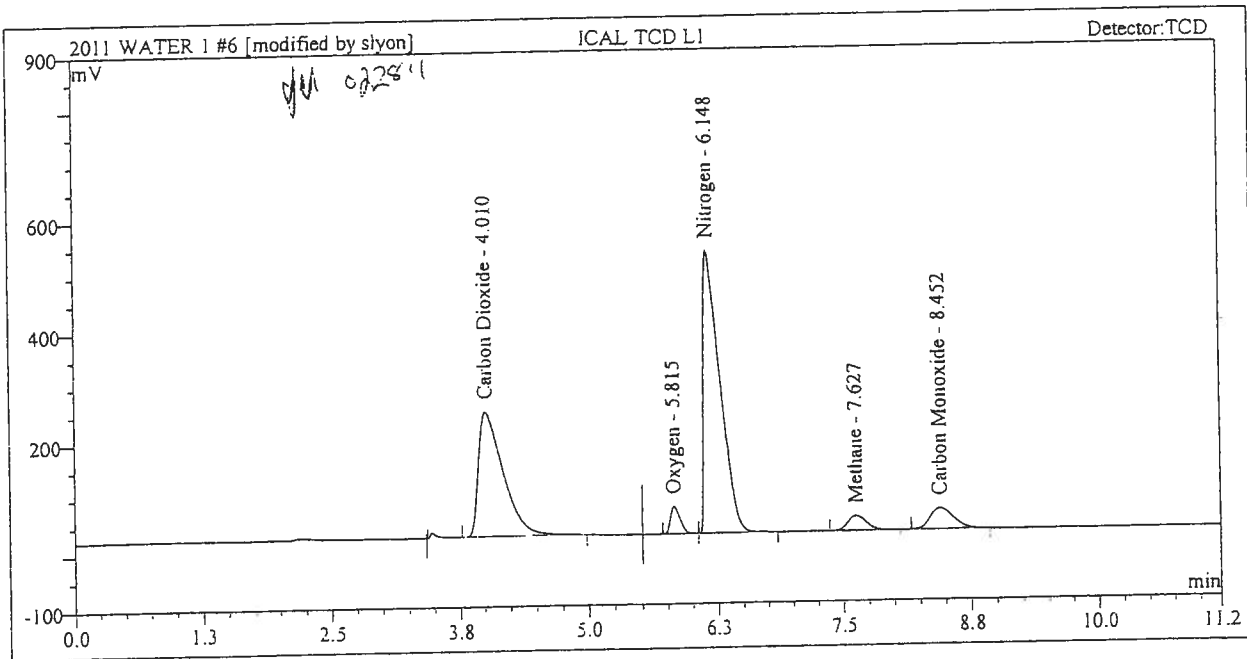
MICROSEEPS

Sample Analysis Report

Sample Name:	ICAL TCD L1	Sequence No:	6
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	12/8/2010 16:54	Analytical Method:	AM20GAx/PM01
System Operator:	slyon	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Carbon Dioxide	4.010	63.374	225.570	BMB	323.7730
2	Oxygen	5.815	5.323	49.868	BMB*	19.5779
3	Nitrogen	6.148	97.322	509.716	bMB*	284.8729
4	Methane	7.627	5.675	26.889	BMB	11091.2649
5	Carbon Monoxide	8.452	9.949	37.755	BMB*	29.3967

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



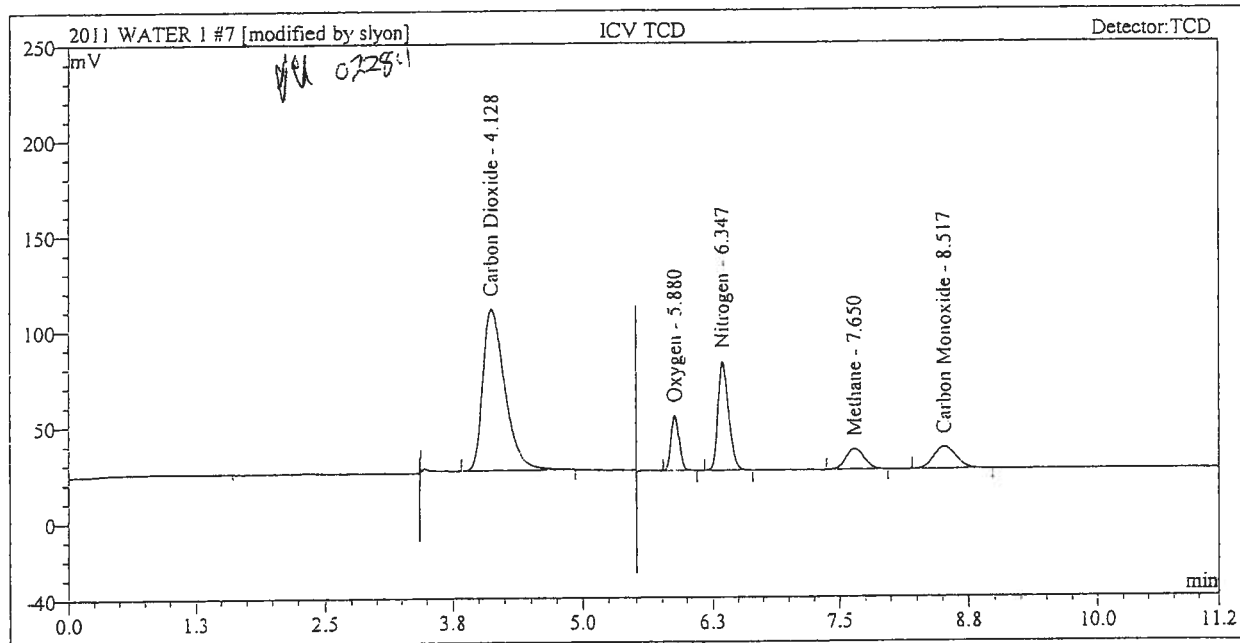
MICROSEEPS

Sample Analysis Report

Sample Name:	ICV TCD	Sequence No:	7
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	12/8/2010 17:08	Analytical Method:	AM20GAx/PM01
System Operator:	slyon	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Carbon Dioxide	4.128	20.845	84.641	BMB	106.4952
2	Oxygen	5.880	2.629	28.968	BMB*	9.6694
3	Nitrogen	6.347	7.022	57.189	BMB*	20.5552
4	Methane	7.650	2.213	10.695	BMB	4326.1260
5	Carbon Monoxide	8.517	2.898	11.553	BMB	8.5637

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



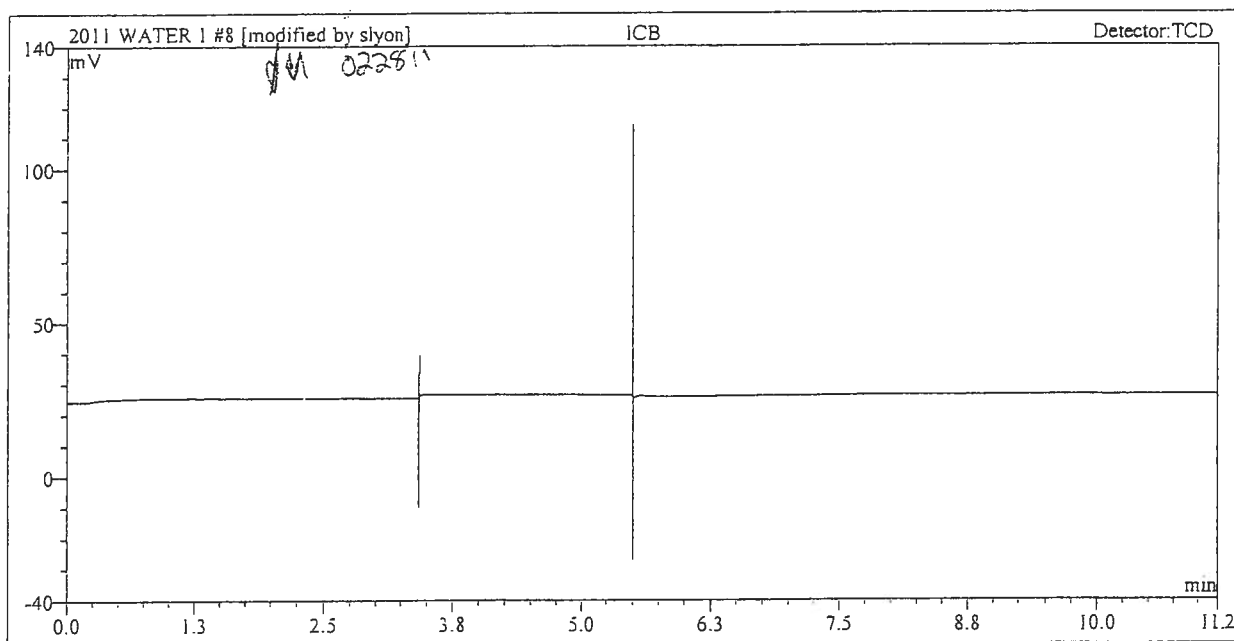
MICROSEEPS

Sample Analysis Report

Sample Name:	ICB	Sequence No:	8
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	12/8/2010 17:20	Analytical Method:	AM20GAX/PM01
System Operator:	slyon	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
----------	----------------	----------------	-------------	-----------	------	--------

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



Risk Department
Case Narrative

Batch number: *M110627005^{PG}*
M110627025^{LHC}

Original Run Date: *6-27-11*

Sample numbers: *P1106206(1-10) CO₂*
P1106207(1-3) M. CO₂
P1106208(1-5) CO₂
P1106223(1-2) M CO₂

Matrix: *WATER Am2d*

FDP →

Out of Control Event: (attach another page, if necessary) *NONE*

Corrective Action Taken: *NONE*

Result: *N/A*

Observations to support use of data: (Note any occurrences of manual integration here)

Samples required manual integration to repair baseline inaccuracies inherent to the software/program

Manual Integration Checklist and Approval

- Manual Integration approved? *Yes* No
- Satisfactorily documented on this narrative?
- Manually integrated chromatogram initialed and dated by analyst?

[Signature]
Signature Lead Analyst or Lab. Mgr. *062811*
Date

Analyzed & Reviewed by: *GM* Date: *6-27-11*

Manual Integration Conducted? *YES* NO

(Circle One)

Reviewed by: *RCW* Date: *062811*

Reviewed & Entered by: *UPLOAD* Date: *6-27-11*

Reviewed by: *[Signature]* Date: *062811*

Corrected by: _____ Date: _____

WATER

DATE: 6-27-11

RA-10-04	CCV - (1X) TV	-FID %R	CCV - (2X) TV	- FID %R	CCV - (1X) TV	- FID %R
Methane	24.7	101	12.35	99	24.7	102
Ethane	46.51	102	23.26	102	46.51	103
Ethane	52.51	102	26.25	101	52.51	103
Propane	66.63	104	33.32	104	66.63	105
Propene	73.69	93	36.84	96	73.69	92
iso-butane	82.90	97	41.45	85	82.90	97
n-butane	85.71	94	42.86	97	85.71	94
Acetylene	75.18	99	37.59	99	75.18	99

RA-09-07	CCV -	-TCD	CCV -	-TCD	CCV -	-TCD
CO ₂	107	101	5350	101	107	105
O ₂	9.79	105	4.96	102	9.79	105
N ₂	20.38	107	10.19	106	20.38	109
HC	4294	103	2147	108	4294	104
CO	8.34	102	4.17	104	8.34	104

LCS-HIGH	TV	LCS %R	LCS %R
Ethane	45.0	103	107
Ethane	40.8	104	109
Propane	67.2	100	105
Propane	60.1	91	94
iso-butane	82.1	99	102
n-butane	84.6	97	99
Acetylene	36.1	109	110
CO ₂	129.3	107	111
Methane	82.5	103	111
CO	2.17	102	110

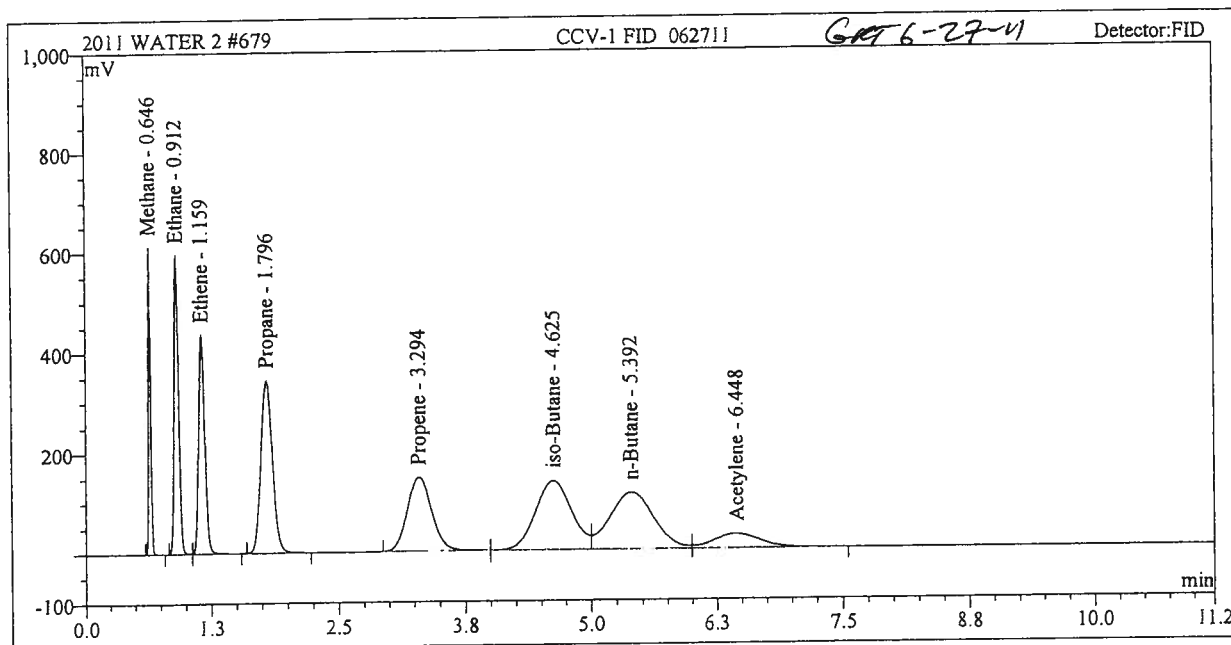
MICROSEEPS

Sample Analysis Report

Sample Name:	CCV-1 FID 062711	Sequence No:	679
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 8:43	Analytical Method:	AM20GAX/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount TV	
1	Methane	0.646	16.896	612.757	BMB	24.7	24.8401
2	Ethane	0.912	30.268	596.519	BM	46.51	47.6471
3	Ethene	1.159	30.663	437.162	MB	52.51	53.7084
4	Propane	1.796	46.112	344.721	BMB	66.63	69.2832
5	Propene	3.294	41.495	148.146	BM	73.69	68.7155
6	iso-Butane	4.625	58.392	138.395	M	82.90	80.3646
7	n-Butane	5.392	57.221	113.745	M	85.71	80.7311
8	Acetylene	6.448	16.219	29.547	MB	75.18	74.5565

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



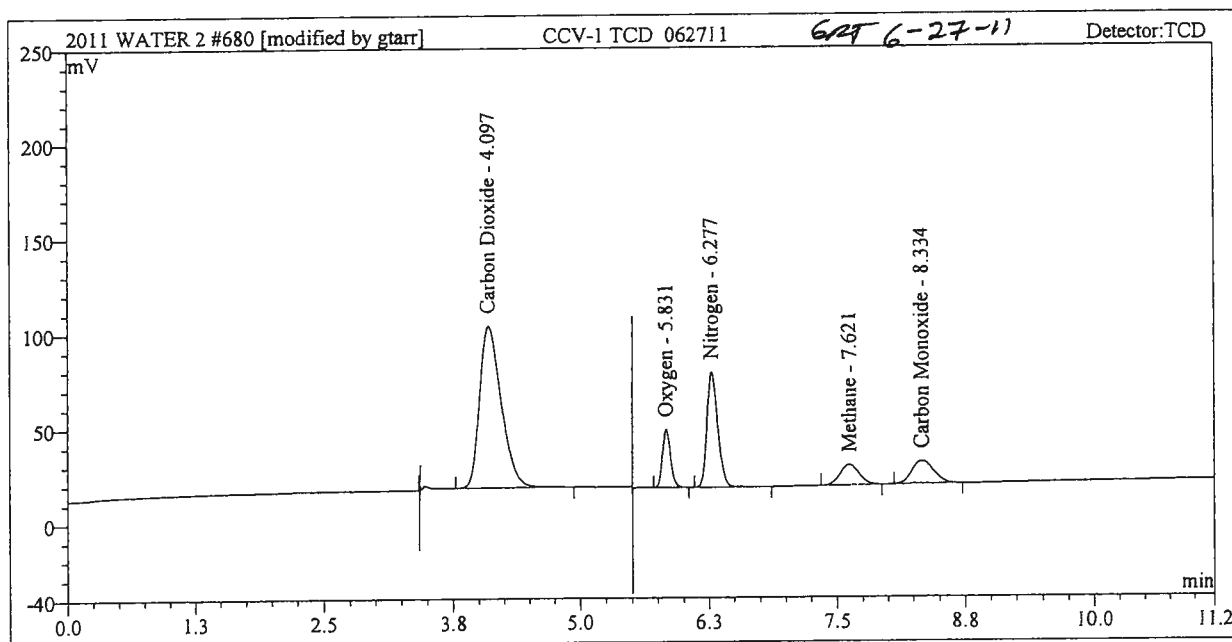
MICROSEEPS

Sample Analysis Report

Sample Name:	CCV-1 TCD 062711	Sequence No:	680
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 8:55	Analytical Method:	AM20GAX/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount TV	
1	Carbon Dioxide	4.097	21.208	85.024	BMB	107	108.3480
2	Oxygen	5.831	2.806	30.514	BMB	9.79	10.3199
3	Nitrogen	6.277	7.426	60.696	BMB	20.38	21.7367
4	Methane	7.621	2.268	10.781	BMB*	429.4	4432.4279
5	Carbon Monoxide	8.334	2.874	11.965	BMB*	8.34	8.4934

FID UNITS (Methane thru Acetylene ug/L)
TCD UNITS (Methane ug/L, CO₂, O₂, N₂, CO mg/L)
RGD UNITS (Hydrogen nM)



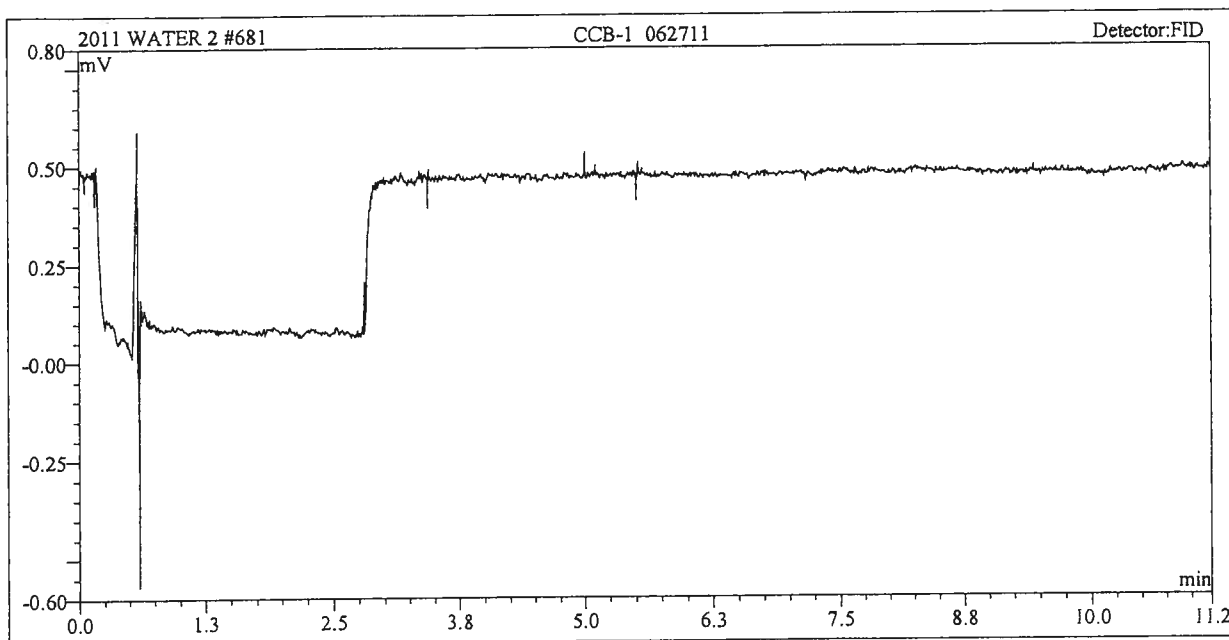
MICROSEEPS

Sample Analysis Report

Sample Name:	CCB-1 062711	Sequence No:	681
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 9:10	Analytical Method:	AM20GAx/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
----------	----------------	----------------	-------------	-----------	------	--------

FID UNITS (Methane thru Acetylene ug/L)
TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
RGD UNITS (Hydrogen nM)



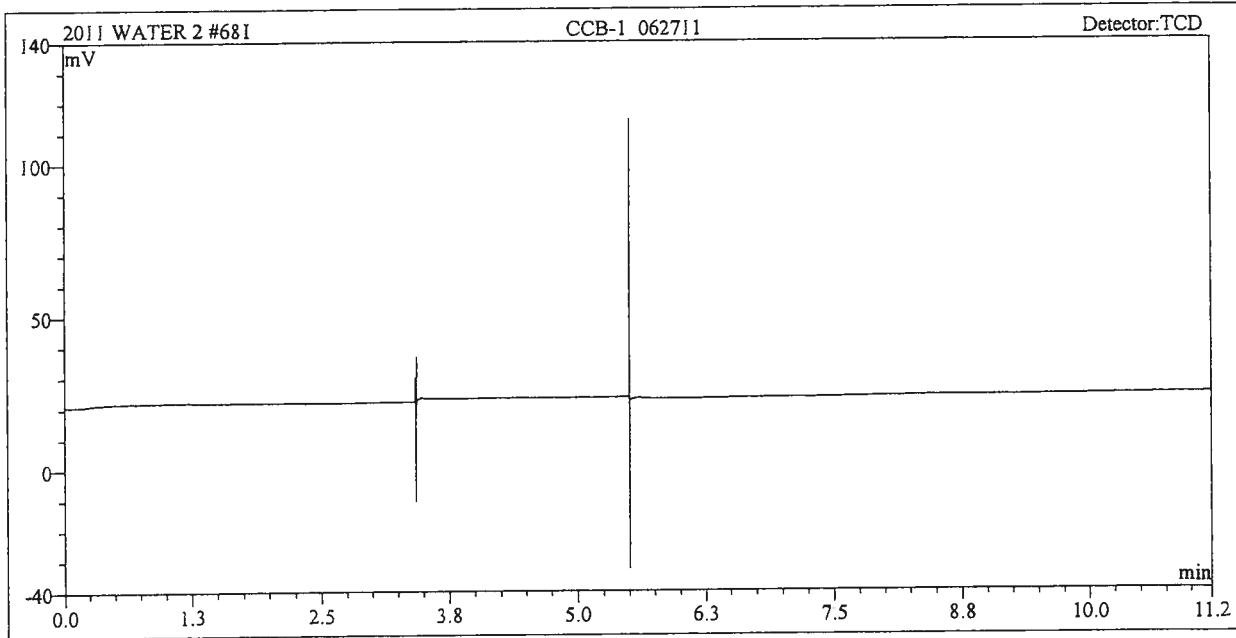
MICROSEEPS

Sample Analysis Report

Sample Name:	CCB-1 062711	Sequence No:	681
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 9:10	Analytical Method:	AM20GAx/PM01
System Operator:	qtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
----------	----------------	----------------	-------------	-----------	------	--------

FID UNITS (Methane thru Acetylene ug/L)
TCD UNITS (Methane ug/L, CO₂, O₂, N₂, CO mg/L)
RGD UNITS (Hydrogen nM)



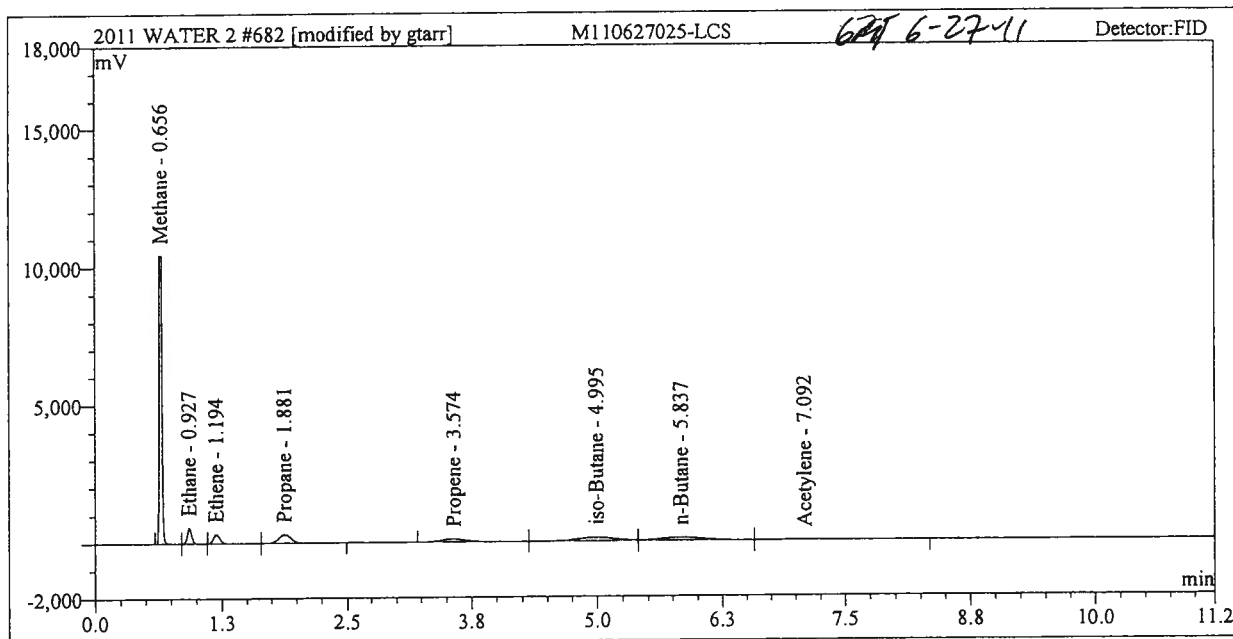
MICROSEEPS

Sample Analysis Report

Sample Name:	M110627025-LCS	Sequence No:	682
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 9:23	Analytical Method:	AM20GAX/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Methane	0.656	384.046	10437.505	BM	584.6217
2	Ethane	0.927	29.405	573.162	M	45.0 46.2882
3	Ethene	1.194	24.292	332.098	M	40.8 42.5490
4	Propane	1.881	44.933	313.103	MB	67.2 67.5126
5	Propene	3.574	32.849	107.741	BM*	60.1 54.3972
6	iso-Butane	4.995	58.939	130.551	M	82.1 81.1174
7	n-Butane	5.837	58.034	108.371	M*	84.6 81.8776
8	Acetylene	7.092	8.575	14.762	MB*	36.1 39.4181

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



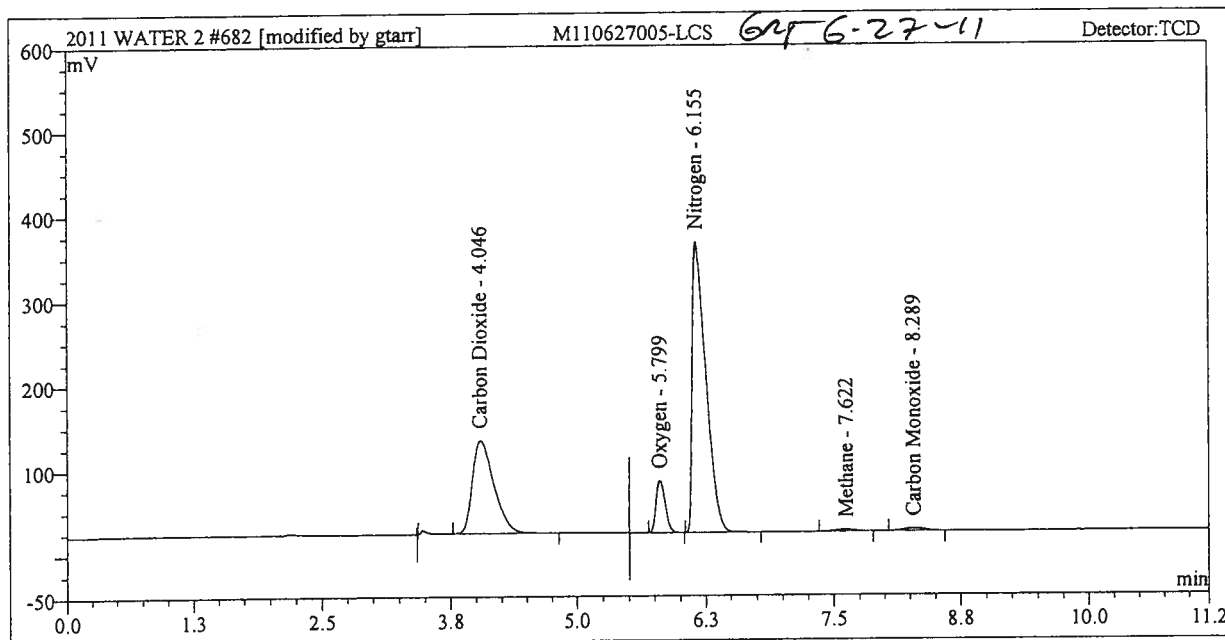
MICROSEEPS

Sample Analysis Report

Sample Name:	M110627005-LCS	Sequence No:	682
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 9:23	Analytical Method:	AM20GAX/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Carbon Dioxide	4.046	27.117	109.551	BMB	<i>TV</i> 129.3 138.5403
2	Oxygen	5.799	6.352	61.601	BMB	23.3617
3	Nitrogen	6.155	53.418	342.877	BMB	156.3619
4	Methane	7.622	0.434	2.094	BMB*	<i>825</i> 847.4511
5	Carbon Monoxide	8.289	0.749	3.111	BMB*	<i>2.17</i> 2.2126

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



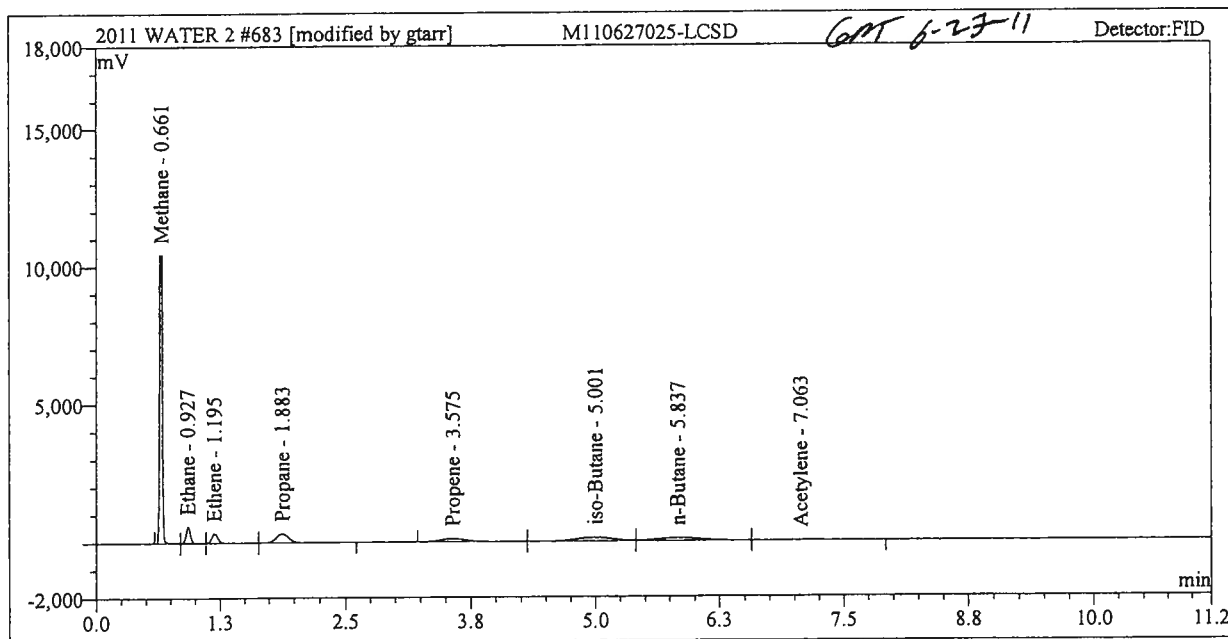
MICROSEEPS

Sample Analysis Report

Sample Name:	M110627025-LCSD	Sequence No:	683
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 9:37	Analytical Method:	AM20GAx/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount TV
1	Methane	0.661	389.125	10437.419	BM	572.0893
2	Ethane	0.927	30.656	598.317	M	45.0 48.2568
3	Ethene	1.195	25.429	347.679	M	40.8 44.5406
4	Propane	1.883	46.772	325.620	MB	67.2 70.2748
5	Propene	3.575	34.124	112.297	BM*	60.1 56.5095
6	iso-Butane	5.001	61.035	135.697	M*	82.1 84.0021
7	n-Butane	5.837	59.311	111.903	M*	89.6 83.6793
8	Acetylene	7.063	8.603	15.252	MB*	36.1 39.5474

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



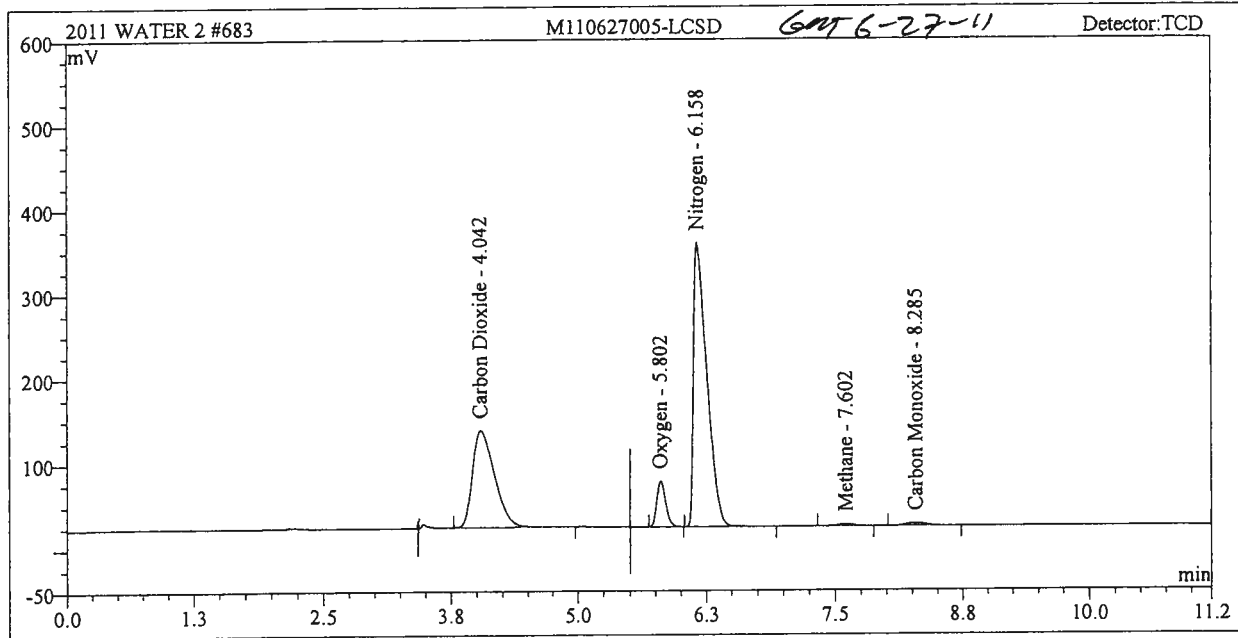
MICROSEEPS

Sample Analysis Report

Sample Name:	M110627005-LCSD	Sequence No:	683
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 9:37	Analytical Method:	AM20GAx/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Carbon Dioxide	4.042	28.114	113.236	BMB	<i>TV</i> 129.3 143.6318
2	Oxygen	5.802	5.486	53.564	BMB	20.1767
3	Nitrogen	6.158	51.618	334.752	BMB	151.0916
4	Methane	7.602	0.467	2.237	BMB	<i>825</i> 913.2701
5	Carbon Monoxide	8.285	0.810	3.279	BMB	<i>2.17</i> 2.3921

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



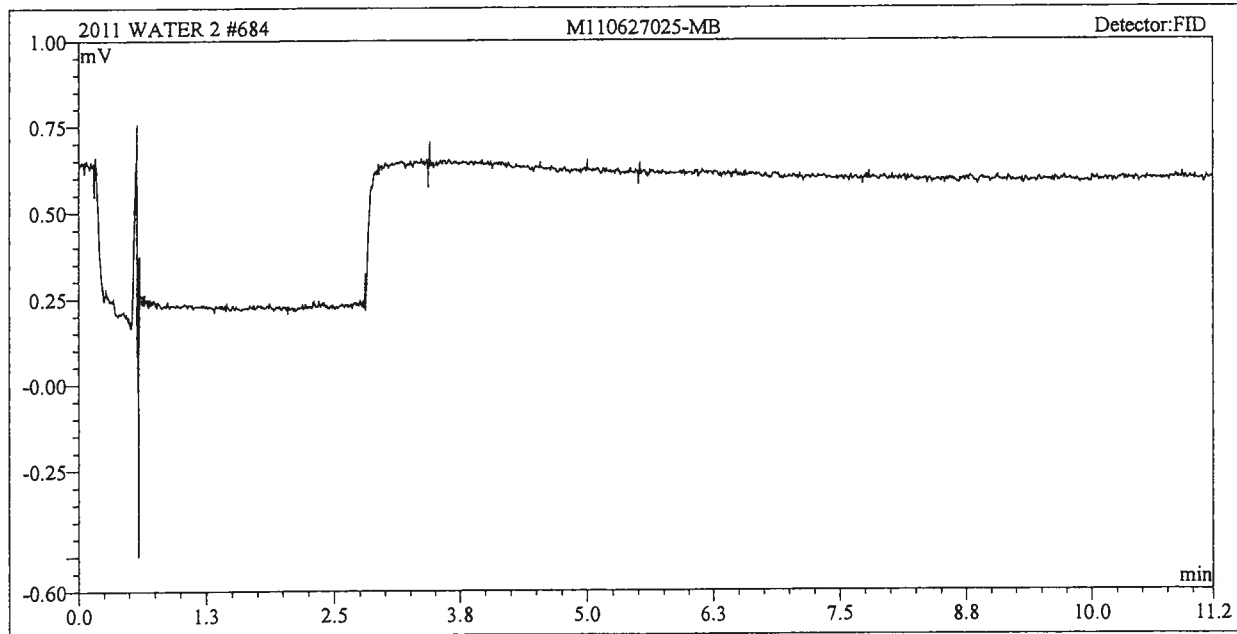
MICROSEEPS

Sample Analysis Report

Sample Name:	M110627025-MB	Sequence No:	684
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 9:56	Analytical Method:	AM20GAx/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
----------	----------------	----------------	-------------	-----------	------	--------

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO₂, O₂, N₂, CO mg/L)
 RGD UNITS (Hydrogen nM)



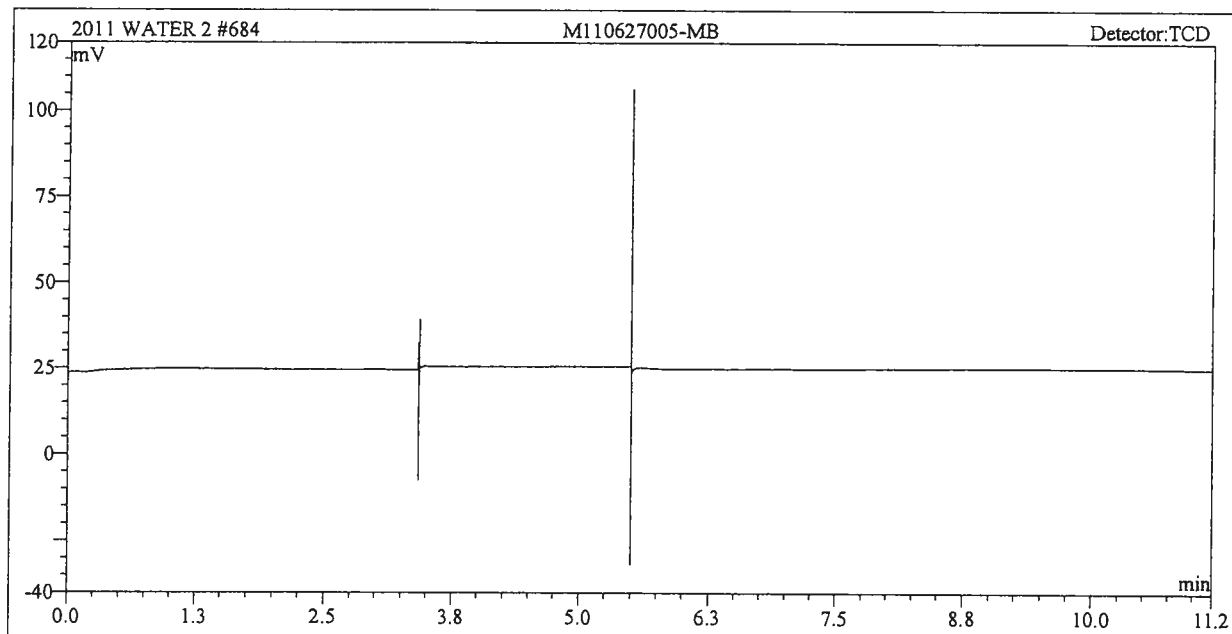
MICROSEEPS

Sample Analysis Report

Sample Name:	M110627005-MB	Sequence No:	684
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 9:56	Analytical Method:	AM20GAx/PM01
System Operator:	qtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
----------	----------------	----------------	-------------	-----------	------	--------

FID UNITS (Methane thru Acetylene ug/L)
TCD UNITS (Methane ug/L, CO₂, O₂, N₂, CO mg/L)
RGD UNITS (Hydrogen nM)



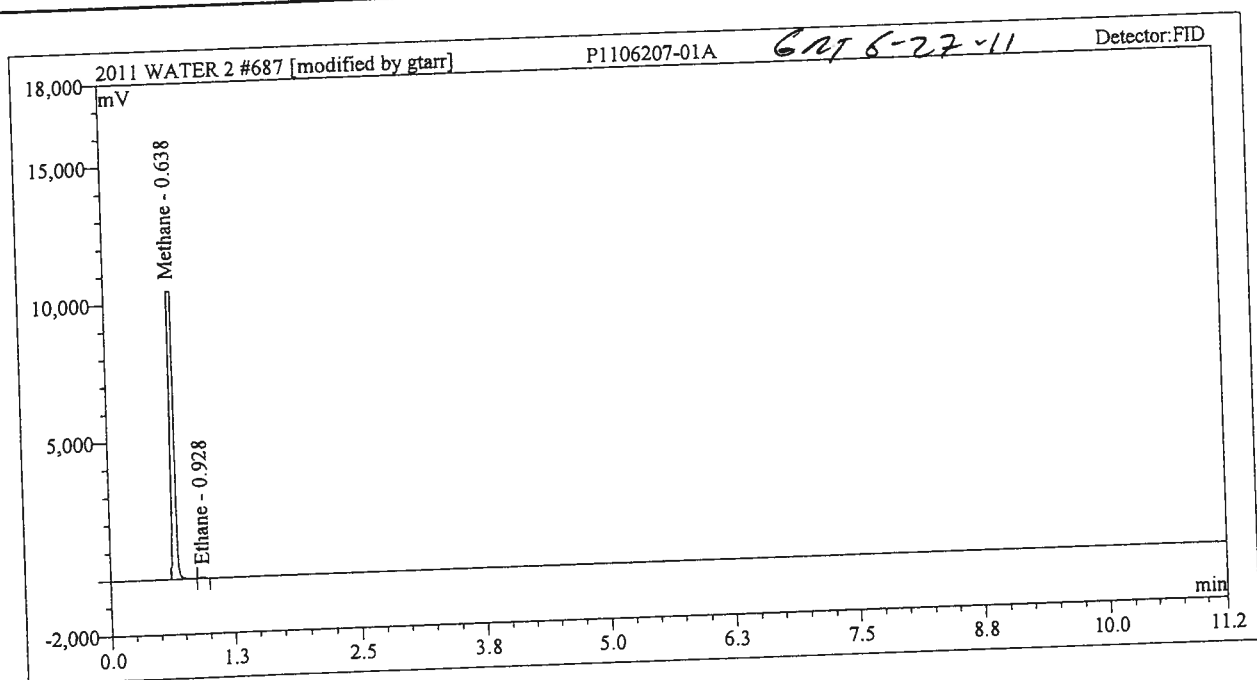
MICROSEEPS

Sample Analysis Report

Sample Name:	P1106207-01A	Sequence No:	687
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 10:35	Analytical Method:	AM20GAX/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Methane	0.638	518.966	10435.839	BMB*	-762.9793
2	Ethane	0.928	2.719	55.816	BMB*	4.2798

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



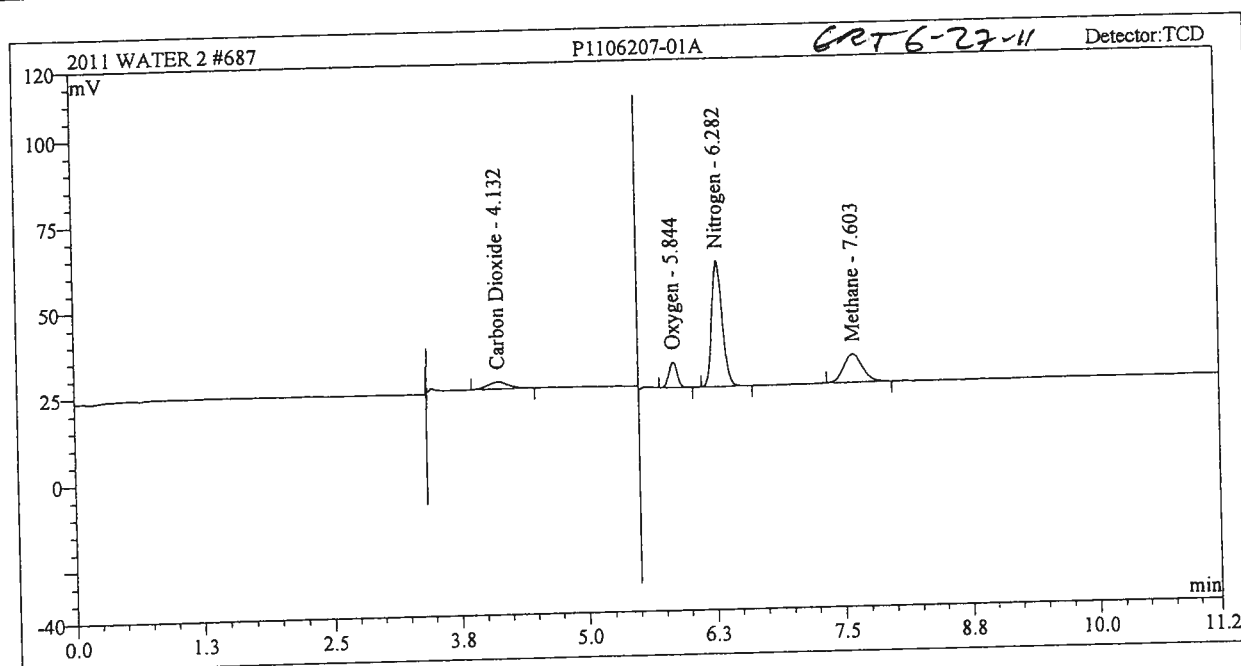
MICROSEEPS

Sample Analysis Report

Sample Name:	P1106207-01A	Sequence No:	687
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 10:35	Analytical Method:	AM20GAX/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Carbon Dioxide	4.132	0.490	2.074	BMB	2.5018
2	Oxygen	5.844	0.688	7.408	BMB	2.5307
3	Nitrogen	6.282	4.466	36.640	BMB	13.0734
4	Methane	7.603	1.753	8.216	BMB	3425.4967

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



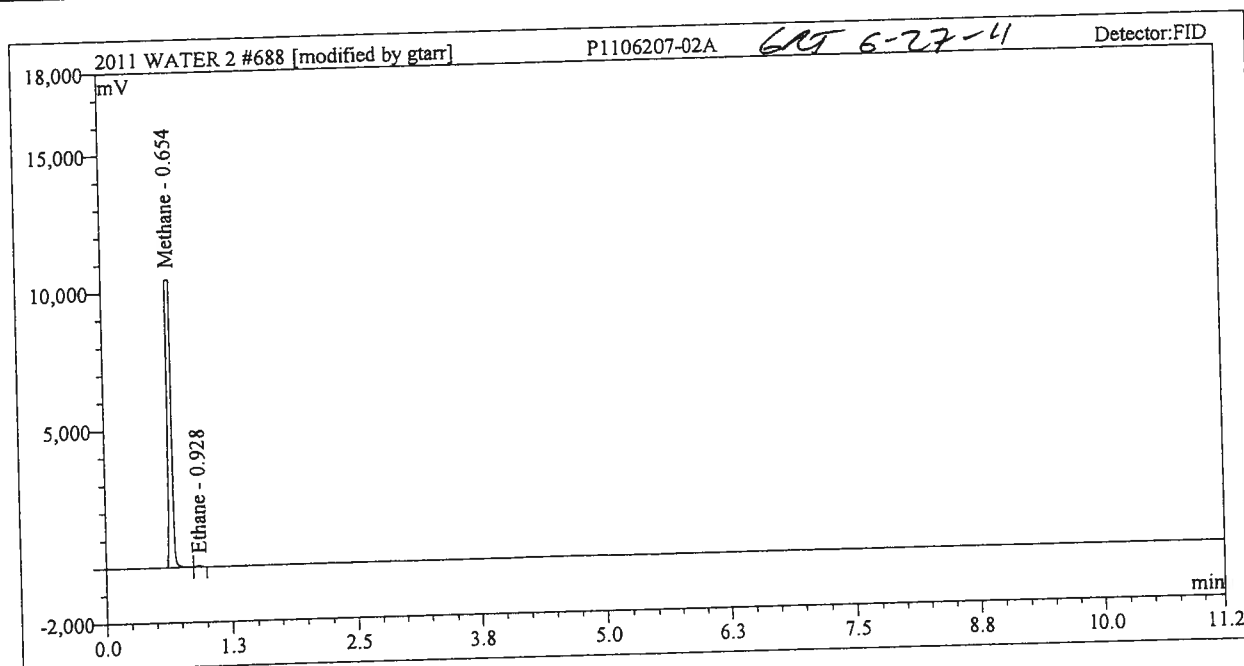
MICROSEEPS

Sample Analysis Report

Sample Name:	P1106207-02A	Sequence No:	688
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 10:50	Analytical Method:	AM20GAx/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Methane	0.654	521.640	10434.722	BMB*	766.9118
2	Ethane	0.928	2.942	59.951	BMB*	4.6318

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



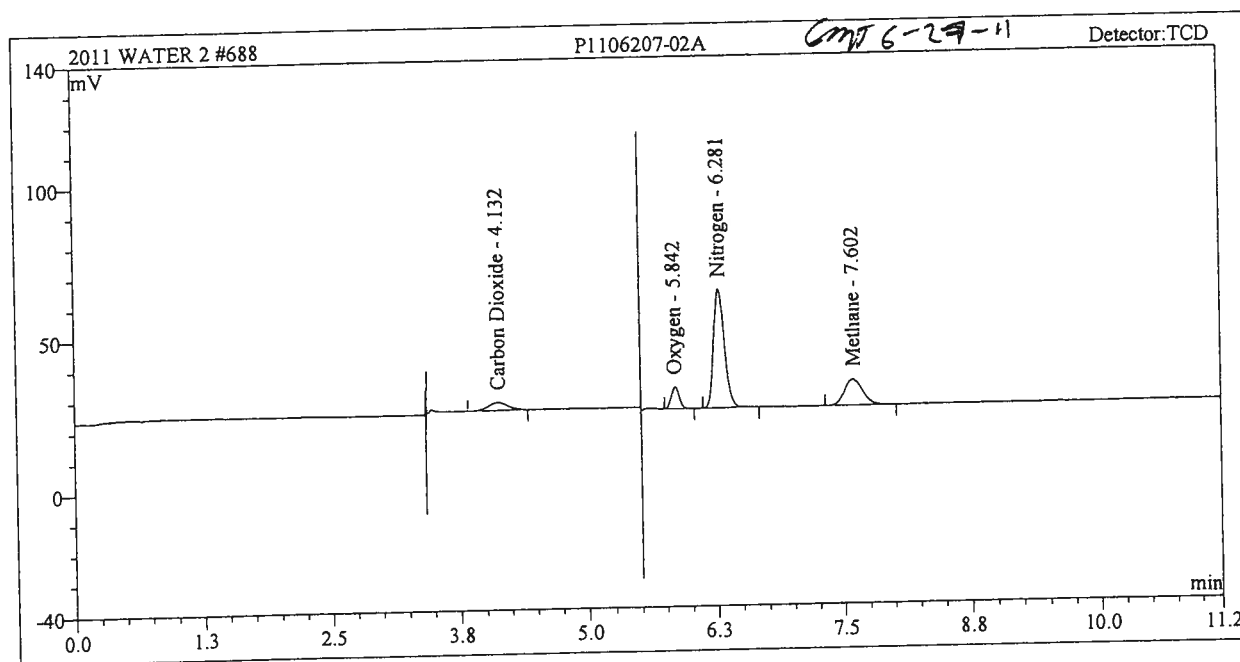
MICROSEEPS

Sample Analysis Report

Sample Name:	P1106207-02A	Sequence No:	688
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 10:50	Analytical Method:	AM20GAX/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Carbon Dioxide	4.132	0.598	2.596	BMB	3.0554
2	Oxygen	5.842	0.661	7.161	BMB	2.4294
3	Nitrogen	6.281	4.735	38.611	BMB	13.8591
4	Methane	7.602	1.816	8.486	BMB	3549.2204

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



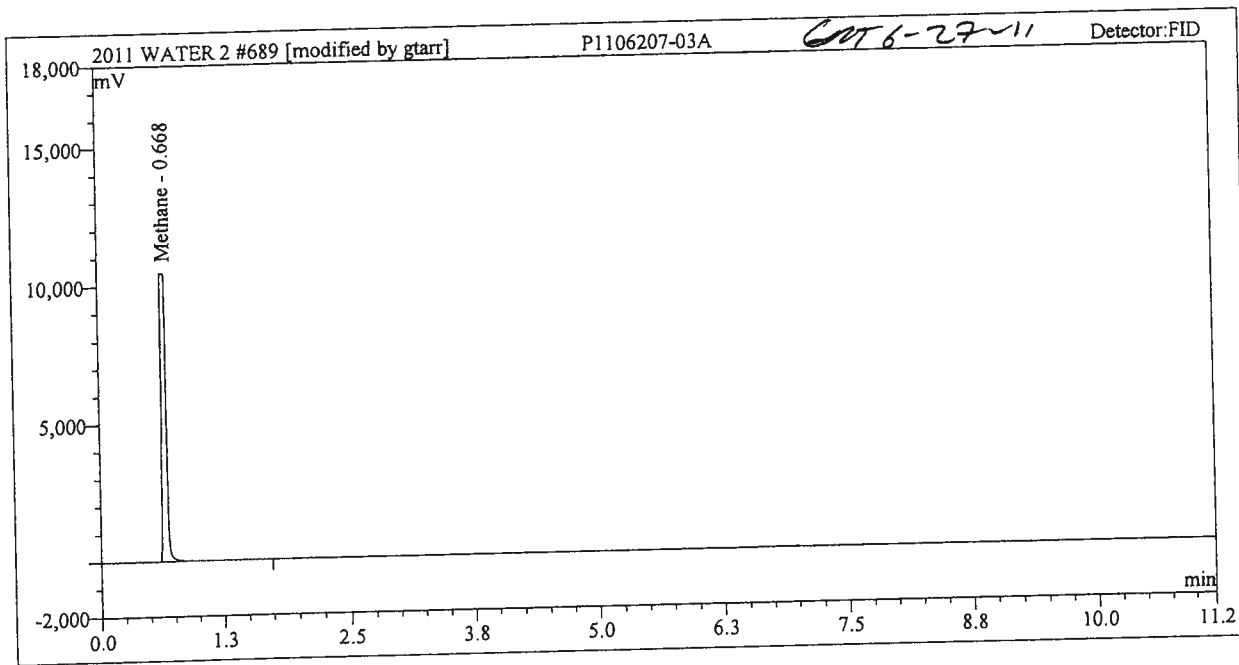
MICROSEEPS

Sample Analysis Report

Sample Name:	P1106207-03A	Sequence No:	689
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 11:02	Analytical Method:	AM20GAX/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Methane	0.668	608.402	10433.780	BMB*	894.4687

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



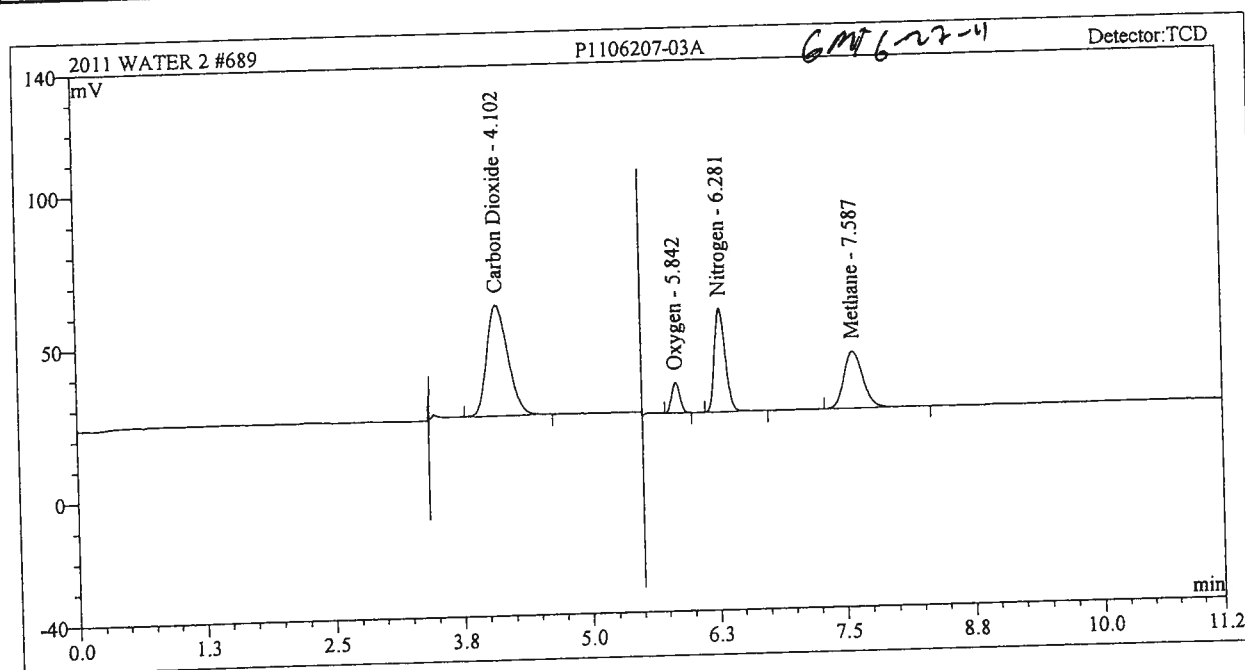
MICROSEEPS

Sample Analysis Report

Sample Name:	P1106207-03A	Sequence No:	689
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 11:02	Analytical Method:	AM20GAX/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Carbon Dioxide	4.102	8.651	36.218	BMB	44.1953
2	Oxygen	5.842	0.914	9.983	BMB	3.3620
3	Nitrogen	6.281	4.136	33.873	BMB	12.1080
4	Methane	7.587	4.029	18.615	BMB	7874.6075

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



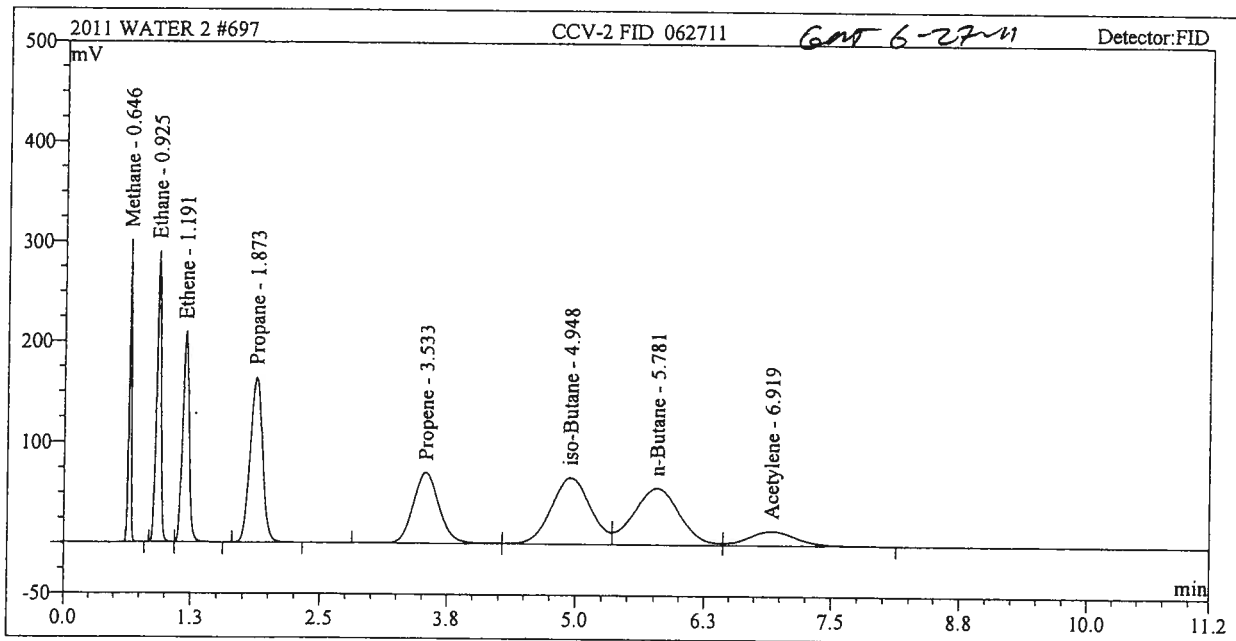
MICROSEEPS

Sample Analysis Report

Sample Name:	CCV-2 FID 062711	Sequence No:	697
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 12:47	Analytical Method:	AM20GAX/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Methane	0.646	8.324	301.075	BMB	12.35 12.2383
2	Ethane	0.925	15.016	289.813	BM	23.26 23.6380
3	Ethene	1.191	15.201	209.400	MB	26.25 26.6249
4	Propane	1.873	22.996	163.907	BMB	33.32 34.5519
5	Propene	3.533	21.391	70.609	BM	36.84 35.4234
6	iso-Butane	4.948	29.304	66.154	M	41.45 40.3308
7	n-Butane	5.781	29.396	56.498	M	42.86 41.4740
8	Acetylene	6.919	8.091	14.580	MB	37.59 37.1932

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



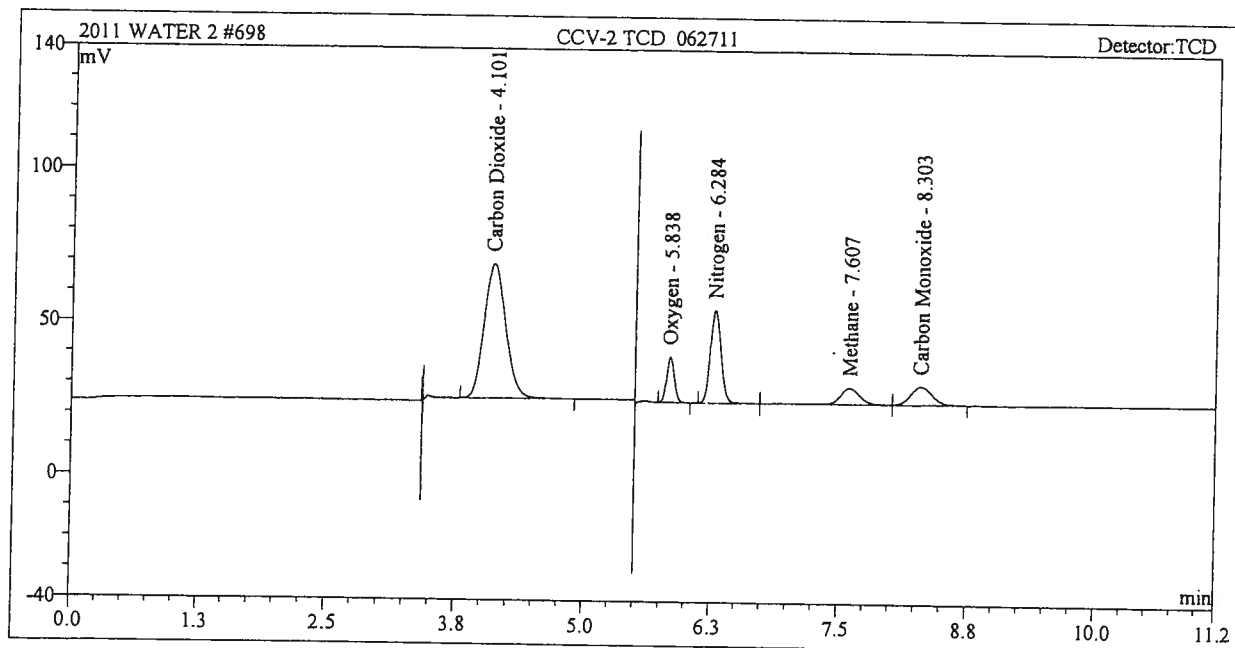
MICROSEEPS

Sample Analysis Report

Sample Name:	CCV-2 TCD 062711	Sequence No:	698
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 13:00	Analytical Method:	AM20GAx/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount TV
1	Carbon Dioxide	4.101	10.613	43.922	BMB	53.50 54.2197
2	Oxygen	5.838	1.371	14.904	BMB	4.96 5.0424
3	Nitrogen	6.284	3.696	30.315	BM	10.19 10.8174
4	Methane	7.607	1.191	5.378	M	2.47 2328.2748
5	Carbon Monoxide	8.303	1.463	6.055	MB	4.17 4.3218

FID UNITS (Methane thru Acetylene ug/L)
TCD UNITS (Methane ug/L, CO₂, O₂, N₂, CO mg/L)
RGD UNITS (Hydrogen nM)



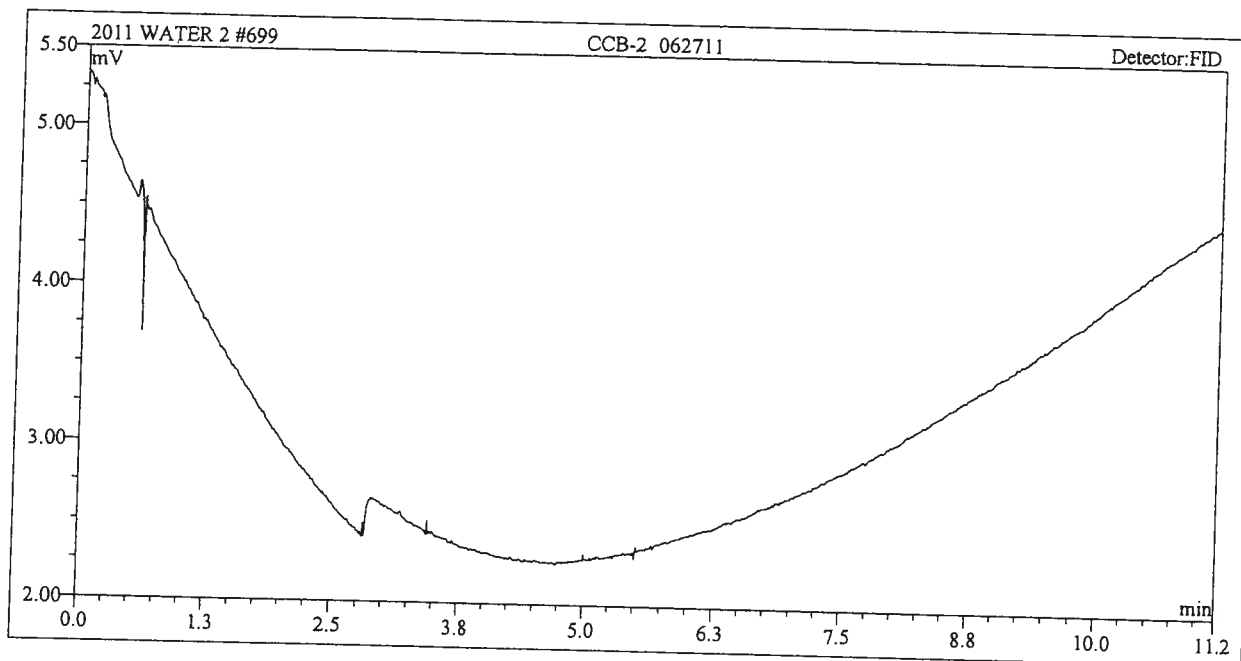
MICROSEEPS

Sample Analysis Report

Sample Name:	CCB-2 062711	Sequence No:	699
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 13:13	Analytical Method:	AM20GAX/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
----------	----------------	----------------	-------------	-----------	------	--------

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



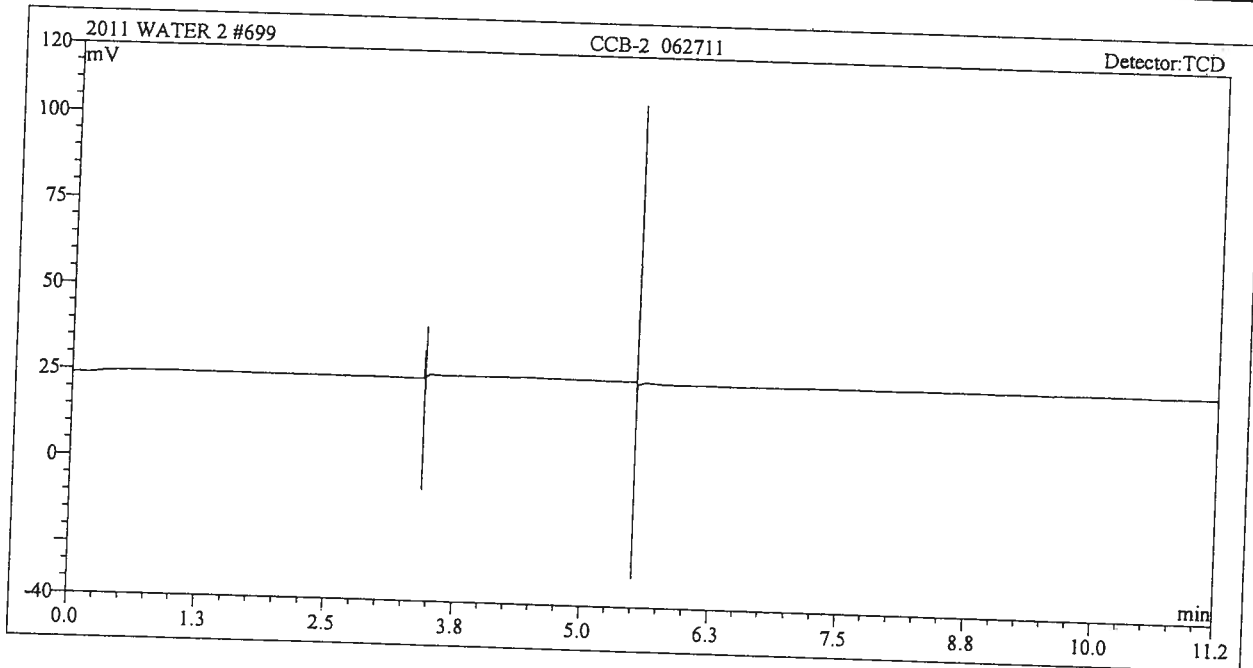
MICROSEEPS

Sample Analysis Report

Sample Name:	CCB-2 062711	Sequence No:	699
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 13:13	Analytical Method:	AM20GAx/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
----------	----------------	----------------	-------------	-----------	------	--------

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



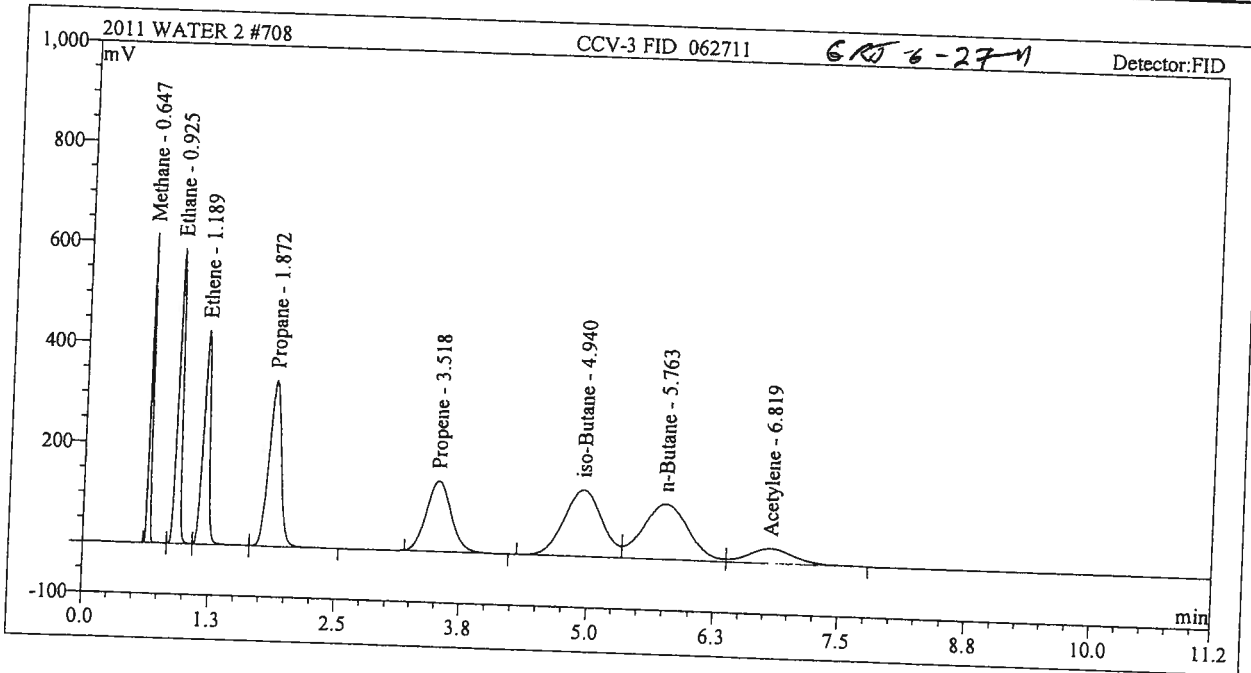
MICROSEEPS

Sample Analysis Report

Sample Name:	CCV-3 FID 062711	Sequence No:	708
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 15:18	Analytical Method:	AM20GAX/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Methane	0.647	17.087	616.133		TV
2	Ethane	0.925	30.549	588.082	BM	24.7 25.1214
3	Ethene	1.189	31.003	427.386	M	46.51 48.0893
4	Propane	1.872	46.529	331.391	M	52.51 54.3025
5	Propene	3.518	40.951	140.924	MB	66.63 69.9106
6	iso-Butane	4.940	58.411	133.459	BMB	73.69 67.8134
7	n-Butane	5.763	57.077	111.119	BM	82.90 80.3909
8	Acetylene	6.819	16.183	30.035	M	85.71 80.5278
					MB	75.18 74.3915

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



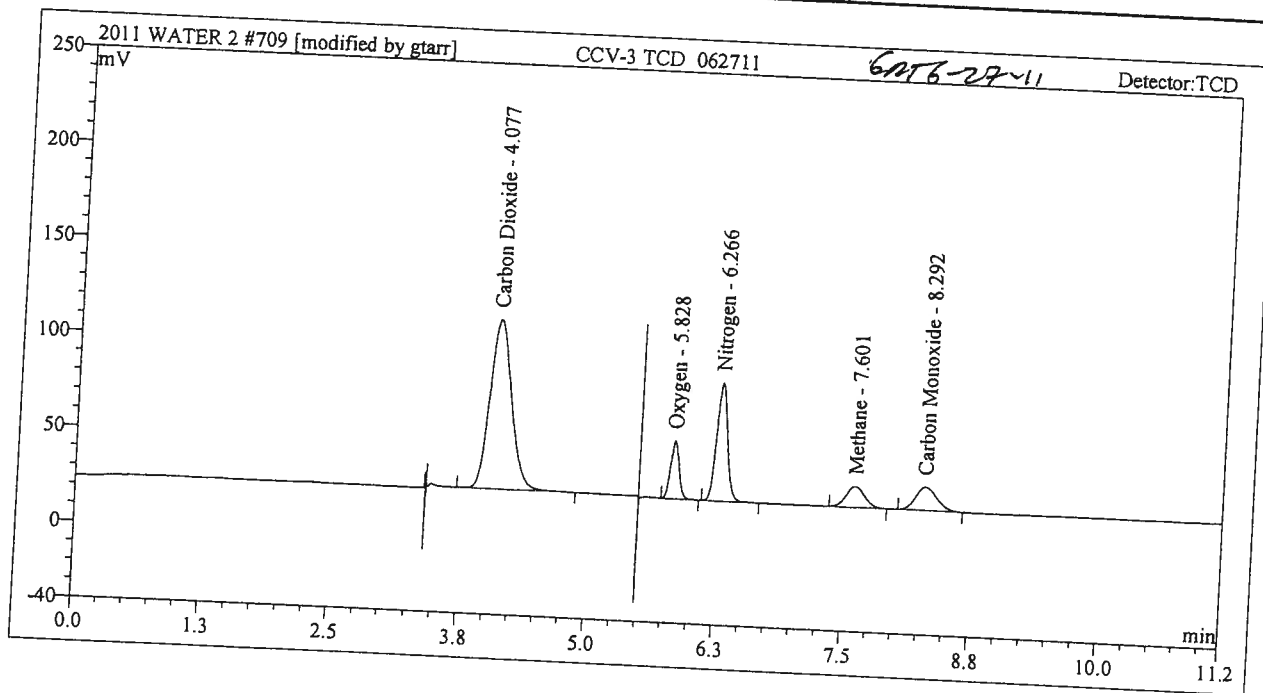
MICROSEEPS

Sample Analysis Report

Sample Name:	CCV-3 TCD 062711	Sequence No:	709
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 15:32	Analytical Method:	AM20GAX/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Carbon Dioxide	4.077	21.949	88.965		TV
2	Oxygen	5.828	2.806	30.302	BMB	107 112.1336
3	Nitrogen	6.266	7.561	62.018	BMB	9.99 10.3217
4	Methane	7.601	2.279	10.874	BMB*	2038 22.1309
5	Carbon Monoxide	8.292	2.936	12.272	BMB*	4294 4455.1819
					BMB*	8.34 8.6747

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



Data Validation Worksheet

Lab Report # 228920
 Project Port Harbor Facilities Complex

DV by: SC
 Date: 07/21/11

Lab IDs	Sample IDs	Date Collected	Parameters									
			TPHg (8015B)	TPHd/mo (8015B)	MTBE BTEX (8260B)	Anions (300.0)	Metals (6010B)	Diss SO ₄ ⁻² (SM4500P -E)	Alk (2320B)	Orth-P (SM4500 P)	Gases (AM20 GAX)	
-001	MW-9	6/22/11	X	X	X	X	X	X	X	X	X	X
-002	MW-5	6/22/11	X	X	X	X	X	X	X	X	X	X
-003	MW-1	6/22/11	X	X	X	X	X	X	X	X	X	X
-004	MW-10	6/22/11	X	X	X	X	X	X	X	X	X	X
-005	MW-2	6/22/11	X	X	X	X	X	X	X	X	X	X
-006	QCTB	6/22/11			X + TPHg							
-007	QCTB-1	6/22/11			X + TPHg							
Confirm lab contaminant and re-extract												
-008	MW-2	6/22/11		x								

Lab ID: C+T, gases subbed to MicroSeeps
 Cooler Temperature: 8.0, 8.0
 Chain-of-Custody: OK
 Samples preservatives: OK

QUAL for -008 outside of HT

Parameter: **TPHg**

HTs: 14 days – analyzed 6/23/11 (1)
 Batch IDs: 176173
 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: 176176: 7 days – extracted 6/23/11 (1) analyzed 6/27/10 (5)
 176886: extracted 7/19/11 (26) analyzed 7/20/11 (27) outside of HT to confirm lab contaminant detected as TPHmo in previous extraction → QUAL outside of HT for TPHmo only
 Batch IDs: 176176
 176886
 Surrogates: OK
 Method Blank: OK, surrogates OK
 LCS: OK, surrogates OK
 MS/MSD: MS OK, surrogates OK
 MSD OK, surrogates OK

Parameter: **BTEX + MTBE**

HTs: 14 days – analyzed 6/23/11 (1)
 Batch IDs: 176145
 176244
 Surrogates: OK
 Method Blank: OK, surrogates OK

MS/MSD: MS OK, surrogates OK
MSD OK, surrogates OK
BS/BSD: BS OK, surrogates OK
BSD OK, surrogates OK

Parameter: **Anions**

HTs: 28 days – analyzed 6/23/11 (1)
Batch IDs: 176133
Method Blank: OK
LCS: OK
MS/MSD: MS OK
MSD recovery out of range, QC sample not one of our samples → NO QUAL

Parameter: **Metals**

HTs: 6 months – analyzed 6/23/11 (1)
Batch IDs: 176182
Method Blank: OK
BS/BSD: BS OK
MS/MSD: MS out of range, QC sample not one of our samples → NO QUAL
MSD out of range, QC sample not one of our samples → NO QUAL

Parameter: **Alkalinity**

HTs: 14 days – analyzed 6/27/11 (5)
Batch IDs: 176243
Method Blank: OK
LCS: OK
MS/MSD: MS OK
MSD OK

Parameter: **Dissolved Sulfide**

HTs: 7 days – analyzed 6/23/11 (1)
Batch IDs: 176144
Method Blank: OK
LCS: OK
MS/MSD: MS OK
MSD OK

Parameter: **Orthophosphate**

HTs: 48 hrs – analyzed 6/22/11 (1)
Batch IDs: 176132
Method Blank: OK
LCS: OK
MS/MSD: MS OK
MSD OK

Parameter: **TDS**

HTs: 7 days – extracted 6/24/11 (2)
Batch IDs: 176195
Method Blank: OK
BS/BSD: MS OK

SDUP: MSD OK
OK

Parameter: **Gases**

HTs: 14 days – analyzed 7/4/11 (12)

Method Blank: OK

LCS/LCSD: LCS OK

LCSD OK

MS/MSD: MS out of range, QC sample not our sample → NO QUAL

MSD out of range, QC sample not our sample → NO QUAL



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 228920
ANALYTICAL REPORT**

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

Project : 4656016
Location : Port Of Oakland - HFC
Level : II

<u>Sample ID</u>	<u>Lab ID</u>
MW-9	228920-001
MW-5	228920-002
MW-1	228920-003
MW-10	228920-004
MW-2	228920-005
QCTB	228920-006
QCTB-1	228920-007
MW-2	228920-008

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: 07/21/2011

NELAP # 01107CA

CASE NARRATIVE

Laboratory number: 228920
Client: Malcolm Pirnie, Inc.
Project: 4656016
Location: Port Of Oakland - HFC
Request Date: 06/22/11
Samples Received: 06/22/11

This data package contains sample and QC results for seven water samples, requested for the above referenced project on 06/22/11. The samples were received cold and intact.

TPH-Purgeables and/or BTXE by GC (EPA 8015B):

No analytical problems were encountered.

TPH-Extractables by GC (EPA 8015B):

228920-008 was prepared outside of hold time to investigate the hydrocarbon peak from the original extraction; affected data was qualified with "b". The peak was confirmed by EPA 8270 to be bis(2-ethylhexyl)phthalate, which is a contaminant of an unknown source, but was not found in the second TPH extraction. No other analytical problems were encountered.

Volatile Organics by GC/MS (EPA 8260B):

No analytical problems were encountered.

Semivolatile Organics by GC/MS (EPA 8270C):

No analytical problems were encountered.

Metals (EPA 6010B):

No analytical problems were encountered.

Ion Chromatography (EPA 300.0):

High recovery was observed for nitrogen, nitrite in the MSD for batch 176133; the parent sample was not a project sample, the LCS was within limits, the associated RPD was within limits, and this analyte was not detected at or above the RL in the associated samples. MW-10 (lab # 228920-004) was diluted due to high chloride concentration. No other analytical problems were encountered.

Alkalinity (SM2320B):

No analytical problems were encountered.

Dissolved Sulfide (SM4500S2-D):

No analytical problems were encountered.

Total Dissolved Solids (TDS) (SM2540C):

No analytical problems were encountered.

CASE NARRATIVE

Laboratory number: 228920
Client: Malcolm Pirnie, Inc.
Project: 4656016
Location: Port Of Oakland - HFC
Request Date: 06/22/11
Samples Received: 06/22/11

Orthophosphate Phosphorous (SM4500P-E):

No analytical problems were encountered.

AM20GAX (AM20GAX):

Microseeps, Inc. in Pittsburgh, PA performed the analysis (NELAP certified).
Please see the Microseeps, Inc. case narrative.

ID#:

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Lab Work Order #

228920

Send Results to:	Contact & Company Name: Todd Miller ARCADIS	Telephone: 510-596-9695
	Address: 2000 Powell St, 7th Floor	Fax: 510-652-4906
	City State Zip: Emeryville CA 94608	E-mail Address: todd.miller@arcadis-us.com
	Project Name/Location (City, State): Port HFC / Oakland, CA	Project #: 04656016.0000
	Sampler's Printed Name: Sarah Carman	Sampler's Signature: <i>Sarah Carman</i>

Preservative	HCL	HCL			NaOH	HNO ₃	BAK
Filtered (✓)							
# of Containers	3 ea	3 ea	2 ea	1 ea	1 ea	1 ea	2 ea
Container Information	Vials	Vials	500 ml poly	500 ml poly	250 ml	500 ml	Vials

PARAMETER ANALYSIS & METHOD

	<i>TPH-G 8015B</i>	<i>15TEX-MTE 82608</i>	<i>TPH-d/mc SW cleanup 8015B</i>	<i>TDS, alkalinity, anions, O-PDy</i>	<i>disolved sulfate 370.2</i>	<i>disolved cations - Mn, Fe - field HPLC</i>	<i>Morgan CO2</i>
--	--------------------	------------------------	----------------------------------	---------------------------------------	-------------------------------	---	-------------------

Keys		
Preservation Key:	Container Information Key:	
A. H ₂ SO ₄	1. 40 ml Vial	
B. HCL	2. 1 L Amber	
C. HNO ₃	3. 250 ml Plastic	
D. NaOH	4. 500 ml Plastic	
E. None	5. Encore	
F. Other: _____	6. 2 oz. Glass	
G. Other: _____	7. 4 oz. Glass	
H. Other: _____	8. 8 oz. Glass	
	9. Other: _____	
	10. Other: _____	
Matrix Key:		
SO - Soil	SE - Sediment	NL - NAPL/Oil
W - Water	SL - Sludge	SW - Sample Wipe
T - Tissue	A - Air	Other: _____

Sample ID	Collection		Type (✓)		Matrix	TPH-G 8015B	15TEX-MTE 82608	TPH-d/mc SW cleanup 8015B	TDS, alkalinity, anions, O-PDy	disolved sulfate 370.2	disolved cations - Mn, Fe - field HPLC	Morgan CO2
	Date	Time	Comp	Grab								
MW-9	6/22/11	9:50			W	X	X	X	X	X	X	X
MW-5		10:00										
MW-1		12:10										
MW-10		14:50										
MW-2		16:20										
QCTB												
QCTB-1			X		X	X	X					

REMARKS

Special Instructions/Comments: *Please bill Port of Oakland directly* Special QA/QC Instructions(✓):

Laboratory Information and Receipt		Relinquished By		Received By		Relinquished By		Laboratory Received By	
Lab Name: CAT	Cooler Custody Seal (✓) <input type="checkbox"/> Intact <input type="checkbox"/> Not Intact	Printed Name: <i>Sarah Carman</i>	Signature: <i>Sarah Carman</i>	Printed Name: <i>Pat Gonzalez</i>	Signature: <i>Pat Gonzalez</i>	Printed Name:	Signature:	Printed Name:	Signature:
<input checked="" type="checkbox"/> Cooler packed with ice (✓)	Sample Receipt: <i>on ice, etc.</i>	Firm: ARCADIS	Date/Time: <i>6/22/11 1800</i>	Firm/Courier: CAT	Date/Time: <i>6/22/11 1800</i>	Firm/Courier:	Date/Time:	Firm:	Date/Time:
Specify Turnaround Requirements: Standard	Condition/Cooler Temp: _____								

4 of 71

COOLER RECEIPT CHECKLIST



Curtis & Tompkins, Ltd.

Login # 228920 Date Received 6/22/11 Number of coolers 2
Client ALCADIS Project Port of Oakland

Date Opened 6/22/11 By (print) Vidia Corchi (sign) [Signature]
Date Logged in [initials] By (print) [initials] (sign) [initials]

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

2A. Were custody seals present? ... YES (circle) on cooler on samples NO
How many Name Date

2B. Were custody seals intact upon arrival? YES NO (N/A)

3. Were custody papers dry and intact when received? YES NO

4. Were custody papers filled out properly (ink, signed, etc)? YES NO

5. Is the project identifiable from custody papers? (If so fill out top of form) YES NO

6. Indicate the packing in cooler: (if other, describe)

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

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

Type of ice used: Wet Blue/Gel None Temp(°C) 8.0, 8.0
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. Did you check preservatives for all bottles for each sample? YES NO N/A

16. Did you document your preservative check? YES NO N/A

17. Did you change the hold time in LIMS for unpreserved VOAs? YES (NO) N/A

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

19. Was the client contacted concerning this sample delivery? YES (NO)
If YES, Who was called? By Date:

COMMENTS

Blank lines for handwritten comments.

Curtis & Tompkins Sample Preservation for 228920

Sample	pH: <2	>12	Other
-001a	<input type="checkbox"/>	<input type="checkbox"/>	_____
b	<input type="checkbox"/>	<input type="checkbox"/>	_____
c	<input type="checkbox"/>	<input type="checkbox"/>	_____
d	<input type="checkbox"/>	<input type="checkbox"/>	_____
e	<input type="checkbox"/>	<input type="checkbox"/>	_____
f	<input type="checkbox"/>	<input type="checkbox"/>	_____
g	<input type="checkbox"/>	<input type="checkbox"/>	_____
h	<input type="checkbox"/>	<input type="checkbox"/>	_____
i	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
j	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	_____ <i>VC</i>
k	<input type="checkbox"/>	<input type="checkbox"/>	_____
l	<input type="checkbox"/>	<input type="checkbox"/>	_____
m	<input type="checkbox"/>	<input type="checkbox"/>	_____
-002a	<input type="checkbox"/>	<input type="checkbox"/>	_____
b	<input type="checkbox"/>	<input type="checkbox"/>	_____
c	<input type="checkbox"/>	<input type="checkbox"/>	_____
d	<input type="checkbox"/>	<input type="checkbox"/>	_____
e	<input type="checkbox"/>	<input type="checkbox"/>	_____
f	<input type="checkbox"/>	<input type="checkbox"/>	_____
g	<input type="checkbox"/>	<input type="checkbox"/>	_____
h	<input type="checkbox"/>	<input type="checkbox"/>	_____
i	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____

Sample	pH: <2	>12	Other
j	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
k	<input type="checkbox"/>	<input type="checkbox"/>	_____
l	<input type="checkbox"/>	<input type="checkbox"/>	_____
m	<input type="checkbox"/>	<input type="checkbox"/>	_____
-003a	<input type="checkbox"/>	<input type="checkbox"/>	_____
b	<input type="checkbox"/>	<input type="checkbox"/>	_____
c	<input type="checkbox"/>	<input type="checkbox"/>	_____
d	<input type="checkbox"/>	<input type="checkbox"/>	_____
e	<input type="checkbox"/>	<input type="checkbox"/>	_____
f	<input type="checkbox"/>	<input type="checkbox"/>	_____
g	<input type="checkbox"/>	<input type="checkbox"/>	_____
h	<input type="checkbox"/>	<input type="checkbox"/>	_____
i	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
j	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
k	<input type="checkbox"/>	<input type="checkbox"/>	_____
l	<input type="checkbox"/>	<input type="checkbox"/>	_____
m	<input type="checkbox"/>	<input type="checkbox"/>	_____
-004a	<input type="checkbox"/>	<input type="checkbox"/>	_____
b	<input type="checkbox"/>	<input type="checkbox"/>	_____
c	<input type="checkbox"/>	<input type="checkbox"/>	_____
d	<input type="checkbox"/>	<input type="checkbox"/>	_____

Sample	pH: <2	>12	Other
e	<input type="checkbox"/>	<input type="checkbox"/>	_____
f	<input type="checkbox"/>	<input type="checkbox"/>	_____
g	<input type="checkbox"/>	<input type="checkbox"/>	_____
h	<input type="checkbox"/>	<input type="checkbox"/>	_____
i	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
j	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
k	<input type="checkbox"/>	<input type="checkbox"/>	_____
l	<input type="checkbox"/>	<input type="checkbox"/>	_____
m	<input type="checkbox"/>	<input type="checkbox"/>	_____
-005a	<input type="checkbox"/>	<input type="checkbox"/>	_____
b	<input type="checkbox"/>	<input type="checkbox"/>	_____
c	<input type="checkbox"/>	<input type="checkbox"/>	_____
d	<input type="checkbox"/>	<input type="checkbox"/>	_____
e	<input type="checkbox"/>	<input type="checkbox"/>	_____
f	<input type="checkbox"/>	<input type="checkbox"/>	_____
g	<input type="checkbox"/>	<input type="checkbox"/>	_____
h	<input type="checkbox"/>	<input type="checkbox"/>	_____
i	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
j	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
k	<input type="checkbox"/>	<input type="checkbox"/>	_____
l	<input type="checkbox"/>	<input type="checkbox"/>	_____
m	<input type="checkbox"/>	<input type="checkbox"/>	_____

Analyst: *[Signature]*
 Date: 9/22/11
 Page 1 of 1



Total Volatile Hydrocarbons			
Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	06/22/11
Units:	ug/L	Received:	06/22/11
Diln Fac:	1.000	Analyzed:	06/23/11
Batch#:	176173		

Field ID: MW-10 Lab ID: 228920-004
Type: SAMPLE

Analyte	Result	RL
Gasoline C7-C12	320 Y	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	114	78-123

Field ID: MW-2 Lab ID: 228920-005
Type: SAMPLE

Analyte	Result	RL
Gasoline C7-C12	ND	50

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	106	78-123

Type: BLANK Lab ID: QC597664

Analyte	Result	RL
Gasoline C7-C12	ND	50

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

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

Batch QC Report

Total Volatile Hydrocarbons			
Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC597663	Batch#:	176173
Matrix:	Water	Analyzed:	06/23/11
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	1,000	984.1	98	80-120

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	98	78-123

Batch QC Report

Total Volatile Hydrocarbons			
Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8015B
Field ID:	ZZZZZZZZZZ	Batch#:	176173
MSS Lab ID:	228924-002	Sampled:	06/22/11
Matrix:	Water	Received:	06/22/11
Units:	ug/L	Analyzed:	06/24/11
Diln Fac:	1.000		

Type: MS Lab ID: QC597665

Analyte	MSS Result	Spiked	Result	%REC	Limits
Gasoline C7-C12	15.62	2,000	1,858	92	66-120

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	107	78-123

Type: MSD Lab ID: QC597666

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	2,000	1,818	90	66-120	2	25

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	107	78-123

RPD= Relative Percent Difference

Batch QC Report

Total Volatile Hydrocarbons			
Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8015B
Field ID:	ZZZZZZZZZZ	Batch#:	176173
MSS Lab ID:	228925-007	Sampled:	06/20/11
Matrix:	Water	Received:	06/23/11
Units:	ug/L	Analyzed:	06/24/11
Diln Fac:	1.000		

Type: MS Lab ID: QC597667

Analyte	MSS Result	Spiked	Result	%REC	Limits
Gasoline C7-C12	18.41	2,000	1,836	91	66-120

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	107	78-123

Type: MSD Lab ID: QC597668

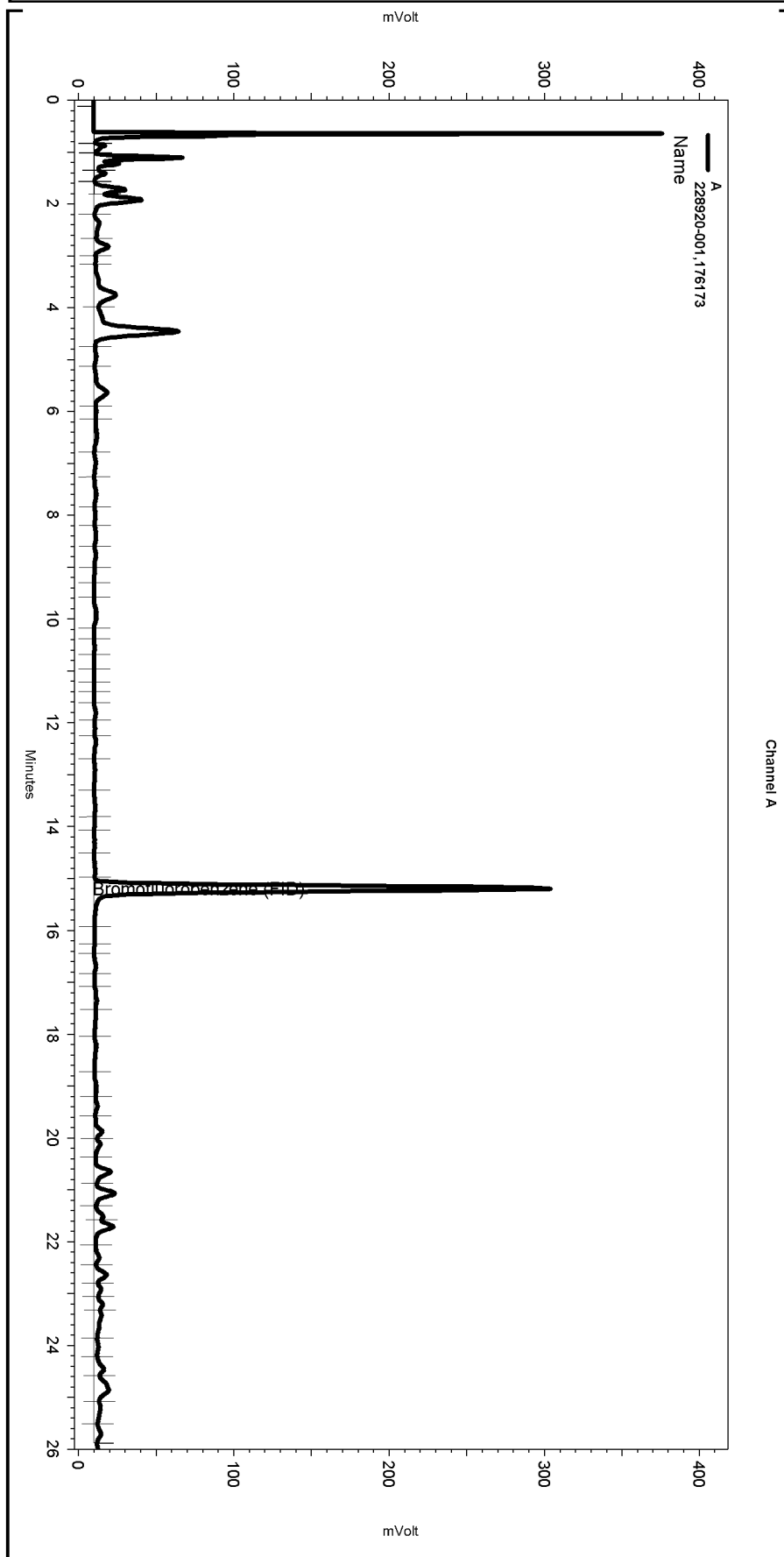
Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	2,000	1,805	89	66-120	2	25

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

RPD= Relative Percent Difference

Sequence File: \\Lims\gdrive\ezchrom\Projects\GC07\Sequence\174.seq
 Sample Name: 228920-001,176173
 Data File: \\Lims\gdrive\ezchrom\Projects\GC07\Data\174-008
 Instrument: GC07 (Offline) Vial: N/A Operator: Tvh 2. Analyst (lims2k3\tvh2)
 Method Name: \\Lims\gdrive\ezchrom\Projects\GC07\Method\tvhbtxe153.met

Software Version 3.1.7
 Run Date: 6/23/2011 7:33:08 PM
 Analysis Date: 6/24/2011 10:56:28 AM
 Sample Amount: 5 Multiplier: 5
 Vial & pH or Core ID: b



---< General Method Parameters >---

No items selected for this section

---< A >---

No items selected for this section

Integration Events

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

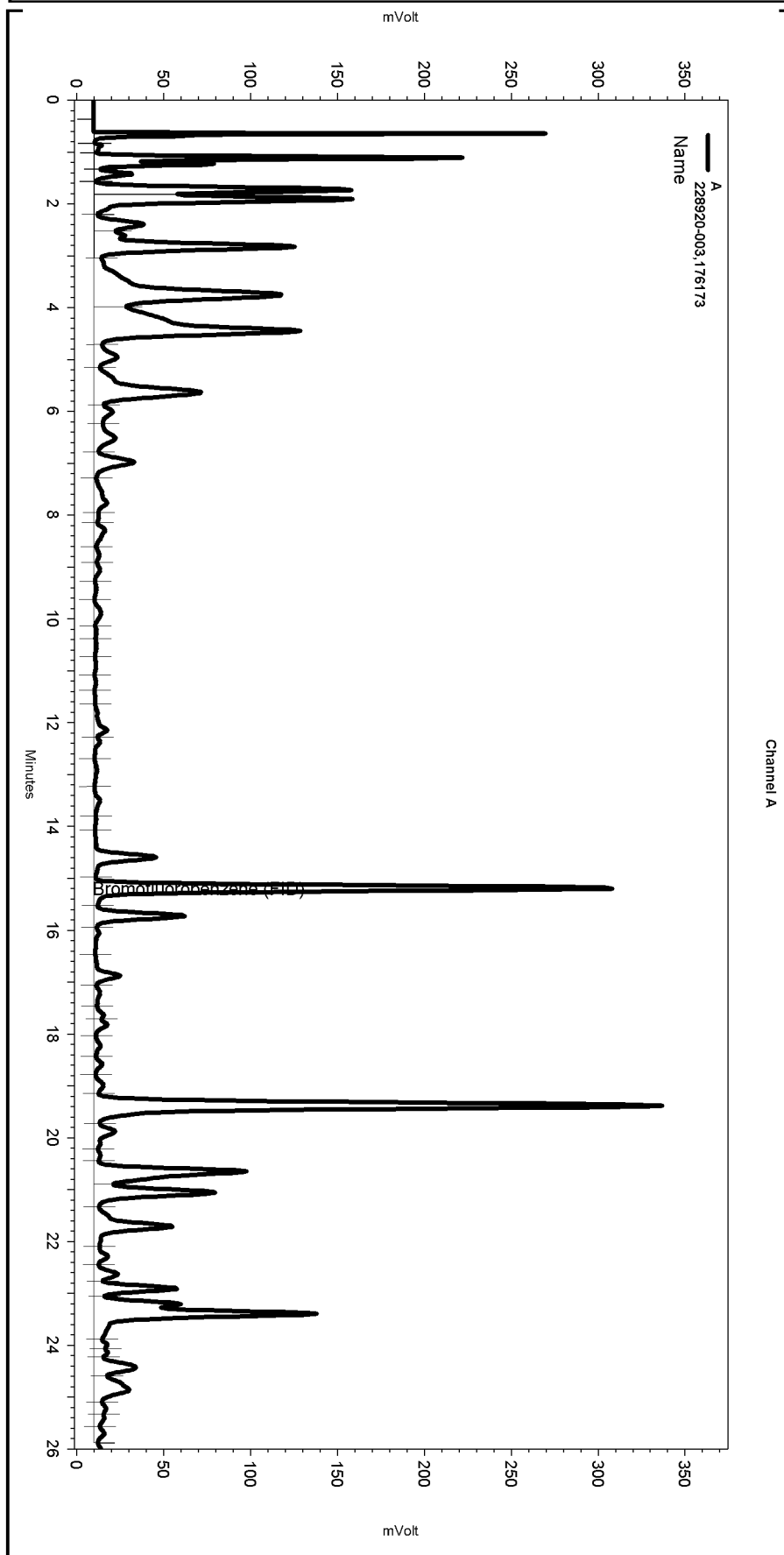
Manual Integration Fixes

Data File: \\Lims\gdrive\ezchrom\Projects\GC07\Data\174-008

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

Sequence File: \\Lims\gdrive\ezchrom\Projects\GC07\Sequence\174.seq
 Sample Name: 228920-003,176173
 Data File: \\Lims\gdrive\ezchrom\Projects\GC07\Data\174-010
 Instrument: GC07 (Offline) Vial: N/A Operator: Tvh 2. Analyst (lims2k3\tvh2)
 Method Name: \\Lims\gdrive\ezchrom\Projects\GC07\Method\TVHBTXE153.MET

Software Version 3.1.7
 Run Date: 6/23/2011 8:50:46 PM
 Analysis Date: 6/24/2011 10:59:59 AM
 Sample Amount: 5 Multiplier: 5
 Vial & pH or Core ID: b



---< General Method Parameters >---

No items selected for this section

---< A >---

No items selected for this section

Integration Events

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

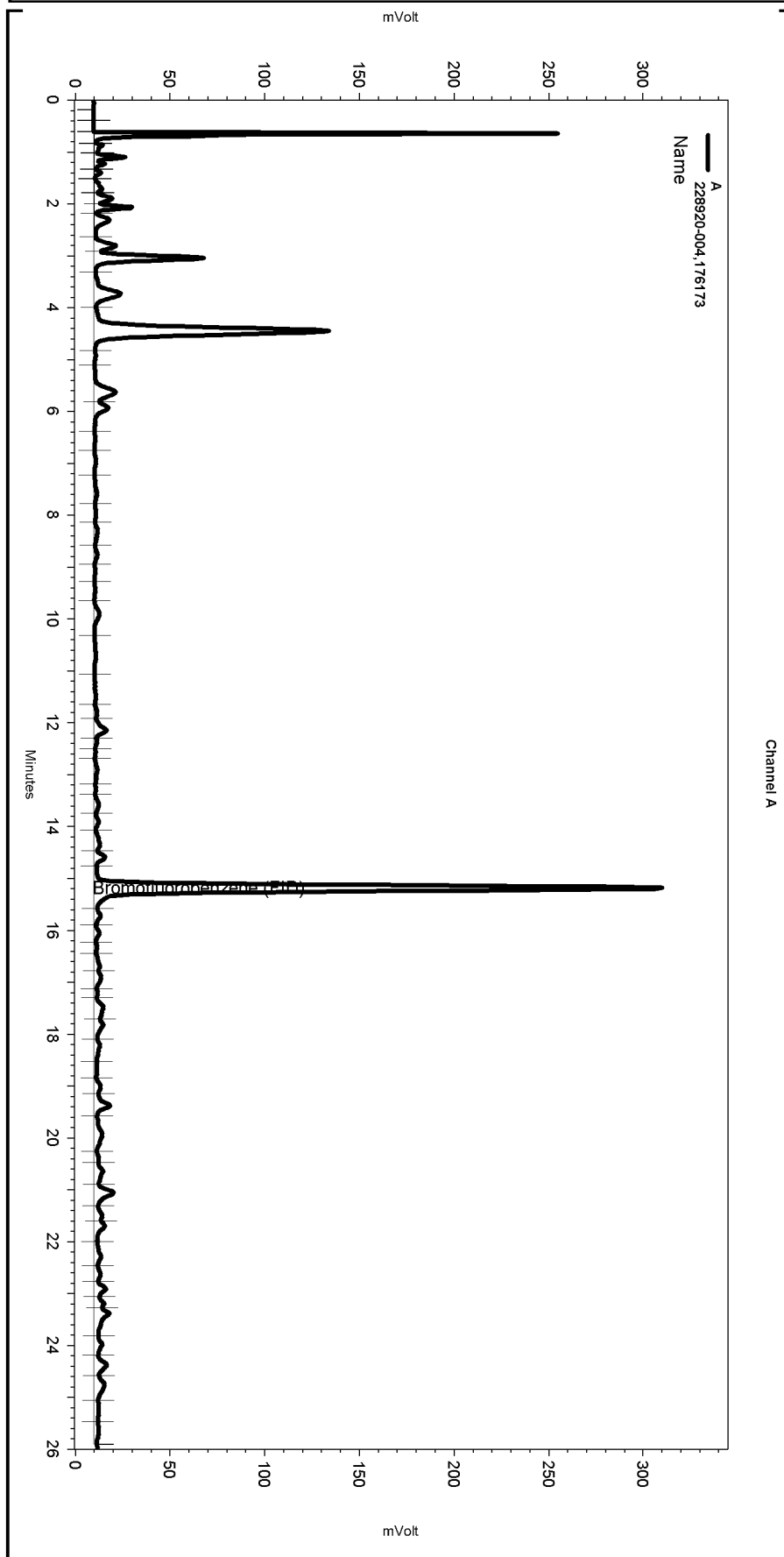
Manual Integration Fixes

Data File: \\Lims\gdrive\ezchrom\Projects\GC07\Data\174-010

Enabled	Event Type	Start (Minutes)	Stop (Minutes)	Value
Yes	Lowest Point Horizontal Baseline	0	26.017	0

Sequence File: \\Lims\gdrive\ezchrom\Projects\GC07\Sequence\174.seq
 Sample Name: 228920-004,176173
 Data File: \\Lims\gdrive\ezchrom\Projects\GC07\Data\174-011
 Instrument: GC07 (Offline) Vial: N/A Operator: Tvh 2. Analyst (lims2k3\tvh2)
 Method Name: \\Lims\gdrive\ezchrom\Projects\GC07\Method\TVHBTXE153.MET

Software Version 3.1.7
 Run Date: 6/23/2011 9:29:30 PM
 Analysis Date: 6/24/2011 11:00:51 AM
 Sample Amount: 5 Multiplier: 5
 Vial & pH or Core ID: b



---< General Method Parameters >---

No items selected for this section

---< A >---

No items selected for this section

Integration Events

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

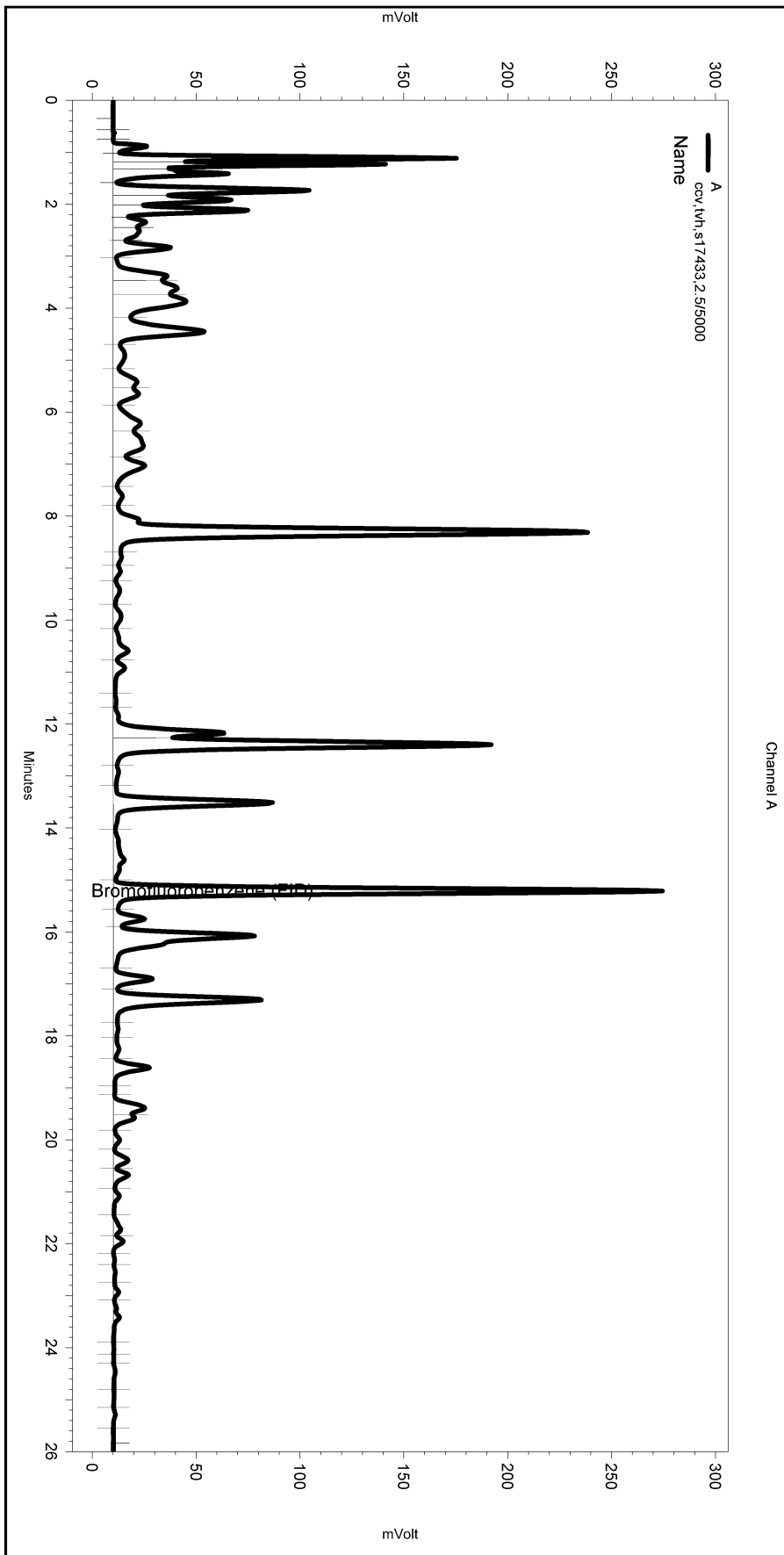
Manual Integration Fixes

Data File: \\Lims\gdrive\ezchrom\Projects\GC07\Data\174-011

Enabled	Event Type	Start (Minutes)	Stop (Minutes)	Value
Yes	Lowest Point Horizontal Baseline	0	26.017	0

Sequence File: \\Lims\gdrive\ezchrom\Projects\GC07\Sequence\174.seq
 Sample Name: ccv,tvh,s17433,2.5/5000
 Data File: \\Lims\gdrive\ezchrom\Projects\GC07\Data\174-003
 Instrument: GC07 Vial: N/A Operator: lims2k3\tvh3
 Method Name: \\Lims\gdrive\ezchrom\Projects\GC07\Method\tvhbx153.met

Software Version 3.1.7
 Run Date: 6/23/2011 12:32:03 PM
 Analysis Date: 6/23/2011 1:00:47 PM
 Sample Amount: 5 Multiplier: 5
 Vial & pH or Core ID: {Data Description}



---< General Method Parameters >---

No items selected for this section

---< A >---

No items selected for this section

Integration Events

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

Manual Integration Fixes

Data File: C:\Documents and Settings\All Users\Application Data\ChromatographySystem\Recovery Data\Instrument.10049\174-003_CF2F.tmp

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

Channel A

Total Extractable Hydrocarbons			
Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 3520C
Project#:	4656016	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	06/22/11
Units:	ug/L	Received:	06/22/11
Diln Fac:	1.000		

Field ID:	MW-9	Prepared:	06/23/11
Type:	SAMPLE	Analyzed:	06/27/11
Lab ID:	228920-001	Cleanup Method:	EPA 3630C
Batch#:	176176		

Analyte	Result	RL
Diesel C10-C24	160 Y	50
Motor Oil C24-C36	ND	300

Surrogate	%REC	Limits
o-Terphenyl	97	68-120

Field ID:	MW-5	Prepared:	06/23/11
Type:	SAMPLE	Analyzed:	06/27/11
Lab ID:	228920-002	Cleanup Method:	EPA 3630C
Batch#:	176176		

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

Surrogate	%REC	Limits
o-Terphenyl	101	68-120

Field ID:	MW-1	Prepared:	06/23/11
Type:	SAMPLE	Analyzed:	06/27/11
Lab ID:	228920-003	Cleanup Method:	EPA 3630C
Batch#:	176176		

Analyte	Result	RL
Diesel C10-C24	890	50
Motor Oil C24-C36	ND	300

Surrogate	%REC	Limits
o-Terphenyl	88	68-120

Y= Sample exhibits chromatographic pattern which does not resemble standard
 Z= Sample exhibits unknown single peak or peaks
 b= See narrative
 ND= Not Detected
 RL= Reporting Limit

Total Extractable Hydrocarbons

Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 3520C
Project#:	4656016	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	06/22/11
Units:	ug/L	Received:	06/22/11
Diln Fac:	1.000		

Field ID: MW-10	Prepared: 06/23/11
Type: SAMPLE	Analyzed: 06/27/11
Lab ID: 228920-004	Cleanup Method: EPA 3630C
Batch#: 176176	

Analyte	Result	RL
Diesel C10-C24	630	50
Motor Oil C24-C36	ND	300

Surrogate	%REC	Limits
o-Terphenyl	106	68-120

Field ID: MW-2	Prepared: 06/23/11
Type: SAMPLE	Analyzed: 06/27/11
Lab ID: 228920-005	Cleanup Method: EPA 3630C
Batch#: 176176	

Analyte	Result	RL
Diesel C10-C24	ND	50
Motor Oil C24-C36	1,100 Y Z	300

Surrogate	%REC	Limits
o-Terphenyl	115	68-120

Field ID: MW-2	Prepared: 07/19/11
Type: SAMPLE	Analyzed: 07/20/11
Lab ID: 228920-008	Cleanup Method: EPA 3630C
Batch#: 176886	

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

Surrogate	%REC	Limits
o-Terphenyl	92 b	68-120

Type: BLANK	Prepared: 06/23/11
Lab ID: QC597679	Analyzed: 06/27/11
Batch#: 176176	Cleanup Method: EPA 3630C

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

Surrogate	%REC	Limits
o-Terphenyl	102	68-120

Y= Sample exhibits chromatographic pattern which does not resemble standard
 Z= Sample exhibits unknown single peak or peaks
 b= See narrative
 ND= Not Detected
 RL= Reporting Limit

Total Extractable Hydrocarbons			
Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 3520C
Project#:	4656016	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	06/22/11
Units:	ug/L	Received:	06/22/11
Diln Fac:	1.000		

Type:	BLANK	Prepared:	07/18/11
Lab ID:	QC600494	Analyzed:	07/19/11
Batch#:	176886	Cleanup Method:	EPA 3630C

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

Surrogate	%REC	Limits
o-Terphenyl	108	68-120

Y= Sample exhibits chromatographic pattern which does not resemble standard
 Z= Sample exhibits unknown single peak or peaks
 b= See narrative
 ND= Not Detected
 RL= Reporting Limit

Batch QC Report

Total Extractable Hydrocarbons			
Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 3520C
Project#:	4656016	Analysis:	EPA 8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC597680	Batch#:	176176
Matrix:	Water	Prepared:	06/23/11
Units:	ug/L	Analyzed:	06/27/11

Cleanup Method: EPA 3630C

Analyte	Spiked	Result	%REC	Limits
Diesel C10-C24	2,500	2,482	99	61-120

Surrogate	%REC	Limits
o-Terphenyl	111	68-120

Batch QC Report

Total Extractable Hydrocarbons			
Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 3520C
Project#:	4656016	Analysis:	EPA 8015B
Field ID:	ZZZZZZZZZZ	Batch#:	176176
MSS Lab ID:	228925-007	Sampled:	06/20/11
Matrix:	Water	Received:	06/23/11
Units:	ug/L	Prepared:	06/23/11
Diln Fac:	1.000	Analyzed:	06/27/11

Type: MS Lab ID: QC597681

Analyte	MSS Result	Spiked	Result	%REC	Limits
Diesel C10-C24	417.9	2,500	2,726	92	33-140

Surrogate	%REC	Limits
o-Terphenyl	111	68-120

Type: MSD Lab ID: QC597682

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Diesel C10-C24	2,500	2,984	103	33-140	9	30

Surrogate	%REC	Limits
o-Terphenyl	112	68-120

RPD= Relative Percent Difference

Batch QC Report

Total Extractable Hydrocarbons			
Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 3520C
Project#:	4656016	Analysis:	EPA 8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC600495	Batch#:	176886
Matrix:	Water	Prepared:	07/18/11
Units:	ug/L	Analyzed:	07/19/11

Cleanup Method: EPA 3630C

Analyte	Spiked	Result	%REC	Limits
Diesel C10-C24	2,500	2,452	98	61-120

Surrogate	%REC	Limits
o-Terphenyl	104	68-120

Batch QC Report

Total Extractable Hydrocarbons			
Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 3520C
Project#:	4656016	Analysis:	EPA 8015B
Field ID:	ZZZZZZZZZZ	Batch#:	176886
MSS Lab ID:	229390-002	Sampled:	07/13/11
Matrix:	Water	Received:	07/14/11
Units:	ug/L	Prepared:	07/18/11
Diln Fac:	1.000	Analyzed:	07/19/11

Type: MS Lab ID: QC600496

Analyte	MSS Result	Spiked	Result	%REC	Limits
Diesel C10-C24	17.35	2,500	2,433	97	33-140

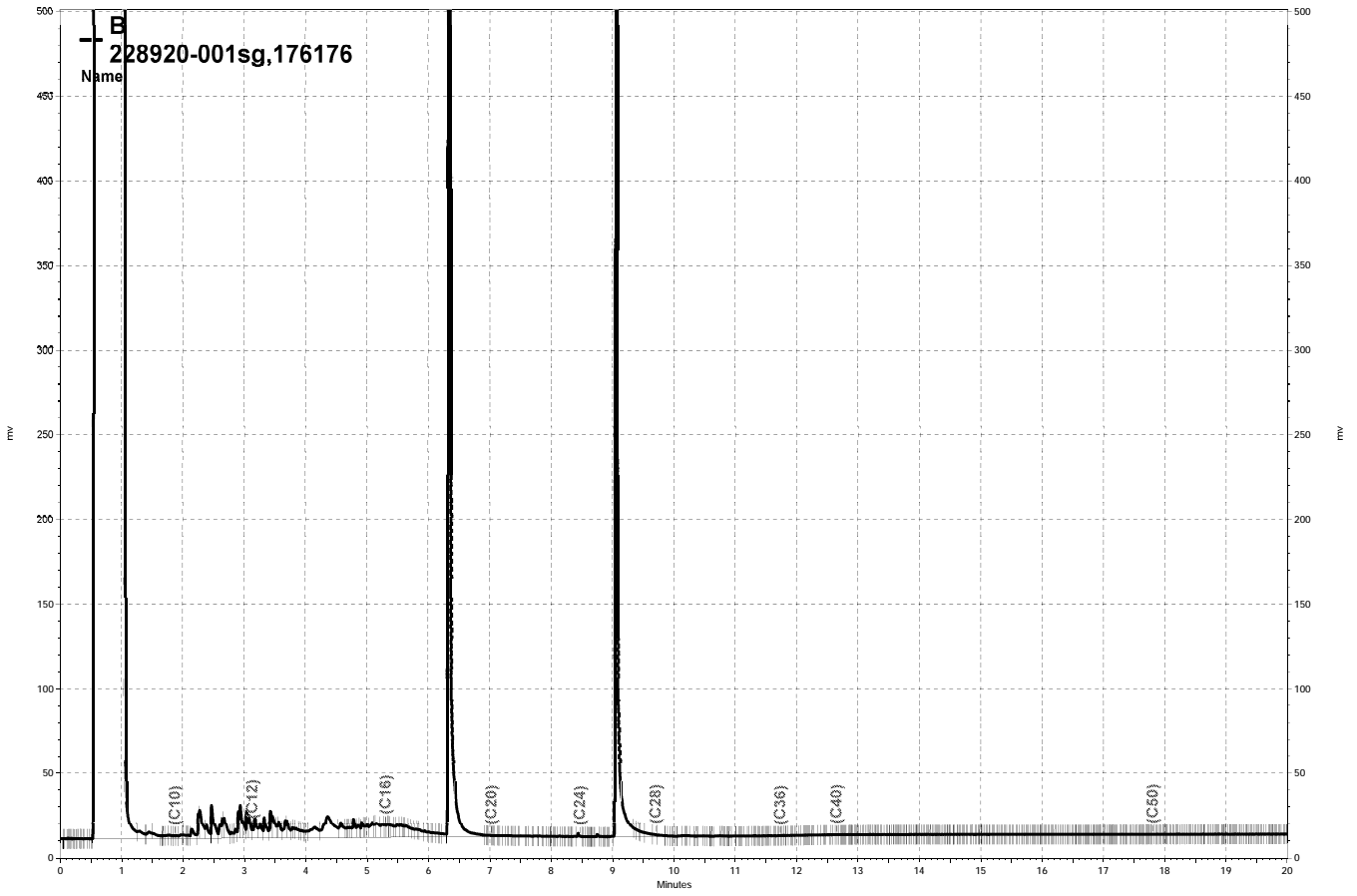
Surrogate	%REC	Limits
o-Terphenyl	103	68-120

Type: MSD Lab ID: QC600497

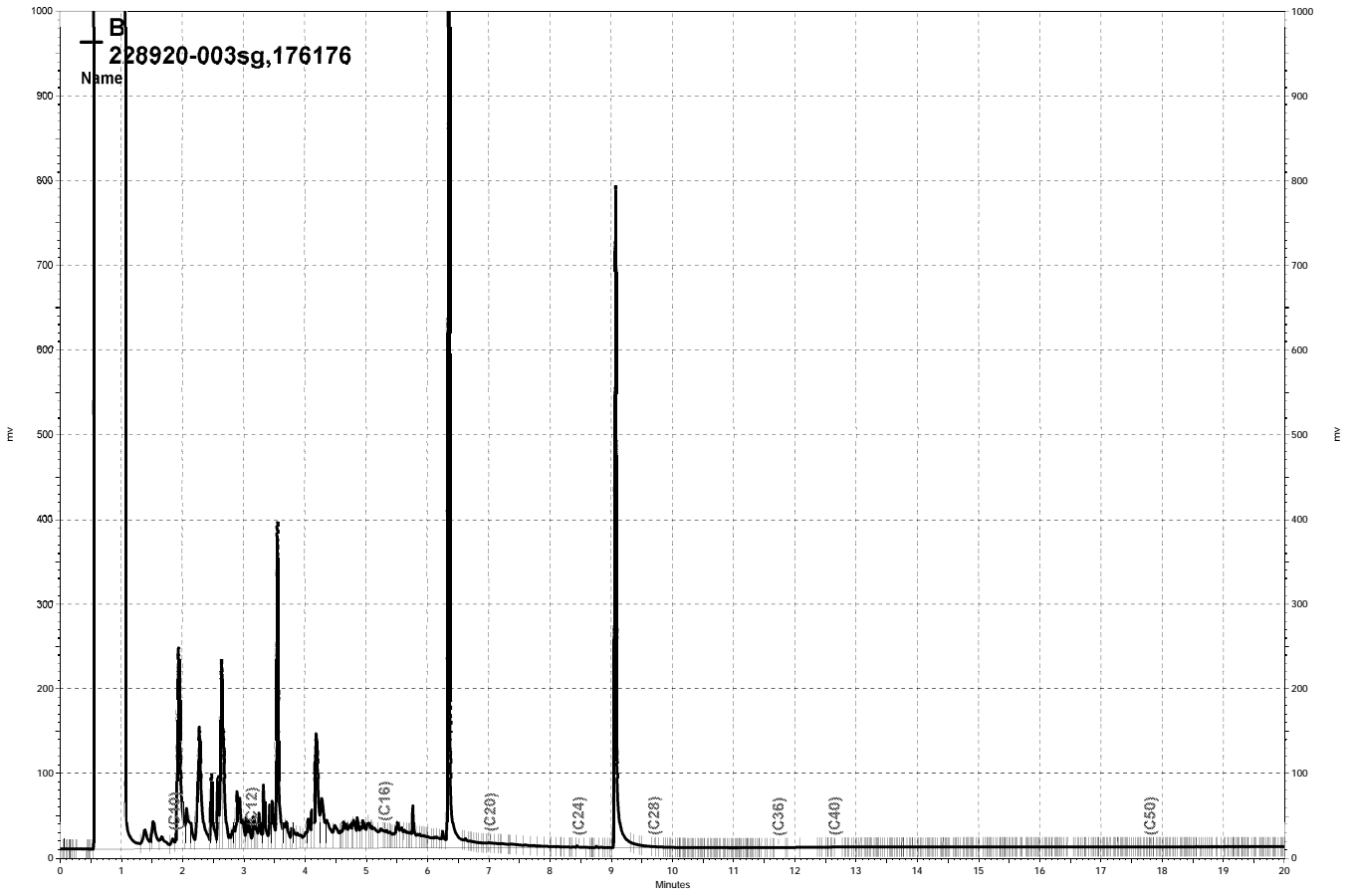
Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Diesel C10-C24	2,500	2,474	98	33-140	2	30

Surrogate	%REC	Limits
o-Terphenyl	104	68-120

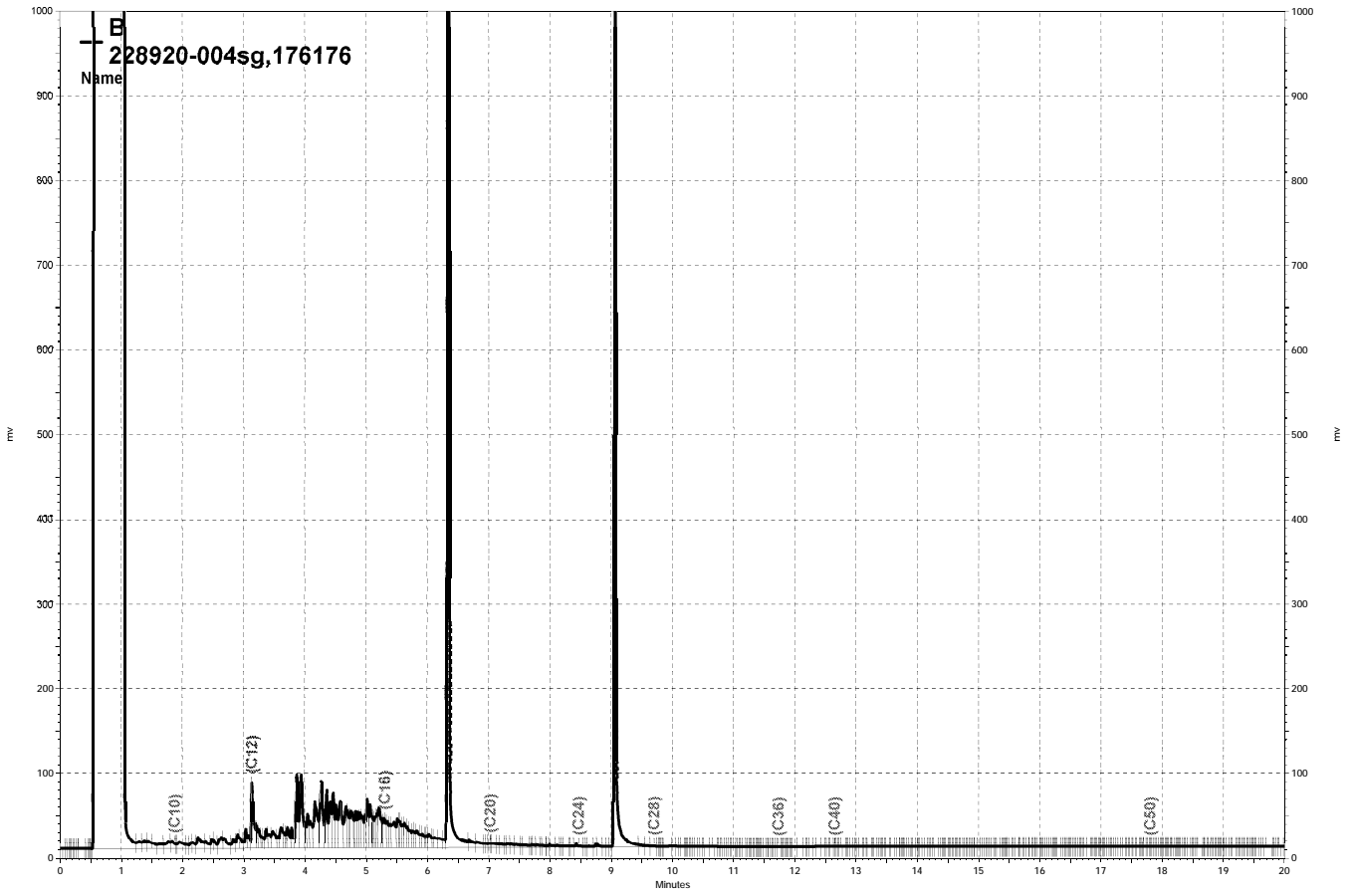
RPD= Relative Percent Difference



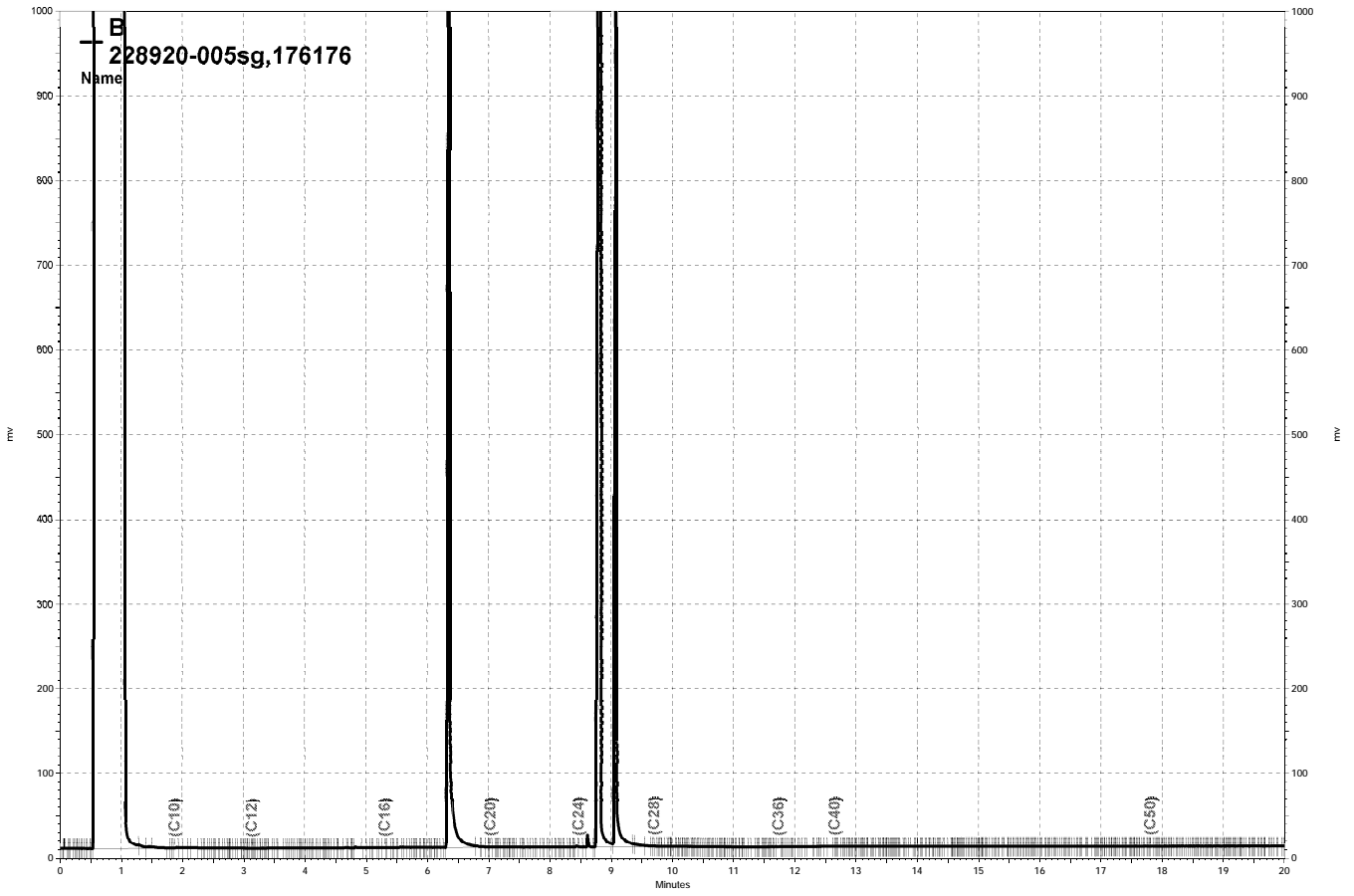
— \\Lims\gdrive\ezchrom\Projects\GC15B\Data\177b029, B



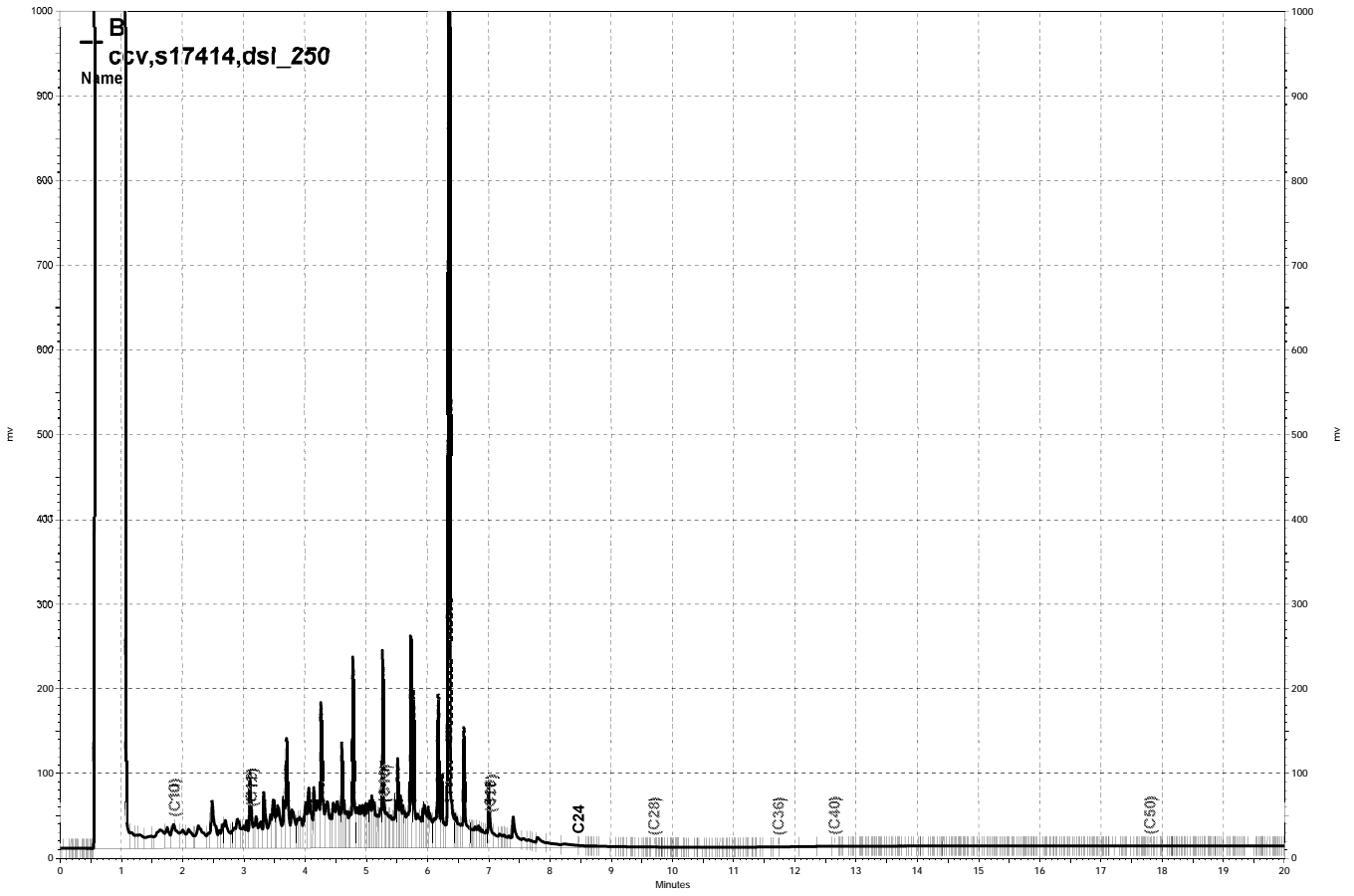
— \\Lims\gdrive\ezchrom\Projects\GC15B\Data\177b031, B



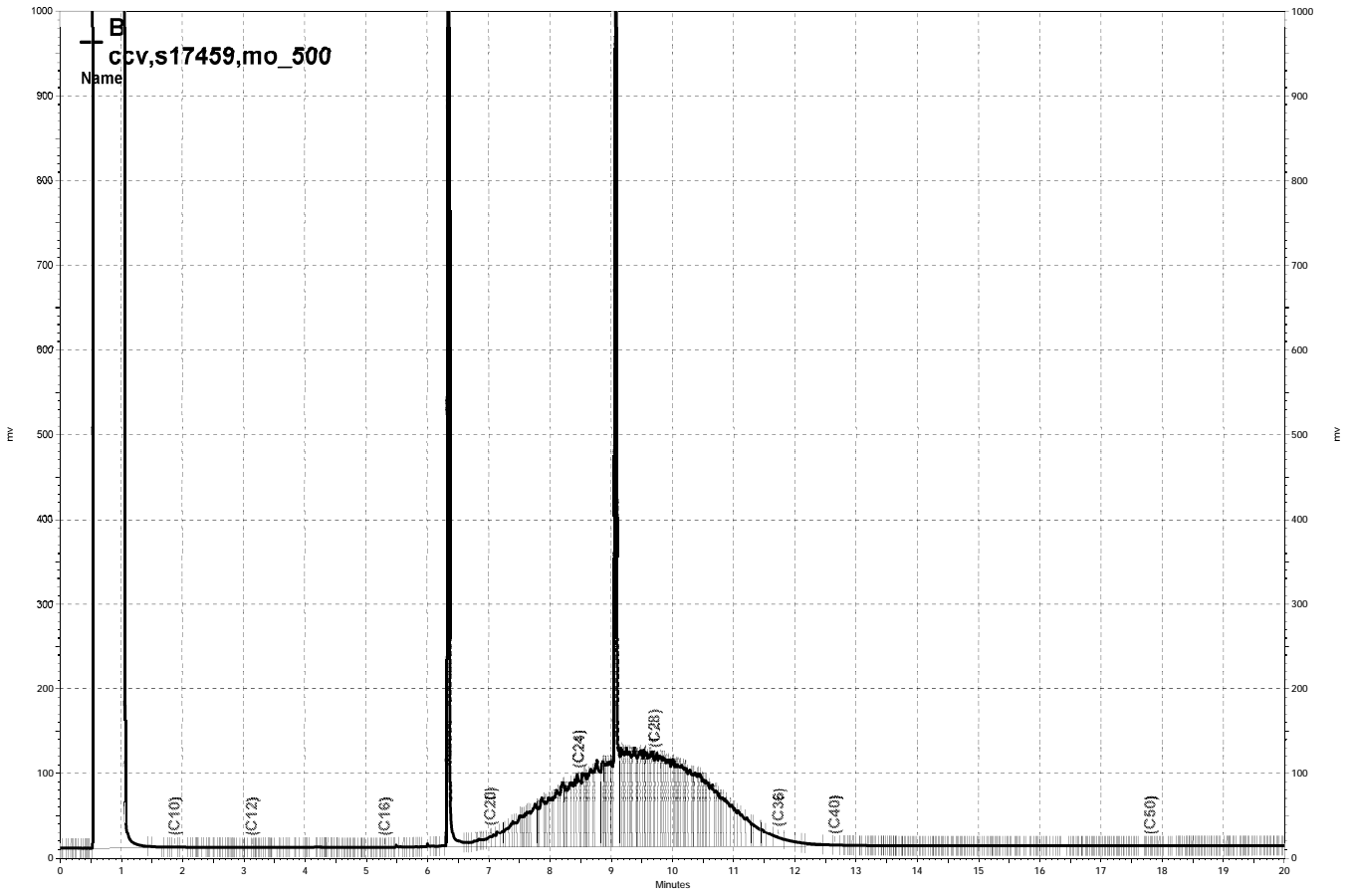
— \\Lims\gdrive\ezchrom\Projects\GC15B\Data\177b032, B



— \\Lims\gdrive\ezchrom\Projects\GC15B\Data\177b033, B



— \\Lims\gdrive\ezchrom\Projects\GC15B\Data\177b023, B



— \\Lims\gdrive\ezchrom\Projects\GC15B\Data\177b024, B

Purgeable Aromatics by GC/MS

Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-9	Batch#:	176145
Lab ID:	228920-001	Sampled:	06/22/11
Matrix:	Water	Received:	06/22/11
Units:	ug/L	Analyzed:	06/23/11
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	ND	0.5
Benzene	25	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5

Surrogate	%REC	Limits
Dibromofluoromethane	101	80-127
1,2-Dichloroethane-d4	100	73-145
Toluene-d8	96	80-120
Bromofluorobenzene	101	80-120

ND= Not Detected
 RL= Reporting Limit

Purgeable Aromatics by GC/MS

Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-5	Batch#:	176145
Lab ID:	228920-002	Sampled:	06/22/11
Matrix:	Water	Received:	06/22/11
Units:	ug/L	Analyzed:	06/23/11
Diln Fac:	1.000		

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

Surrogate	%REC	Limits
Dibromofluoromethane	102	80-127
1,2-Dichloroethane-d4	102	73-145
Toluene-d8	95	80-120
Bromofluorobenzene	97	80-120

ND= Not Detected
 RL= Reporting Limit

Purgeable Aromatics by GC/MS

Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-1	Batch#:	176191
Lab ID:	228920-003	Sampled:	06/22/11
Matrix:	Water	Received:	06/22/11
Units:	ug/L	Analyzed:	06/24/11
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	ND	0.5
Benzene	46	0.5
Toluene	1.9	0.5
Ethylbenzene	2.6	0.5
m,p-Xylenes	1.1	0.5
o-Xylene	0.9	0.5

Surrogate	%REC	Limits
Dibromofluoromethane	92	80-127
1,2-Dichloroethane-d4	90	73-145
Toluene-d8	98	80-120
Bromofluorobenzene	97	80-120

ND= Not Detected
 RL= Reporting Limit

Purgeable Aromatics by GC/MS

Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-10	Batch#:	176145
Lab ID:	228920-004	Sampled:	06/22/11
Matrix:	Water	Received:	06/22/11
Units:	ug/L	Analyzed:	06/23/11
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	ND	0.5
Benzene	54	0.5
Toluene	ND	0.5
Ethylbenzene	2.2	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5

Surrogate	%REC	Limits
Dibromofluoromethane	101	80-127
1,2-Dichloroethane-d4	100	73-145
Toluene-d8	96	80-120
Bromofluorobenzene	96	80-120

ND= Not Detected
 RL= Reporting Limit

Purgeable Aromatics by GC/MS

Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-2	Batch#:	176145
Lab ID:	228920-005	Sampled:	06/22/11
Matrix:	Water	Received:	06/22/11
Units:	ug/L	Analyzed:	06/23/11
Diln Fac:	1.000		

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

Surrogate	%REC	Limits
Dibromofluoromethane	100	80-127
1,2-Dichloroethane-d4	99	73-145
Toluene-d8	94	80-120
Bromofluorobenzene	98	80-120

ND= Not Detected
 RL= Reporting Limit

Gasoline by GC/MS			
Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Matrix:	Water	Sampled:	06/22/11
Units:	ug/L	Received:	06/22/11
Diln Fac:	1.000	Analyzed:	06/27/11
Batch#:	176244		

Field ID: QCTB Lab ID: 228920-006
Type: SAMPLE

Analyte	Result	RL
Gasoline C7-C12	ND	50
MTBE	ND	0.50
Benzene	ND	0.50
Toluene	ND	0.50
Ethylbenzene	ND	0.50
m,p-Xylenes	ND	0.50
o-Xylene	ND	0.50

Surrogate	%REC	Limits
Dibromofluoromethane	103	80-127
1,2-Dichloroethane-d4	107	73-145
Toluene-d8	107	80-120
Bromofluorobenzene	104	80-120

Field ID: QCTB-1 Lab ID: 228920-007
Type: SAMPLE

Analyte	Result	RL
Gasoline C7-C12	ND	50
MTBE	ND	0.50
Benzene	ND	0.50
Toluene	ND	0.50
Ethylbenzene	ND	0.50
m,p-Xylenes	ND	0.50
o-Xylene	ND	0.50

Surrogate	%REC	Limits
Dibromofluoromethane	105	80-127
1,2-Dichloroethane-d4	107	73-145
Toluene-d8	108	80-120
Bromofluorobenzene	104	80-120

ND= Not Detected
RL= Reporting Limit

Gasoline by GC/MS			
Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Matrix:	Water	Sampled:	06/22/11
Units:	ug/L	Received:	06/22/11
Diln Fac:	1.000	Analyzed:	06/27/11
Batch#:	176244		

Type: BLANK Lab ID: QC597964

Analyte	Result	RL
Gasoline C7-C12	ND	50
MTBE	ND	0.50
Benzene	ND	0.50
Toluene	ND	0.50
Ethylbenzene	ND	0.50
m,p-Xylenes	ND	0.50
o-Xylene	ND	0.50

Surrogate	%REC	Limits
Dibromofluoromethane	104	80-127
1,2-Dichloroethane-d4	99	73-145
Toluene-d8	100	80-120
Bromofluorobenzene	105	80-120

ND= Not Detected
 RL= Reporting Limit

Batch QC Report

Purgeable Aromatics by GC/MS			
Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Matrix:	Water	Batch#:	176145
Units:	ug/L	Analyzed:	06/23/11
Diln Fac:	1.000		

Type: BS Lab ID: QC597556

Analyte	Spiked	Result	%REC	Limits
MTBE	12.50	9.520	76	59-123
Benzene	12.50	11.89	95	80-122
Toluene	12.50	11.48	92	80-120
Ethylbenzene	12.50	11.61	93	80-120
m,p-Xylenes	25.00	24.36	97	80-120
o-Xylene	12.50	11.84	95	80-120

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

Type: BSD Lab ID: QC597557

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	12.50	10.51	84	59-123	10	20
Benzene	12.50	12.30	98	80-122	3	20
Toluene	12.50	11.74	94	80-120	2	20
Ethylbenzene	12.50	12.37	99	80-120	6	20
m,p-Xylenes	25.00	25.12	100	80-120	3	20
o-Xylene	12.50	12.31	98	80-120	4	20

Surrogate	%REC	Limits
Dibromofluoromethane	95	80-127
1,2-Dichloroethane-d4	99	73-145
Toluene-d8	99	80-120
Bromofluorobenzene	96	80-120

RPD= Relative Percent Difference

Batch QC Report

Purgeable Aromatics by GC/MS			
Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC597558	Batch#:	176145
Matrix:	Water	Analyzed:	06/23/11
Units:	ug/L		

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

Surrogate	%REC	Limits
Dibromofluoromethane	101	80-127
1,2-Dichloroethane-d4	99	73-145
Toluene-d8	99	80-120
Bromofluorobenzene	95	80-120

ND= Not Detected

RL= Reporting Limit

Batch QC Report

Purgeable Aromatics by GC/MS			
Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC597735	Batch#:	176191
Matrix:	Water	Analyzed:	06/24/11
Units:	ug/L		

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

Surrogate	%REC	Limits
Dibromofluoromethane	94	80-127
1,2-Dichloroethane-d4	89	73-145
Toluene-d8	97	80-120
Bromofluorobenzene	96	80-120

ND= Not Detected
 RL= Reporting Limit

Batch QC Report

Purgeable Aromatics by GC/MS			
Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Matrix:	Water	Batch#:	176191
Units:	ug/L	Analyzed:	06/24/11
Diln Fac:	1.000		

Type: BS Lab ID: QC597736

Analyte	Spiked	Result	%REC	Limits
MTBE	18.75	15.63	83	59-123
Benzene	18.75	17.36	93	80-122
Toluene	18.75	17.85	95	80-120
Ethylbenzene	18.75	17.57	94	80-120
m,p-Xylenes	37.50	38.52	103	80-120
o-Xylene	18.75	19.44	104	80-120

Surrogate	%REC	Limits
Dibromofluoromethane	92	80-127
1,2-Dichloroethane-d4	89	73-145
Toluene-d8	97	80-120
Bromofluorobenzene	95	80-120

Type: BSD Lab ID: QC597737

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	18.75	15.68	84	59-123	0	20
Benzene	18.75	16.72	89	80-122	4	20
Toluene	18.75	17.47	93	80-120	2	20
Ethylbenzene	18.75	17.28	92	80-120	2	20
m,p-Xylenes	37.50	37.55	100	80-120	3	20
o-Xylene	18.75	19.07	102	80-120	2	20

Surrogate	%REC	Limits
Dibromofluoromethane	91	80-127
1,2-Dichloroethane-d4	89	73-145
Toluene-d8	97	80-120
Bromofluorobenzene	96	80-120

RPD= Relative Percent Difference

Batch QC Report

Purgeable Aromatics by GC/MS			
Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	ZZZZZZZZZZ	Batch#:	176191
MSS Lab ID:	228915-007	Sampled:	06/22/11
Matrix:	Water	Received:	06/22/11
Units:	ug/L	Analyzed:	06/24/11
Diln Fac:	1.000		

Type: MS Lab ID: QC597782

Analyte	MSS Result	Spiked	Result	%REC	Limits
MTBE	<0.1000	18.75	16.03	85	73-120
Benzene	<0.1000	18.75	17.07	91	80-120
Toluene	<0.1000	18.75	17.72	95	80-120
Ethylbenzene	<0.1124	18.75	17.60	94	80-120
m,p-Xylenes	<0.1000	37.50	38.14	102	80-120
o-Xylene	<0.1000	18.75	19.45	104	80-120

Surrogate	%REC	Limits
Dibromofluoromethane	92	80-127
1,2-Dichloroethane-d4	90	73-145
Toluene-d8	97	80-120
Bromofluorobenzene	92	80-120

Type: MSD Lab ID: QC597783

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	18.75	16.22	87	73-120	1	20
Benzene	18.75	16.88	90	80-120	1	20
Toluene	18.75	17.26	92	80-120	3	20
Ethylbenzene	18.75	17.27	92	80-120	2	20
m,p-Xylenes	37.50	37.74	101	80-120	1	20
o-Xylene	18.75	18.84	100	80-120	3	20

Surrogate	%REC	Limits
Dibromofluoromethane	91	80-127
1,2-Dichloroethane-d4	89	73-145
Toluene-d8	97	80-120
Bromofluorobenzene	93	80-120

RPD= Relative Percent Difference

Batch QC Report

Gasoline by GC/MS			
Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Matrix:	Water	Batch#:	176244
Units:	ug/L	Analyzed:	06/27/11
Diln Fac:	1.000		

Type: BS Lab ID: QC597962

Analyte	Spiked	Result	%REC	Limits
MTBE	25.00	22.07	88	59-123
Benzene	25.00	25.86	103	80-122
Toluene	25.00	27.10	108	80-120
Ethylbenzene	25.00	27.10	108	80-120
m,p-Xylenes	50.00	53.64	107	80-120
o-Xylene	25.00	26.64	107	80-120

Surrogate	%REC	Limits
Dibromofluoromethane	101	80-127
1,2-Dichloroethane-d4	107	73-145
Toluene-d8	104	80-120
Bromofluorobenzene	109	80-120

Type: BSD Lab ID: QC597963

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	25.00	24.80	99	59-123	12	20
Benzene	25.00	29.94	120	80-122	15	20
Toluene	25.00	27.72	111	80-120	2	20
Ethylbenzene	25.00	27.73	111	80-120	2	20
m,p-Xylenes	50.00	52.72	105	80-120	2	20
o-Xylene	25.00	28.03	112	80-120	5	20

Surrogate	%REC	Limits
Dibromofluoromethane	100	80-127
1,2-Dichloroethane-d4	110	73-145
Toluene-d8	105	80-120
Bromofluorobenzene	99	80-120

RPD= Relative Percent Difference

Batch QC Report

Gasoline by GC/MS			
Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Matrix:	Water	Batch#:	176244
Units:	ug/L	Analyzed:	06/27/11
Diln Fac:	1.000		

Type: BS Lab ID: QC597986

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	1,000	1,080	108	80-120

Surrogate	%REC	Limits
Dibromofluoromethane	100	80-127
1,2-Dichloroethane-d4	111	73-145
Toluene-d8	99	80-120
Bromofluorobenzene	98	80-120

Type: BSD Lab ID: QC597987

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	1,000	996.4	100	80-120	8	20

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

RPD= Relative Percent Difference

Semivolatile Organics by GC/MS

Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 3520C
Project#:	4656016	Analysis:	EPA 8270C
Analyte:	bis(2-Ethylhexyl)phthalate	Batch#:	176921
Field ID:	MW-2	Sampled:	06/22/11
Lab ID:	228920-005	Received:	06/22/11
Matrix:	Water	Prepared:	06/23/11
Units:	ug/L	Analyzed:	07/19/11
Diln Fac:	5.000		

Result	RL
680	250

RL= Reporting Limit

Dissolved Metals Analytical Report

Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 6010B
Matrix:	Filtrate	Sampled:	06/22/11
Units:	ug/L	Received:	06/22/11
Batch#:	176182	Prepared:	06/23/11

Field ID: MW-10 Lab ID: 228920-004
 Type: SAMPLE

Analyte	Result	RL	Diln Fac	Analyzed
Calcium	130,000	2,000	10.00	07/06/11
Iron	7,800	100	1.000	07/05/11
Magnesium	67,000	500	1.000	07/05/11
Manganese	4,200	5.0	1.000	07/05/11
Potassium	30,000	500	1.000	07/05/11
Sodium	420,000	5,000	10.00	07/06/11

Field ID: MW-2 Lab ID: 228920-005
 Type: SAMPLE

Analyte	Result	RL	Diln Fac	Analyzed
Calcium	26,000	500	1.000	07/05/11
Iron	ND	100	1.000	07/05/11
Magnesium	27,000	500	1.000	07/05/11
Manganese	77	5.0	1.000	07/05/11
Potassium	1,100	500	1.000	07/05/11
Sodium	150,000	5,000	10.00	07/06/11

Type: BLANK Diln Fac: 1.000
 Lab ID: QC597699

Analyte	Result	RL	Analyzed
Calcium	ND	500	06/28/11
Iron	ND	100	06/28/11
Magnesium	ND	500	06/28/11
Manganese	ND	5.0	06/28/11
Potassium	ND	500	06/28/11
Sodium	ND	500	07/06/11

ND= Not Detected
 RL= Reporting Limit

Batch QC Report
Dissolved Metals Analytical Report

Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 6010B
Matrix:	Filtrate	Batch#:	176182
Units:	ug/L	Prepared:	06/23/11
Diln Fac:	1.000		

Type: BS Lab ID: QC597700

Analyte	Spiked	Result	%REC	Limits	Analyzed
Calcium	20,000	17,720	89	78-120	06/28/11
Iron	1,000	887.1	89	73-124	06/28/11
Magnesium	20,000	17,910	90	76-120	06/28/11
Manganese	50.00	45.57	91	80-120	06/28/11
Potassium	10,000	8,612	86	69-120	06/28/11
Sodium	20,000	17,270	86	75-120	07/06/11

Type: BSD Lab ID: QC597701

Analyte	Spiked	Result	%REC	Limits	RPD	Lim	Analyzed
Calcium	20,000	17,890	89	78-120	1	20	06/28/11
Iron	1,000	892.3	89	73-124	1	25	06/28/11
Magnesium	20,000	18,300	91	76-120	2	20	06/28/11
Manganese	50.00	47.11	94	80-120	3	21	06/28/11
Potassium	10,000	8,822	88	69-120	2	20	06/28/11
Sodium	20,000	17,960	90	75-120	4	20	07/06/11

RPD= Relative Percent Difference

Batch QC Report
Dissolved Metals Analytical Report

Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 6010B
Field ID:	ZZZZZZZZZZ	Batch#:	176182
MSS Lab ID:	228925-007	Sampled:	06/20/11
Matrix:	Filtrate	Received:	06/23/11
Units:	ug/L	Prepared:	06/23/11

Type: MS Lab ID: QC597702

Analyte	MSS Result	Spiked	Result	%REC	Limits	Diln	Fac	Analyzed
Calcium	182,400	20,000	185,500	15 NM	53-134	10.00		07/06/11
Iron	17,090	1,000	15,670	-142 NM	61-129	1.000		06/29/11
Magnesium	81,960	20,000	86,970	25 NM	62-127	1.000		06/29/11
Manganese	654.6	50.00	682.8	56 NM	64-128	1.000		06/29/11
Potassium	13,810	10,000	20,430	66	62-129	1.000		06/29/11
Sodium	206,400	20,000	207,600	6 NM	55-132	10.00		07/06/11

Type: MSD Lab ID: QC597703

Analyte	Spiked	Result	%REC	Limits	RPD	Lim	Diln	Fac	Analyzed
Calcium	20,000	186,400	20 NM	53-134	1	20	10.00		07/06/11
Iron	1,000	17,620	53 NM	61-129	12	32	1.000		06/29/11
Magnesium	20,000	98,540	83 NM	62-127	12	23	1.000		06/29/11
Manganese	50.00	690.3	71 NM	64-128	1	26	1.000		06/29/11
Potassium	10,000	23,150	93	62-129	12	24	1.000		06/29/11
Sodium	20,000	208,800	12 NM	55-132	1	29	10.00		07/06/11

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

Curtis & Tompkins Laboratories Analytical Report

Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 300.0
Matrix:	Water	Batch#:	176133
Units:	mg/L	Received:	06/22/11

Field ID:	MW-9	Lab ID:	228920-001
Type:	SAMPLE	Sampled:	06/22/11 09:50

Analyte	Result	RL	Diln Fac	Analyzed
Chloride	290	5.0	25.00	06/23/11 05:23
Nitrogen, Nitrite	ND	0.05	1.000	06/23/11 01:54
Nitrogen, Nitrate	ND	0.05	1.000	06/23/11 01:54
Sulfate	0.54	0.50	1.000	06/23/11 01:54

Field ID:	MW-5	Lab ID:	228920-002
Type:	SAMPLE	Sampled:	06/22/11 10:00

Analyte	Result	RL	Diln Fac	Analyzed
Chloride	300	4.0	20.00	06/23/11 05:40
Nitrogen, Nitrite	ND	0.05	1.000	06/23/11 02:28
Nitrogen, Nitrate	ND	0.05	1.000	06/23/11 02:28
Sulfate	69	10	20.00	06/23/11 05:40

Field ID:	MW-1	Diln Fac:	1.000
Type:	SAMPLE	Sampled:	06/22/11 12:10
Lab ID:	228920-003	Analyzed:	06/23/11 03:03

Analyte	Result	RL
Chloride	11	0.20
Nitrogen, Nitrite	ND	0.05
Nitrogen, Nitrate	ND	0.05
Sulfate	ND	0.50

ND= Not Detected
 RL= Reporting Limit

Curtis & Tompkins Laboratories Analytical Report

Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 300.0
Matrix:	Water	Batch#:	176133
Units:	mg/L	Received:	06/22/11

Field ID: MW-10 Lab ID: 228920-004
 Type: SAMPLE Sampled: 06/22/11 14:50

Analyte	Result	RL	Diln Fac	Analyzed
Chloride	530	10	50.00	06/23/11 06:50
Nitrogen, Nitrite	ND	0.10	2.000	06/23/11 04:48
Nitrogen, Nitrate	ND	0.05	1.000	06/23/11 03:38
Sulfate	4.1	0.50	1.000	06/23/11 03:38

Field ID: MW-2 Diln Fac: 1.000
 Type: SAMPLE Sampled: 06/22/11 16:20
 Lab ID: 228920-005 Analyzed: 06/23/11 04:13

Analyte	Result	RL
Chloride	19	0.20
Nitrogen, Nitrite	ND	0.05
Nitrogen, Nitrate	0.25	0.05
Sulfate	31	0.50

Type: BLANK Diln Fac: 1.000
 Lab ID: QC597493 Analyzed: 06/23/11 01:19

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

ND= Not Detected
 RL= Reporting Limit

Batch QC Report

Curtis & Tompkins Laboratories Analytical Report

Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 300.0
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC597494	Batch#:	176133
Matrix:	Water	Analyzed:	06/23/11 01:36
Units:	mg/L		

Analyte	Spiked	Result	%REC	Limits
Chloride	4.000	4.069	102	80-120
Nitrogen, Nitrite	1.000	1.020	102	80-120
Nitrogen, Nitrate	1.000	1.040	104	80-120
Sulfate	10.00	10.45	105	80-120

Batch QC Report
Curtis & Tompkins Laboratories Analytical Report

Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 300.0
Field ID:	ZZZZZZZZZZ	Diln Fac:	5.000
MSS Lab ID:	228898-004	Batch#:	176133
Matrix:	Water	Sampled:	06/21/11 10:55
Units:	mg/L	Received:	06/21/11

Type: MS Analyzed: 06/23/11 13:58
 Lab ID: QC597495

Analyte	MSS Result	Spiked	Result	%REC	Limits
Chloride	34.60	10.00	43.18	86	80-120
Nitrogen, Nitrite	<0.06434	2.500	2.951	118	80-121
Nitrogen, Nitrate	<0.05636	2.500	2.561	102	80-120
Sulfate	39.85	25.00	66.21	105	80-120

Type: MSD Analyzed: 06/23/11 14:15
 Lab ID: QC597496

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Chloride	10.00	43.30	87	80-120	0	20
Nitrogen, Nitrite	2.500	3.113	125 *	80-121	5	20
Nitrogen, Nitrate	2.500	2.570	103	80-120	0	20
Sulfate	25.00	65.81	104	80-120	1	20

*= Value outside of QC limits; see narrative

RPD= Relative Percent Difference

Alkalinity			
Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM2320B
Matrix:	Water	Sampled:	06/22/11
Units:	mg/L	Received:	06/22/11
Diln Fac:	1.000	Analyzed:	06/27/11
Batch#:	176243		

Field ID: MW-9 Lab ID: 228920-001
 Type: SAMPLE

Analyte	Result	RL
Alkalinity, Bicarbonate	750	6.7
Alkalinity, Carbonate	ND	6.7
Alkalinity, Hydroxide	ND	6.7
Alkalinity, Total as CaCO ₃	750	6.7

Field ID: MW-5 Lab ID: 228920-002
 Type: SAMPLE

Analyte	Result	RL
Alkalinity, Bicarbonate	360	6.7
Alkalinity, Carbonate	ND	6.7
Alkalinity, Hydroxide	ND	6.7
Alkalinity, Total as CaCO ₃	360	6.7

Field ID: MW-1 Lab ID: 228920-003
 Type: SAMPLE

Analyte	Result	RL
Alkalinity, Bicarbonate	250	6.7
Alkalinity, Carbonate	ND	6.7
Alkalinity, Hydroxide	ND	6.7
Alkalinity, Total as CaCO ₃	250	6.7

ND= Not Detected
 RL= Reporting Limit

Alkalinity			
Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM2320B
Matrix:	Water	Sampled:	06/22/11
Units:	mg/L	Received:	06/22/11
Diln Fac:	1.000	Analyzed:	06/27/11
Batch#:	176243		

Field ID: MW-10 Lab ID: 228920-004
 Type: SAMPLE

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

Field ID: MW-2 Lab ID: 228920-005
 Type: SAMPLE

Analyte	Result	RL
Alkalinity, Bicarbonate	500	6.7
Alkalinity, Carbonate	ND	6.7
Alkalinity, Hydroxide	ND	6.7
Alkalinity, Total as CaCO3	500	6.7

Type: BLANK Lab ID: QC597956

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

ND= Not Detected
 RL= Reporting Limit

Batch QC Report

Alkalinity			
Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM2320B
Analyte:	Alkalinity, Total as CaCO ₃	Units:	mg/L
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC597957	Batch#:	176243
Matrix:	Water	Analyzed:	06/27/11

Spiked	Result	%REC	Limits
200.0	188.4	94	90-110

Batch QC Report

Alkalinity			
Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM2320B
Analyte:	Alkalinity, Total as CaCO3	Diln Fac:	1.000
Field ID:	ZZZZZZZZZZ	Batch#:	176243
MSS Lab ID:	228898-004	Sampled:	06/21/11
Matrix:	Water	Received:	06/21/11
Units:	mg/L	Analyzed:	06/27/11

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
MS	QC597958	606.7	333.0	899.3	88	80-120		
MSD	QC597959		333.0	904.0	89	80-120	1	25

RPD= Relative Percent Difference

Dissolved Sulfide			
Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM4500S2-D
Analyte:	Dissolved Sulfide	Batch#:	176144
Matrix:	Water	Sampled:	06/22/11
Units:	mg/L	Received:	06/22/11
Diln Fac:	1.000	Analyzed:	06/23/11

Field ID	Type	Lab ID	Result	RL
MW-9	SAMPLE	228920-001	0.09	0.04
MW-5	SAMPLE	228920-002	ND	0.04
MW-1	SAMPLE	228920-003	0.24	0.04
MW-10	SAMPLE	228920-004	0.09	0.04
MW-2	SAMPLE	228920-005	ND	0.04
	BLANK	QC597552	ND	0.04

ND= Not Detected
 RL= Reporting Limit

Batch QC Report

Dissolved Sulfide			
Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM4500S2-D
Analyte:	Dissolved Sulfide	Diln Fac:	1.000
Field ID:	MW-2	Batch#:	176144
MSS Lab ID:	228920-005	Sampled:	06/22/11
Matrix:	Water	Received:	06/22/11
Units:	mg/L	Analyzed:	06/23/11

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
MS	QC597553	<0.04000	0.6670	0.6316	95	64-123		
MSD	QC597554		0.6670	0.6169	93	64-123	2	20
LCS	QC597555		0.6670	0.6827	102	80-120		

RPD= Relative Percent Difference

Orthophosphate Phosphorous			
Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM4500P-E
Analyte:	Orthophosphate (as P)	Batch#:	176132
Matrix:	Water	Received:	06/22/11
Units:	mg/L		

Field ID	Type	Lab ID	Result	RL	Diln Fac	Sampled	Analyzed
MW-9	SAMPLE	228920-001	1.3	0.060	2.000	06/22/11 09:50	06/22/11 18:40
MW-5	SAMPLE	228920-002	0.35	0.030	1.000	06/22/11 10:00	06/22/11 18:30
MW-1	SAMPLE	228920-003	0.13	0.030	1.000	06/22/11 12:10	06/22/11 18:30
MW-10	SAMPLE	228920-004	0.46	0.030	1.000	06/22/11 14:50	06/22/11 18:30
MW-2	SAMPLE	228920-005	0.13	0.030	1.000	06/22/11 16:20	06/22/11 18:30
	BLANK	QC597491	ND	0.030	1.000		06/22/11 18:30

ND= Not Detected
 RL= Reporting Limit

Batch QC Report

Orthophosphate Phosphorous			
Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM4500P-E
Analyte:	Orthophosphate (as P)	Diln Fac:	1.000
Field ID:	MW-2	Batch#:	176132
MSS Lab ID:	228920-005	Sampled:	06/22/11 16:20
Matrix:	Water	Received:	06/22/11
Units:	mg/L	Analyzed:	06/22/11 18:30

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
LCS	QC597492		0.4000	0.3929	98	80-120		
MS	QC597579	0.1329	0.4000	0.5313	100	76-120		
MSD	QC597580		0.4000	0.5361	101	76-120	1	20

RPD= Relative Percent Difference

Total Dissolved Solids (TDS)			
Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM2540C
Analyte:	Total Dissolved Solids	Sampled:	06/22/11
Matrix:	Water	Received:	06/22/11
Units:	mg/L	Prepared:	06/24/11
Batch#:	176195	Analyzed:	06/27/11

Field ID	Type	Lab ID	Result	RL	Diln Fac
MW-9	SAMPLE	228920-001	1,240	11	1.111
MW-5	SAMPLE	228920-002	960	10	1.000
MW-1	SAMPLE	228920-003	270	10	1.000
MW-10	SAMPLE	228920-004	2,030	14	1.429
MW-2	SAMPLE	228920-005	610	10	1.000
	BLANK	QC597744	ND	10	1.000

ND= Not Detected
 RL= Reporting Limit

Batch QC Report

Total Dissolved Solids (TDS)			
Lab #:	228920	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM2540C
Analyte:	Total Dissolved Solids	Batch#:	176195
Field ID:	ZZZZZZZZZZ	Sampled:	06/23/11
MSS Lab ID:	228946-002	Received:	06/23/11
Matrix:	Water	Prepared:	06/24/11
Units:	mg/L	Analyzed:	06/27/11

Type	Lab ID	MSS Result	Spiked	Result	RL	%REC	Limits	RPD	Lim	Diln	Fac
BS	QC597745		104.0	114.0		110	75-120				1.000
BSD	QC597746		104.0	116.0		112	75-120	2	5		1.000
SDUP	QC597747	1,630		1,635	12.50			0	5		1.250

RL= Reporting Limit

RPD= Relative Percent Difference

Laboratory Job Number 228920

Subcontracted Products

Microseeps, Inc.



Client Name: Curtis & Tompkins, Ltd.
Contact: Desiree Tetrault
Address: 2323 Fifth St
Berkeley, CA 94710

Page: Page 1 of 8
Lab Proj #: P1106224
Report Date: 07/06/11
Client Proj Name: Port of Oakland-HFC
Client Proj #: 228920

Laboratory Results

Total pages in data package: 9

<u>Lab Sample #</u>	<u>Client Sample ID</u>
P1106224-01	MW-9
P1106224-02	MW-5
P1106224-03	MW-1
P1106224-04	MW-10
P1106224-05	MW-2

Microseeps test results meet all the requirements of the NELAC standards or provide reasons and/or justification if they do not.

Approved By: Heather Hauser (HH) **Date:** 7-7-11

Project Manager: Heather Hauser

The analytical results reported here are reliable and usable to the precision expressed in this report. As required by some regulating authorities, a full discussion of the uncertainty in our analytical results can be obtained at our web site or through customer service. Unless otherwise specified, all results are reported on a wet weight basis.

*As a valued client we would appreciate your comments on our service.
Please call customer service at (412)826-5245 or email customerservice@microseeps.com.*

Case Narrative: The percent recovery on the MS/MSD analysis for methane was outside of control limits due to the high sample concentration.

Client Name: Curtis & Tompkins, Ltd.
 Contact: Desiree Tetrault
 Address: 2323 Fifth St
 Berkeley, CA 94710

Page: Page 2 of 8
 Lab Proj #: P1106224
 Report Date: 07/06/11
 Client Proj Name: Port of Oakland-HFC
 Client Proj #: 228920

<u>Sample Description</u>	<u>Matrix</u>	<u>Lab Sample #</u>	<u>Sampled Date/Time</u>		<u>Received</u>		
MW-9	Water	P1106224-01	22 Jun. 11	9:50	24 Jun. 11	13:26	
<u>Analyte(s)</u>	<u>Flag</u>	<u>Result</u>	<u>PQL</u>	<u>Units</u>	<u>Method #</u>	<u>Analysis Date</u>	<u>By</u>
RiskAnalysis							
N Carbon dioxide		71.00	5.00	mg/L	AM20GAX	7/4/11	mm
N Methane	M	10000.000	0.100	ug/L	AM20GAX	7/4/11	mm



Data Qualifiers: J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis

Client Name: Curtis & Tompkins, Ltd.
 Contact: Desiree Tetrault
 Address: 2323 Fifth St
 Berkeley, CA 94710

Page: Page 3 of 8
 Lab Proj #: P1106224
 Report Date: 07/06/11
 Client Proj Name: Port of Oakland-HFC
 Client Proj #: 228920

<u>Sample Description</u>	<u>Matrix</u>	<u>Lab Sample #</u>	<u>Sampled Date/Time</u>	<u>Received</u>			
MW-5	Water	P1106224-02	22 Jun. 11 10:00	24 Jun. 11 13:26			
<u>Analyte(s)</u>	<u>Flag</u>	<u>Result</u>	<u>PQL</u>	<u>Units</u>	<u>Method #</u>	<u>Analysis Date</u>	<u>By</u>
RiskAnalysis							
N Carbon dioxide		27.00	5.00	mg/L	AM20GAX	7/4/11	mm
N Methane	M	74.000	0.100	ug/L	AM20GAX	7/4/11	mm



Data Qualifiers: J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis

Client Name: Curtis & Tompkins, Ltd.
 Contact: Desiree Tetrault
 Address: 2323 Fifth St
 Berkeley, CA 94710

Page: Page 4 of 8
 Lab Proj #: P1106224
 Report Date: 07/06/11
 Client Proj Name: Port of Oakland-HFC
 Client Proj #: 228920

<u>Sample Description</u>	<u>Matrix</u>	<u>Lab Sample #</u>	<u>Sampled Date/Time</u>	<u>Received</u>			
MW-1	Water	P1106224-03	22 Jun. 11 12:10	24 Jun. 11 13:26			
<u>Analyte(s)</u>	<u>Flag</u>	<u>Result</u>	<u>PQL</u>	<u>Units</u>	<u>Method #</u>	<u>Analysis Date</u>	<u>By</u>
RiskAnalysis							
N Carbon dioxide		17.00	5.00	mg/L	AM20GAX	7/4/11	mm
N Methane	M	6300.000	0.100	ug/L	AM20GAX	7/4/11	mm



Data Qualifiers: J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis

Client Name: Curtis & Tompkins, Ltd.
 Contact: Desiree Tetrault
 Address: 2323 Fifth St
 Berkeley, CA 94710

Page: Page 5 of 8
 Lab Proj #: P1106224
 Report Date: 07/06/11
 Client Proj Name: Port of Oakland-HFC
 Client Proj #: 228920

<u>Sample Description</u>	<u>Matrix</u>	<u>Lab Sample #</u>	<u>Sampled Date/Time</u>	<u>Received</u>			
MW-10	Water	P1106224-04	22 Jun. 11 14:50	24 Jun. 11 13:26			
<u>Analyte(s)</u>	<u>Flag</u>	<u>Result</u>	<u>PQL</u>	<u>Units</u>	<u>Method #</u>	<u>Analysis Date</u>	<u>By</u>
RiskAnalysis							
N Carbon dioxide		160.00	5.00	mg/L	AM20GAX	7/4/11	mm
N Methane	M	7300.000	0.100	ug/L	AM20GAX	7/4/11	mm



Data Qualifiers: J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis

Client Name: Curtis & Tompkins, Ltd.
 Contact: Desiree Tetrault
 Address: 2323 Fifth St
 Berkeley, CA 94710

Page: Page 6 of 8
 Lab Proj #: P1106224
 Report Date: 07/06/11
 Client Proj Name: Port of Oakland-HFC
 Client Proj #: 228920

<u>Sample Description</u>	<u>Matrix</u>	<u>Lab Sample #</u>	<u>Sampled Date/Time</u>	<u>Received</u>			
MW-2	Water	P1106224-05	22 Jun. 11 16:20	24 Jun. 11 13:26			
<u>Analyte(s)</u>	<u>Flag</u>	<u>Result</u>	<u>PQL</u>	<u>Units</u>	<u>Method #</u>	<u>Analysis Date</u>	<u>By</u>
RiskAnalysis							
N Carbon dioxide		23.00	5.00	mg/L	AM20GAX	7/4/11	mm
N Methane	M	0.690	0.100	ug/L	AM20GAX	7/4/11	mm



Data Qualifiers: J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis

Client Name: Curtis & Tompkins, Ltd.
 Contact: Desiree Tetrault
 Address: 2323 Fifth St
 Berkeley, CA 94710

Page: Page 7 of 8
 Lab Proj #: P1106224
 Report Date: 07/06/11
 Client Proj Name: Port of Oakland-HFC
 Client Proj #: 228920

Prep Method: In House Dissolved Gas Sample Preparation
Analysis Method: Light Hydrocarbons (C1-C4) in Water

M110704002-MB

	<u>Result</u>	<u>TrueSpikeConc.</u>	<u>RDL</u>	<u>%Recovery</u>	<u>Ctl Limits</u>
Methane	< 0.100 ug/L		0.100		- NA

M110704002-LCS

	<u>Result</u>	<u>TrueSpikeConc.</u>	<u>%Recovery</u>	<u>Ctl Limits</u>
Methane	760.000 ug/L	825.00	92.00	80 - 120

M110704002-LCSD

	<u>Result</u>	<u>TrueSpikeConc.</u>	<u>%Recovery</u>	<u>Ctl Limits</u>	<u>RPD</u>	<u>RPD Ctl Limits</u>
Methane	760.000 ug/L	825.00	92.00	80 - 120	0.00	0 - 20

P1106227-07A-MS

	<u>Result</u>	<u>TrueSpikeConc.</u>	<u>%Recovery</u>	<u>Ctl Limits</u>
Methane	12000.000 ug/L	825.00	242.00	70 - 130

P1106227-07A-MSD

	<u>Result</u>	<u>TrueSpikeConc.</u>	<u>%Recovery</u>	<u>Ctl Limits</u>	<u>RPD</u>	<u>RPD Ctl Limits</u>
Methane	13000.000 ug/L	825.00	364.00	70 - 130	8.00	0 - 20

 Outlined Results indicate results outside of Control limits

Data Qualifiers: J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis



Client Name: Curtis & Tompkins, Ltd.
 Contact: Desiree Tetrault
 Address: 2323 Fifth St
 Berkeley, CA 94710

Page: Page 8 of 8
 Lab Proj #: P1106224
 Report Date: 07/06/11
 Client Proj Name: Port of Oakland-HFC
 Client Proj #: 228920

Prep Method: In House Dissolved Gas Sample Preparation
Analysis Method: Analysis of Dissolved Permanent Gases in Water

M110704003-MB

	<u>Result</u>	<u>TrueSpikeConc.</u>	<u>RDL</u>	<u>%Recovery</u>	<u>Ctl Limits</u>
Carbon dioxide	< 5.00 mg/L		5.00		- NA

M110704003-LCS

	<u>Result</u>	<u>TrueSpikeConc.</u>	<u>%Recovery</u>	<u>Ctl Limits</u>
Carbon dioxide	120.00 mg/L	129.30	93.00	80 - 120

M110704003-LCSD

	<u>Result</u>	<u>TrueSpikeConc.</u>	<u>%Recovery</u>	<u>Ctl Limits</u>	<u>RPD</u>	<u>RPD Ctl Limits</u>
Carbon dioxide	120.00 mg/L	129.30	93.00	80 - 120	0.00	0 - 20

Outlined Results indicate results outside of Control limits

Data Qualifiers: J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis



Curtis & Tompkins, Ltd.
 Analytical Laboratories, Since 1878
 2323 Fifth Street
 Berkeley, CA 94710
 (510) 486-0900
 (510) 486-0532

P1106224

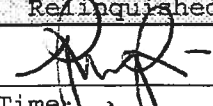
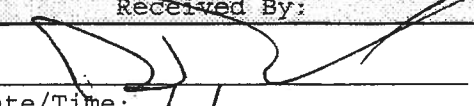
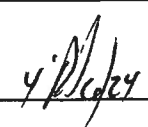
Project Number: 228920
 Site: Port Of Oakland - HFC

Subcontract Laboratory:
 Microseeps, Inc.
 220 William Pitt Way
 Pittsburgh, PA 15238
 (412) 826-5245
 ATTN: Heather Hauser

Results due: Report Level: II

Please send report to: Desiree N. Tetrault (desiree.tetrault@ctberk.com)
 *** Please report using Sample ID rather than C&T Lab #.

Sample ID	Sampled	Matrix	Analysis	C&T Lab #	Comments
MW-9	06/22 09:50	Water	AM20GAX	228920-001	Methane and CO2 only
MW-5	06/22 10:00	Water	AM20GAX	228920-002	Methane and CO2 only
MW-1	06/22 12:10	Water	AM20GAX	228920-003	Methane and CO2 only
MW-10	06/22 14:50	Water	AM20GAX	228920-004	Methane and CO2 only
MW-2	06/22 16:20	Water	AM20GAX	228920-005	Methane and CO2 only

Notes:	Requisitioned By: 	Received By: 
	Date/Time: 6/23/11 13:15	Date/Time: 6/24/11 10:00
		

Signature on this form constitutes a firm Purchase Order for the services requested above.

Data Validation Worksheet

Lab Report # 228940
 Project Port Harbor Facilities Complex

DV by: SC
 Date: 07/11/11

Lab IDs	Sample IDs	Date Collected	Parameters								
			TPHg (8015B)	TPHd/mo (8015B)	MTBE BTEX (8260B)	Anions (300.0)	Metals (6010B)	Diss SO ₄ ⁻² (SM4500P -E)	Alk (2320B)	Orth-P (SM4500 P)	Gases (AM20 GAX)
-001	MW-12	6/23/11	X	X	X	X	X	X	X	X	X
-002	MW-8A	6/23/11	X	X	X	X	X	X	X	X	X
-003	QCTB	6/23/11			X + TPHg						

Lab ID: C+T, gases subbed to MicroSeeps
 Cooler Temperature: cold
 Chain-of-Custody: OK
 Samples preservatives: OK

NO QUALS

Parameter: **TPHg**

HTs: 14 days – analyzed 6/24/11 (1)
 Batch IDs: 176210
 Surrogates: OK
 Method Blank: OK, surrogates OK
 LCS: OK, surrogates OK
 MS/MSD: MS OK, surrogates OK
 MSD OK, surrogates OK

Parameter: **TPHd/mo**

HTs: 7 days – extracted 6/24/11 (1) analyzed 6/27/10 (4)
 Batch IDs: 176176
 Surrogates: OK
 Method Blank: OK, surrogates OK
 LCS: OK, surrogates OK
 BS/BSD: BS OK, surrogates OK
 BSD OK, surrogates OK

Parameter: **BTEX + MTBE**

HTs: 14 days – analyzed 6/24/11 (1)
 Batch IDs: 176186
 Surrogates: OK
 Method Blank: OK, surrogates OK
 BS/BSD: BS OK, surrogates OK
 BSD OK, surrogates OK

Parameter: **Anions**

HTs: 28 days – analyzed 6/23/11 (0)
Batch IDs: 176164
Method Blank: OK
LCS: OK
MS/MSD: MS out of range, sample concentration >4x spike concentration → NO QUAL
MSD out of range, sample concentration >4x spike concentration → NO QUAL

Parameter: **Metals**

HTs: 6 months – analyzed 6/23/11 (0)
Batch IDs: 176183
Method Blank: OK
BS/BSD: BS OK
BSD OK
MS/MSD: MS out of range, sample concentration >4x spike concentration → NO QUAL
MSD out of range, sample concentration >4x spike concentration → NO QUAL

Parameter: **Alkalinity**

HTs: 14 days – analyzed 6/29/11 (6)
Batch IDs: 176325
Method Blank: OK
LCS: OK
MS/MSD: MS OK
MSD OK

Parameter: **Dissolved Sulfide**

HTs: 7 days – analyzed 6/28/11 (5)
Batch IDs: 176286
Method Blank: OK
LCS: OK
MS/MSD: MS OK
MSD OK

Parameter: **Orthophosphate**

HTs: 48 hrs – analyzed 6/23/11 (1)
Batch IDs: 176162
Method Blank: OK
LCS: OK
MS/MSD: MS OK
MSD OK

Parameter: **TDS**

HTs: 7 days – extracted 6/24/11 (1)
Batch IDs: 176195
Method Blank: OK
BS/BSD: BS OK
BSD OK
SDUP: OK

Parameter: **Gases**

HTs: 14 days – analyzed 6/27/11 (4)

Method Blank: OK

LCS/LCSD: LCS OK

LCSD OK



Curtis & Tompkins, Ltd.
Analytical Laboratories, Since 1878



Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878

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

**Laboratory Job Number 228940
ANALYTICAL REPORT**

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

Project : 4656016
Location : Port Of Oakland - HFC
Level : II

<u>Sample ID</u>	<u>Lab ID</u>
MW-12	228940-001
MW-8A	228940-002
QCTB	228940-003

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: *Deviné N. Tetrault*
Project Manager

Date: 07/14/2011

NELAP # 01107CA

CASE NARRATIVE

Laboratory number: 228940
Client: Malcolm Pirnie, Inc.
Project: 4656016
Location: Port Of Oakland - HFC
Request Date: 06/23/11
Samples Received: 06/23/11

This data package contains sample and QC results for three water samples, requested for the above referenced project on 06/23/11. The samples were received cold and intact.

TPH-Purgeables and/or BTXE by GC (EPA 8015B):

No analytical problems were encountered.

TPH-Extractables by GC (EPA 8015B):

No analytical problems were encountered.

Volatile Organics by GC/MS (EPA 8260B):

No analytical problems were encountered.

Metals (EPA 6010B):

No analytical problems were encountered.

Ion Chromatography (EPA 300.0):

No analytical problems were encountered.

Alkalinity (SM2320B):

No analytical problems were encountered.

Dissolved Sulfide (SM4500S2-D):

No analytical problems were encountered.

Total Dissolved Solids (TDS) (SM2540C):

No analytical problems were encountered.

Orthophosphate Phosphorous (SM4500P-E):

No analytical problems were encountered.

AM20GAX (AM20GAX):

Microseeps, Inc. in Pittsburgh, PA performed the analysis (NELAP certified). Please see the Microseeps, Inc. case narrative.

ID#: **223940**

CHAIN OF CUSTODY & LABORATORY ANALYSIS REQUEST FORM

Page ___ of ___

Lab Work Order #

Send Results to:	Contact & Company Name: Todd Miller ARCADIS		Telephone: 510-516-9695		Preservative HCL HCL				NaOH HCL, BAK
	Address: 2000 Powell St, #714		Fax: 510-652-4906		Filtered (✓)				
	City State Zip Emeryville CA 94608		E-mail Address: todd.miller@arcadis-us.com		# of Containers 3 ea 3 ea 2 ea 1 ea 1 ea 1 ea 2 ea				
					Container Information VOAS VOAS 0.5 L can 0.5 L poly 250 poly 500 poly Vbag				
Project Name/Location (City, State): Port HCL / Oakland, CA					PARAMETER ANALYSIS & METHOD				
Project #: 04650016.000									
Sampler's Printed Name: Sarah Carman					TPH G SCISB BTEX - MTBE TPHD / W SG cleanup TDS, alkalinity, anions, O-P, P disolved solids 37C.2 disolved metals Mn, Fe - field filtered Methane, CO2				
Sampler's Signature: <i>[Signature]</i>									
Sample ID	Collection		Type (✓)		Matrix				
	Date	Time	Comp	Grab					
MW-12	6/23/11	940			W	X	X	X	X
MW-8A	↓	1055			↓	↓	↓	↓	↓
QCTB	↓				↓	↓	↓	↓	↓

Keys

Preservation Key:
 A. H₂SO₄
 B. HCL
 C. HNO₃
 D. NaOH
 E. None
 F. Other: _____
 G. Other: _____
 H. Other: _____

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

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

REMARKS

Special Instructions/Comments: Special QA/QC Instructions(✓):

Laboratory Information and Receipt		Relinquished By		Received By		Relinquished By		Laboratory Received By	
Lab Name: CT	Cooler Custody Seal (✓) <input type="checkbox"/> Intact <input type="checkbox"/> Not Intact	Printed Name: Caroline Orsi	Signature: <i>[Signature]</i>	Printed Name: Pat Gonzalez	Signature: <i>[Signature]</i>	Printed Name:	Signature:	Printed Name:	Signature:
<input checked="" type="checkbox"/> Cooler packed with ice (✓)		Firm: ARCADIS	Date/Time: 6/23/11 1333	Firm/Courier: CT 6/23/11	Date/Time: 13.33	Firm/Courier:	Date/Time:	Firm:	Date/Time:
Specify Turnaround Requirements: Standard	Sample Receipt:								
Shipping Tracking #:	Condition/Cooler Temp:								

3 of 91

COOLER RECEIPT CHECKLIST



Login # 228940 Date Received 6/23/11 Number of coolers 1
Client ARCADIS Project Port of Oakland

Date Opened 6/23/11 By (print) Vidya Oishi (sign) [Signature]
Date Logged in [Arrow] By (print) R. Paris (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, Cloth material, Foam blocks, Cardboard, Bags, Styrofoam, None, Paper towels

7. Temperature documentation: * Notify PM if temperature exceeds 6°C
Type of ice used: Wet, Blue/Gel, None Temp(°C)

Samples Received on ice & cold without a temperature blank

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

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

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

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

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

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

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

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

15. Did you check preservatives for all bottles for each sample? YES NO N/A

16. Did you document your preservative check? YES NO N/A

17. Did you change the hold time in LIMS for unpreserved VOAs? YES NO N/A

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

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

COMMENTS

Blank lines for handwritten comments.

Curtis & Tompkins Sample Preservation for 228940

Sample	pH: <2	>12	Other
-001a	<input type="checkbox"/>	<input type="checkbox"/>	_____
b	<input type="checkbox"/>	<input type="checkbox"/>	_____
c	<input type="checkbox"/>	<input type="checkbox"/>	_____
d	<input type="checkbox"/>	<input type="checkbox"/>	_____
e	<input type="checkbox"/>	<input type="checkbox"/>	_____
f	<input type="checkbox"/>	<input type="checkbox"/>	_____
g	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
h	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
i	<input type="checkbox"/>	<input type="checkbox"/>	_____
j	<input type="checkbox"/>	<input type="checkbox"/>	_____
k	<input type="checkbox"/>	<input type="checkbox"/>	_____
l	<input type="checkbox"/>	<input type="checkbox"/>	_____
m	<input type="checkbox"/>	<input type="checkbox"/>	_____
-002a	<input type="checkbox"/>	<input type="checkbox"/>	_____
b	<input type="checkbox"/>	<input type="checkbox"/>	_____
c	<input type="checkbox"/>	<input type="checkbox"/>	_____
d	<input type="checkbox"/>	<input type="checkbox"/>	_____
e	<input type="checkbox"/>	<input type="checkbox"/>	_____
f	<input type="checkbox"/>	<input type="checkbox"/>	_____
g	<input type="checkbox"/>	<input checked="" type="checkbox"/>	_____
h	<input checked="" type="checkbox"/>	<input type="checkbox"/>	_____
i	<input type="checkbox"/>	<input type="checkbox"/>	_____
j	<input type="checkbox"/>	<input type="checkbox"/>	_____
k	<input type="checkbox"/>	<input type="checkbox"/>	_____
l	<input type="checkbox"/>	<input type="checkbox"/>	_____
m	<input type="checkbox"/>	<input type="checkbox"/>	_____

Analyst: VQ
 Date: 6/23/11

Batch QC Report

Total Volatile Hydrocarbons			
Lab #:	228940	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC597836	Batch#:	176214
Matrix:	Water	Analyzed:	06/24/11
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	1,000	1,006	101	80-120

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

Batch QC Report

Total Volatile Hydrocarbons			
Lab #:	228940	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8015B
Field ID:	MW-8A	Batch#:	176214
MSS Lab ID:	228940-002	Sampled:	06/23/11
Matrix:	Water	Received:	06/23/11
Units:	ug/L	Analyzed:	06/24/11
Diln Fac:	1.000		

Type: MS Lab ID: QC597838

Analyte	MSS Result	Spiked	Result	%REC	Limits
Gasoline C7-C12	22.23	2,000	1,900	94	66-120

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

Type: MSD Lab ID: QC597839

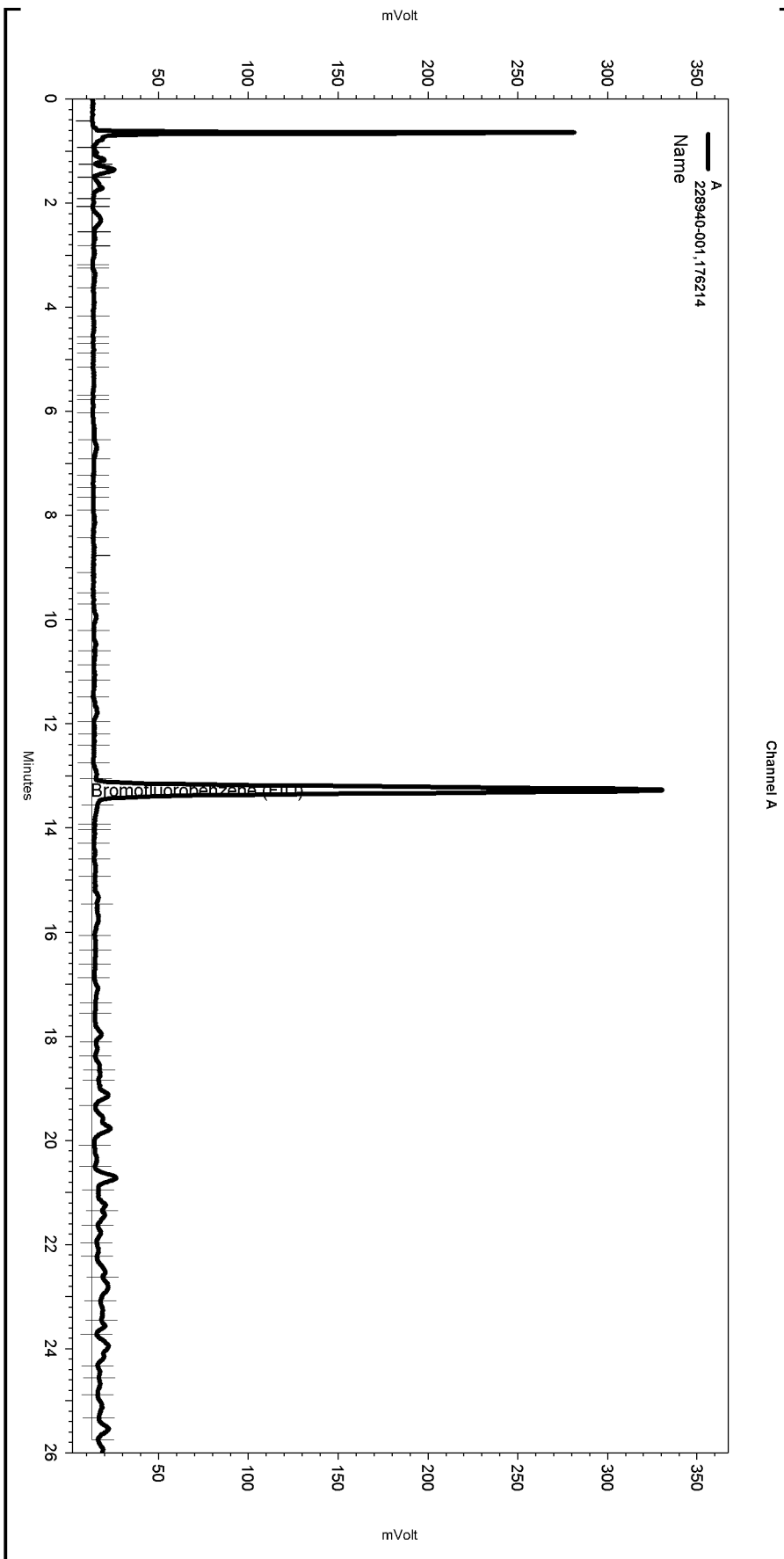
Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	2,000	1,968	97	66-120	4	25

Surrogate	%REC	Limits
Bromofluorobenzene (FID)	112	78-123

RPD= Relative Percent Difference

Sequence File: \\Lims\gdrive\ezchrom\Projects\GC05\Sequence\175.seq
 Sample Name: 228940-001,176214
 Data File: \\Lims\gdrive\ezchrom\Projects\GC05\Data\175-008
 Instrument: GC05 (Offline) Vial: N/A Operator: Tvh 2. Analyst (lims2k3\tvh2)
 Method Name: \\Lims\gdrive\ezchrom\Projects\GC05\Method\TVHBTX111.met

Software Version 3.1.7
 Run Date: 6/24/2011 7:48:43 PM
 Analysis Date: 6/27/2011 12:22:59 PM
 Sample Amount: 5 Multiplier: 5
 Vial & pH or Core ID: b1.0



-----< General Method Parameters >-----

No items selected for this section

-----< A >-----

No items selected for this section

Integration Events

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

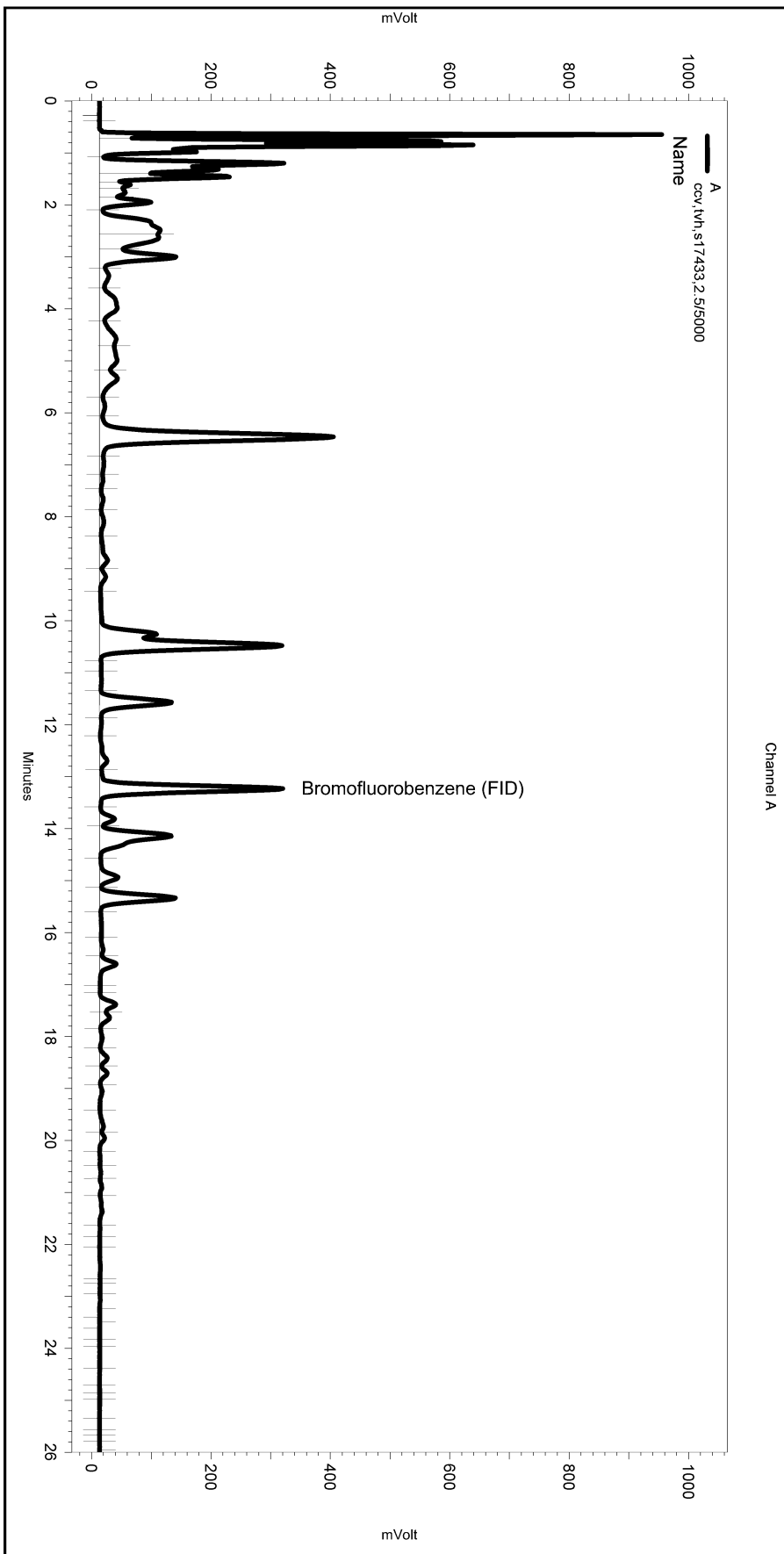
Manual Integration Fixes

Data File: \\Lims\gdrive\ezchrom\Projects\GC05\Data\175-008

Enabled	Event Type	Start (Minutes)	Stop (Minutes)	Value
Yes	Lowest Point Horizontal Baseli	0	26.017	0
Yes	Split Peak	13.568	0	0

Sequence File: \\Lims\gdrive\ezchrom\Projects\GC05\Sequence175.seq
 Sample Name: ccv,tvh,s17433,2.5/5000
 Data File: \\Lims\gdrive\ezchrom\Projects\GC05\Data\175-003
 Instrument: GC05 Vial: N/A Operator: lims2k3\tvh3
 Method Name: \\Lims\gdrive\ezchrom\Projects\GC05\Method\tvhbtxe111.met

Software Version 3.1.7
 Run Date: 6/24/2011 12:07:06 PM
 Analysis Date: 6/24/2011 12:35:52 PM
 Sample Amount: 5 Multiplier: 5
 Vial & pH or Core ID: {Data Description}



 ---< General Method Parameters >-----

No items selected for this section

 ---< A >-----

No items selected for this section

Integration Events

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

Manual Integration Fixes

Data File: C:\Documents and Settings\All Users\Application
 Data\ChromatographySystem\Recovery
 Data\Instrument.10048\175-003_D3CD.tmp

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

Total Extractable Hydrocarbons			
Lab #:	228940	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 3520C
Project#:	4656016	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	06/23/11
Units:	ug/L	Received:	06/23/11
Diln Fac:	1.000	Prepared:	06/24/11
Batch#:	176210	Analyzed:	06/27/11

Field ID: MW-12 Lab ID: 228940-001
 Type: SAMPLE Cleanup Method: EPA 3630C

Analyte	Result	RL
Diesel C10-C24	270 Y	50
Motor Oil C24-C36	ND	300

Surrogate	%REC	Limits
o-Terphenyl	106	68-120

Field ID: MW-8A Lab ID: 228940-002
 Type: SAMPLE Cleanup Method: EPA 3630C

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

Surrogate	%REC	Limits
o-Terphenyl	84	68-120

Type: BLANK Cleanup Method: EPA 3630C
 Lab ID: QC597818

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

Surrogate	%REC	Limits
o-Terphenyl	100	68-120

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

Batch QC Report

Total Extractable Hydrocarbons			
Lab #:	228940	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 3520C
Project#:	4656016	Analysis:	EPA 8015B
Matrix:	Water	Batch#:	176210
Units:	ug/L	Prepared:	06/24/11
Diln Fac:	1.000	Analyzed:	06/27/11

Type: BS Cleanup Method: EPA 3630C
 Lab ID: QC597819

Analyte	Spiked	Result	%REC	Limits
Diesel C10-C24	2,500	1,983	79	61-120

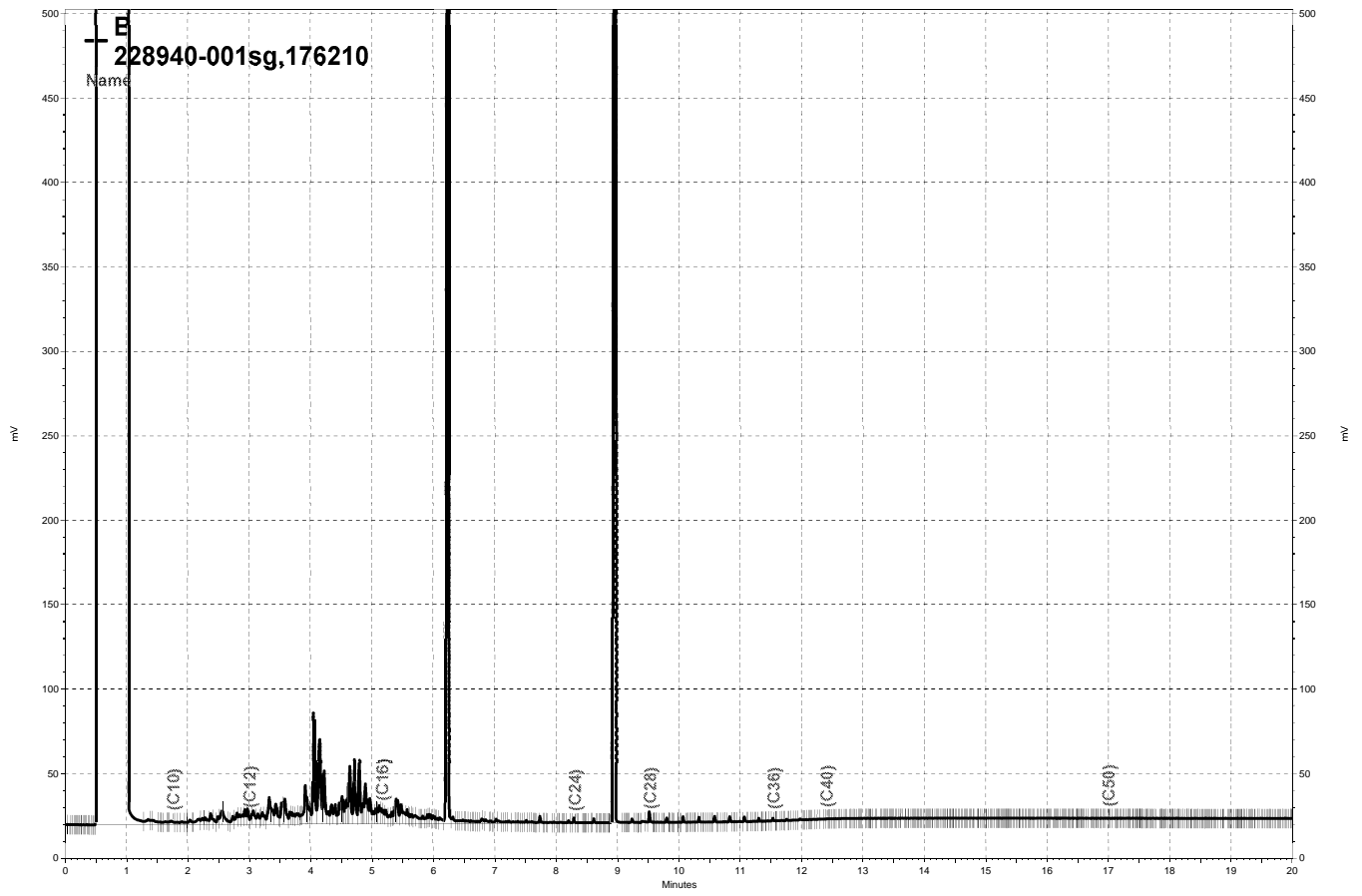
Surrogate	%REC	Limits
o-Terphenyl	105	68-120

Type: BSD Cleanup Method: EPA 3630C
 Lab ID: QC597820

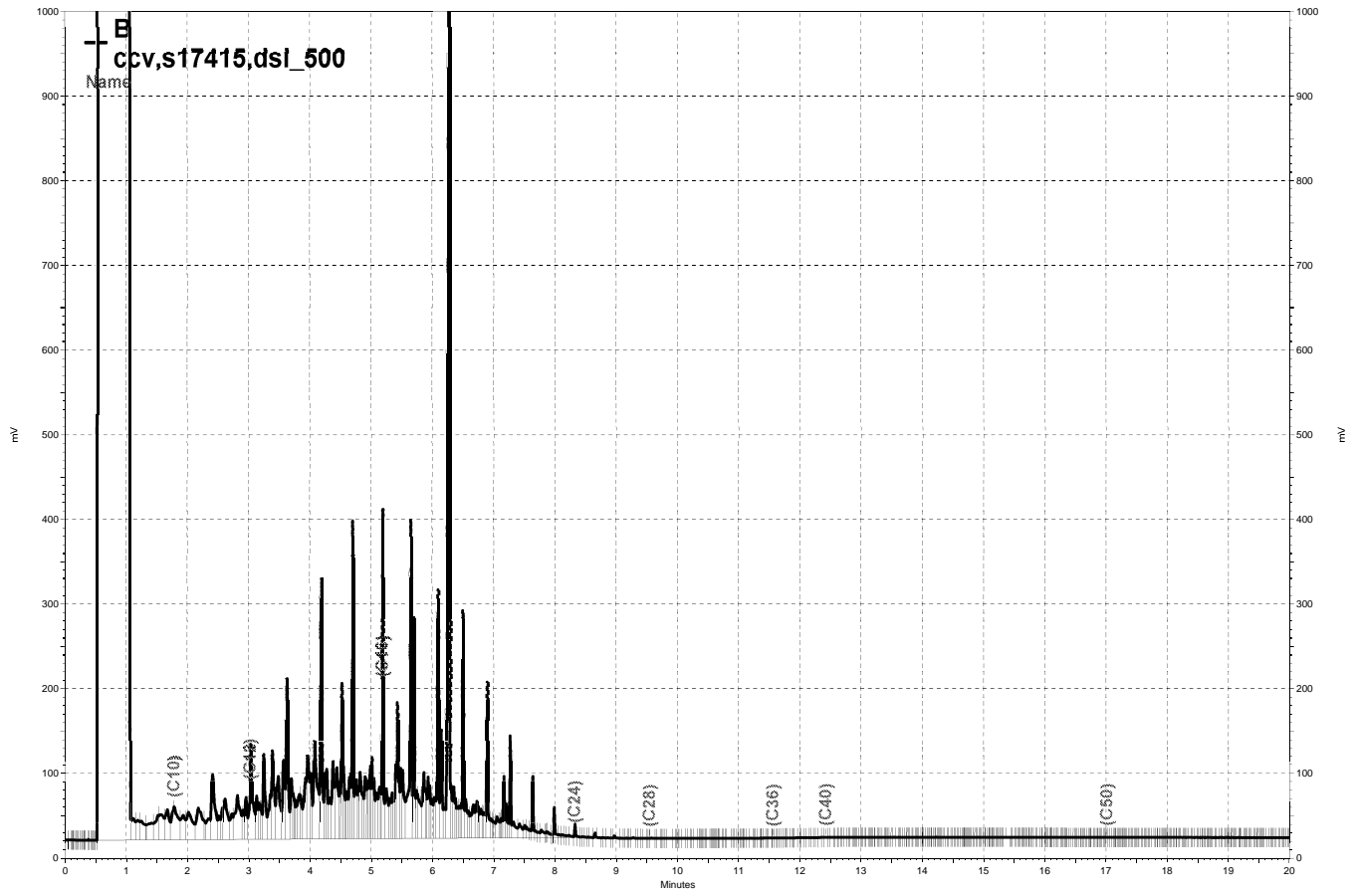
Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Diesel C10-C24	2,500	1,975	79	61-120	0	20

Surrogate	%REC	Limits
o-Terphenyl	106	68-120

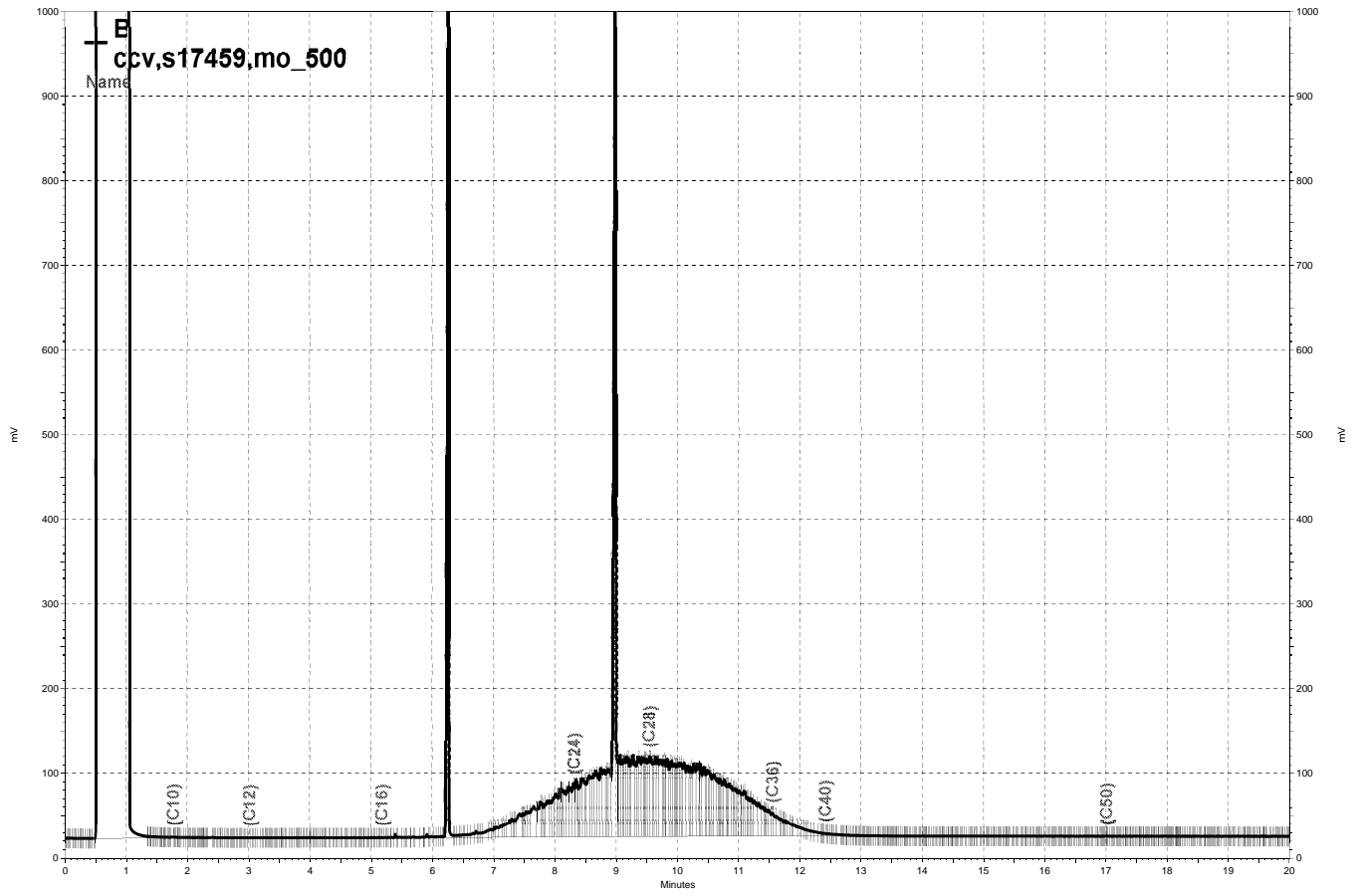
RPD= Relative Percent Difference



\\Lims\gdrive\ezchrom\Projects\GC14B\Data\178b018, B



\\Lims\gdrive\ezchrom\Projects\GC14B\Data\178b004, B



— \\Lims\gdrive\ezchrom\Projects\GC14B\Data\178b003, B

Purgeable Aromatics by GC/MS

Lab #:	228940	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-12	Batch#:	176186
Lab ID:	228940-001	Sampled:	06/23/11
Matrix:	Water	Received:	06/23/11
Units:	ug/L	Analyzed:	06/24/11
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	3.2	0.5
Benzene	ND	0.5
Toluene	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5

Surrogate	%REC	Limits
Dibromofluoromethane	94	80-127
1,2-Dichloroethane-d4	100	73-145
Toluene-d8	100	80-120
Bromofluorobenzene	98	80-120

ND= Not Detected
 RL= Reporting Limit

Purgeable Aromatics by GC/MS

Lab #:	228940	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	MW-8A	Batch#:	176186
Lab ID:	228940-002	Sampled:	06/23/11
Matrix:	Water	Received:	06/23/11
Units:	ug/L	Analyzed:	06/24/11
Diln Fac:	1.000		

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

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

ND= Not Detected
 RL= Reporting Limit

Purgeable Aromatics by GC/MS

Lab #:	228940	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Field ID:	QCTB	Batch#:	176186
Lab ID:	228940-003	Sampled:	06/23/11
Matrix:	Water	Received:	06/23/11
Units:	ug/L	Analyzed:	06/24/11
Diln Fac:	1.000		

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

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

ND= Not Detected
 RL= Reporting Limit

Batch QC Report

Purgeable Aromatics by GC/MS			
Lab #:	228940	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Matrix:	Water	Batch#:	176186
Units:	ug/L	Analyzed:	06/24/11
Diln Fac:	1.000		

Type: BS Lab ID: QC597718

Analyte	Spiked	Result	%REC	Limits
MTBE	25.00	20.56	82	59-123
Benzene	25.00	25.36	101	80-122
Toluene	25.00	24.71	99	80-120
Ethylbenzene	25.00	25.60	102	80-120
m,p-Xylenes	50.00	51.95	104	80-120
o-Xylene	25.00	25.39	102	80-120

Surrogate	%REC	Limits
Dibromofluoromethane	99	80-127
1,2-Dichloroethane-d4	99	73-145
Toluene-d8	98	80-120
Bromofluorobenzene	96	80-120

Type: BSD Lab ID: QC597719

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	25.00	19.34	77	59-123	6	20
Benzene	25.00	21.24	85	80-122	18	20
Toluene	25.00	22.09	88	80-120	11	20
Ethylbenzene	25.00	22.83	91	80-120	11	20
m,p-Xylenes	50.00	45.41	91	80-120	13	20
o-Xylene	25.00	22.89	92	80-120	10	20

Surrogate	%REC	Limits
Dibromofluoromethane	101	80-127
1,2-Dichloroethane-d4	92	73-145
Toluene-d8	96	80-120
Bromofluorobenzene	96	80-120

RPD= Relative Percent Difference

Batch QC Report

Purgeable Aromatics by GC/MS			
Lab #:	228940	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	EPA 5030B
Project#:	4656016	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC597720	Batch#:	176186
Matrix:	Water	Analyzed:	06/24/11
Units:	ug/L		

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

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

ND= Not Detected
 RL= Reporting Limit

Dissolved Metals Analytical Report

Lab #:	228940	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 6010B
Matrix:	Filtrate	Sampled:	06/23/11
Units:	ug/L	Received:	06/23/11
Batch#:	176183	Prepared:	06/23/11

Field ID:	MW-12	Lab ID:	228940-001
Type:	SAMPLE		

Analyte	Result	RL	Diln Fac	Analyzed
Calcium	93,000	500	1.000	07/06/11
Iron	460	100	1.000	07/06/11
Magnesium	43,000	500	1.000	07/06/11
Manganese	1,300	5.0	1.000	07/06/11
Potassium	15,000	500	1.000	07/06/11
Sodium	160,000	5,000	10.00	07/07/11

Field ID:	MW-8A	Lab ID:	228940-002
Type:	SAMPLE		

Analyte	Result	RL	Diln Fac	Analyzed
Calcium	46,000	500	1.000	07/06/11
Iron	2,300	100	1.000	07/06/11
Magnesium	58,000	500	1.000	07/06/11
Manganese	670	5.0	1.000	07/06/11
Potassium	15,000	500	1.000	07/06/11
Sodium	230,000	5,000	10.00	07/07/11

Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC597706	Analyzed:	07/06/11

Analyte	Result	RL
Calcium	ND	500
Iron	ND	100
Magnesium	ND	500
Manganese	ND	5.0
Potassium	ND	500
Sodium	ND	500

ND= Not Detected
 RL= Reporting Limit

Batch QC Report

Dissolved Metals Analytical Report

Lab #:	228940	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 6010B
Matrix:	Filtrate	Batch#:	176183
Units:	ug/L	Prepared:	06/23/11
Diln Fac:	1.000	Analyzed:	07/06/11

Type: BS Lab ID: QC597707

Analyte	Spiked	Result	%REC	Limits
Calcium	20,000	19,650	98	78-120
Iron	1,000	973.7	97	73-124
Magnesium	20,000	20,010	100	76-120
Manganese	50.00	50.98	102	80-120
Potassium	10,000	9,643	96	69-120
Sodium	20,000	19,610	98	75-120

Type: BSD Lab ID: QC597708

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Calcium	20,000	19,230	96	78-120	2	20
Iron	1,000	924.5	92	73-124	5	25
Magnesium	20,000	19,370	97	76-120	3	20
Manganese	50.00	49.99	100	80-120	2	21
Potassium	10,000	9,381	94	69-120	3	20
Sodium	20,000	18,800	94	75-120	4	20

RPD= Relative Percent Difference

Batch QC Report
Dissolved Metals Analytical Report

Lab #:	228940	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 6010B
Field ID:	MW-4	Batch#:	176183
MSS Lab ID:	228896-001	Sampled:	06/21/11
Matrix:	Filtrate	Received:	06/21/11
Units:	ug/L	Prepared:	06/23/11
Diln Fac:	1.000	Analyzed:	07/06/11

Type: MS Lab ID: QC597709

Analyte	MSS Result	Spiked	Result	%REC	Limits
Calcium	20,910	20,000	38,830	90	53-134
Iron	37.04	1,000	985.4	95	61-129
Magnesium	56,980	20,000	74,820	89	62-127
Manganese	183.9	50.00	231.5	95	64-128
Potassium	13,850	10,000	23,030	92	62-129
Sodium	340,900	20,000	371,900 >LR	155 NM	55-132

Type: MSD Lab ID: QC597710

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Calcium	20,000	38,190	86	53-134	2	20
Iron	1,000	986.4	95	61-129	0	32
Magnesium	20,000	72,540	78	62-127	3	23
Manganese	50.00	227.3	87	64-128	2	26
Potassium	10,000	22,840	90	62-129	1	24
Sodium	20,000	368,300 >LR	137 NM	55-132	NC	29

NC= Not Calculated

NM= Not Meaningful: Sample concentration > 4X spike concentration

>LR= Response exceeds instrument's linear range

RPD= Relative Percent Difference

Curtis & Tompkins Laboratories Analytical Report

Lab #:	228940	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 300.0
Matrix:	Water	Batch#:	176164
Units:	mg/L	Received:	06/23/11

Field ID: MW-12 Lab ID: 228940-001
 Type: SAMPLE Sampled: 06/23/11 09:40

Analyte	Result	RL	Diln Fac	Analyzed
Chloride	180	2.0	10.00	06/23/11 19:36
Nitrogen, Nitrite	ND	0.05	1.000	06/23/11 16:25
Nitrogen, Nitrate	ND	0.05	1.000	06/23/11 16:25
Sulfate	2.4	0.50	1.000	06/23/11 16:25

Field ID: MW-8A Lab ID: 228940-002
 Type: SAMPLE Sampled: 06/23/11 10:55

Analyte	Result	RL	Diln Fac	Analyzed
Chloride	140	2.0	10.00	06/23/11 21:04
Nitrogen, Nitrite	ND	0.05	1.000	06/23/11 16:42
Nitrogen, Nitrate	ND	0.05	1.000	06/23/11 16:42
Sulfate	38	0.50	1.000	06/23/11 16:42

Type: BLANK Diln Fac: 1.000
 Lab ID: QC597629 Analyzed: 06/23/11 15:50

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

ND= Not Detected
 RL= Reporting Limit

Batch QC Report

Curtis & Tompkins Laboratories Analytical Report

Lab #:	228940	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 300.0
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC597630	Batch#:	176164
Matrix:	Water	Analyzed:	06/23/11 16:07
Units:	mg/L		

Analyte	Spiked	Result	%REC	Limits
Chloride	4.000	4.134	103	80-120
Nitrogen, Nitrite	1.000	1.048	105	80-120
Nitrogen, Nitrate	1.000	1.075	108	80-120
Sulfate	10.00	10.49	105	80-120

Batch QC Report
Curtis & Tompkins Laboratories Analytical Report

Lab #:	228940	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	EPA 300.0
Field ID:	MW-12	Diln Fac:	10.00
MSS Lab ID:	228940-001	Batch#:	176164
Matrix:	Water	Sampled:	06/23/11 09:40
Units:	mg/L	Received:	06/23/11

Type: MS Analyzed: 06/24/11 14:43
 Lab ID: QC597631

Analyte	MSS Result	Spiked	Result	%REC	Limits
Chloride	177.3	20.00	185.5	41 NM	80-120
Nitrogen, Nitrite	<0.01287	5.000	6.015	120	80-121
Nitrogen, Nitrate	<0.01127	5.000	5.088	102	80-120
Sulfate	2.383	50.00	51.71	99	80-120

Type: MSD Analyzed: 06/24/11 15:00
 Lab ID: QC597632

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Chloride	20.00	185.9	43 NM	80-120	0	20
Nitrogen, Nitrite	5.000	5.919	118	80-121	2	20
Nitrogen, Nitrate	5.000	5.092	102	80-120	0	20
Sulfate	50.00	52.49	100	80-120	2	20

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

Alkalinity			
Lab #:	228940	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM2320B
Matrix:	Water	Sampled:	06/23/11
Units:	mg/L	Received:	06/23/11
Diln Fac:	1.000	Analyzed:	06/29/11
Batch#:	176325		

Field ID: MW-12 Lab ID: 228940-001
 Type: SAMPLE

Analyte	Result	RL
Alkalinity, Bicarbonate	620	6.7
Alkalinity, Carbonate	ND	6.7
Alkalinity, Hydroxide	ND	6.7
Alkalinity, Total as CaCO3	620	6.7

Field ID: MW-8A Lab ID: 228940-002
 Type: SAMPLE

Analyte	Result	RL
Alkalinity, Bicarbonate	760	6.7
Alkalinity, Carbonate	ND	6.7
Alkalinity, Hydroxide	ND	6.7
Alkalinity, Total as CaCO3	760	6.7

Type: BLANK Lab ID: QC598294

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

ND= Not Detected
 RL= Reporting Limit
 Page 1 of 1

Batch QC Report

Alkalinity			
Lab #:	228940	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM2320B
Analyte:	Alkalinity, Total as CaCO3	Units:	mg/L
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC598295	Batch#:	176325
Matrix:	Water	Analyzed:	06/29/11

Spiked	Result	%REC	Limits
200.0	190.4	95	90-110

Batch QC Report

Alkalinity			
Lab #:	228940	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM2320B
Analyte:	Alkalinity, Total as CaCO3	Diln Fac:	1.000
Field ID:	MW-12	Batch#:	176325
MSS Lab ID:	228940-001	Sampled:	06/23/11
Matrix:	Water	Received:	06/23/11
Units:	mg/L	Analyzed:	06/29/11

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
MS	QC598296	616.7	333.0	926.7	93	80-120		
MSD	QC598297		333.0	906.7	87	80-120	2	25

RPD= Relative Percent Difference

Dissolved Sulfide			
Lab #:	228940	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM4500S2-D
Analyte:	Dissolved Sulfide	Sampled:	06/23/11
Matrix:	Water	Received:	06/23/11
Units:	mg/L	Analyzed:	06/28/11
Batch#:	176286		

Field ID	Type	Lab ID	Result	RL	Diln Fac
MW-12	SAMPLE	228940-001	4.7	2.0	50.00
MW-8A	SAMPLE	228940-002	ND	0.04	1.000
	BLANK	QC598139	ND	0.04	1.000

ND= Not Detected
 RL= Reporting Limit

Batch QC Report

Dissolved Sulfide			
Lab #:	228940	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM4500S2-D
Analyte:	Dissolved Sulfide	Batch#:	176286
Field ID:	MW-12	Sampled:	06/23/11
MSS Lab ID:	228940-001	Received:	06/23/11
Matrix:	Water	Analyzed:	06/28/11
Units:	mg/L		

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim	Diln	Fac
LCS	QC598140		0.7200	0.6652	92	80-120			1.000	
MS	QC598141	4.700	36.00	40.82	100	64-123			50.00	
MSD	QC598142		36.00	41.66	103	64-123	2	20	50.00	

RPD= Relative Percent Difference

Orthophosphate Phosphorous

Lab #:	228940	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM4500P-E
Analyte:	Orthophosphate (as P)	Batch#:	176162
Matrix:	Water	Received:	06/23/11
Units:	mg/L	Analyzed:	06/23/11 15:25

Field ID	Type	Lab ID	Result	RL	Diln Fac	Sampled
MW-12	SAMPLE	228940-001	0.76	0.030	1.000	06/23/11 09:40
MW-8A	SAMPLE	228940-002	1.3	0.15	5.000	06/23/11 10:55
	BLANK	QC597623	ND	0.030	1.000	

ND= Not Detected
 RL= Reporting Limit

Batch QC Report

Orthophosphate Phosphorous			
Lab #:	228940	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM4500P-E
Analyte:	Orthophosphate (as P)	Diln Fac:	1.000
Field ID:	MW-12	Batch#:	176162
MSS Lab ID:	228940-001	Sampled:	06/23/11 09:40
Matrix:	Water	Received:	06/23/11
Units:	mg/L	Analyzed:	06/23/11 15:25

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
LCS	QC597624		0.4000	0.4187	105	80-120		
MS	QC597625	0.7623	0.4000	1.192	107	76-120		
MSD	QC597626		0.4000	1.158	99	76-120	3	20

RPD= Relative Percent Difference

Total Dissolved Solids (TDS)			
Lab #:	228940	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM2540C
Analyte:	Total Dissolved Solids	Sampled:	06/23/11
Matrix:	Water	Received:	06/23/11
Units:	mg/L	Prepared:	06/24/11
Diln Fac:	1.000	Analyzed:	06/27/11
Batch#:	176195		

Field ID	Type	Lab ID	Result	RL
MW-12	SAMPLE	228940-001	940	10
MW-8A	SAMPLE	228940-002	1,060	10
	BLANK	QC597744	ND	10

ND= Not Detected
 RL= Reporting Limit

Batch QC Report

Total Dissolved Solids (TDS)			
Lab #:	228940	Location:	Port Of Oakland - HFC
Client:	Malcolm Pirnie, Inc.	Prep:	METHOD
Project#:	4656016	Analysis:	SM2540C
Analyte:	Total Dissolved Solids	Batch#:	176195
Field ID:	ZZZZZZZZZZ	Sampled:	06/23/11
MSS Lab ID:	228946-002	Received:	06/23/11
Matrix:	Water	Prepared:	06/24/11
Units:	mg/L	Analyzed:	06/27/11

Type	Lab ID	MSS Result	Spiked	Result	RL	%REC	Limits	RPD	Lim	Diln	Fac
BS	QC597745		104.0	114.0		110	75-120				1.000
BSD	QC597746		104.0	116.0		112	75-120	2	5		1.000
SDUP	QC597747	1,630		1,635	12.50			0	5		1.250

RL= Reporting Limit

RPD= Relative Percent Difference

Laboratory Job Number 228940

Subcontracted Products

Microseeps, Inc.



Client Name: Curtis & Tompkins, Ltd.
Contact: Desiree Tetrault
Address: 2323 Fifth St
Berkeley, CA 94710

Page: Page 1 of 5
Lab Proj #: P1106223
Report Date: 06/30/11
Client Proj Name: Port of Oakland-HFC
Client Proj #: 228940

Laboratory Results

Total pages in data package: 55

<u>Lab Sample #</u>	<u>Client Sample ID</u>
P1106223-01	MW-12
P1106223-02	MW-8A

Microseeps test results meet all the requirements of the NELAC standards or provide reasons and/or justification if they do not.

Approved By: Heather Hauser (DH) **Date:** 7-5-2011

Project Manager: Heather Hauser

The analytical results reported here are reliable and usable to the precision expressed in this report. As required by some regulating authorities, a full discussion of the uncertainty in our analytical results can be obtained at our web site or through customer service. Unless otherwise specified, all results are reported on a wet weight basis.

*As a valued client we would appreciate your comments on our service.
Please call customer service at (412)826-5245 or email customerservice@microseeps.com.*

Case Narrative:

Client Name: Curtis & Tompkins, Ltd.
 Contact: Desiree Tetrault
 Address: 2323 Fifth St
 Berkeley, CA 94710

Page: Page 2 of 5
 Lab Proj #: P1106223
 Report Date: 06/30/11
 Client Proj Name: Port of Oakland-HFC
 Client Proj #: 228940

<u>Sample Description</u>	<u>Matrix</u>	<u>Lab Sample #</u>	<u>Sampled Date/Time</u>	<u>Received</u>			
MW-12	Water	P1106223-01	23 Jun. 11 9:40	24 Jun. 11 13:21			
<u>Analyte(s)</u>	<u>Flag</u>	<u>Result</u>	<u>PQL</u>	<u>Units</u>	<u>Method #</u>	<u>Analysis Date</u>	<u>By</u>
RiskAnalysis							
N Carbon dioxide		85.00	5.00	mg/L	AM20GAX	6/27/11	gt
N Methane		5100.000	0.100	ug/L	AM20GAX	6/27/11	gt



Data Qualifiers: J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis

Client Name: Curtis & Tompkins, Ltd.
 Contact: Desiree Tetrault
 Address: 2323 Fifth St
 Berkeley, CA 94710

Page: Page 3 of 5
 Lab Proj #: P1106223
 Report Date: 06/30/11
 Client Proj Name: Port of Oakland-HFC
 Client Proj #: 228940

<u>Sample Description</u>	<u>Matrix</u>	<u>Lab Sample #</u>	<u>Sampled Date/Time</u>	<u>Received</u>			
MW-8A	Water	P1106223-02	23 Jun. 11 10:55	24 Jun. 11 13:21			
<u>Analyte(s)</u>	<u>Flag</u>	<u>Result</u>	<u>PQL</u>	<u>Units</u>	<u>Method #</u>	<u>Analysis Date</u>	<u>By</u>
RiskAnalysis							
N Carbon dioxide		48.00	5.00	mg/L	AM20GAX	6/27/11	gt
N Methane		400.000	0.100	ug/L	AM20GAX	6/27/11	gt



Data Qualifiers: J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis

Client Name: Curtis & Tompkins, Ltd.
 Contact: Desiree Tetrault
 Address: 2323 Fifth St
 Berkeley, CA 94710

Page: Page 4 of 5
 Lab Proj #: P1106223
 Report Date: 06/30/11
 Client Proj Name: Port of Oakland-HFC
 Client Proj #: 228940

Prep Method: In House Dissolved Gas Sample Preparation
Analysis Method: Analysis of Dissolved Permanent Gases in Water

M110627005-MB

	<u>Result</u>	<u>TrueSpikeConc.</u>	<u>RDL</u>	<u>%Recovery</u>	<u>Ctl Limits</u>
Carbon dioxide	< 5.00 mg/L		5.00		- NA

M110627005-LCS

	<u>Result</u>	<u>TrueSpikeConc.</u>	<u>%Recovery</u>	<u>Ctl Limits</u>
Carbon dioxide	140.00 mg/L	129.30	108.00	80 - 120

M110627005-LCSD

	<u>Result</u>	<u>TrueSpikeConc.</u>	<u>%Recovery</u>	<u>Ctl Limits</u>	<u>RPD</u>	<u>RPD Ctl Limits</u>
Carbon dioxide	140.00 mg/L	129.30	108.00	80 - 120	0.00	0 - 20

Outlined Results indicate results outside of Control limits



Data Qualifiers: J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis

Client Name: Curtis & Tompkins, Ltd.
 Contact: Desiree Tetrault
 Address: 2323 Fifth St
 Berkeley, CA 94710

Page: Page 5 of 5
 Lab Proj #: P1106223
 Report Date: 06/30/11
 Client Proj Name: Port of Oakland-HFC
 Client Proj #: 228940

Prep Method: In House Dissolved Gas Sample Preparation
Analysis Method: Light Hydrocarbons (C1-C4) in Water

M110627025-MB

	<u>Result</u>	<u>TrueSpikeConc.</u>	<u>RDL</u>	<u>%Recovery</u>	<u>Ctl Limits</u>
Methane	< 0.100 ug/L		0.100		- NA

M110627025-LCS

	<u>Result</u>	<u>TrueSpikeConc.</u>	<u>%Recovery</u>	<u>Ctl Limits</u>
Methane	850.000 ug/L	825.00	103.00	80 - 120

M110627025-LCSD

	<u>Result</u>	<u>TrueSpikeConc.</u>	<u>%Recovery</u>	<u>Ctl Limits</u>	<u>RPD</u>	<u>RPD Ctl Limits</u>
Methane	910.000 ug/L	825.00	110.00	80 - 120	6.82	0 - 20

Outlined Results indicate results outside of Control limits

Data Qualifiers: J - estimated value, U - Non detect, R - Poor surrogate recovery, M - Recovery/RPD poor for MS/MSD, SAMP/DUP, B - detected in blank, S - field sample as received did not meet NELAC sample acceptance criteria, L - Subcontracted Lab used, N - NELAC certified analysis



Curtis & Tompkins, Ltd.
 Analytical Laboratories, Since 1878
 2323 Fifth Street
 Berkeley, CA 94710
 (510) 486-0900
 (510) 486-0532

P1106223

Project Number: 228940
 Site: Port Of Oakland - HFC

Subcontract Laboratory:
 Microseeps, Inc.
 220 William Pitt Way
 Pittsburgh, PA 15238
 (412) 826-5245
 ATTN: Heather Hauser

Results due: Report Level: II

Please send report to: Desiree N. Tetrault (desiree.tetrault@ctberk.com)
 *** Please report using Sample ID rather than C&T Lab #.

Sample ID	Sampled	Matrix	Analysis	C&T Lab #	Comments
MW-12	06/23 09:40	Water	AM20GAX	228940-001	
MW-8A	06/23 10:55	Water	AM20GAX	228940-002	

Notes:	Relinquished By:	Received By:
	Date/Time:	Date/Time:

Relinquished By: *[Signature]*
 Date/Time: 6/23/11 13:44
 Received By: *[Signature]*
 Date/Time: 6/24/11 11:00
[Signature]

Signature on this form constitutes a firm Purchase Order for the services requested above.

Method File: WATER
Operator: siyon

Title: Dissolved Gases AM20GAX
Datasource: BIOREM11_local
Location: BIOREM14\2011 WATER 1 SEQ

Created: 5/5/2004 12:45:44 PM by bcarnicelli
Last Update: 2/27/2011 7:22:38 PM by siyon

P1106223

Peak Table:

Use Recently Detected Retention Times: Off
Peak Retention Time Determination: Absolute
Dead time:
Delay Time of 2'nd Detector: <None>
Delay Time of 3'rd Detector: <None>

No.	Peak Name	Ret.Time	Ret.Time FID	Ret.Time TCD	Ret.Time RGD	Window	Standard	Int.Type	Cal.Type
1	Methane	0.635 min	0.635 min			0.200 AN	External	Area	Lin
2	Ethane	0.906 min	0.906 min			0.200 AN	External	Area	Lin
3	Ethene	1.169 min	1.169 min			0.200 AN	External	Area	Lin
4	Propane	1.833 min	1.833 min			0.200 AN	External	Area	Lin
5	Hydrogen	3.210 min			3.210 min	0.200 AN	External	Area	Lin
6	Propene	3.466 min	3.466 min			0.200 AN	External	Area	Lin
7	Carbon Dioxide	3.993 min		3.993 min		0.500 AN	External	Area	Lin
8	iso-Butane	4.835 min	4.835 min			0.500 AN	External	Area	Lin
9	n-Butane	5.645 min	5.645 min			0.300 AN	External	Area	Lin
10	Oxygen	5.918 min		5.918 min		0.300 AN	External	Area	Lin
11	Nitrogen	6.330 min		6.330 min		0.500 AN	External	Area	Lin
12	Acetylene	6.866 min	6.866 min			0.400 AN	External	Area	Lin
13	Methane	7.586 min		7.586 min		0.400 AN	External	Area	Lin
14	Carbon Monoxide	8.486 min		8.486 min		0.400 AN	External	Area	Lin

Method File: WATER
Operator: slyon

Title: Dissolved Gases AM20GAX
Datasource: BIOREM11_local
Location: BIOREM14\2011 WATER 1.SEQ

Created: 5/5/2004 12:45:44 PM by bcarnicelli
Last Update: 2/27/2011 7:22:38 PM by slyon

Peak Table:

Use Recently Detected Retention Times: Off
Peak Retention Time Determination: Absolute
Dead time:
Delay Time of 2'nd Detector: <None>
Delay Time of 3'rd Detector: <None>

No.	Peak Name	Ret.Time	Peak Type	Group	Comment
1	Methane	0.635 min	Auto		
2	Ethane	0.906 min	Auto		
3	Ethene	1.169 min	Auto		
4	Propane	1.833 min	Auto		
5	Hydrogen	3.210 min	Auto		
6	Propene	3.466 min	Auto		
7	Carbon Dioxide	3.993 min	Auto		
8	iso-Butane	4.835 min	Auto		
9	n-Butane	5.645 min	Auto		
10	Oxygen	5.918 min	Auto		
11	Nitrogen	6.330 min	Auto		
12	Acetylene	6.866 min	Auto		
13	Methane	7.586 min	Auto		
14	Carbon Monoxide	8.486 min	Auto		

Method File: WATER
 Operator: siyon

Title: Dissolved Gases AM20GAX
 Datasource: BIOREM11_local
 Location: BIOREM14\2011 WATER 1.SEQ

Created: 5/5/2004 12:45:44 PM by bcarnicelli
 Last Update: 2/27/2011 7:22:38 PM by siyon

Amount Table:

Dimension of Amounts:
 Reference volume for amounts: Use inject volume of first standard
 Number of Amount Columns: 21
 Sample column used for amount column assignment: Sample Name

No.	Peak Name	Ret.Time	Ret.Time FID	Ret.Time TCD	Ret.Time RGD	Amount ICAL FID L8	Amount ICAL FID L7	Amount ICAL FID L6
1	Methane	0.635 min	0.635 min			0.011000	0.054000	0.134000
2	Ethane	0.906 min	0.906 min			0.021000	0.104000	0.260000
3	Ethene	1.169 min	1.169 min			0.023000	0.113000	0.284000
4	Propane	1.833 min	1.833 min			0.030000	0.152000	0.379000
5	Hydrogen	3.210 min			3.210 min	0.031000	0.157000	0.393000
6	Propene	3.466 min	3.466 min					
7	Carbon Dioxide	3.993 min		3.993 min		0.035000	0.176000	0.440000
8	iso-Butane	4.835 min	4.835 min			0.037000	0.186000	0.466000
9	n-Butane	5.645 min	5.645 min					
10	Oxygen	5.918 min		5.918 min				
11	Nitrogen	6.330 min		6.330 min			0.313000	0.782000
12	Acetylene	6.866 min	6.866 min					
13	Methane	7.586 min		7.586 min				
14	Carbon Monoxide	8.486 min		8.486 min				

Method File: WATER
 Operator: siyon

Title: Dissolved Gases AM20GAX
 Datasource: BIOREM11_local
 Location: BIOREM14\2011 WATER 1.SEQ

Created: 5/5/2004 12:45:44 PM by bcarnicelli
 Last Update: 2/27/2011 7:22:38 PM by siyon

Amount Table:

Dimension of Amounts:
 Reference volume for amounts: Use inject volume of first standard
 Number of Amount Columns: 21
 Sample column used for amount column assignment: Sample Name

No.	Peak Name	Ret.Time	Amount ICAL FID L5	Amount ICAL FID L4	Amount ICAL FID L3	Amount ICAL FID L2	Amount ICAL FID L1	Amount ICAL H2 L7	Amount ICAL H2 L6
1	Methane	0.635 min	0.537000	2.687000	10.750000	33.590000	134.360000		
2	Ethane	0.906 min	1.040000	5.200000	20.800000	65.000000	259.980000		
3	Ethene	1.169 min	1.134000	5.671000	22.680000	70.880000	283.530000		
4	Propane	1.833 min	1.516000	7.579000	30.320000	94.740000	378.950000	2.940000	7.350000
5	Hydrogen	3.210 min							
6	Propene	3.466 min	1.571000	7.856000	31.420000	98.200000	392.810000		
7	Carbon Dioxide	3.993 min							
8	iso-Butane	4.835 min	1.760000	8.798000	35.190000	109.970000	439.890000		
9	n-Butane	5.645 min	1.864000	9.320000	37.280000	116.500000	465.990000		
10	Oxygen	5.918 min							
11	Nitrogen	6.330 min							
12	Acetylene	6.866 min	3.126000	15.630000	62.520000	195.380000	781.500000		
13	Methane	7.586 min							
14	Carbon Monoxide	8.486 min							

Method File: WATER
 Operator: slyon

Title: Dissolved Gases AM20GAX
 Datasource: BIOREM11_local
 Location: BIOREM14\2011 WATER 1.SEQ

Created: 5/5/2004 12:45:44 PM by bcarnicelli
 Last Update: 2/27/2011 7:22:38 PM by slyon

Amount Table:

Dimension of Amounts:
 Reference volume for amounts: Use inject volume of first standard
 Number of Amount Columns: 21
 Sample column used for amount column assignment: Sample Name

No.	Peak Name	Ret. Time	Amount ICAL H2 L5	Amount ICAL H2 L4	Amount ICAL H2 L3	Amount ICAL H2 L2	Amount ICAL H2 L1	Amount ICAL TCD L6	Amount ICAL TCD L5
1	Methane	0.635 min							
2	Ethane	0.906 min							
3	Ethene	1.169 min							
4	Propane	1.833 min							
5	Hydrogen	3.210 min	29.400000	73.500000	147.000000	294.000000	735.000000		
6	Propene	3.466 min						1.278000	3.195000
7	Carbon Dioxide	3.993 min							
8	iso-Butane	4.835 min							
9	n-Butane	5.645 min						0.077600	0.194000
10	Oxygen	5.918 min						1.128680	2.821700
11	Nitrogen	6.330 min							
12	Acetylene	6.866 min							109.800000
13	Methane	7.586 min							0.290500
14	Carbon Monoxide	8.486 min							

Method File: WATER
 Operator: slyon

Title: Dissolved Gases AM20GAx
 Datasource: BIOREM11_local
 Location: BIOREM14\2011 WATER 1.SEQ

Created: 5/5/2004 12:45:44 PM by bcarnicelli
 Last Update: 2/27/2011 7:22:38 PM by slyon

Amount Table:

Dimension of Amounts:
 Reference volume for amounts: Use inject volume of first standard
 Number of Amount Columns: 21
 Sample column used for amount column assignment: Sample Name

No.	Peak Name	Ret. Time	Amount ICAL TCD L4	Amount ICAL TCD L3	Amount ICAL TCD L2	Amount ICAL TCD L1
1	Methane	0.635 min				
2	Ethane	0.906 min				
3	Ethene	1.169 min				
4	Propane	1.833 min				
5	Hydrogen	3.210 min				
6	Propene	3.466 min				
7	Carbon Dioxide	3.993 min	6.390000	31.950000	159.750000	319.500000
8	iso-Butane	4.835 min				
9	n-Butane	5.645 min				
10	Oxygen	5.918 min	0.388000	1.940000	9.700000	19.400000
11	Nitrogen	6.330 min	5.643000	28.217000	141.085000	282.170000
12	Acetylene	6.866 min				
13	Methane	7.586 min	219.600000	1098.000000	5490.000000	10980.000000
14	Carbon Monoxide	8.486 min	0.581000	2.905000	14.525000	29.050000

Method File: WATER
Operator: slyon

Title: Dissolved Gases AM20GAX
Datasource: BIOREM11_local
Location: BIOREM14\2011 WATER 1 SEQ

Created: 5/5/2004 12:45:44 PM by bcarnicelli
Last Update: 2/27/2011 7:22:38 PM by slyon

Calibration:

Calibration Mode: Total
Auto Recalibrate: On
Curve Fitting Model: Normal
Dual-Column Separate Calibration: Off

No.	Enabled	Name	Smp.No.	Pos.	Inj. Vol.	Weight	ISTD Amount	Dil. Factor	Inj. Date/Time
1	<input checked="" type="checkbox"/>	ICAL TCD L6	1	1	1.0	1.0000	1.0000	1.0000	12/8/2010 3:39:38 PM
2	<input checked="" type="checkbox"/>	ICAL TCD L5	2	2	1.0	1.0000	1.0000	1.0000	12/8/2010 3:54:49 PM
3	<input checked="" type="checkbox"/>	ICAL TCD L4	3	3	1.0	1.0000	1.0000	1.0000	12/8/2010 4:13:17 PM
4	<input checked="" type="checkbox"/>	ICAL TCD L3	4	4	1.0	1.0000	1.0000	1.0000	12/8/2010 4:26:21 PM
5	<input checked="" type="checkbox"/>	ICAL TCD L2	5	5	1.0	1.0000	1.0000	1.0000	12/8/2010 4:42:41 PM
6	<input checked="" type="checkbox"/>	ICAL TCD L1	6	6	1.0	1.0000	1.0000	1.0000	12/8/2010 4:54:54 PM
7	<input checked="" type="checkbox"/>	ICAL FID L8	9	9	1.0	1.0000	1.0000	1.0000	2/27/2011 1:05:04 PM
8	<input checked="" type="checkbox"/>	ICAL FID L7	10	10	1.0	1.0000	1.0000	1.0000	2/27/2011 1:17:20 PM
9	<input checked="" type="checkbox"/>	ICAL FID L6	11	11	1.0	1.0000	1.0000	1.0000	2/27/2011 1:32:41 PM
10	<input checked="" type="checkbox"/>	ICAL FID L5	12	12	1.0	1.0000	1.0000	1.0000	2/27/2011 1:45:08 PM
11	<input checked="" type="checkbox"/>	ICAL FID L4	13	13	1.0	1.0000	1.0000	1.0000	2/27/2011 1:57:23 PM
12	<input checked="" type="checkbox"/>	ICAL FID L3	14	14	1.0	1.0000	1.0000	1.0000	2/27/2011 2:12:00 PM
13	<input checked="" type="checkbox"/>	ICAL FID L2	15	15	1.0	1.0000	1.0000	1.0000	2/27/2011 2:24:18 PM
14	<input checked="" type="checkbox"/>	ICAL FID L1	16	16	1.0	1.0000	1.0000	1.0000	2/27/2011 2:36:33 PM

Light Hydrocarbons

Method AM20GAX

2/27/2011

No.	Ret.Time min	Peak Name	Cal.Type	Points	R-Square %	Offset	Slope	Curve
1	0.64	Methane	Lin	8	99.993	0.00000	0.68018	0.00000
2	0.92	Ethane	Lin	8	99.992	0.00000	0.63526	0.00000
3	1.18	Ethene	Lin	8	99.991	0.00000	0.57092	0.00000
4	1.86	Propane	Lin	8	99.990	0.00000	0.66556	0.00000
5	3.55	Propene	Lin	8	99.988	0.00000	0.60387	0.00000
6	4.92	iso-Butane	Lin	8	99.989	0.00000	0.72658	0.00000
7	5.76	n-Butane	Lin	8	99.987	0.00000	0.70879	0.00000
8	7.03	Acetylene	Lin	7	99.971	0.00000	0.21754	0.00000

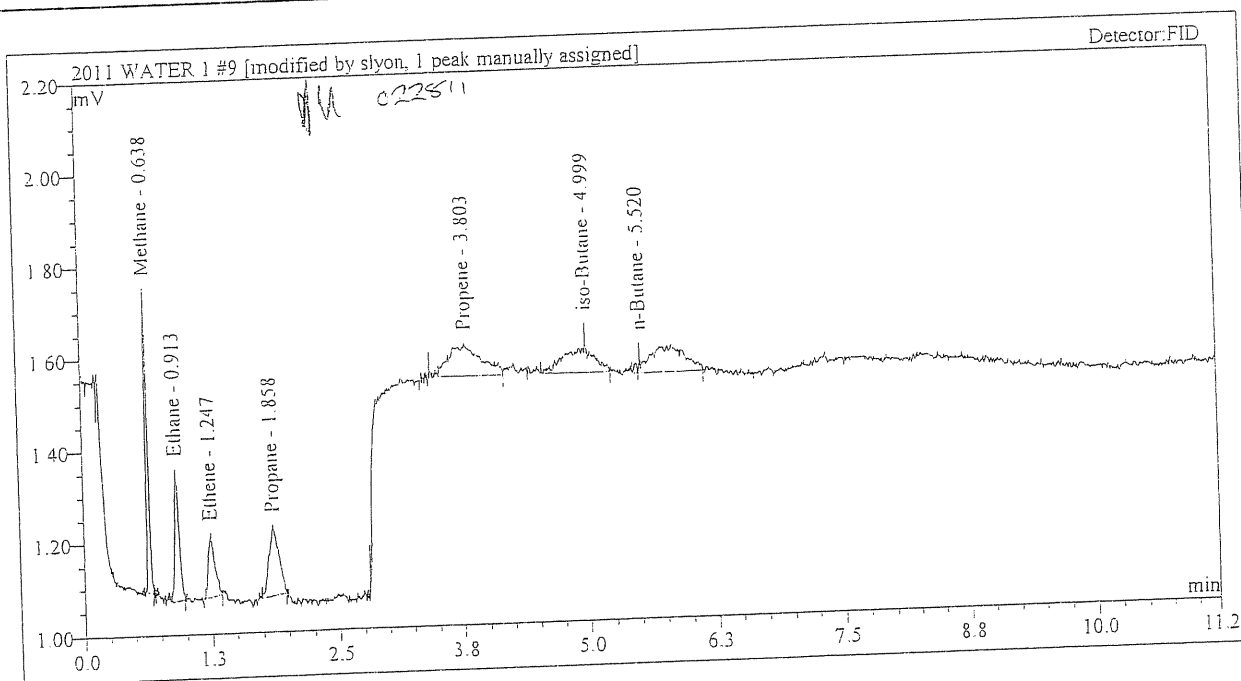
MICROSEEPS

Sample Analysis Report

Sample Name:	ICAL FID L8	Sequence No:	9
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	2/27/2011 13:05	Analytical Method:	AM20GAX/PM01
System Operator:	slyon	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Methane	0.638	0.017	0.664	BMB*	0.0250
2	Ethane	0.913	0.015	0.287	BMB*	0.0232
3	Ethene	1.247	0.010	0.139	BMB*	0.0175
4	Propene	1.858	0.017	0.153	BMB*	0.0251
5	Propane	3.803	0.025	0.073	BMB*^	0.0418
6	Propene	4.999	0.020	0.108	BMB*	0.0274
7	iso-Butane	5.520	0.023	0.067	BMB*	0.0327

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



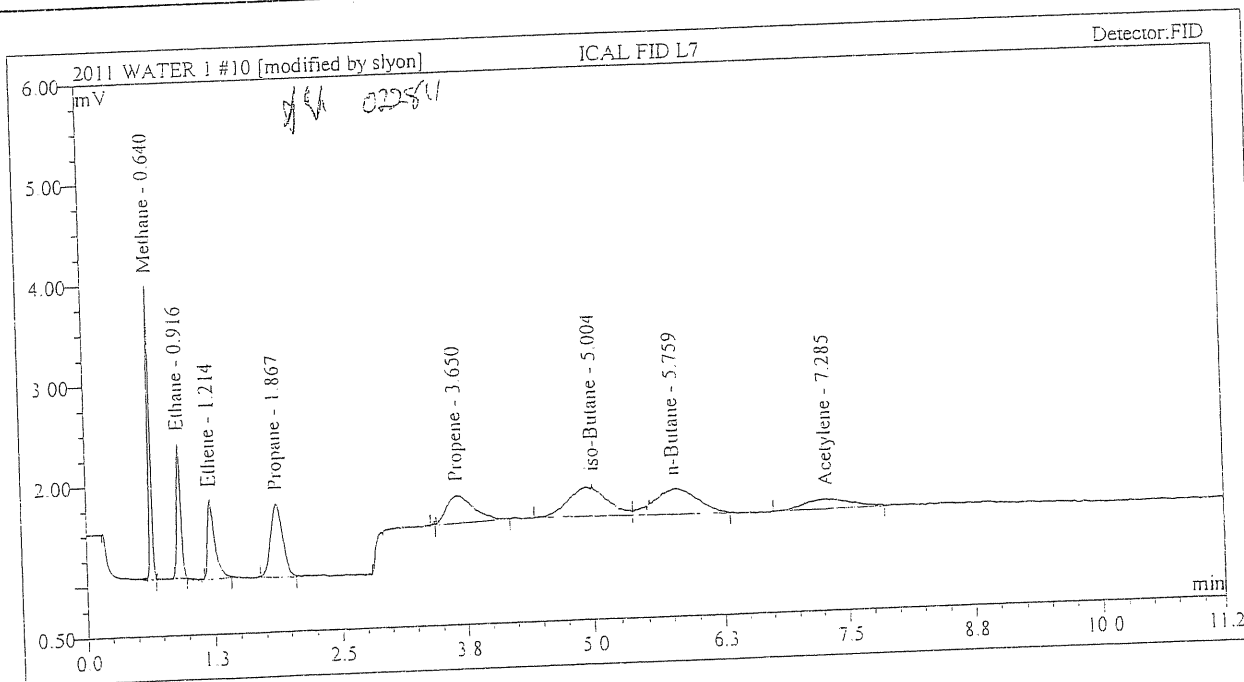
MICROSEEPS

Sample Analysis Report

Sample Name:	ICAL FID L7	Sequence No:	10
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	2/27/2011 13:17	Analytical Method:	AM20GAX/PM01
System Operator:	slyon	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Methane	0.640	0.080	2.927	BMB*	0.1173
2	Ethane	0.916	0.068	1.346	BMB*	0.1069
3	Ethene	1.214	0.064	0.796	BMB*	0.1121
4	Propane	1.867	0.104	0.742	BMB*	0.1569
5	Propene	3.650	0.088	0.294	BMB*	0.1453
6	iso-Butane	5.004	0.127	0.322	BM *	0.1748
7	n-Butane	5.759	0.125	0.263	MB*	0.1770
8	Acetylene	7.285	0.052	0.104	BMB*	0.2386

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO₂, O₂, N₂, CO mg/L)
 RGD UNITS (Hydrogen nM)



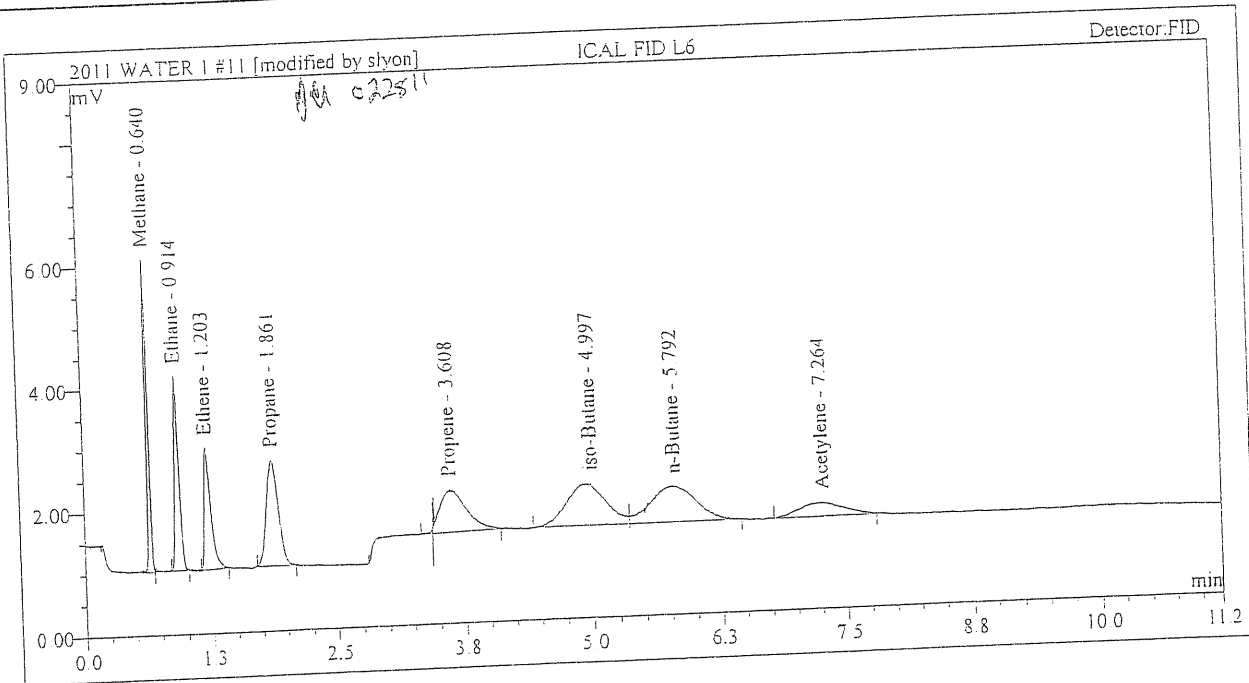
MICROSEEPS

Sample Analysis Report

Sample Name:	ICAL FID L6	Sequence No:	11
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	2/27/2011 13:32	Analytical Method:	AM20GAX/PM01
System Operator:	slyon	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Methane	0.640	0.138	5.086	BMB*	0.2030
2	Ethane	0.914	0.162	3.163	BMB*	0.2558
3	Ethene	1.203	0.152	1.975	BMB*	0.2658
4	Propane	1.861	0.237	1.712	BMB*	0.3554
5	Propene	3.608	0.204	0.697	BMB*	0.3370
6	Propene	4.997	0.293	0.678	BM *	0.4027
7	iso-Butane	5.792	0.297	0.580	MB*	0.4197
8	n-Butane	7.264	0.114	0.228	BMB*	0.5237

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



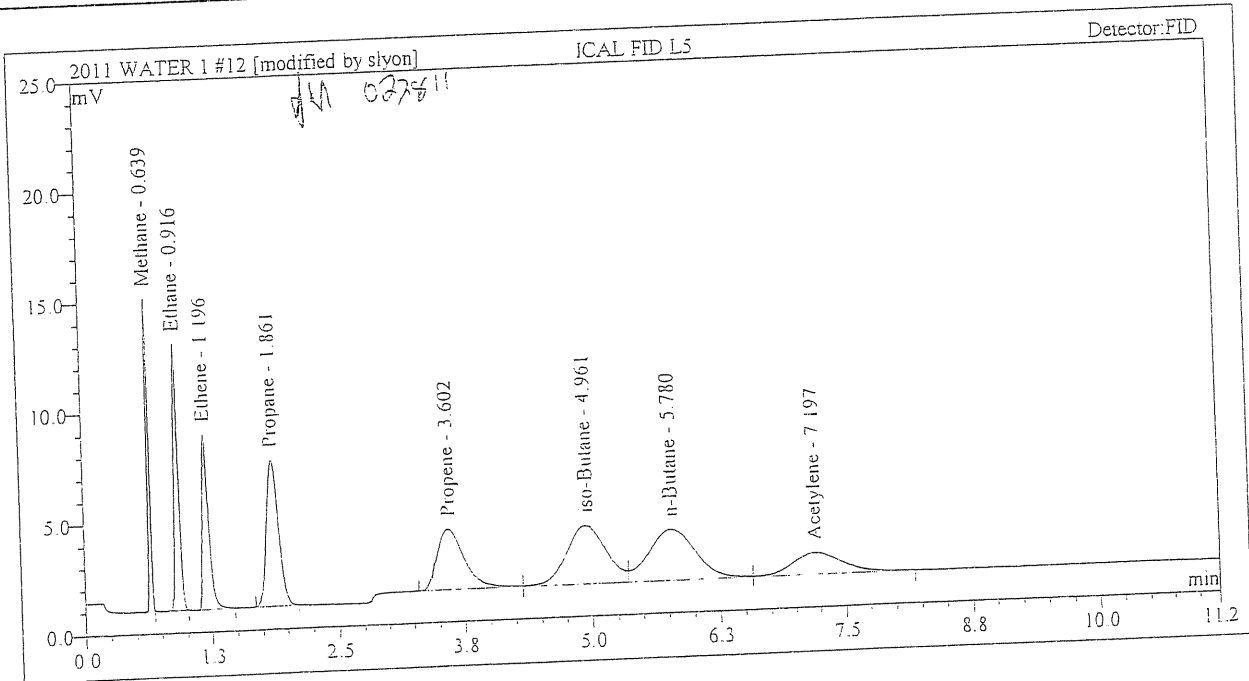
MICROSEEPS

Sample Analysis Report

Sample Name:	ICAL FID L5	Sequence No:	12
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	2/27/2011 13:45	Analytical Method:	AM20GAx/PM01
System Operator:	slyon	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Methane	0.639	0.381	14.143	BMB*	0.5602
2	Ethane	0.916	0.616	12.070	BMB	0.9704
3	Ethene	1.196	0.595	7.932	BMB*	1.0416
4	Propane	1.861	0.932	6.629	BMB*	1.3999
5	Propene	3.602	0.866	2.778	BM *	1.4348
6	iso-Butane	4.961	1.198	2.657	M *	1.6494
7	n-Butane	5.780	1.237	2.323	M *	1.7456
8	Acetylene	7.197	0.585	1.007	MB*	2.6886

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



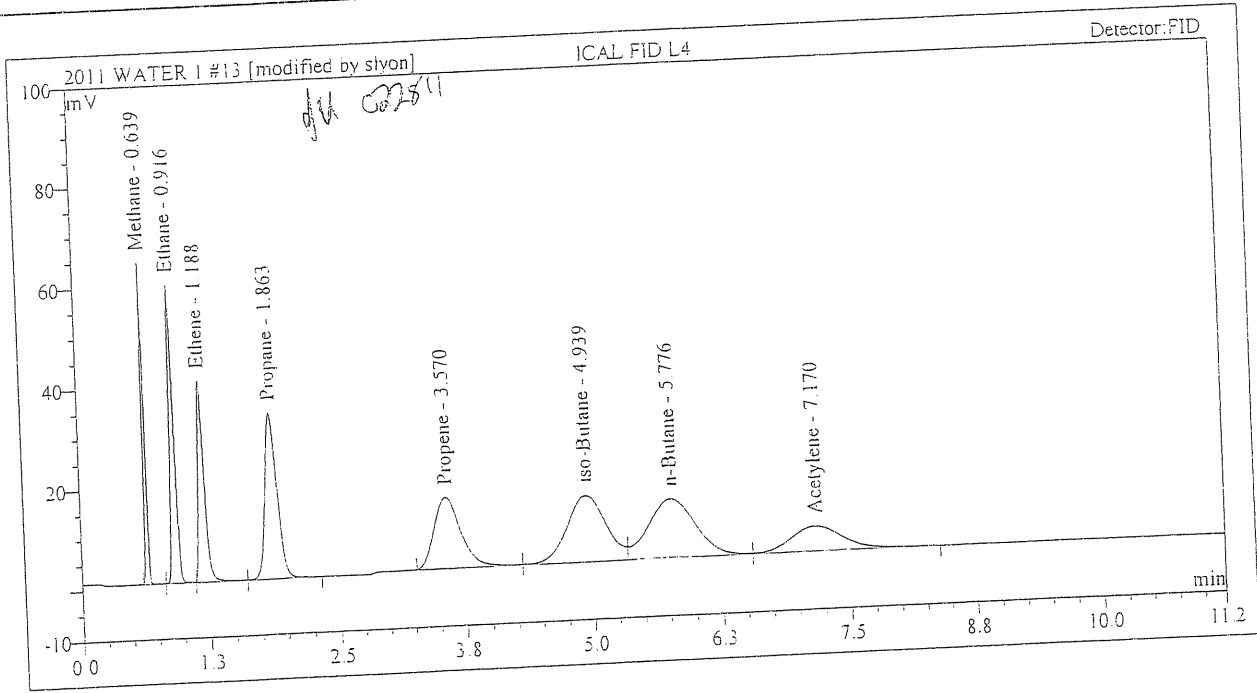
MICROSEEPS

Sample Analysis Report

Sample Name:	ICAL FID L4	Sequence No:	13
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	2/27/2011 13:57	Analytical Method:	AM20GAx/PM01
System Operator:	slyon	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Methane	0.639	1.737	63.898	BM *	2.5544
2	Ethane	0.916	3.049	59.260	M *	4.8000
3	Ethene	1.188	2.967	40.075	M *	5.1960
4	Propane	1.863	4.652	33.012	MB*	6.9899
5	Propene	3.570	4.321	14.169	BM *	7.1550
6	iso-Butane	4.939	5.886	13.216	M *	8.1008
7	n-Butane	5.776	6.178	11.716	M *	8.7167
8	Acetylene	7.170	2.904	4.988	MB*	13.3513

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO₂, O₂, N₂, CO mg/L)
 RGD UNITS (Hydrogen uM)



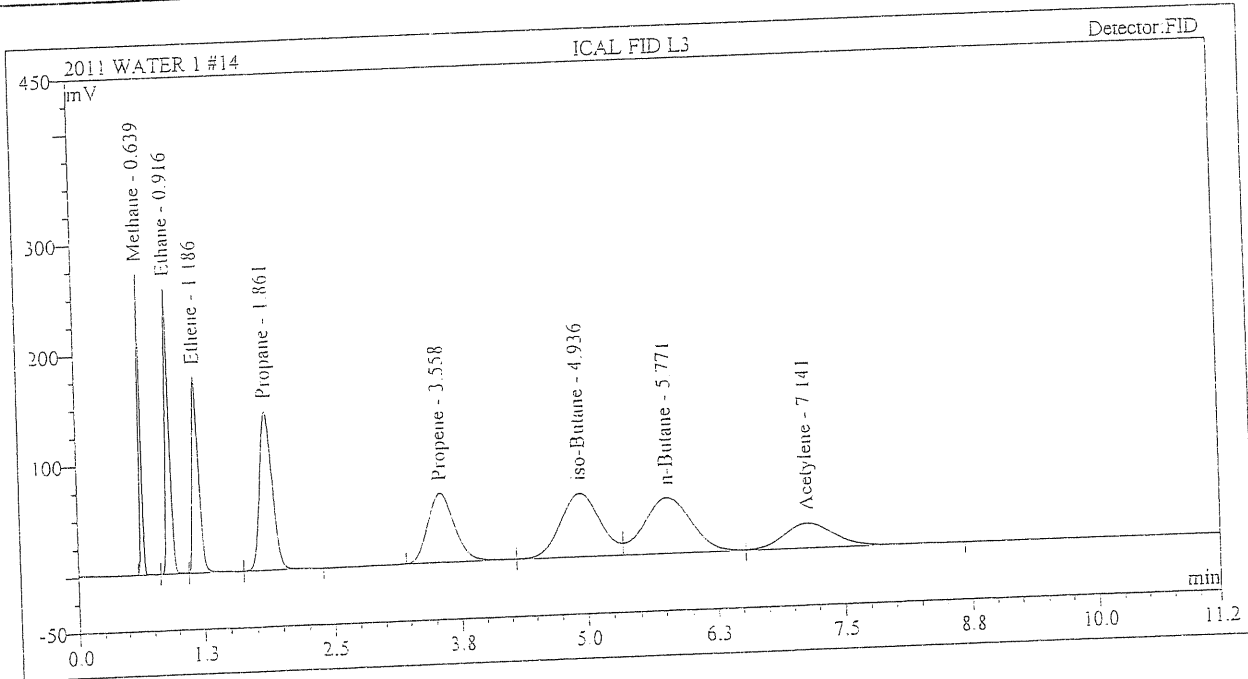
MICROSEEPS

Sample Analysis Report

Sample Name:	ICAL FID L3	Sequence No:	14
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	2/27/2011 14:12	Analytical Method:	AM20Gax/PM01
System Operator:	slyon	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Methane	0.639	7.380	271.997	BM	10.8506
2	Ethane	0.916	13.239	257.730	M	20.8395
3	Ethene	1.186	12.926	176.732	M	22.6400
4	Propane	1.861	20.111	142.962	MB	30.2163
5	Propene	3.558	18.822	62.336	BM	31.1683
6	iso-Butane	4.936	25.463	57.196	M	35.0454
7	n-Butane	5.771	26.307	50.251	M	37.1162
8	Acetylene	7.141	13.031	22.447	MB	59.9005

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO₂, O₂, N₂, CO mg/L)
 RGD UNITS (Hydrogen nM)



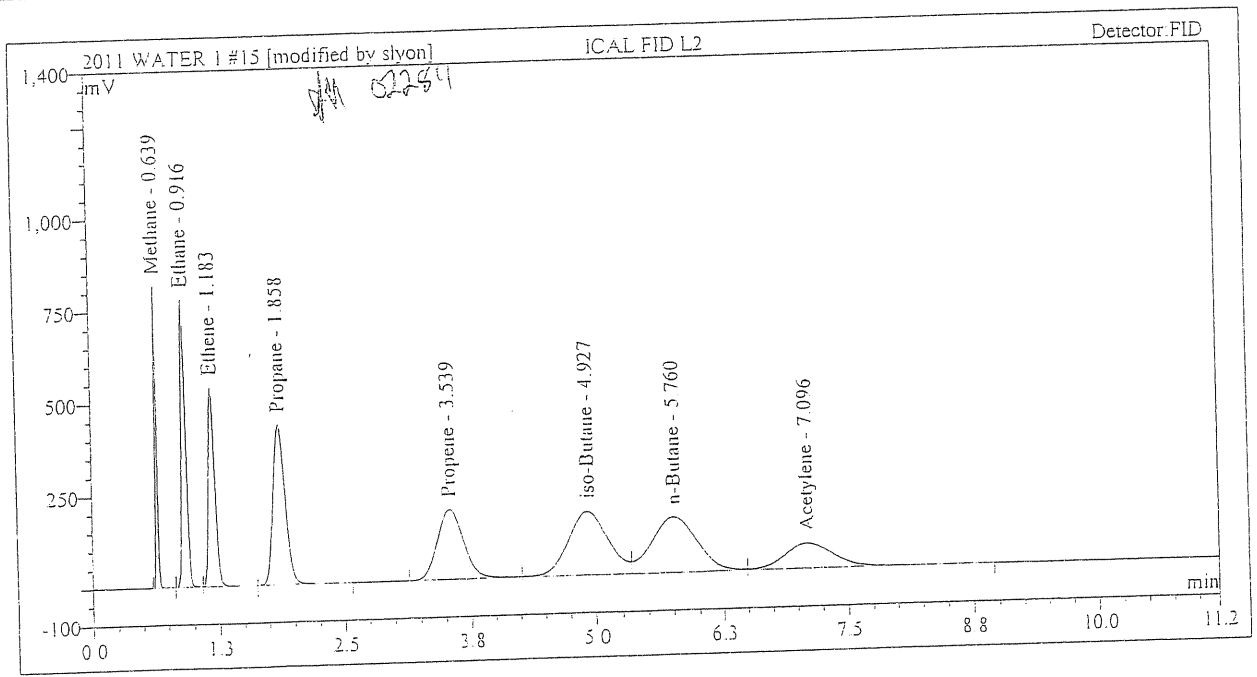
MICROSEEPS

Sample Analysis Report

Sample Name:	ICAL FID L2	Sequence No:	15
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	2/27/2011 14:24	Analytical Method:	AM20GAX/PM01
System Operator:	slyon	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Methane	0.639	22.201	816.969	BM	32.6397
2	Ethane	0.916	40.035	778.837	M	63.0213
3	Ethene	1.183	39.134	538.157	M	68.5460
4	Propane	1.858	60.888	433.288	MB	91.4848
5	Propene	3.539	57.030	189.999	BM *	94.4412
6	iso-Butane	4.927	76.913	172.926	M *	105.8559
7	n-Butane	5.760	79.222	151.452	M *	111.7711
8	Acetylene	7.096	40.095	69.323	MB*	184.3134

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



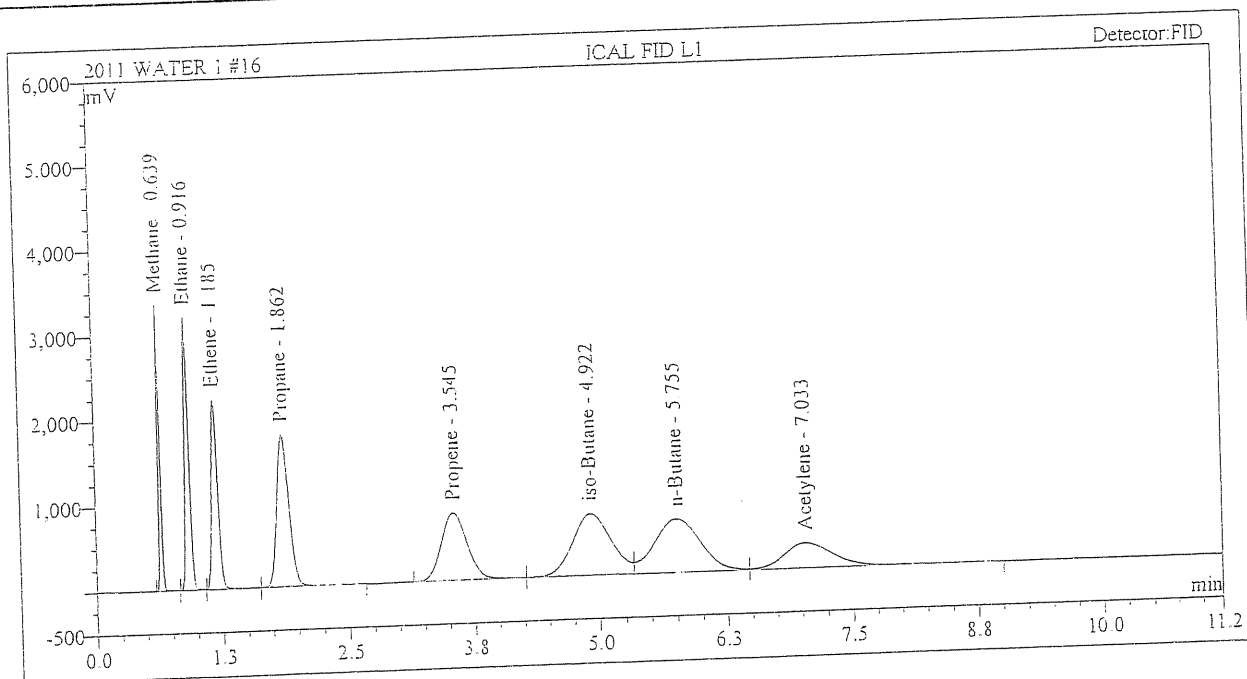
MICROSEEPS

Sample Analysis Report

Sample Name:	ICAL FID L1	Sequence No:	16
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	2/27/2011 14:36	Analytical Method:	AM20GAX/PM01
System Operator:	slyon	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Methane	0.639	91.547	3356.828	BM	134.5920
2	Ethane	0.916	165.472	3204.878	M	260.4798
3	Ethene	1.185	162.214	2225.253	M	284.1266
4	Propane	1.862	252.768	1790.788	MB	379.7844
5	Propene	3.545	237.795	795.669	BM	393.7844
6	iso-Butane	4.922	320.384	727.582	M	440.9445
7	n-Butane	5.755	331.144	633.284	M	467.1979
8	Acetylene	7.033	170.662	297.350	MB	784.5239

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



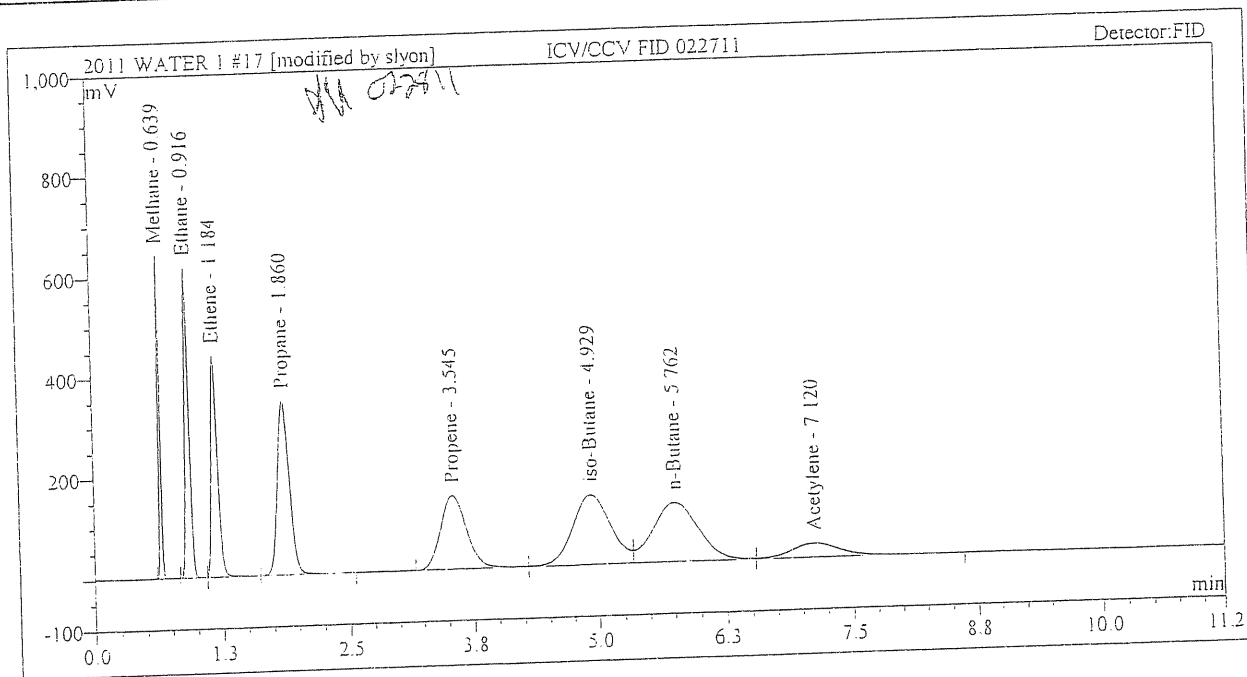
MICROSEEPS

Sample Analysis Report

Sample Name:	ICV/CCV FID 022711	Sequence No:	17
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1 0000
Date Time Collected:	2/27/2011 14:48	Analytical Method:	AM20GAX/PM01
System Operator:	slyon	Comment:	RA-08-11 1X

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount TV
1	Methane	0.639	17.469	642.190	BM	23 959 25.6824
2	Ethane	0.916	31.671	616.358	M	46 61 49.8557
3	Ethene	1.184	32.089	441.192	M	52.67 56.2051
4	Propane	1.860	48.681	346.254	MB	66 76 73.1425
5	Propene	3.545	43.985	146.472	BM *	73 91 72.8392
6	iso-Butane	4.929	61.392	138.416	M *	83.33 84.4936
7	n-Butane	5.762	61.768	117.946	M *	86 34 87.1464
8	Acetylene	7.120	16.575	28.622	MB*	74.87 76.1942

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO₂, O₂, N₂, CO mg/L)
 RGD UNITS (Hydrogen nM)



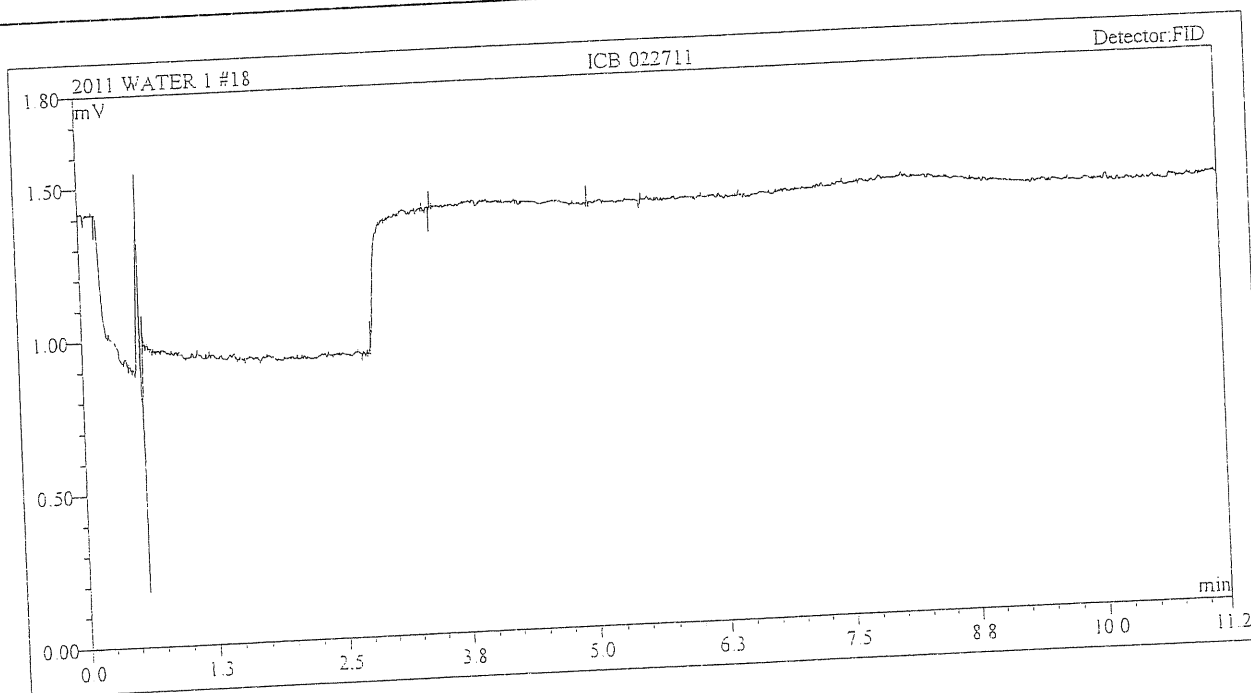
MICROSEEPS

Sample Analysis Report

Sample Name:	ICB 022711	Sequence No:	18
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	2/27/2011 15:09	Analytical Method:	AM20GAX/PM01
System Operator:	slyon	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
----------	----------------	----------------	-------------	-----------	------	--------

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



Permenant Gases

Method AM20GAX

12/8/2010

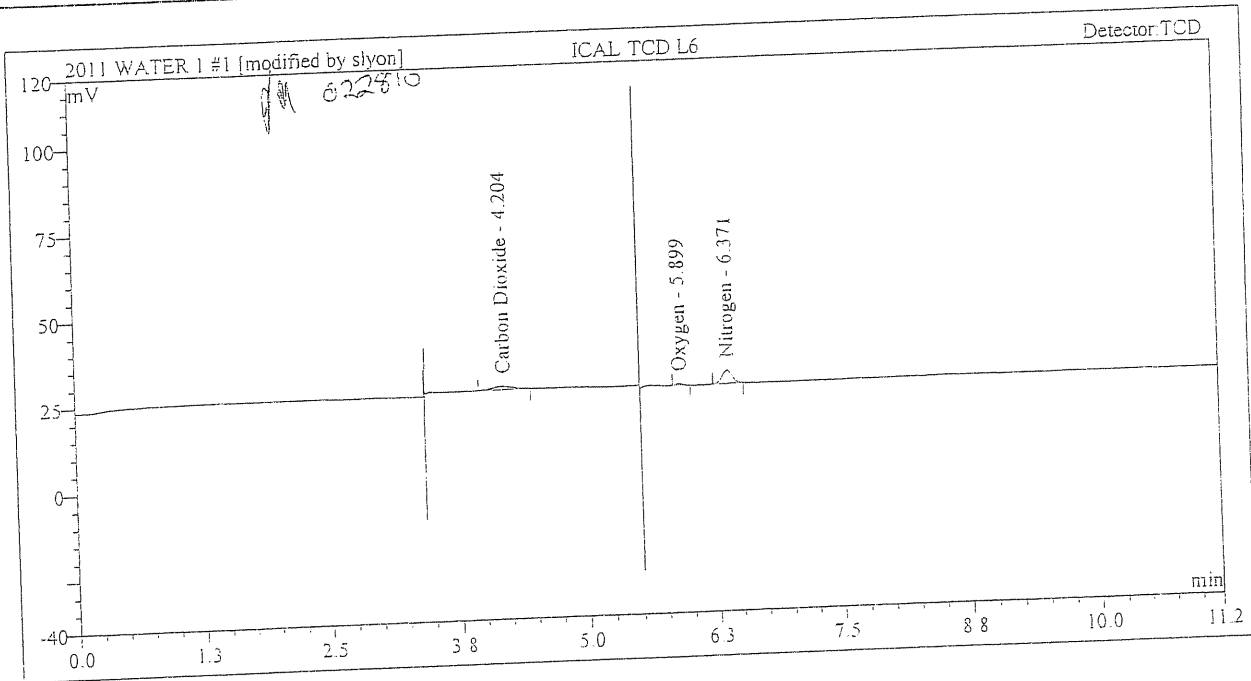
No.	Ret.Time min	Peak Name	Cal.Type	Points	R-Square %	Offset	Slope	Curve
1	4.01	Carbon Dioxide	Lin	6	99.895	0.00000	0.19574	0.00000
2	5.81	Oxygen	Lin	6	99.927	0.00000	0.27188	0.00000
3	6.15	Nitrogen	Lin	6	99.943	0.00000	0.34163	0.00000
4	7.63	Methane	Lin	5	99.931	0.00000	0.00051	0.00000
5	8.45	Carbon Monoxide	Lin	5	99.905	0.00000	0.33844	0.00000

MICROSEEPS Sample Analysis Report

Sample Name:	ICAL TCD L6	Sequence No:	1
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	12/8/2010 15:39	Analytical Method:	AM20GAX/PM01
System Operator:	slyon	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Carbon Dioxide	4.204	0.237	1.052	BMB*	1.2114
2	Oxygen	5.899	0.045	0.580	BMB*	0.1657
3	Nitrogen	6.371	0.482	3.994	BMB*	1.4105

FID UNITS (Methane thru Acetylene ug/L)
TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
RGD UNITS (Hydrogen nM)



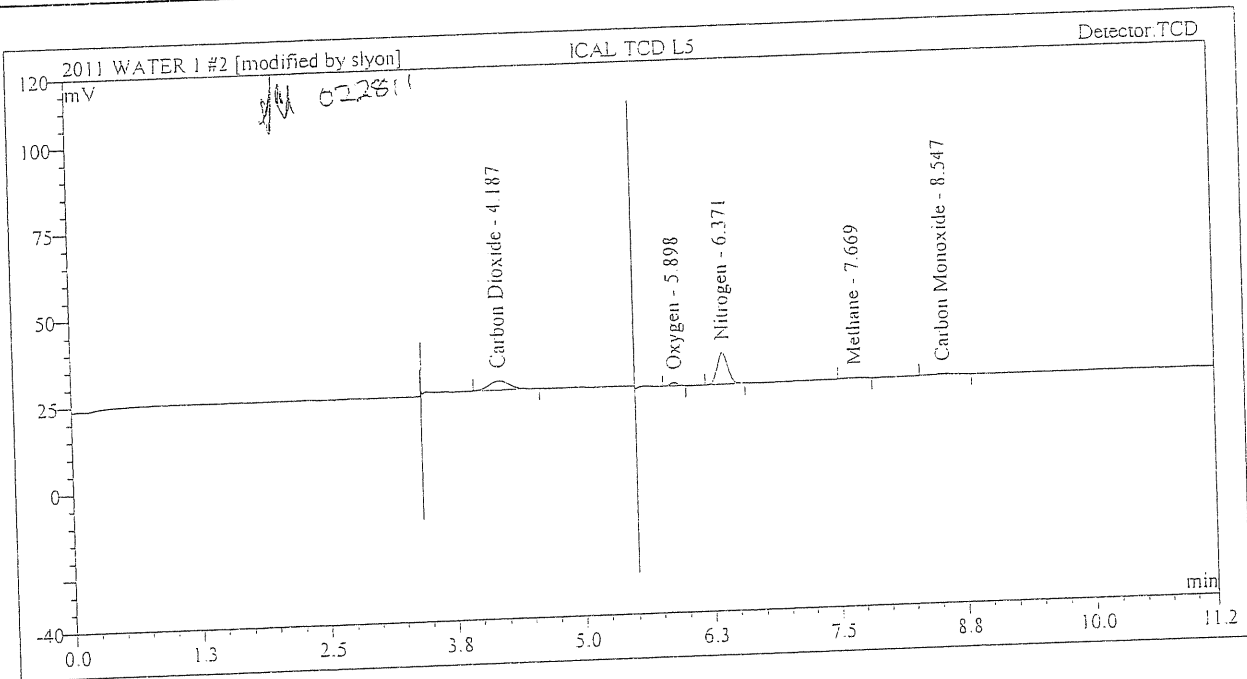
MICROSEEPS

Sample Analysis Report

Sample Name:	ICAL TCD L5	Sequence No:	2
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	12/8/2010 15:54	Analytical Method:	AM20GAX/PM01
System Operator:	slyon	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Carbon Dioxide	4.187	0.619	2.671	BMB	3.1635
2	Oxygen	5.898	0.093	1.046	BMB*	0.3437
3	Nitrogen	6.371	1.140	9.261	BMB*	3.3365
4	Methane	7.669	0.055	0.302	BMB*	106.9470
5	Carbon Monoxide	8.547	0.100	0.398	BMB*	0.2952

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



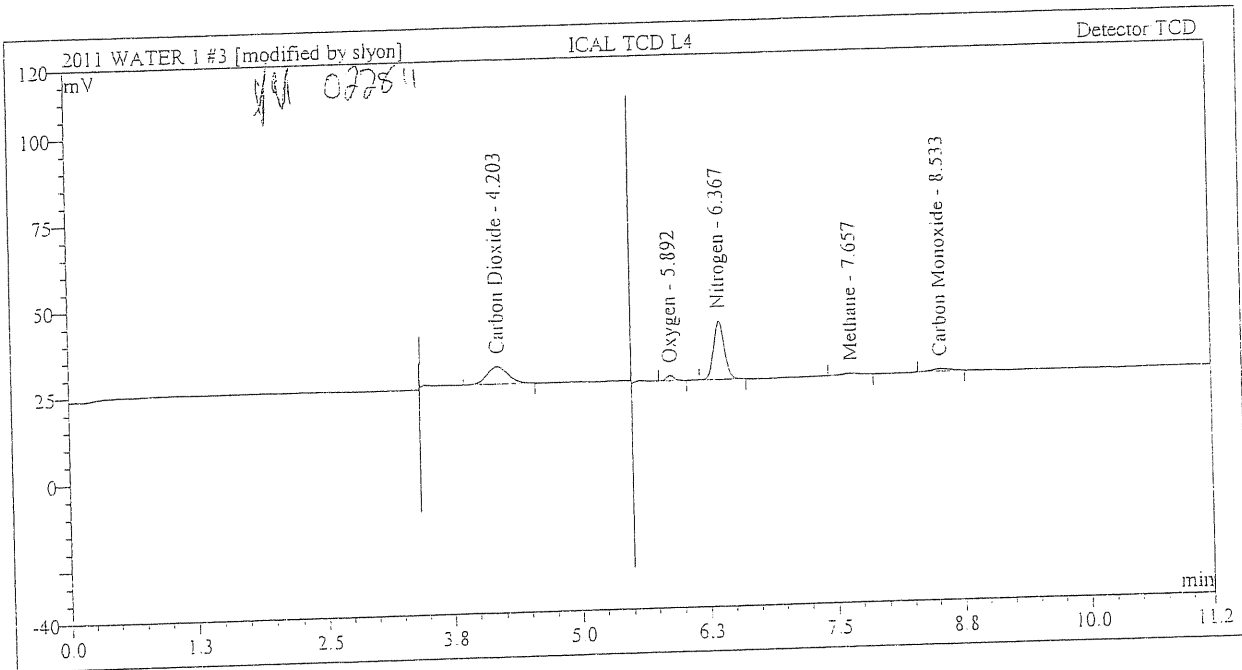
MICROSEEPS

Sample Analysis Report

Sample Name:	ICAL TCD L4	Sequence No:	3
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	12/8/2010 16:13	Analytical Method:	AM20GAX/PM01
System Operator:	slyon	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Carbon Dioxide	4.203	1.217	5.148	BMB	6.2172
2	Oxygen	5.892	0.146	1.624	BMB	0.5379
3	Nitrogen	6.367	2.117	17.025	BMB	6.1964
4	Methane	7.657	0.099	0.535	BMB	193.4061
5	Carbon Monoxide	8.533	0.171	0.757	BMB*	0.5041

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO₂, O₂, N₂, CO mg/L)
 RGD UNITS (Hydrogen nM)



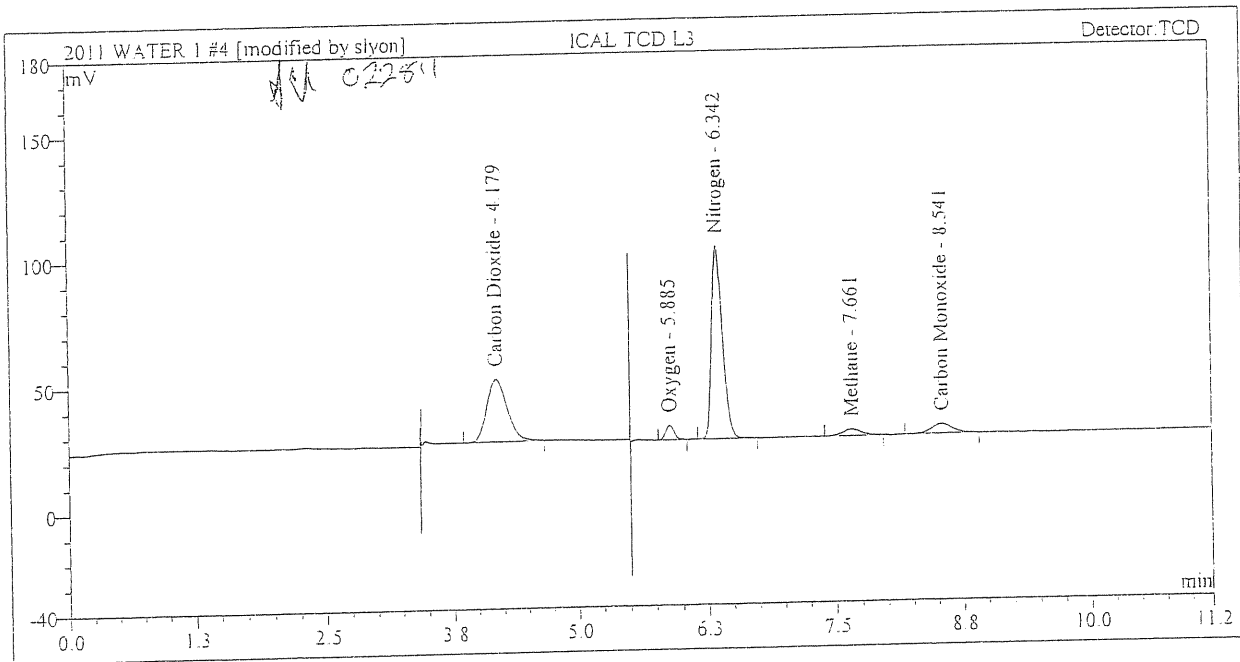
MICROSEEPS

Sample Analysis Report

Sample Name:	ICAL TCD L3	Sequence No:	4
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	12/8/2010 16:26	Analytical Method:	AM20GAX/PM01
System Operator:	slyon	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Carbon Dioxide	4.179	5.865	24.846	BMB	29.9643
2	Oxygen	5.885	0.536	5.886	BMB*	1.9731
3	Nitrogen	6.342	9.592	76.472	BMB*	28.0779
4	Methane	7.661	0.559	2.682	BMB	1092.9680
5	Carbon Monoxide	8.541	0.964	3.898	BMB*	2.8479

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



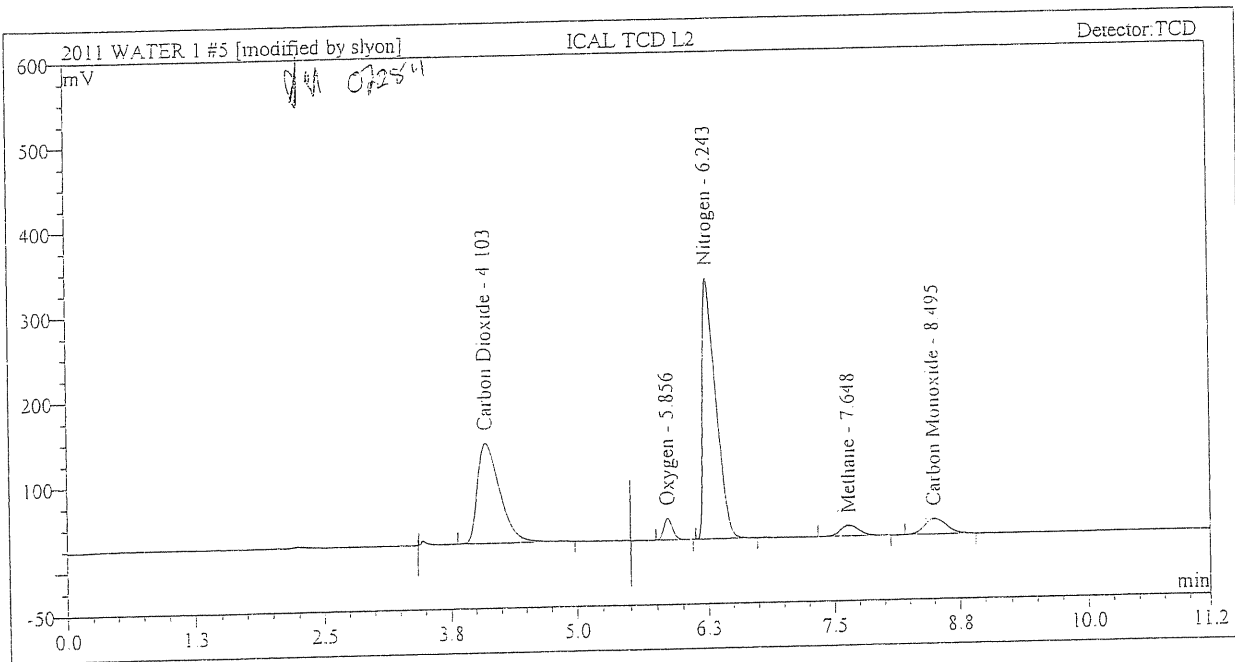
MICROSEEPS

Sample Analysis Report

Sample Name:	ICAL TCD L2	Sequence No:	5
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	12/8/2010 16.42	Analytical Method:	AM20GAX/PM01
System Operator:	slyon	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Carbon Dioxide	4.103	29.676	117.535	BMB	151.6092
2	Oxygen	5.856	2.536	25.826	BMB	9.3278
3	Nitrogen	6.243	46.350	306.963	BMB*	135.6723
4	Methane	7.648	2.696	12.833	BMB*	5269.5814
5	Carbon Monoxide	8.495	4.686	18.527	BMB*	13.8461

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



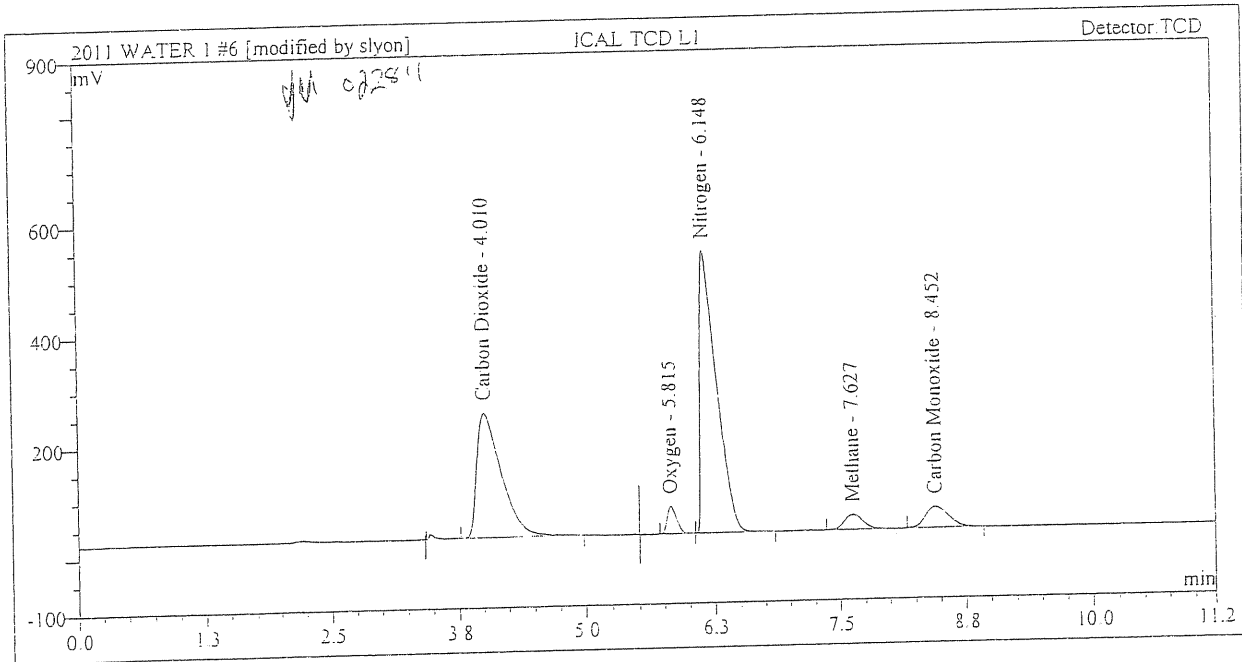
MICROSEEPS

Sample Analysis Report

Sample Name:	ICAL TCD L1	Sequence No:	6
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	12/8/2010 16:54	Analytical Method:	AM20GAX/PM01
System Operator:	slyon	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Carbon Dioxide	4.010	63.374	225.570	BMB	323.7730
2	Oxygen	5.815	5.323	49.868	BMB*	19.5779
3	Nitrogen	6.148	97.322	509.716	bMB*	284.8729
4	Methane	7.627	5.675	26.889	BMB	11091.2649
5	Carbon Monoxide	8.452	9.949	37.755	BMB*	29.3967

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



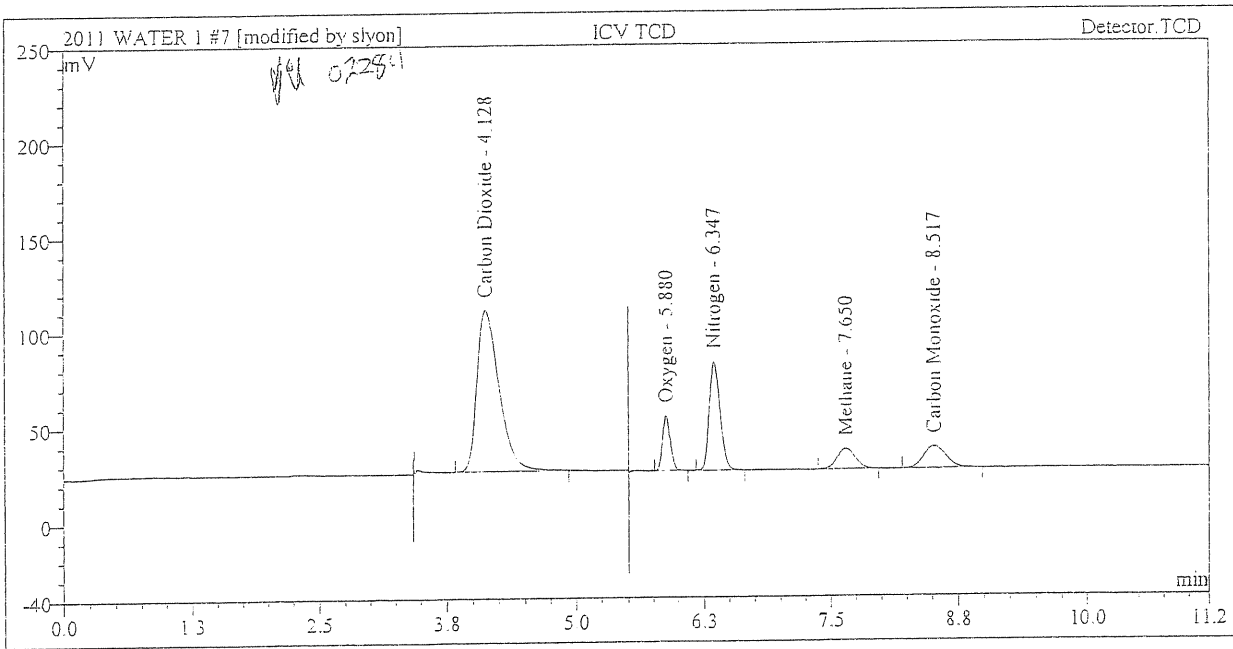
MICROSEEPS

Sample Analysis Report

Sample Name:	ICV TCD	Sequence No:	7
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	12/8/2010 17:08	Analytical Method:	AM20GAX/PM01
System Operator:	slyon	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Carbon Dioxide	4.128	20.845	84.641	BMB	106.4952
2	Oxygen	5.880	2.629	28.968	BMB*	9.6694
3	Nitrogen	6.347	7.022	57.189	BMB*	20.5552
4	Methane	7.650	2.213	10.695	BMB	4326.1260
5	Carbon Monoxide	8.517	2.898	11.553	BMB	8.5637

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



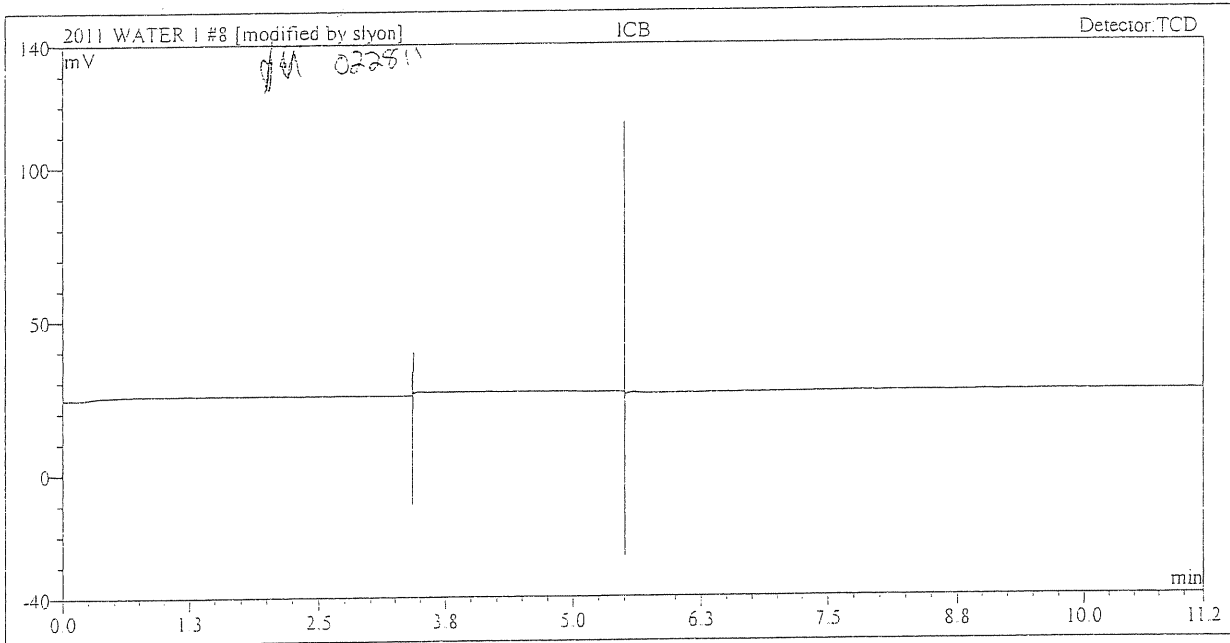
MICROSEEPS

Sample Analysis Report

Sample Name:	ICB	Sequence No:	8
Sequence Name:	2011 WATER 1	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1 0000
Date Time Collected:	12/8/2010 17:20	Analytical Method:	AM20GAX/PM01
System Operator:	slyon	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
----------	----------------	----------------	-------------	-----------	------	--------

FID UNITS (Methane thru Acetylene ug/L)
TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
RGD UNITS (Hydrogen nM)



Risk Department
Case Narrative

Batch number: M110627005^{PG}
M110627025^{LHC}

Original Run Date: 6-27-11

Sample numbers: P1106206(1-10) CO₂
P1106207(1-3) M_eCO₂
P1106208(1-5) CO₂
P1106223(1-2) M CO₂

Matrix: WATER Am20

FDP →

Out of Control Event: (attach another page, if necessary) NONE

Corrective Action Taken: NONE

Result: N/A

Observations to support use of data: (Note any occurrences of manual integration here)

Samples required manual integration to repair baseline inaccuracies inherent to the software/program

Manual Integration Checklist and Approval

- Manual Integration approved? Yes No
- Satisfactorily documented on this narrative?
- Manually integrated chromatogram initialed and dated by analyst?

[Signature] 062811
Signature Lead Analyst or Lab. Mgr. Date

Analyzed & Reviewed by: GMT Date 6-27-11
 Manual Integration Conducted? YES NO
 (Circle One)
 Reviewed by: RAW Date: 062811
 Reviewed & Entered by: UPLOAD Date: 6-27-11
 Reviewed by: [Signature] Date: 062811
 Corrected by: _____ Date: _____

WATER

DATE: 6-27-11

RA-10-04	CCV - (IX) TV	-FID %R	CCV - (IX) TV	- FID %R	CCV - (IX) TV	- FID %R
Methane	24.7	101	12.55	99	24.7	102
Ethane	46.51	102	23.26	102	46.51	103
Ethane	52.51	102	26.25	101	52.51	103
Propane	66.63	104	33.32	104	66.63	105
Propane	73.69	93	36.84	96	73.69	92
iso-butane	82.90	97	41.45	85	82.90	97
n-butane	85.71	94	42.86	97	85.71	94
Acetylene	75.18	99	37.59	99	75.18	99

RA-09-07	CCV -	- TCD	CCV -	- TCD	CCV -	- TCD
CO ₂	107	101	5350	101	107	105
O ₂	9.79	105	4.96	102	9.79	105
N ₂	20.38	107	10.19	106	20.38	109
HC	4294	103	2147	108	4294	104
CO	8.34	102	4.17	104	8.34	104

LCS-HIGH	TV	LCS 420° %R	LCS %R
Ethane	45.0	103	107
Ethane	40.8	104	109
Propane	67.2	100	105
Propane	60.1	91	94
iso-butane	82.1	99	102
n-butane	84.6	97	99
Acetylene	36.1	109	110
CO ₂	129.3	107	111
Methane	82.5	103	111
CO	2.17	102	110

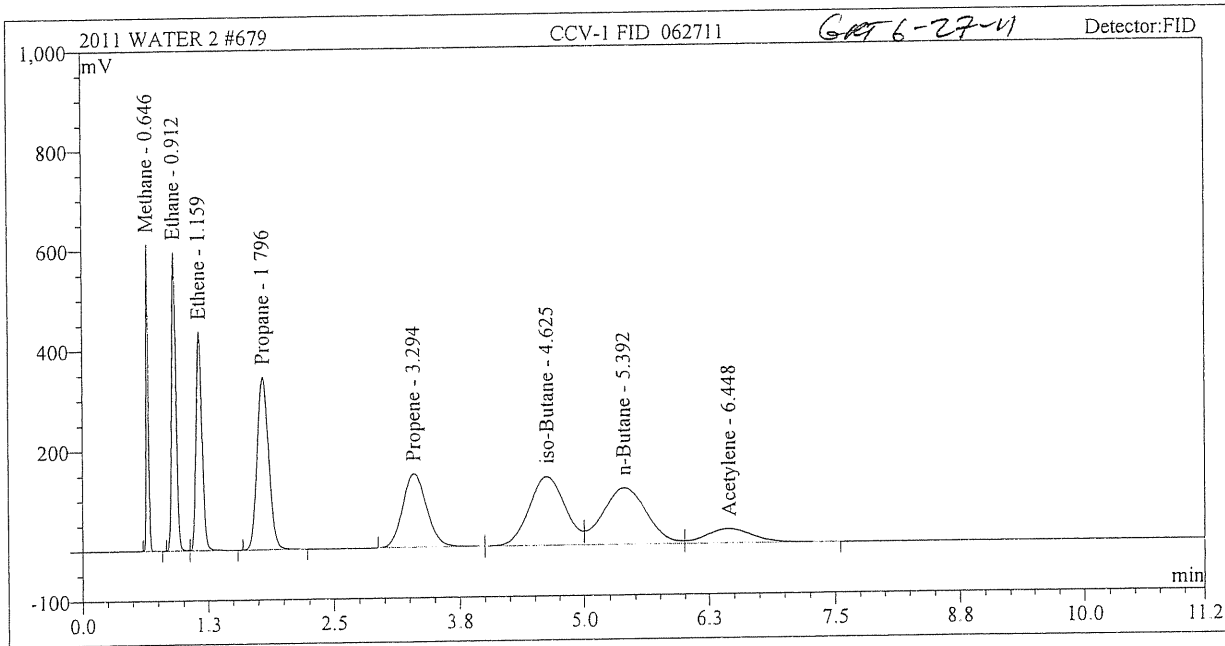
MICROSEEPS

Sample Analysis Report

Sample Name:	CCV-1 FID 062711	Sequence No:	679
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 8:43	Analytical Method:	AM20GAx/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount TV	
1	Methane	0.646	16.896	612.757	BMB	24.7	24.8401
2	Ethane	0.912	30.268	596.519	BM	46.51	47.6471
3	Ethene	1.159	30.663	437.162	MB	52.51	53.7084
4	Propane	1.796	46.112	344.721	BMB	66.63	69.2832
5	Propene	3.294	41.495	148.146	BM	73.69	68.7155
6	iso-Butane	4.625	58.392	138.395	M	82.90	80.3646
7	n-Butane	5.392	57.221	113.745	M	85.71	80.7311
8	Acetylene	6.448	16.219	29.547	MB	75.18	74.5565

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



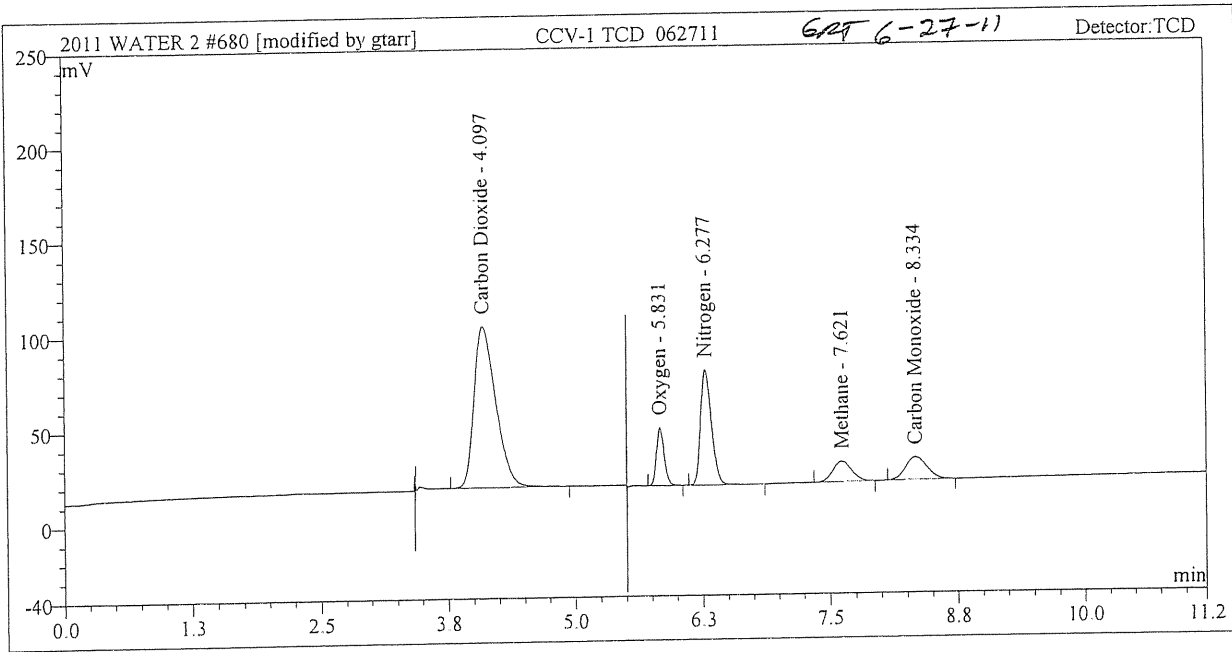
MICROSEEPS

Sample Analysis Report

Sample Name:	CCV-1 TCD 062711	Sequence No:	680
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 8:55	Analytical Method:	AM20GAX/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount TV	Amount
1	Carbon Dioxide	4.097	21.208	85.024	BMB	107	108.3480
2	Oxygen	5.831	2.806	30.514	BMB	9.79	10.3199
3	Nitrogen	6.277	7.426	60.696	BMB	20.38	21.7367
4	Methane	7.621	2.268	10.781	BMB*	4294	4432.4279
5	Carbon Monoxide	8.334	2.874	11.965	BMB*	8.34	8.4934

FID UNITS (Methane thru Acetylene ug/L)
TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
RGD UNITS (Hydrogen nM)



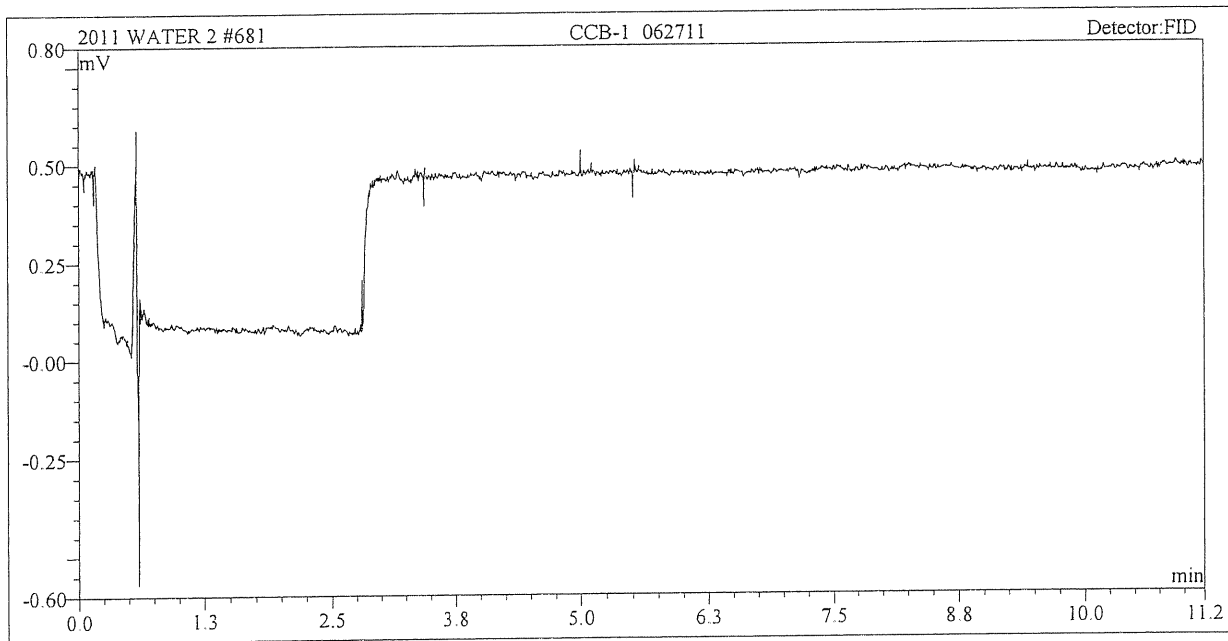
MICROSEEPS

Sample Analysis Report

Sample Name:	CCB-1 062711	Sequence No:	681
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 9:10	Analytical Method:	AM20GAX/PM01
System Operator:	qtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
----------	----------------	----------------	-------------	-----------	------	--------

FID UNITS (Methane thru Acetylene ug/L)
TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
RGD UNITS (Hydrogen nM)



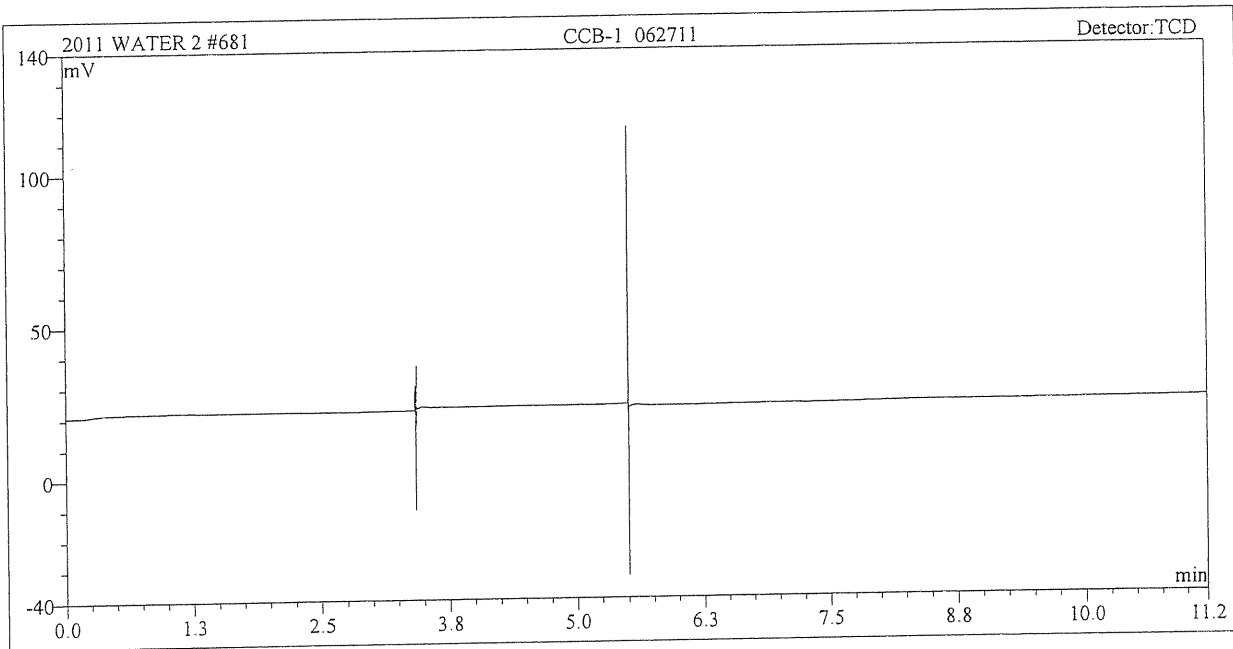
MICROSEEPS

Sample Analysis Report

Sample Name:	CCB-1 062711	Sequence No:	681
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 9:10	Analytical Method:	AM20GAx/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
----------	----------------	----------------	-------------	-----------	------	--------

FID UNITS (Methane thru Acetylene ug/L)
TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
RGD UNITS (Hydrogen nM)



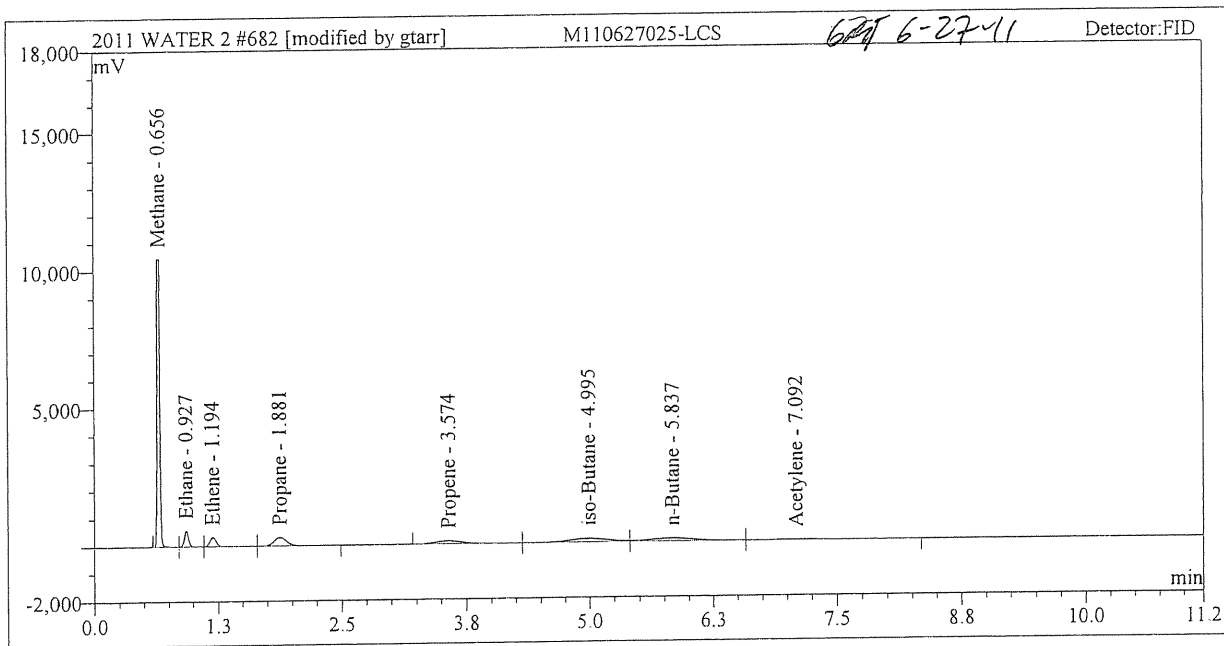
MICROSEEPS

Sample Analysis Report

Sample Name:	M110627025-LCS	Sequence No:	682
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 9:23	Analytical Method:	AM20GAX/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount TV
1	Methane	0.656	384.046	10437.505	BM	564.6217
2	Ethane	0.927	29.405	573.162	M	45.0 46.2882
3	Ethene	1.194	24.292	332.098	M	40.8 42.5490
4	Propane	1.881	44.933	313.103	MB	67.2 67.5126
5	Propene	3.574	32.849	107.741	BM *	60.1 54.3972
6	iso-Butane	4.995	58.939	130.551	M	82.1 81.1174
7	n-Butane	5.837	58.034	108.371	M *	84.6 81.8776
8	Acetylene	7.092	8.575	14.762	MB*	36.1 39.4181

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



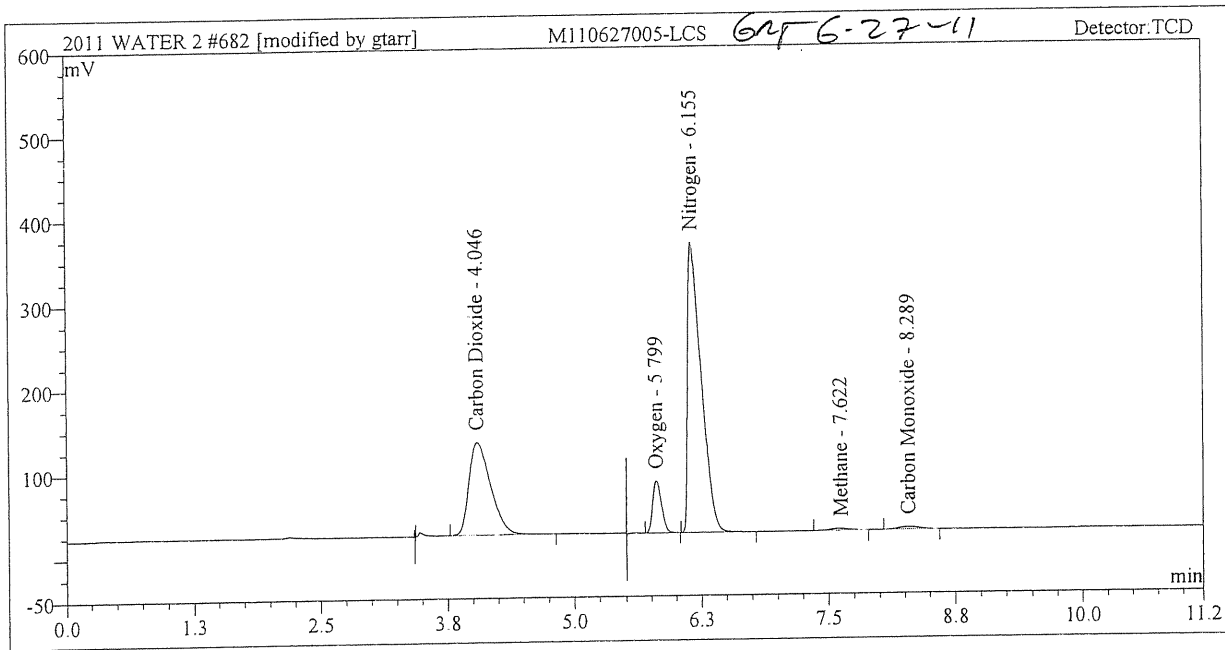
MICROSEEPS

Sample Analysis Report

Sample Name:	M110627005-LCS	Sequence No:	682
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 9:23	Analytical Method:	AM20GAX/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Carbon Dioxide	4.046	27.117	109.551	BMB	129.3 138.5403
2	Oxygen	5.799	6.352	61.601	BMB	23.3617
3	Nitrogen	6.155	53.418	342.877	BMB	156.3619
4	Methane	7.622	0.434	2.094	BMB*	825 847.4511
5	Carbon Monoxide	8.289	0.749	3.111	BMB*	2.17 2.2126

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



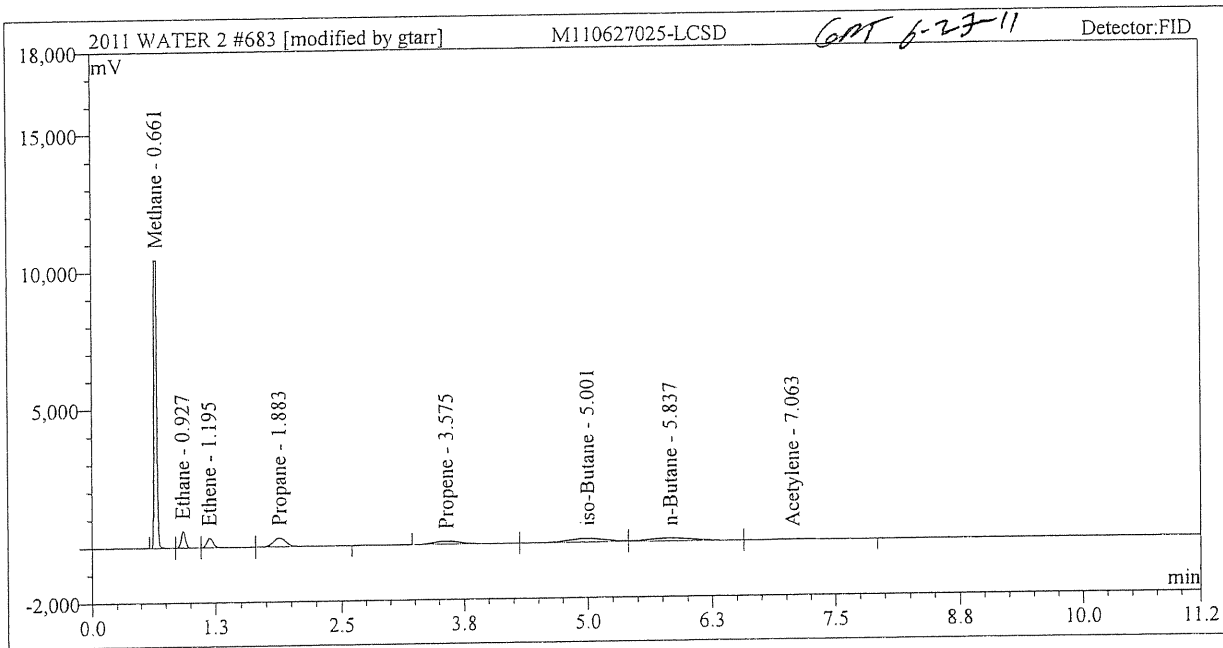
MICROSEEPS

Sample Analysis Report

Sample Name:	M110627025-LCSD	Sequence No:	683
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 9:37	Analytical Method:	AM20GAX/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount TV
1	Methane	0.661	389.125	10437.419	BM	-572.0893
2	Ethane	0.927	30.656	598.317	M	45.0 48.2568
3	Ethene	1.195	25.429	347.679	M	40.3 44.5406
4	Propane	1.883	46.772	325.620	MB	67.2 70.2748
5	Propene	3.575	34.124	112.297	BM *	60.1 56.5095
6	iso-Butane	5.001	61.035	135.697	M *	82.1 84.0021
7	n-Butane	5.837	59.311	111.903	M *	84.6 83.6793
8	Acetylene	7.063	8.603	15.252	MB*	36.1 39.5474

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



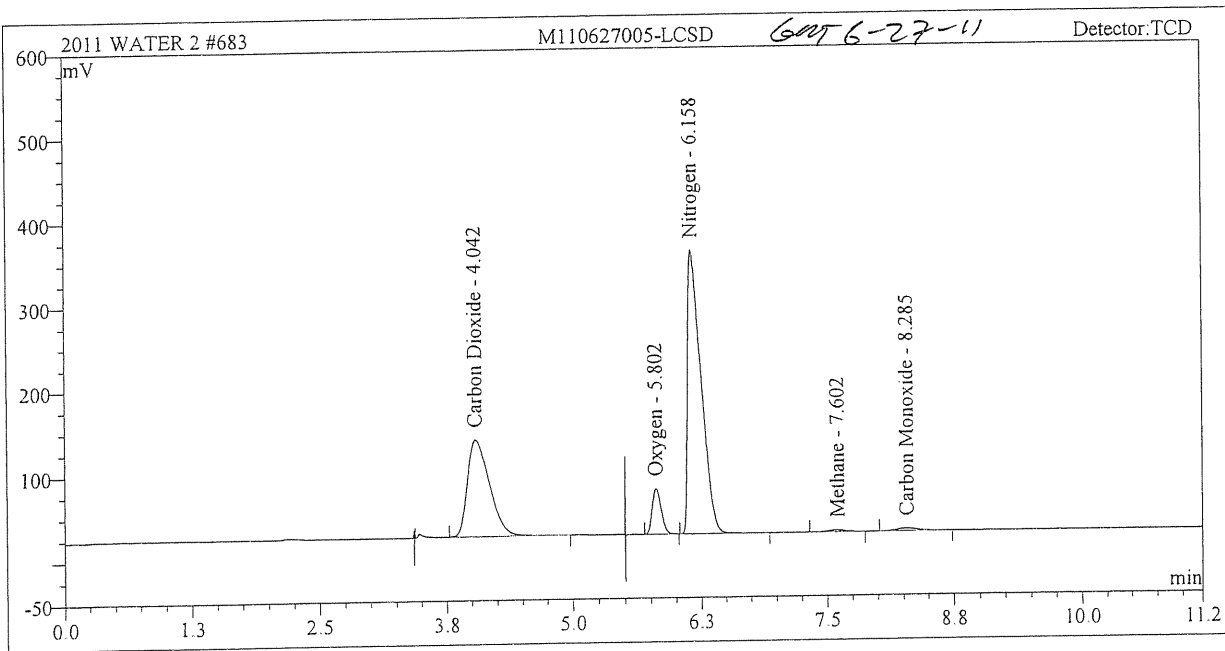
MICROSEEPS

Sample Analysis Report

Sample Name:	M110627005-LCSD	Sequence No:	683
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 9:37	Analytical Method:	AM20GAX/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Carbon Dioxide	4.042	28.114	113.236	BMB	<i>TV</i> 143.6318
2	Oxygen	5.802	5.486	53.564	BMB	20.1767
3	Nitrogen	6.158	51.618	334.752	BMB	151.0916
4	Methane	7.602	0.467	2.237	BMB	<i>825</i> 913.2701
5	Carbon Monoxide	8.285	0.810	3.279	BMB	<i>2.17</i> 2.3921

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



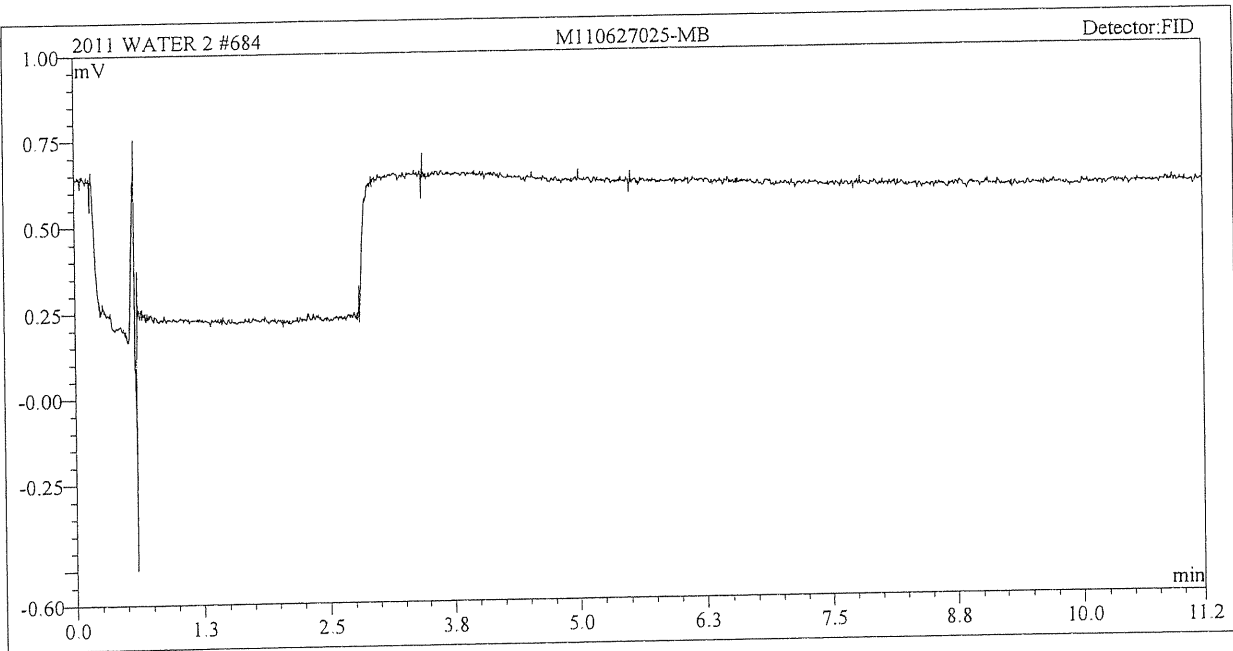
MICROSEEPS

Sample Analysis Report

Sample Name:	M110627025-MB	Sequence No:	684
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 9:56	Analytical Method:	AM20GAX/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
----------	----------------	----------------	-------------	-----------	------	--------

FID UNITS (Methane thru Acetylene ug/L)
TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
RGD UNITS (Hydrogen nM)



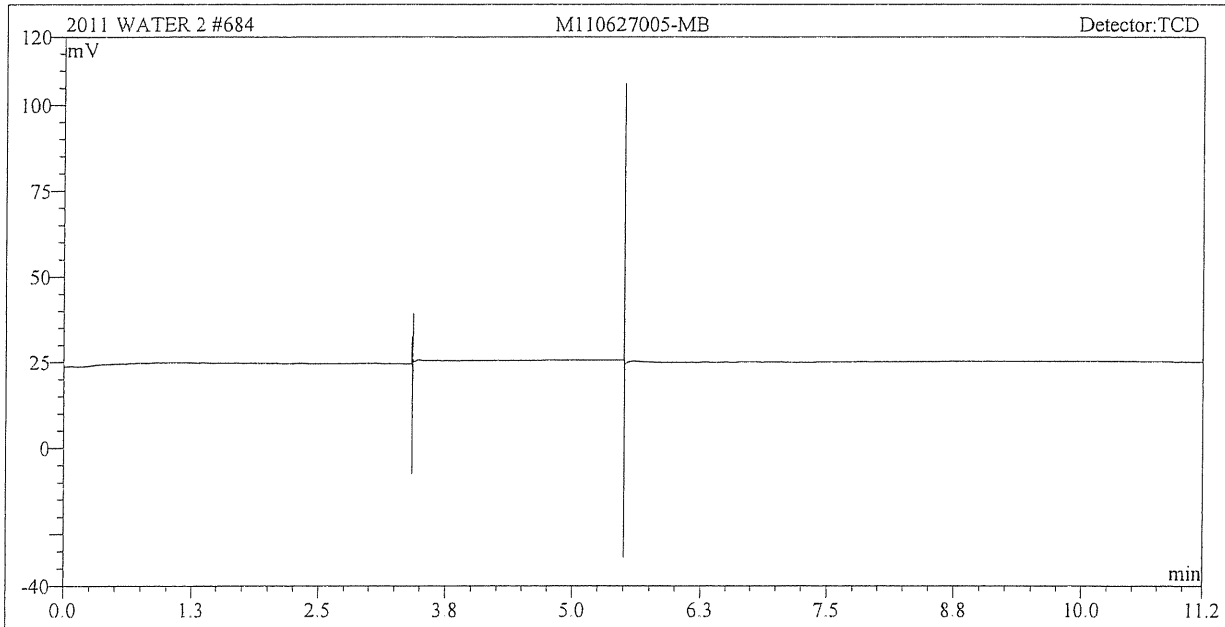
MICROSEEPS

Sample Analysis Report

Sample Name:	M110627005-MB	Sequence No:	684
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 9:56	Analytical Method:	AM20GAx/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
----------	----------------	----------------	-------------	-----------	------	--------

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



MICROSEEPS

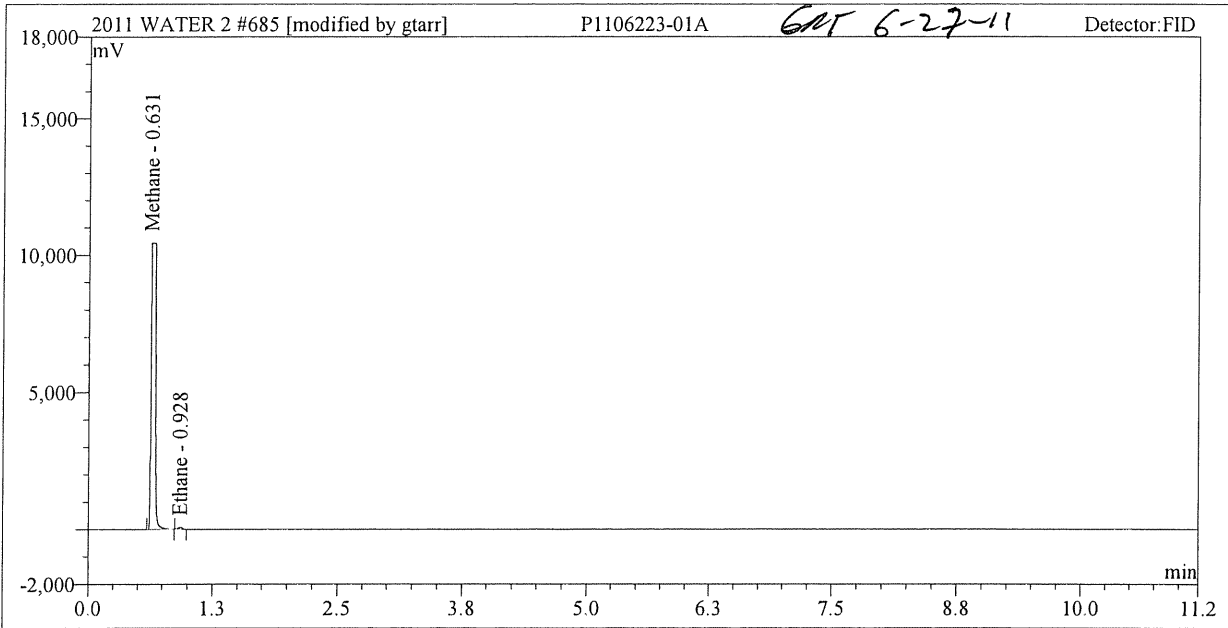
Sample Analysis Report

Sample Name:	P1106223-01A	Sequence No:	685
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 10:09	Analytical Method:	AM20GAX/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Methane	0.631	563.577	10436.204	BMB*	828.5670
2	Ethane	0.928	3.366	70.176	BMB*	5.2990

1

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



1 This sample experienced saturated Methane peak.
 Refer to TCD for a reportable Methane concentration.

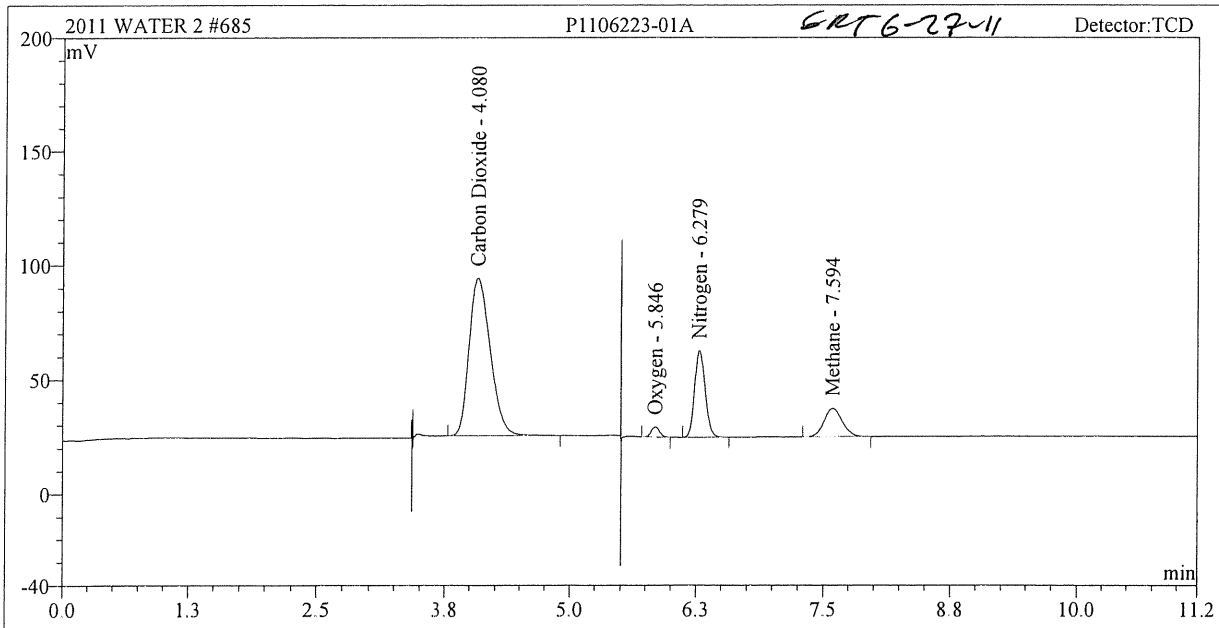
MICROSEEPS

Sample Analysis Report

Sample Name:	P1106223-01A	Sequence No:	685
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 10:09	Analytical Method:	AM20GAx/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Carbon Dioxide	4.080	16.718	68.911	BMB	85.4111
2	Oxygen	5.846	0.409	4.465	BMB	1.5051
3	Nitrogen	6.279	4.595	37.883	BMB	13.4512
4	Methane	7.594	2.621	12.466	BMB	5122.9721

FID UNITS (Methane thru Acetylene ug/L)
TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
RGD UNITS (Hydrogen nM)



MICROSEEPS

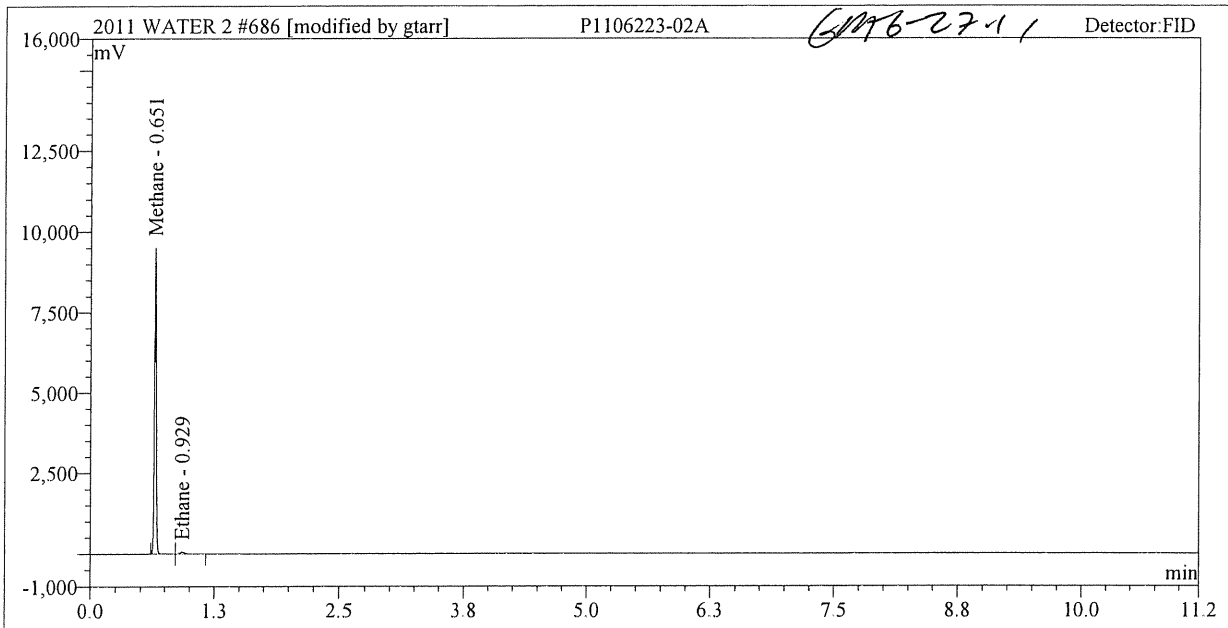
Sample Analysis Report

Sample Name:	P1106223-02A	Sequence No:	686
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 10:22	Analytical Method:	AM20GAx/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Methane	0.651	228.028	9509.042	BM *	335.2451
2	Ethane	0.929	3.106	60.484	MB*	4.8892

1

FID UNITS (Methane thru Acetylene ug/L)
TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
RGD UNITS (Hydrogen nM)



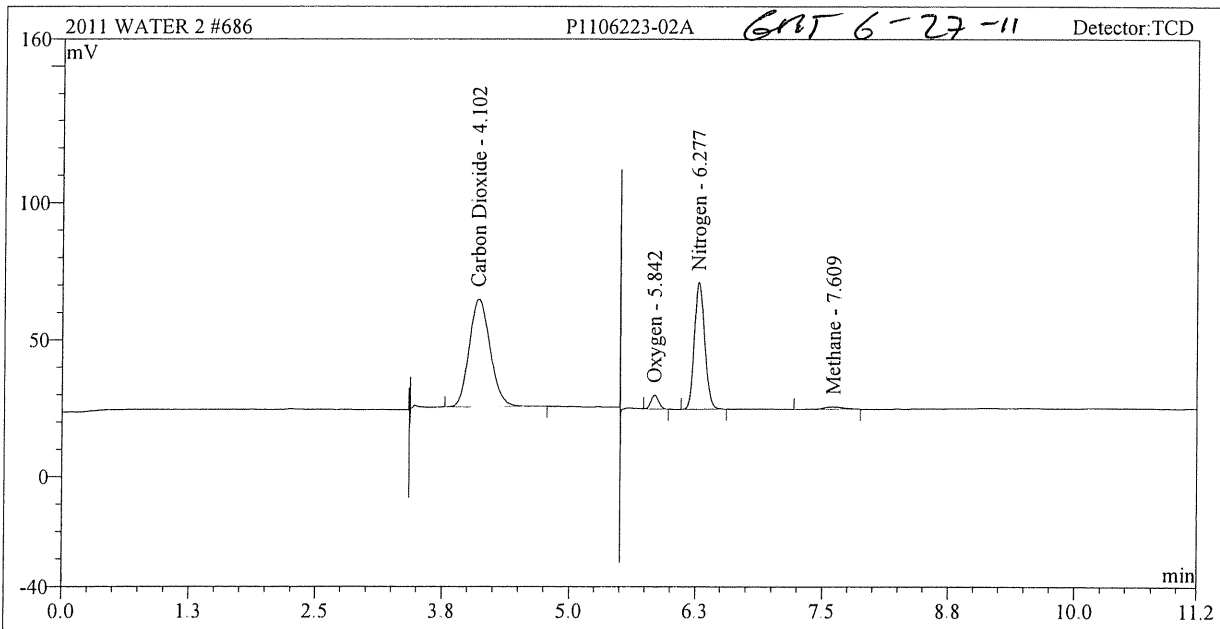
MICROSEEPS

Sample Analysis Report

Sample Name:	P1106223-02A	Sequence No:	686
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 10:22	Analytical Method:	AM20GAx/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Carbon Dioxide	4.102	9.436	39.321	BMB	48.2052
2	Oxygen	5.842	0.463	5.085	BMB	1.7025
3	Nitrogen	6.277	5.647	46.315	BMB	16.5295
4	Methane	7.609	0.203	0.890	BMB	397.0814

FID UNITS (Methane thru Acetylene ug/L)
TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
RGD UNITS (Hydrogen nM)



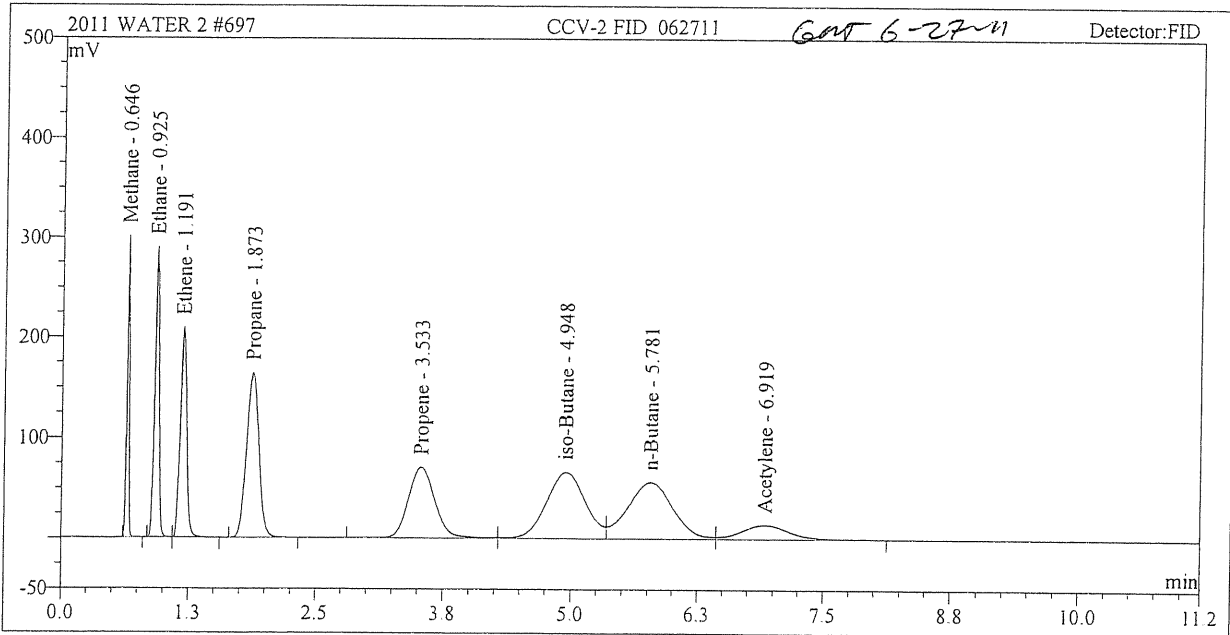
MICROSEEPS

Sample Analysis Report

Sample Name:	CCV-2 FID 062711	Sequence No:	697
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 12:47	Analytical Method:	AM20Gax/PM01
System Operator:	qtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Methane	0.646	8.324	301.075	BMB	<i>12.35</i> 12.2383
2	Ethane	0.925	15.016	289.813	BM	<i>23.26</i> 23.6380
3	Ethene	1.191	15.201	209.400	MB	<i>26.25</i> 26.6249
4	Propane	1.873	22.996	163.907	BMB	<i>33.32</i> 34.5519
5	Propene	3.533	21.391	70.609	BM	<i>36.84</i> 35.4234
6	iso-Butane	4.948	29.304	66.154	M	<i>41.45</i> 40.3308
7	n-Butane	5.781	29.396	56.498	M	<i>42.86</i> 41.4740
8	Acetylene	6.919	8.091	14.580	MB	<i>37.59</i> 37.1932

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



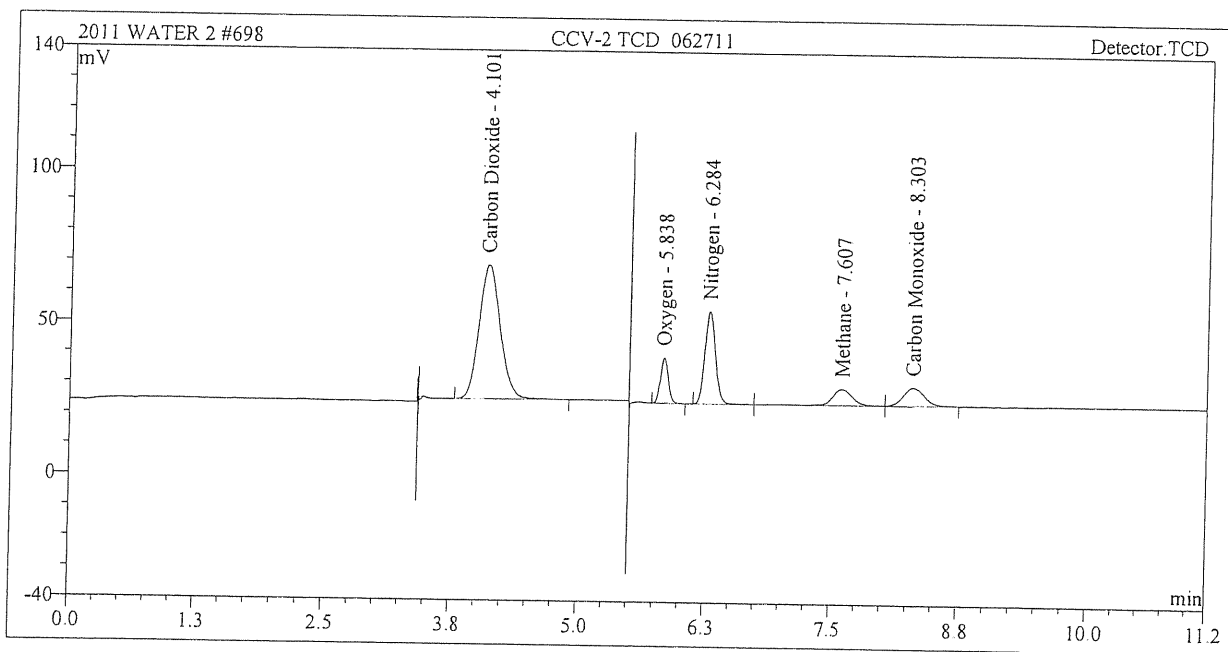
MICROSEEPS

Sample Analysis Report

Sample Name:	CCV-2 TCD 062711	Sequence No:	698
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 13:00	Analytical Method:	AM20GAx/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Carbon Dioxide	4.101	10.613	43.922	BMB	<i>TV</i> 53.50 54.2197
2	Oxygen	5.838	1.371	14.904	BMB	4.96 5.0424
3	Nitrogen	6.284	3.696	30.315	BM	10.19 10.8174
4	Methane	7.607	1.191	5.378	M	2.147 2328.2748
5	Carbon Monoxide	8.303	1.463	6.055	MB	4.17 4.3218

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



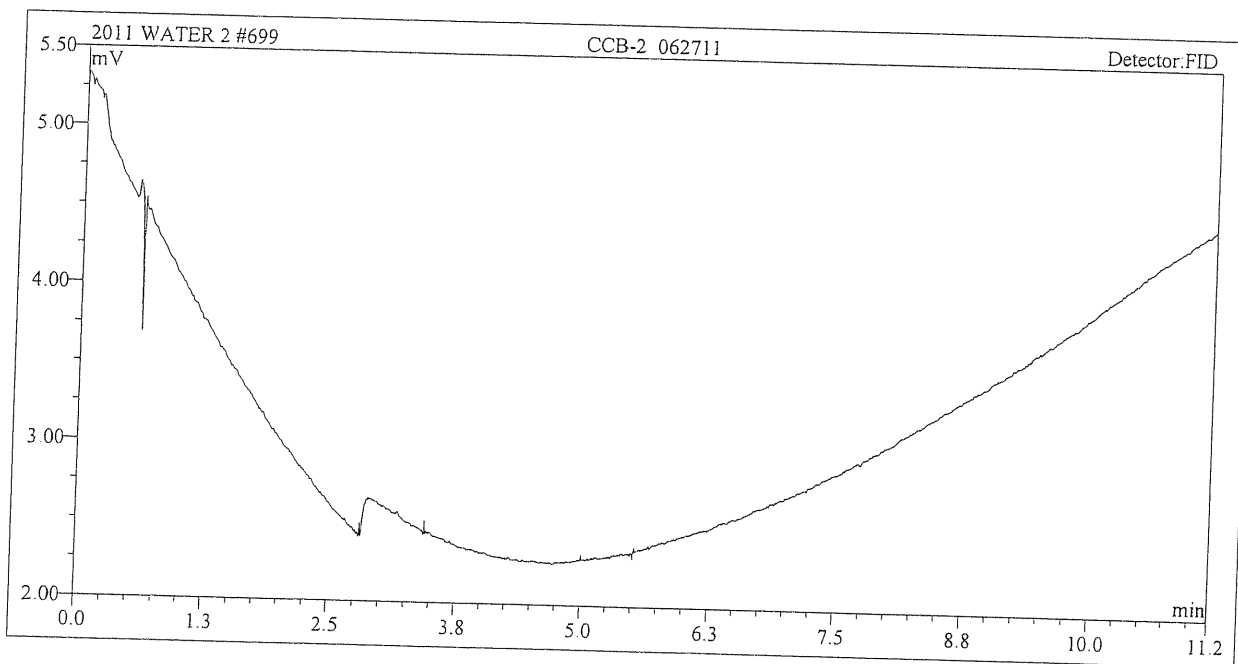
MICROSEEPS

Sample Analysis Report

Sample Name:	CCB-2 062711	Sequence No:	699
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 13:13	Analytical Method:	AM20GAx/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
----------	----------------	----------------	-------------	-----------	------	--------

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



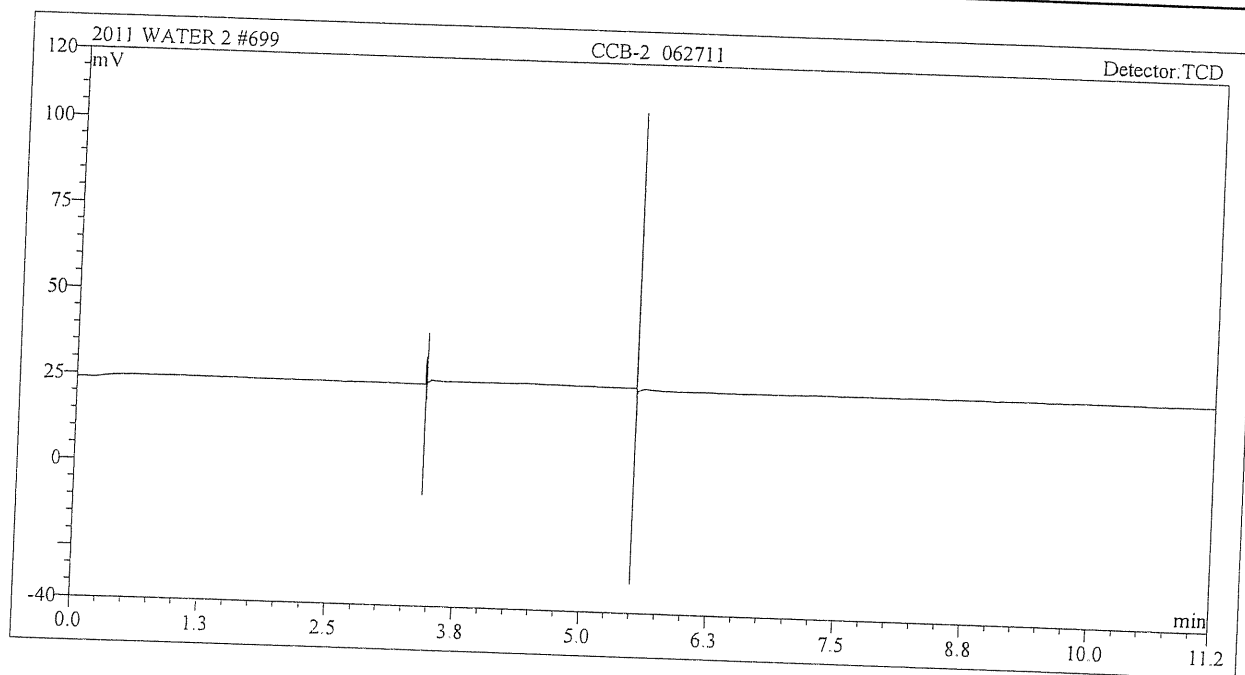
MICROSEEPS

Sample Analysis Report

Sample Name:	CCB-2 062711	Sequence No:	699
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 13:13	Analytical Method:	AM20GAx/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
----------	----------------	----------------	-------------	-----------	------	--------

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



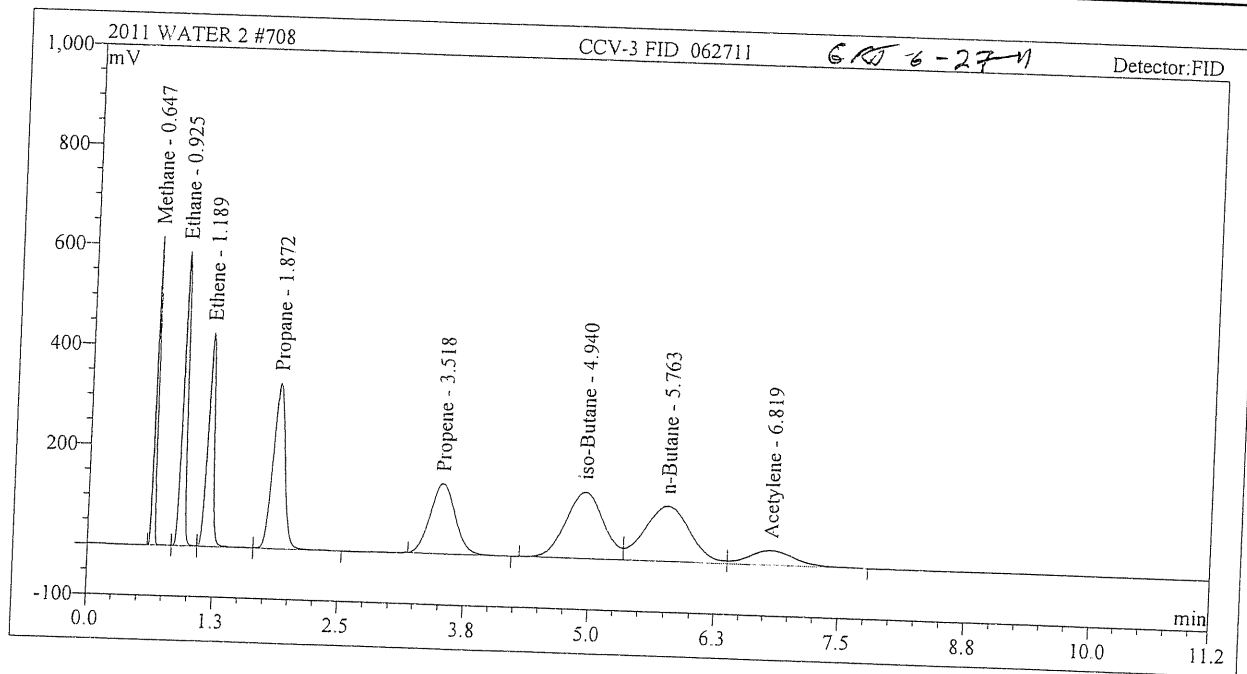
MICROSEEPS

Sample Analysis Report

Sample Name:	CCV-3 FID 062711	Sequence No:	708
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 15:18	Analytical Method:	AM20GAX/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Methane	0.647	17.087	616.133		TV
2	Ethane	0.925	30.549	588.082	BM	24.7 25.1214
3	Ethene	1.189	31.003	427.386	M	46.51 48.0893
4	Propane	1.872	46.529	331.391	M	52.51 54.3025
5	Propene	3.518	40.951	140.924	MB	66.63 69.9106
6	iso-Butane	4.940	58.411	133.459	BMB	73.69 67.8134
7	n-Butane	5.763	57.077	111.119	BM	82.90 80.3909
8	Acetylene	6.819	16.183	30.035	M	85.71 80.5278
					MB	75.18 74.3915

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)



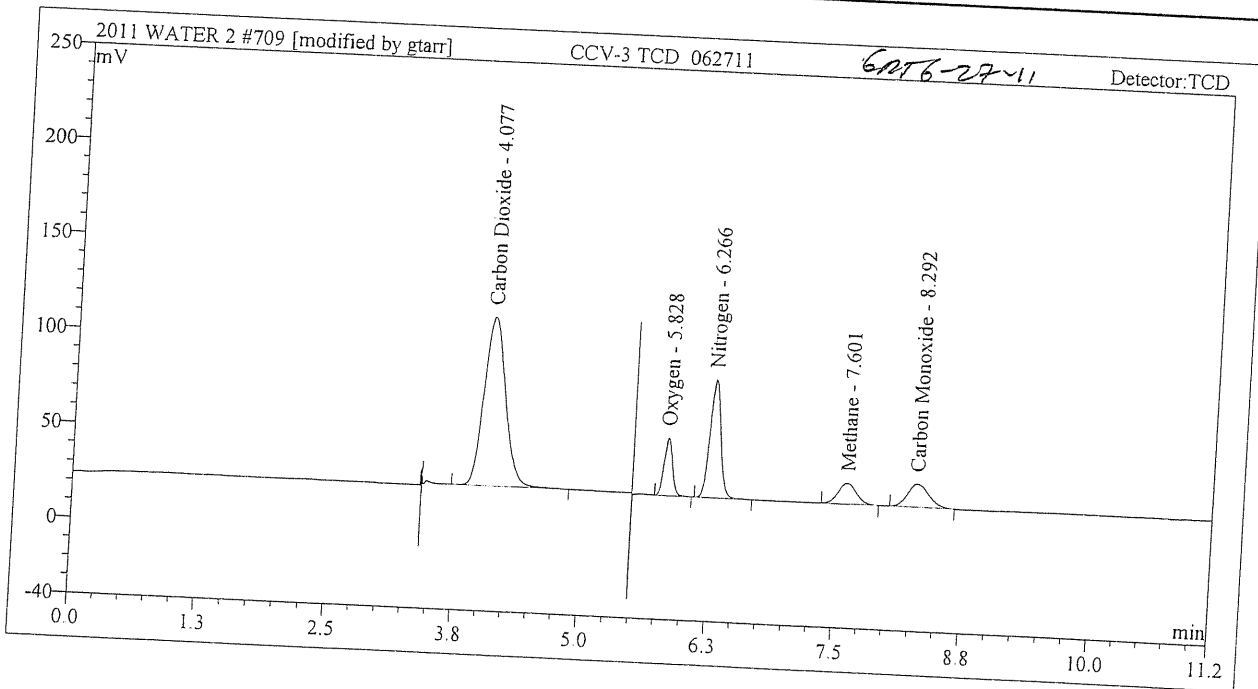
MICROSEEPS

Sample Analysis Report

Sample Name:	CCV-3 TCD 062711	Sequence No:	709
Sequence Name:	2011 WATER 2	Instrument ID:	BIOREM14
Program Method:	BIOREM14AM20	Injection vol.:	1.0
Quantitation Method:	WATER	Dilution Factor:	1.0000
Date Time Collected:	6/27/2011 15:32	Analytical Method:	AM20GAX/PM01
System Operator:	gtarr	Comment:	

Peak No.	Component Name	Retention Time	Area mV*min	Height mV	Type	Amount
1	Carbon Dioxide	4.077	21.949	88.965		<i>TV</i>
2	Oxygen	5.828	2.806	30.302	BMB	<i>107</i> 112.1336
3	Nitrogen	6.266	7.561	62.018	BMB	<i>9.79</i> 10.3217
4	Methane	7.601	2.279	10.874	BMB*	<i>2038</i> 22.1309
5	Carbon Monoxide	8.292	2.936	12.272	BMB*	<i>4294</i> 4455.1819
						<i>8.34</i> 8.6747

FID UNITS (Methane thru Acetylene ug/L)
 TCD UNITS (Methane ug/L, CO2, O2, N2, CO mg/L)
 RGD UNITS (Hydrogen nM)





Port of Oakland

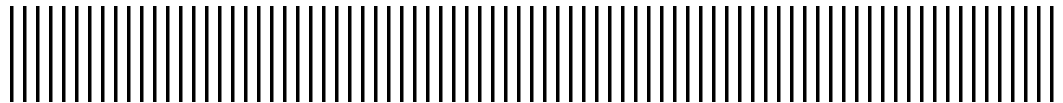
530 Water Street • Oakland, CA 94607

Appendix C

Free Product Recovery System

Operation and Maintenance Field

Sheets



Site Visit Date:		01/05/14		Recorded By:		C			
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								
	Post-run								
RW-4	Pre-run								
	Post-run								
RW-5									Inactive
RW-6	Pre-run								
	Post-run								
RW-7	Pre-run								
	Post-run								
RW-8	Pre-run								
	Post-run								
RW-9	Pre-run								
	Post-run								
MW-3	Pre-run	9.58	9.67	0.09					
	Post-run	—	9.80	N/A				40.1	

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:

Compressor condensate emptied?
 Depth to interface (feet):

Site Visit Date:		01/12/11		Recorded By:				CD	
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	9.87	11.04	1.17	P=7		55:19		
	Post-run	10.16	10.51	0.35	D=30	10.71	55:49	nm	
RW-4	Pre-run	9.12	9.20	0.08	P=7		112:19		Did not run pump
	Post-run	—	—	—	D=0	10.38	—	nm	
RW-5	N/A - Truck parked over well								Inactive
RW-6	Pre-run	8.51	9.68	1.17	P=7	4.0	395:17		
	Post-run	8.63	9.57	0.94	D=30	16.3	395:47	nm	
RW-7	Pre-run	7.86	7.91	0.05	P=7	4.0 → 6.0	458:21		Did not run pump
	Post-run	—	—	—	D=0	9.75	5.4	nm	
RW-8	Pre-run	9.07	9.21	0.14	P=7	4.4	128:48		Did not run pump
	Post-run	—	—	—	D=0	10.1	—	nm	
RW-9	Pre-run	9.26	9.45	0.19	P=7		6:01		Did not run pump
	Post-run	—	—	—	D=0	10.5	—	nm	
MW-3	Pre-run	9.85	10.39	0.54					No measurable product following purge
	Post-run	—	10.21	0.00				0.25	

Elapsed Time @ Blower (hrs): 22910.68
 Sight Column Water Level (empty) 1/4 1/2 3/4 full (empty @ 1/2 or more)
 Depth of product in convault (feet): 1.75
 Approximate total volume recovered:

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

Site Vis		ate: 01/21/11			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								
	Post-run								
RW-4	Pre-run								
	Post-run								
RW-5									Inactive
RW-6	Pre-run								
	Post-run								
RW-7	Pre-run								
	Post-run								
RW-8	Pre-run								
	Post-run								
RW-9	Pre-run								
	Post-run								
MW-3	Pre-run	10.03	10.97	0.94					
	Post-run	10.68	10.70	0.02				0.5	

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:

Compressor condensate emptied?
 Depth to interface (feet):

Site Visit Date:		01/26/11		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	10.43	0.15	10.71	P=7 D=0	56:19	nm	Did not run	
	Post-run	nm	nm	nm			56:19			
RW-4	Pre-run	9.39	9.89	0.50	10.38	P=7 D=15	112:19	nm		
	Post-run	9.39	9.71	0.32			112:34			
RW-5									Inactive	
RW-6	Pre-run	8.65	9.55	0.90	10.3	P=7 D=15	34 → 6.0	396:17	nm	Checked pump manually — seemed ok
	Post-run	8.57	9.47	0.90			6.2	396:32		
RW-7	Pre-run	7.55	7.64	0.09	9.75	P=7 D=0	6.0	458:22	nm	Did not run
	Post-run	nm	nm	nm			nm	458:22		
RW-8	Pre-run	9.23	9.31	0.08	10.1	P=7 D=0	1.8 → 7.0	128:48	nm	Did not run
	Post-run	nm	nm	nm			nm	128:48		
RW-9	Pre-run	9.32	9.53	0.21	10.5	P=7 D=0		6:01	nm	Did not run
	Post-run	nm	nm	nm				6:01		
MW-3	Pre-run	10.18	11.11	0.93					0.5	
	Post-run	10.53	10.55	0.02						

Elapsed Time @ Blower (hrs): 23246.48
 Sight Column Water Level: empty 1/4 1/2 3/4 full (empty @ 1/2 or more)
 Depth of product in convault (feet): 1.72
 Approximate total volume recovered:

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

Site Visit Date: 2/2/11 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									
RW-2									
RW-3	Pre-run								
	Post-run								
RW-4	Pre-run								
	Post-run								
RW-5									
RW-6	Pre-run								
	Post-run								
RW-7	Pre-run								
	Post-run								
RW-8	Pre-run								
	Post-run								
RW-9	Pre-run								
	Post-run								
MW-3	Pre-run	10.28	11.43	1.15					
	Post-run	10.63	10.70	0.07				1/2	#

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

Compressor condensate emptied?
 Depth to interface (feet):

Site Visit Date:		2/10/11		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					Pump inactive				
RW-2					Pump inactive				
RW-3	Pre-run	10.45	10.90	0.45	10.71	P=7 D=15	56:29	NM	
	Post-run	10.44	10.84	0.40			56:34		
RW-4	Pre-run	9.52	10.54	1.02	10.38 ↓ 10.1	P=7 D=15	112:49	NM	Inspected Pump: safety line had ring had broken; reattached line (tied) pump looks ok → had been hanging from air hose, may have been out of range
	Post-run	9.50	10.50	1.00			113:04		
RW-5	Not accessible				Pump inactive				
RW-6	Pre-run	8.44	9.74	1.30	10.3	P=7 D=15	6.4	396:47	Set to run for 30 min next week (2/17)
	Post-run	8.54	9.47	0.93			6.6		
RW-7	Pre-run	7.50	7.68	0.18	9.75	P=7 D=0	8	458:22	Did not run pump
	Post-run	—	—	—			—		
RW-8	Pre-run	9.13	9.33	0.20	10.1	P=7 D=0	4.2	128:48	Did not run pump Leaky valve
	Post-run	9.50	—	—			—		
RW-9	Pre-run	9.42	9.63	0.21	10.5	P=7 D=0	6:01	6:01	Did not run pump
	Post-run	—	—	—			—		
MW-3	Pre-run	10.35	11.50	1.15				1/2	
	Post-run	10.58	10.63	0.05					

Elapsed Time @ Blower (hrs): 23,607

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

Compressor condensate emptied?

Depth to interface (feet): 2.01

Site Visit Date:		2/24/11		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									Pump inactive
RW-2									Pump inactive
RW-3	Pre-run	9.42	12.13	2.71	P=7				~ 2 inches standing water in well box
	Post-run	10.15	10.62	0.47	D=45		57:34	NM	
RW-4	Pre-run	8.90	9.10	0.30	P=7				~ 1 inch water in well box
	Post-run	8.95	9.24	0.29	D=15		113:34	NM	
RW-5	NM	NM	NM					NA	inaccessible
RW-6	Pre-run	8.15	9.82	1.65	P=7	7.8			NM
	Post-run	8.50	9.52	1.02	D=30	7.7	398:02		
RW-7	Pre-run	7.82	8.92	1.10	P=7	7.5 → 6.0			~ 3 inches water in vault
	Post-run	7.89	8.32	0.43	D=30	0.0 → 6.8	458:52 416:05		
RW-8	Pre-run	8.86	9.23	0.37	P=7	8.5			NM
	Post-run	9.24	9.35	0.11	D=15	7.8	129:03 4:05		
RW-9	Pre-run	9.24	9.43	0.19	P=7				Did not run pump
	Post-run	NM	NM	NM	D=0		6:01		
MW-3	Pre-run	9.53	10.74	1.21					0.5
	Post-run	10.02	10.04	0.02					

Time @ Blower (hrs): 23943.19
 Vacuum Water Level: empty 1/4 1/2 3/4 full (empty @ 1/2 or more)
 Product in convault (feet): 1.68

Compressor condensate emptied?
 Depth to interface (feet): 2.19

Site Visit Date:		3/8/11		3/9/11		Recorded By:		CJ	
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					Pump inactive				
RW-2					Pump inactive				
RW-3	Pre-run	9.45	13.04	3.59	P=7		58:19	NM	
	Post-run	10.65	11.37	0.72	10.71	D=45	59:04		
RW-4	Pre-run	8.93	8.96	0.03	P=7		113:49	NM	Did not run pump
	Post-run	NM	NM	NM	10.1	D=0	113:49		
RW-5	NM	NM	NM		Pump inactive			NA	Pump Not accessible due to truck
RW-6	Pre-run	8.25	9.37	1.12	P=7	7.0	398:32	NM	
	Post-run	8.44	9.08	0.64	10.3 9.3	D=30	5.0		
RW-7	Pre-run	7.42	7.53	0.11	P=7	4.5	459:22	NM	Did not run
	Post-run	NM	NM	NM	9.75	D=0	NM		
RW-8	Pre-run	8.78	9.01	0.23	P=7	9.0	129:18	NM	Did not run
	Post-run	NM	NM	NM	10.11	D=0	NM		
RW-9	Pre-run	9.16	9.35	0.19	P=7		6:01	NM	Did not run
	Post-run	NM	NM	NM	10.5	D=0	6:01		
MW-3	Pre-run	9.63	10.79	1.16				0.5	
	Post-run	9.87	9.91	0.04					

Elapsed Time @ Blower (hrs): 24255.12
 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

Compressor condensate emptied?
 Depth to interface (feet): 2.12

Site Visit Date:		3/16/10		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										
RW-2										
RW-3	Pre-run									
	Post-run									
RW-4	Pre-run									
	Post-run									
RW-5										
RW-6	Pre-run									
	Post-run									
RW-7	Pre-run									
	Post-run									
RW-8	Pre-run									
	Post-run									
RW-9	Pre-run									
	Post-run									
MW-3	Pre-run	9.26	10.43	1.17						
	Post-run	9.68	9.70	0.02				0.25		

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

Compressor condensate emptied?
 Depth to interface (feet):

Site Visit Date:

3/23/11

Recorded By:

(2)

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					Pump inactive				no measurable product	
RW-2	NA	5.73			Pump inactive					
RW-3	Pre-run	8.63	12.18	3.55	10.71	P=7 D=45	59:49	nm	Well box flooded, but not above TOC	
	Post-run	8.72	10.52	1.80			60:34			
RW-4	Pre-run	8.39	8.43	0.04	10.1	P=7 D=0	113:49	nm		
	Post-run	nm	nm	nm			113:49			
RW-5	na	na	na		Pump inactive			n/a	Truck parked on well	
RW-6	Pre-run	8.18	8.96	0.78	9.3	P=7 D=15	6.2	399:22	nm	
	Post-run	8.25	8.82	0.57			6.4	399:47		
RW-7	Pre-run	NA	7.24	0.00	9.75	P=7 D=0	NA	459:22	nm	Well box flooded, but not above TOC Unable to read vacuum; >15 w/ valve closed No measurable product
	Post-run	nm	nm	nm			7.0	459:22		
RW-8	Pre-run	8.42	8.70	0.28	10.11	P=7 D=0	11.2 → 9.4	129:18	nm	
	Post-run	nm	nm	nm			nm	129:18		
RW-9	Pre-run	9.07	9.23	0.16	10.5	P=7 D=0		6:01	nm	
	Post-run	nm	nm	nm				6:01		
MW-3	Pre-run	8.71	9.07	0.36					0.25	
	Post-run	8.82	8.87	0.05						

Elapsed Time @ Blower (hrs): 24591.51

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

Product in convault (feet): 1.57

Compressor condensate emptied?

Depth to interface (feet): 2.13

Site Visit Date: 3/30/11

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					Pump inactive				
RW-2					Pump inactive				
RW-3	Pre-run								
	Post-run								
RW-4	Pre-run								
	Post-run								
RW-5					Pump inactive				
RW-6	Pre-run								
	Post-run								
RW-7	Pre-run								
	Post-run								
RW-8	Pre-run								
	Post-run								
RW-9	Pre-run								
	Post-run								
MW-3	Pre-run	8.87	9.54 8.84	0.67				0.25	
	Post-run	9.54	8.85	0.01					

Elapsed Time @ Blower (hrs):

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

Depth of product in convault (feet):

Compressor condensate emptied?

Depth to interface (feet):

MW-4 DO: 10.26 mg/L

21.0

DO	10.26
pH	7.8
Temp	21.0
Salinity	0.0

Site Visit Date: 4/6/11		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										
RW-2										
RW-3	Pre-run	9.10	11.49 9.72	2.39 2.62	10.71	P=7 D=30	61:19	NM		
	Post-run	9.40	11.16	1.62			61:49			
RW-4	Pre-run	8.46	8.50	0.04	10.1	P=7 D=0	113:50	-		
	Post-run	NM	NM	NM			113:50			
RW-5	NA	NA	NA					NA	Truck parked on well	
RW-6	Pre-run	8.19	8.95	0.76	9.3	P=7 D=30	6.6	400:02	NM	
	Post-run	NM ^{8:22} SC	NM ^{8:48} SC	NM ^{0:46} SC			6.4			400:32
RW-7	Pre-run	7.73	7.73	-	9.75	P=7 D=0	0→7.8	459:22	-	
	Post-run	NM	NM	NM			NM			459:22
RW-8	Pre-run	8.55	8.80	0.25	10.11	P=7 D=0	3.6→5.2	129:18	-	
	Post-run	NM	NM	NM			NM			129:18
RW-9	Pre-run	9.00	9.16	0.16	10.5	P=7 D=0	6:01	-		
	Post-run	NM	NM	NM			6:01			
MW-3	Pre-run	9.16	10.42	1.26				0.5		
	Post-run	9.35	9.39	0.04						

Elapsed Time @ Blower (hrs): 24.925
 Sight Column Water Level: empty 1/4 1/2 3/4 full (empty @ 1/2 or more)
 Depth of product in convault (feet): 1.54

Compressor condensate emptied? Y
 Depth to interface (feet): 2.15

Site Visit Date: 4/14/11 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									Pump inactive
RW-2									
RW-3									
RW-4									
RW-5	<u>6.74</u>	<u>9.72</u>						<u>2</u>	<u>WL/PL falls quickly during equilibration ∴ wait 10 min until equl.</u>
<u>AW-5</u>	<u>9.23</u>	<u>9.52</u>							
RW-6									
RW-7									
RW-8									
RW-9									
MW-3	<u>9.65</u>	<u>10.53</u>	<u>0.88</u>						<u>0.5</u>
	<u>9.90</u>	<u>9.93</u>							

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

Compressor condensate emptied?
 Depth to interface (feet):

Site Visit Date:		4/20/11		Recorded By:		EO			
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									
RW-3	Pre-run	9.70	10.88	1.18	10.71	P=7 D=30		nm	
	Post-run	10.00	10.43	0.43					
RW-4	Pre-run	8.88	8.91	0.03	10.1	P=7 D=0		nm	Did not run
	Post-run	nm	nm	nm					
RW-5		nm	nm					nm	Well is inaccessible
RW-6	Pre-run	8.43	8.54	0.11	9.3	P=7 D=0	4.4	nm	401:13
	Post-run	nm	nm	nm					
RW-7	Pre-run	7.54	7.56	0.02	9.75	P=7 D=0	4.6	nm	459:22
	Post-run	nm	nm	nm					
RW-8	Pre-run	8.92	9.14	0.22	10.11	P=7 D=0	3.0x60	nm	129:18
	Post-run	nm	nm	nm					
RW-9	Pre-run	9.10	9.29	0.19	10.5	P=7 D=0		nm	Did not run
	Post-run	nm	nm	nm					
MW-3	Pre-run	9.69	10.61	0.92				0.5	
	Post-run	10.01	10.03	0.02					

Elapsed Time @ Blower (hrs): 25262.94

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

Depth of product in convault (feet): 1.49

Compressor condensate emptied?

Depth to interface (feet): 2.12

Site Visit Date:		4/27/11		Recorded By:		W			
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									
RW-3	Pre-run								
	Post-run								
RW-4	Pre-run								
	Post-run								
RW-5									
RW-6	Pre-run								
	Post-run								
RW-7	Pre-run								
	Post-run								
RW-8	Pre-run								
	Post-run								
RW-9	Pre-run								
	Post-run								
MW-3	Pre-run	9.88	11.07	1.19					
	Post-run	10.43	10.45	0.02				0.5	
Elapsed Time @ Blower (hrs): 254 31.12 Sight Column Water Level: empty 1/4 1/2 3/4 full (empty @ 1/2 or more) Depth of product in convault (feet):									
								Compressor condensate emptied?	
								Depth to interface (feet):	

Site Visit Date:		5/4/11		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									Pump inactive	
RW-2									Pump inactive	
RW-3	Pre-run	10.05	16.47	0.42	P=7		63:19	NM		
	Post-run	10.10	16.43	0.33	D=15		63:34			
RW-4	Pre-run	9.13	9.17	0.04	P=7		113:50	NM	Did not run pump	
	Post-run	NM	NM	NM	D=0		113:50			
RW-5		NA	NA	NA				NA	Pump inactive Not accessible	
RW-6	Pre-run	8.51	8.62	0.11	P=7	4.3	401:13	NM	Did not run pump	
	Post-run	NM	NM	NM	D=0	NM	401:13			
RW-7	Pre-run	7.68	7.74	0.06	P=7	3.0-75.5	459:22	NM	Did not run pump	
	Post-run	NM	NM	NM	D=0	NM	459:22			
RW-8	Pre-run	9.04	9.20	0.16	P=7	18 → 6.0	129:18	NM	Did not run pump	
	Post-run	NM	NM	NM	D=0	NM	129:18			
RW-9	Pre-run	9.19	9.40	0.21	P=7		6:01	NM	Did not run pump	
	Post-run	NM	NM	NM	D=0		6:01			
MW-3	Pre-run	9.95	11.14	1.19						
	Post-run	10.48	10.50	0.02						

Elapsed Time @ Blower (hrs): 25598.59

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

Depth of product in convault (feet): 1.48

Compressor condensate emptied?

Depth to interface (feet): 2.12

Site Visit Date: 5/13/11 Recorded By: [Signature]

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									Pump inactive
RW-2									Pump inactive
RW-3	Pre-run								
	Post-run								
RW-4	Pre-run								
	Post-run								
RW-5									Pump inactive
RW-6	Pre-run								
	Post-run								
RW-7	Pre-run								
	Post-run								
RW-8	Pre-run								
	Post-run								
RW-9	Pre-run								
	Post-run								
MW-3	Pre-run	10.16	11.45						
	Post-run	10.58	10.74					0.5	

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

Compressor condensate emptied?
 Depth to interface (feet):

Site Visit Date: 5/18/11

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					Pump inactive				
RW-2					Pump inactive				
RW-3	Pre-run 9.95	10.17	0.22	10.71	P=7 D=0 ¹⁵		6:40	NM	Did not run pump - SC Ran pump. Pump will not run next week
	Post-run -	-	-						
RW-4	Pre-run 9.18	9.20	0.02	10.1	P=7 D=0		113:50	-	Did not run pump
	Post-run -	-	-				-		
RW-5	NP	6.78	0.00	Pump inactive				-	no measurable product, but emulsion visible on probe
RW-6	Pre-run 8.53	8.70	0.17	9.3	P=7 D=0	4.0	401:13	-	Did not run pump
	Post-run -	-	-				-		
RW-7	Pre-run NP	7.35	0.00	9.75	P=7 D=0	11.5 → 7.5	459:22	-	no measurable product, but emulsion visible on probe Did not run pump
	Post-run -	-	-				-		
RW-8	Pre-run 8.85	9.10	0.25	10.11	P=7 D=0	8.5	129:18	-	Did not run pump
	Post-run -	-	-				-		
RW-9	Pre-run 9.26	9.46	0.20	10.5			6:01	-	Did not run pump
	Post-run -	-	-				-		
MW-3	Pre-run 9.78	11.60	1.82					1	
	Post-run 10.25	10.45	0.20						

Elapsed Time @ Blower (hrs): 259:38

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

Depth of product in convault (feet): 1.48

Compressor condensate emptied?

Depth to interface (feet): 2.08

Site Visit Date: 5/25/11 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									Pump inactive
RW-2									
RW-3									Pump inactive
RW-4									Pump inactive
RW-5									Pump inactive
RW-6									Pump inactive
RW-7									Pump inactive
RW-8									Pump inactive
RW-9									Pump inactive
MW-3	10.15	11.04	0.89						0.5
	10.62	10.66	0.04						

Elapsed Time @ Blower (hrs): 26.106
 Sight Column Water Level: empty 1/4 1/2 3/4 full (empty @ 1/2 or more)
 Depth of product in convault (feet): 1.0
 Compressor condensate emptied?
 Depth to interface (feet):

Product Recovery System's Low Vacuum Air Discharge Monitoring Log
Port of Oakland Harbor Facilities

Date/Time		PID Reading (ppm)			Air Flow (mps) (cfm)		Vacuum (IWC)	Comments
		SP-1	SP-2	SP-3	AD-1		SP-1	
01/05/11	11230	45.4	0.5	0.6	6.7	28	76	ambient = 0.0-1.5 ppm
01/12/11	11000	21.0	0.5	0.8	6.2	27	76	ambient = 0.5-3.0 ppm
01/21/11	1815	34.3	0.0	0.4	5.8	26	77	
01/26/11	11045	62.6	0.5	0.8	7.4	33	76	
02/02/11	11420	61.1	0.0	0.2	7.1	30	77	
02/10/11	11140	62.9	0.4	0.4	8.5	35	76	ambient 0-0.2 ppm
02/24/11	11145	35.7	0.4	0.3	6.5	28	77	
03/03/11	11500	45.8	0.0	0.0	6.1	26	75	
03/09/11	11130	49.1	0.3	0.4	6.4	28	76	
3/16/11	11300	46.2	0.2	0.3	6.7	28	75	
3/23/11	11310	44.9	0.2	0.4	5.9	26	75	
3/30/11	11045	49.6	0.0	0.6	6.2	27	75	
4/1/11	11115	72.9	0.0	0.3	5.7	25	75	
4/14/11	1145	56.4	0.0	0.0	7.5	32	76	
4/20/11	11230	56.8	0.2	0.4	6.3	27	74	
4/27/11	11245	58.7	0.0	0.2	7.9	34	74	
5/4/11	11200	59.2	0.3	0.4	7.1	30	74	
5/13/11	11015	50.4	0.0	0.0	7.0	30	74	
5/18/11	11815	68.7	0.0	0.2	6.0	26	74	
5/25/11	11530	49.7	0.0	0.0	6.5	28	75	
/								
/								
/								
/								
/								
/								
/								
/								
/								
/								
/								
/								
/								
/								
/								
/								
/								
/								
/								
/								
/								
/								
/								
/								
/								
/								
/								
/								
/								
/								
/								
/								
/								
/								
/								
/								
/								
/								
/								
/								
/								

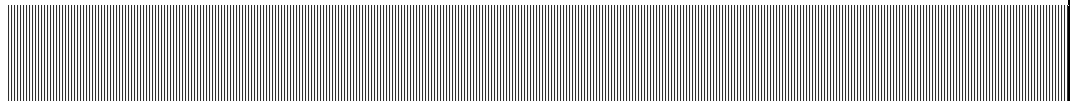
Note :SP-2 reading can not exceed 10 ppmv (as hexane)



Port of Oakland

530 Water Street • Oakland, CA 94607

Appendix D Free Product Recovery System Shutdown Field Notes



0815 - On site

0835 - Removed pump from RW-3 and stored in shed.
Drained all product from lines.

PL = 9.73 WL = 13.52

0900 - Sumbelt on site with air compressor rental

0915 - Purged RW-3 until we could only hear a drip
of product running into the convault. Will
purge a second time in the afternoon.

0920 - Setting up at RW-4.

Pulled pump & drained tubing.

PL = ~~8.95~~ WL = 8.95

no measurable
product

1020 - Pulled pump & purged at RW-6

PL = 8.82 WL = 9.05

1030 - Measured RW-5

PL = 7.38 WL = 7.47

1100 - Pulled pump and completed 1st purge @
RW-7. WL = 7.98

No measurable product, but an emulsion
of product & water was on WL meter
after removing

1115 - Removed pump from RW-8.
 PL = 10.23 WL = 10.34

1145 - Pulled pump from RW-8
 PL = 9.35 WL = 9.56

1210 - Completed first purge at all wells and removed all pumps. Pumps will be stored in PVC tubos with caps inside the shed.

Bled pressure & emptied condensate water from compressor & blower; verified that there was no residual pressure on the gauges.

Set all wells to inactive on the system console and turned power to off.

1230 - off site for lunch.

1315 - Measuring WLS at Shippers Transport Terminal

MW-4: 11.80
 MW-5: 9.06
 MW-9: 11.32
 MW-8A: 10.51
 MW-10: 16.11
 MW-1: 10.77
 MW-2: 10.70
 MW-11: 10.00
 MW-12: 16.81

RW-2: WL = 7.19 no measurable product
 MW-3: PL = 9.91 WL = 10.95

1515 - Completed second purge at RW-9. Purged for 10 min - could only hear a slow drip in convault

1525 - Completed second purge at RW-8. Purged for 5 min - could not hear any product entering convault

1600 - Purged RW-7 and RW-4. Purged both ~5 min and until no product could be heard entering the convault.

1630 - Completed second purge at all wells.

Measured PL in convault:

PL = 1.43 WL = 2.87

Final total run times:

RW-8: 129:18
RW-7: 459:22
RW-6: 401:13
RW-4: 113:50
RW-3: 64:04
RW-9: 6:01

Final blower hours:
26411.01

1010 onsite w/ Siemens

1020 Siemens collects sample

Note: Siemens used WD-40 on bolts to open vessel

1030 • Turned off breakers 31, 33, 35, 26, 28, 30, 32, 34

• Locked breaker box after removing key from plastic sleeve inside box

• Put key on keyring w/ shed key, control panel key, + dolphin key; left in cabinet housing vac valves

1040 offsite - to stop at Home Depot to buy tubing caps.

815 SC + CO at Shed to pick up supplies

845 SC + CO onsite

900 Removed fittings from pump; do not fit caps

915 SC + CO offsite to Home Depot to exchange fittings

1000 SC + CO back ~~on~~ on site

~~Caps placed~~

Fittings removed from pumps, placed on tubing in well vaults + capped

RW-3

RW-9

RW-8

RW-7

RW-6

RW-4

1145 RW-2 has product tubing (thicker hose) w/ no cap + ~~air~~ one hole in well cap not capped

SC + CO capped RW-2's air hose tubing

to purchase appropriate fittings for RW-2 at Home Depot

12:30 Moved to Shipper's Terminal side; MW-4
~~collected~~ removed ORC socks, collected DO reading
DO = 13.52 mg/L T = 19.6°C

ORC socks to be disposed of.

1300 offsite

6/21/11

1400 SC installed fittings in RW-2 tubing