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**SELF-MONITORING REPORT –
FIRST QUARTER 2009
NPDES PERMIT NO. CAG912002**

**GROUNDWATER REMEDIATION AT
CITY OF OAKLAND
MUNICIPAL SERVICES CENTER
7101 EDGEWATER DRIVE
OAKLAND, CALIFORNIA**

Prepared for

**City of Oakland
Public Works Agency
Environmental Services Division
250 Frank H. Ogawa Plaza, Suite 5301
Oakland, CA94612**

April 24, 2009

Prepared by

OTG
**EnviroEngineering
Solutions, Inc.**

7700 Edgewater Drive, Suite 260
Oakland, CA 94621

under a subcontract to

LFR  **ARCADIS** company

1900 Powell Street, 12th Floor
Emeryville, CA 94608



CITY OF OAKLAND



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Public Works Agency
Environmental Services

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April 29, 2009

Ms. Lourdes Gonzales
Regional Water Quality Control Board –
San Francisco Bay Region
1515 Clay Street, Suite 1400
Oakland, CA 94612

Reference: RWQCB Order No. R2-2006-0075, NPDES Permit #CAG912002

Subject: Self-Monitoring Report – First Quarter 2009
Groundwater Remediation at 7101 Edgewater Drive, Oakland, California

Dear Ms. Gonzales:

The City of Oakland is pleased to submit this Self-Monitoring Report, First Quarter 2009, for the groundwater extraction, treatment, and discharge system at the City of Oakland Municipal Services Center located at 7101 Edgewater Drive, Oakland, California. The report has been prepared by LFR Inc. and OTG Enviroengineering Solutions, Inc. under a consultant service contract with the City of Oakland. No violations of RWQCB Order No. R2-2006-0075 or NPDES Permit #CAG912002 were identified during this reporting period.

Certification

I certify under penalty of law that this document and attachments are prepared under my direction or supervision in accordance with the system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing the violations.

If you have questions or comments, please contact me at (510)238-6361.

Sincerely

Gopal Nair
Environmental Program Specialist

April 24, 2009

Mr. Gopal Nair
Environmental Program Specialist
City of Oakland – PWA/ESD
250 Frank H. Ogawa Plaza, Suite 5301
Oakland, CA 94612

Reference: RWQCB Order No. R2-2006-0075, NPDES Permit #CAG912002

Subject: Self-Monitoring Report – First Quarter 2009
Groundwater Remediation at 7101 Edgewater Drive, Oakland, CA

Dear Mr. Nair:

OTG EnviroEngineering Solutions, Inc. (OTG) is pleased to submit this Self-Monitoring Report, First Quarter 2009, for the groundwater extraction, treatment, and discharge system at the City of Oakland Municipal Services Center located at 7101 Edgewater Drive, Oakland, California. OTG conducted the work under a subcontract to LFR Inc. No violations of RWQCB Order No. R2-2006-0075 or NPDES Permit #CAG912002 were identified during this reporting period.

Certification

I certify under penalty of law that this document and all attachments are prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Please contact the undersigned at (510) 465-8982 if you have questions or comments.

Sincerely,
OTG EnviroEngineering Solutions, Inc.



Xinggang Tong, PhD, PE
Project Manager



cc: Mr. Charles Pardini, P.G., LFR Inc.

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1 INTRODUCTION

The City of Oakland Municipal Services Center (MSC) is located at 7101 Edgewater Drive in Oakland, California (the Site; Figure 1). The approximately 17-acre site was originally part of a waterfront tidal marsh complex that was filled between 1950 and 1971. The City of Oakland (the City) leased the land from the Port of Oakland and constructed the MSC around 1972. Bordering the MSC site to the west and the north is the Martin Luther King Regional Shoreline Park, which is also owned by the Port of Oakland. Damon Slough, which runs through the park, is located to the north, and commercial developments are located to the east and south.

The MSC site has been the subject of numerous environmental investigations beginning in about 1989. The suspected sources of on-site contamination include releases from underground storage tanks (USTs), gasoline and diesel fuel hydrant systems, and the floor drain waste collection pits formerly located adjacent to Building No. 5. At one time there were 14 petroleum USTs at the site. In addition, some or all of the material used to fill the site may have been composed of waste material or contaminated fill. A comprehensive investigation conducted by Baseline in 2000 identified the existence of free-phase petroleum hydrocarbon product at four separate areas at the site, labeled as Plumes A through D on Figure 2. Baseline's investigation is documented in its *Site History and Characterization Report* (Baseline, January 2001).

Groundwater monitoring was conducted quarterly from the fourth quarter of 1989 through the third quarter of 2002, and then semi-annually to the present. Shallow groundwater levels vary from approximately 2 to 10 feet below ground surface, and are partially subject to tidal influence. Shallow groundwater flow is toward the southwest to the nearest shoreline along San Leandro Bay across much of the Site. In the northern portion of the MSC, groundwater flows in a more northerly direction toward the curving shoreline and Damon Slough (Baseline, January 2001)

Pilot-scale groundwater/soil vapor dual-phase extraction (DPE) tests were conducted in 2002 to enhance the removal of free-phase petroleum product from Plumes A through D (Cambria Environmental Technology, August 13, 2002 and URS Corporation, August 29, 2002). Extracted groundwater was treated on-site through two 2,000-lb granular activated carbon units connected in series and discharged to on-site storm drain in accordance with a National Pollutant Discharge Elimination System (NPDES) permit granted by the San Francisco Bay Regional Water Quality Control Board (NPDES Permit No. CAG912002). Based on the pilot test results, the City retained Cambria in May 2003 to design a full-scale product recovery and DPE system for Plumes C and D. Cambria's design was revised in October 2005 by Groundwater and Environmental Services (GES) to focus the first phase of product removal on Plume D. The final design drawings were included in Appendix A of the Startup Report (OTG, June 2006). Chemical oxidation and enhanced bioremediation through periodic injections of hydrogen peroxide have been implemented at Plumes A, B and C since July 2004.

In March 2006, the City retained URS Corporation and its subcontractor ERRG to construct GES' redesigned product recovery and DPE system in the Plume D area. A plan view of the system is presented in Figure 3. Construction was completed in early May 2006. Seven wells within Plume D area (RW-D1 through RW-D5, TBW-5, and RW-1) were connected to the extraction system. On May 22, 2006, the product recovery and groundwater extraction portion of the remediation system (pneumatic pumps) was turned on. On May 14, 2007, the DPE portion of the remediation system was turned on. Six additional extraction wells (RW-D6 through RW-D11) were installed within Plume D area in March 2007 (URS, May 2007). They were connected to the DPE system and extraction from them commenced on June 11, 2007.

2. DESCRIPTION OF REMEDIATION SYSTEM

The remediation system consists of extracting liquid (free-phase product and groundwater) and soil vapor from 13 wells located in the Plume D area, separation of free-phase product from groundwater, treatment of groundwater by activated carbon, discharge of treated water to the local storm drain in accordance with the NPDES permit, treatment of soil vapor, and discharge of treated vapor to the atmosphere in accordance with an air discharge permit. A process and instrumentation diagram of the remediation system is illustrated on Figure 4. Design details were included in Appendix A of the Startup Report (OTG, June 2006).

The 13 extraction wells are: RW-D1 through RW-D11, TBW-5 and RW-1. Their locations are shown on Figure 3. Wells RW-D1 through RW-D5 were constructed in December 2001 and wells RW-D6 through RW-D11 were constructed in March 2007, specifically for remediation purposes. Wells RW-1 and TBW-5 were installed during backfilling of the excavation of former fuel hydrant lines in the early 1990s. All wells, except RW-D6 through RW-D11, were equipped with both total fluid recovery pneumatic pumps specifically designed for viscous petroleum product recovery and vacuum lines for liquid/soil vapor DPE. The pneumatic pumps were manufactured by Clean Environment Equipment in Oakland (Model # AP-Custom). An Ingersoll-Rand air compressor (model # SSR UP6-10) provides compressed air to the pneumatic pumps. All wells are piped into a high vacuum extraction unit that can produce up to 28 inches of mercury vacuum. This vacuum unit can be operated in either soil vapor extraction only mode or simultaneous soil vapor and liquid extraction mode. The pneumatic pumps and the vacuum extraction unit can be operated independently.

The liquid extracted by the pneumatic pumps and the vacuum unit is pumped into an oil/water separator (Model # AGM-3SS-90V, Hydro Quip, Inc.). Recovered oil is contained in 55-gallon drums, which are sent to an off-site oil recycling facility. Groundwater is treated through three (3) granular activated carbon (GAC) units connected in series (Model #ASC-2000, U.S.Filter/Westates Carbons) before being discharged into local storm drain. Each GAC unit contains 2,000 lbs of GAC. Figure 5 illustrates the groundwater treatment portion of the remediation system and identifies sampling ports.

A 40 hp liquid-ring vacuum pump capable of 550 actual cubic feet per minute (ACFM) and up to 28 inches mercury vacuum extracts soil vapor and liquid from the 13 wells. The vapor is

abated by a combination of thermal and catalytic oxidizer. At low vapor organic concentrations, activated carbon can also be used for vapor abatement.

3 OPERATIONS AND MAINTENANCE

On May 22, 2006, the pneumatic pumps were turned on to initiate the remediation process. The vacuum extraction portion remained off line. Because the free-phase product appears to be a mixture of gasoline, diesel, and some other highly viscous organics (petroleum tank bottom or coal tar-like material), the vacuum extraction, if turned on, will vaporize gasoline and a portion of the diesel and will make the removal of the viscous product even more difficult. Therefore, remediation scheme includes first using the pneumatic pumps to remove the free-phase product as much as is practical and achievable, and then using the vacuum extraction system to enhance the removal of the remaining petroleum hydrocarbons.

The volume of free-phase product recovered by the pneumatic pumps decreased steadily from the startup in May 2006 through April 2007. On May 14, 2007, RW-D2, RW-D4 and RW-D5 were switched to vacuum DPE operation, while RW-D1, RW-D3, TBW-5 and RW-1 remained under pneumatic pump extraction. On June 11, 2007, the six newly installed wells (RW-D6 through RW-D11) and the remaining pneumatic extraction wells (RW-D1, RW-D3, TBW-5, and RW-D5) were also brought on-line under DPE operations. The pneumatic extraction portion of the remediation system was discontinued.

The remediation system was operated intermittently during the first quarter 2009 due to extensive maintenance requirement. The highly viscous organics that has been extracted has progressively clogged various parts of the extraction piping and control system. The remediation system was shutdown on November 14, 2008 for repair. The radiator and several control sensors were replaced in December 2008. Cleaning of piping interiors continued through January 2009. The system was restarted on February 2, 2009. Operations appeared normal until the early morning (approximately 6:00 am) of February 19 when a fire broke out and the system was shutdown automatically. Investigations conducted by OTG staff and by representatives from Mako Industries (original equipment manufacturer) pointed to the failure of separation of vacuum pump oil from extracted soil vapor. The vacuum pump is an oil-ring type pump, which relies on the spinning of a special oil to generate high vacuum to extract soil vapor. The vacuum oil and the extracted soil vapor are separated by an oil/vapor separator inside an oil holding tank. The soil vapor is pumped through a flame arrestor and into a thermal oxidation chamber, where the extracted organic vapor is oxidized between 1,400 and 1,650 degrees Fahrenheit. The separated oil is recycled back to the pump. The oil/vapor separator failed in the early morning of February 19 and the oil was carried by the soil vapor to the flame arrestor, where the oil caught fire. The remediation system was down from February 19 through March for further repair. The oil/vapor separator was replaced with a new one, and the oil holding tank was cleaned and tested for integrity. All fire damaged equipment and structures were also repaired. The system was restarted on April 2, 2009.

A breakthrough of tertiary butyl alcohol (TBA) in the treated groundwater effluent was confirmed in the fourth quarter 2008. The activated carbon in the second and the third vessels

was replaced with fresh activated carbon on January 2, 2009. The spent carbon was profiled and transported to Siemens' regeneration facility in Arizona for reactivation and reuse. Because TBA was the only compound detected after the first carbon vessel, after the second carbon vessel, and after the third carbon vessel (effluent), the carbon in the first vessel was not changed as it still has capacity to absorb other petroleum constituents. TBA is not a compound with an effluent discharge limit. It is a "trigger" compound with a trigger value of 5 micrograms per liter (ug/L). If the concentration of a trigger compound in the effluent exceeds its trigger value, further studies and confirmation sampling are required as detailed in the NPDES discharge permit.

Routine operations and maintenance (O&M) of the system includes a daily check of functions of liquid level sensors and pumps, adjusting individual extraction wells to optimize extraction rate of soil vapor and groundwater within the equipment design range, removing oil from the oil/water separator, lubricating pumps, monitoring system performance, and other tasks necessary for maintaining proper functioning of the remediation system.

Monthly, quarterly, semi-annual, and annual groundwater and air samples were collected and analyzed from the system per the NPDES permit and the air permit requirement. Figure 5 shows sampling ports for groundwater sample collection. Air samples were collected from the exhaust and the inlet of the DPE system. Extracted groundwater was measured on-site at the influent (prior to the carbon treatment) and at the effluent (after the carbon treatment) for temperature, pH, and electric conductivity using an Oakton pH/Con 10 meter (Serial #311648) and for turbidity using an Oakton T-100 meter (Serial #316738). Before measurement, the pH probe was calibrated with standard solutions of pH 4.00, 7.00, and 10.00; the electric conductivity probe was calibrated with 1413 ug/cm standard solution; and the turbidity meter was calibrated with standard solutions of 0.02, 20.0, 100, and 800 nephelometric turbidity units (NTUs).

Groundwater samples were analyzed by Curtis & Tompkins, Ltd of Berkeley, California, and air samples were analyzed by Torrent Laboratory, Inc., of Milpitas, California. Groundwater analytical methods are listed in Table 1. The laboratory data were found to be of acceptable quality, with qualifications as noted in the laboratory reports.

4 DISCHARGE MONITORING – FIRST QUARTER 2009

Field measured data and laboratory analysis results are summarized in the following tables:

- Table 1 – Laboratory Analytical Procedures;
- Table 2 – Operational Data and Field Measured Parameters;
- Table 3 – Petroleum Hydrocarbon Analytical Data;
- Table 4 – Inorganic Constituents Analytical Data & Fish Bioassay Results;
- Table 5 – Organic Constituents Analytical Data;
- Table 6 – Dual-Phase Extraction Vapor Monitoring Data;
- Table 7 – Petroleum Hydrocarbons Removed through Soil Vapor Extraction; and

- Table 8 – TPH removed through Groundwater Extraction, Floating Product Recovery, and Soil Vapor Extraction.

Major Highlights for the First Quarter 2009 include the following:

- Groundwater extracted from the 13 remediation wells for this reporting period (January 1 through March 31, 2009) totaled 77,990 gallons, which was treated and discharged into the local storm drain, resulting in an average monthly flow rate of 0.0 gallons per minute (gpm) in January, 1.934 gpm in February, and 0.0 gpm in March (Table 2). The remediation system was shutdown from January 1 through February 1 and from February 19 through March 31 for repairs, as described in Section 3.
- The groundwater is treated through three activated carbon vessels in series. The carbon in the second and the third vessels was removed and replaced with fresh activated carbon on January 2 due to the confirmed detection of TBA (a trigger compound) in the effluent in the fourth quarter 2008.
- No separate-phase floating product was recovered in this quarter. Approximately 8 lbs of total petroleum hydrocarbons (TPH, gasoline + diesel) was removed through the extracted groundwater (dissolved in groundwater), and 257 lbs of TPH was removed through soil vapor (Table 8). The total weight of TPH removed from Plume D this quarter was 265 lbs, of which 97% was removed by the DPE through soil vapor extracted and 3% was removed through the groundwater. Since the remediation system started in May 2006, a total of 57,944 lbs, or approximately 8,187 gallons, of TPH has been removed from Plume D (Table 8). The recovered floating product was highly viscous and black in color. Its appearance does not resemble gasoline or diesel.
- Monthly, quarterly, and annual monitoring was conducted on February 9, 2009. There was no monthly monitoring in January and March as the system was shutdown for repairs. Monthly monitoring results are summarized in Tables 2 and 3; quarterly and annual monitoring results are presented in Tables 4 and 5.
- The average concentrations for the influent (after the oil/water separator, but before the carbon treatment) for the first quarter 2009 were 1.4 milligrams per liter (mg/L) TPHg, 11 mg/L TPHd, and 0.018 mg/L benzene. These concentrations are significantly below their respective concentrations when the remediation system was started (Table 3).
- As measured on February 9, the effluent (treated groundwater) had a pH of 7.05, a temperature of 13.0 °C, a conductivity of 14.62 mS/cm, and a turbidity of 1.8 NTU (Table 2).
- TPHg; TPHd; TPHmo; benzene, toluene, ethylbenzene, and xylenes (BTEX); MTBE and all other fuel oxygenates in the monthly effluent samples were all below their respective reporting limits. The reporting limit was 0.5 ug/L for BTEX and MTBE, 50 ug/L for TPHg and TPHd, and 300 ug/L for TPHmo (Table 3).
- Volatile organic compounds (VOCs, by EPA Method 8260) and Semi-VOCs (SVOCs, by EPA Methods 8270 and 8310) were not present in the effluent annual sample at or above their respective reporting limits (Table 5). The annual fish toxicity bioassay with rainbow trout was 95% survival at the end of 96-hour testing period (Table 4).

5 REFERENCES

Baseline Environmental Consulting, *Site History and Characterization*, January 2001

Cambria Environmental Technology, Inc. *TPE Pilot Test and Feasibility Report*, August 13, 2002.

California Regional Water Quality Control Board – San Francisco Bay Region, *Notice of General Permit Coverage for Discharge from the City of Oakland Municipal Service Center located at 7101 Edgewater Drive, Oakland, Alameda County, CA 94621, under the Requirements of Order No. R2-2006-0075, NPDES Permit No. CAG912002 (Fuel General Permit)*, March 12, 2007.

California Regional Water Quality Control Board – San Francisco Bay Region, *Authorization to Discharge Treated Groundwater Under the Requirements of Order No. 01-100, NPDES Permit No. CAG 912002*, April 23, 2002.

OTG EnviroEngineering Solutions, Inc. *Startup Report, Groundwater Remediation at City of Oakland Municipal Services Center*, June 2006

URS Corporation, *Results of Dual-Phase Extraction Pilot Test for Plumes A & B, City of Oakland Municipal Services Center*, August 29, 2002.

URS Corporation, *Extraction Well Installation – City of Oakland Municipal Services Center Site – Plume D*, May 9, 2007.

Table 1 - Laboratory Analytical Procedures
City of Oakland Municipal Services Center Groundwater Remediation Project

	5/22/06	5/30/06	6/26/06	7/25/06 & 8/11/06	9/5/06	10/4/06 & 12/6/06	11/8/06	1/19/07 & 2/22/07	3/14/07	4/24/07 5/17 & 6/21	7/27/07
Flow rate	on-site totalizer	on-site totalizer	on-site totalizer	on-site totalizer	on-site totalizer	on-site totalizer	on-site totalizer	on-site totalizer	on-site totalizer	on-site totalizer	on-site totalizer
Turbidity	on-site	on-site	on-site	on-site	on-site	on-site	on-site	on-site	on-site	on-site	--
pH	on-site	on-site	on-site	on-site	on-site	on-site	on-site	on-site	on-site	on-site	on-site
Temperature	on-site	on-site	on-site	on-site	on-site	on-site	on-site	on-site	on-site	on-site	on-site
E. conductivity	on-site	on-site	on-site	on-site	on-site	on-site	on-site	on-site	on-site	on-site	on-site
Fish bioassay			EPA/821/R-02/012		EPA/821/R-02/012		EPA/821/R-02/012		EPA/821/R-02/012		
Benzene	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8260B	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8260B	EPA 8021B	EPA 8021B
Toluene	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8260B	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8260B	EPA 8021B	EPA 8021B
Ethylbenzene	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8260B	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8260B	EPA 8021B	EPA 8021B
Total xylenes	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8260B	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8260B	EPA 8021B	EPA 8021B
MTBE	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8260B	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8260B	EPA 8021B	EPA 8021B
TPHg & TPHd	EPA 8015B	EPA 8015B	EPA 8015B	EPA 8015B	EPA 8015B	EPA 8015B	EPA 8015B	EPA 8015B	EPA 8015B	EPA 8015B	EPA 8015B
EDB	--	EPA 8260B	--	--	EPA 8260B	--	--	--	EPA 8260B	--	--
VOCs	--	EPA 8260B	--	--	EPA 8260B	--	--	--	EPA 8260B	--	--
TAME	--	EPA 8260B	--	--	EPA 8260B	--	--	--	EPA 8260B	--	--
DIPE	--	EPA 8260B	--	--	EPA 8260B	--	--	--	EPA 8260B	--	--
ETBE	--	EPA 8260B	--	--	EPA 8260B	--	--	--	EPA 8260B	--	--
TBA	--	EPA 8260B	--	--	EPA 8260B	--	--	--	EPA 8260B	--	--
Ethanol	--	EPA 8015B	--	--	EPA 8260B	--	--	--	EPA 8015B	--	--
Methanol	--	EPA 8015B	--	--	EPA 8015B	--	--	--	EPA 8015B	--	--
SVOCs	--	EPA 625	--	--	EPA 8270C	--	--	--	EPA 8270C	--	--
PAHs	--	EPA 610	--	--	EPA 8310	--	--	--	EPA 8310	--	--
Hardness	SM 2340B	SM 2340B	SM 2340B	--	SM 2340B	--	SM 2340B	--	SM 2340B	--	--
Antimony	EPA 200.8	EPA 200.8	EPA 6020	--	EPA 6020	--	EPA 6020	--	EPA 6020	--	--
Arsenic	EPA 200.8	EPA 200.8	EPA 6020	--	EPA 6020	--	EPA 6020	--	EPA 6020	--	--
Beryllium	EPA 200.8	EPA 200.8	EPA 6020	--	EPA 6020	--	EPA 6020	--	EPA 6020	--	--
Cadmium	EPA 200.8	EPA 200.8	EPA 6020	--	EPA 6020	--	EPA 6020	--	EPA 6020	--	--
Chromium	EPA 200.8	EPA 200.8	EPA 6020	--	EPA 6020	--	EPA 6020	--	EPA 6020	--	--
Cr +6	EPA 7196	EPA 7196	EPA 7199	--	EPA 7199	--	EPA 7199	--	EPA 7199	--	--
Copper	EPA 200.8	EPA 200.8	EPA 6020	--	EPA 6020	--	EPA 6020	--	EPA 6020	--	--
Cyanide	EPA 335.2	EPA 335.2	EPA 335.2	--	EPA 335.2	--	EPA 335.2	--	EPA 335.2	--	--
Lead	EPA 200.8	EPA 200.8	EPA 6020	--	EPA 6020	--	EPA 6020	--	EPA 6020	--	--
Mercury	EPA 245.1	EPA 245.1	EPA 7470A	--	EPA 7470A	--	EPA 7470A	--	EPA 7470A	--	--
Nickel	EPA 200.8	EPA 200.8	EPA 6020	--	EPA 6020	--	EPA 6020	--	EPA 6020	--	--
Selenium	EPA 200.8	EPA 200.8	EPA 6020	--	EPA 6020	--	EPA 6020	--	EPA 6020	--	--
Silver	EPA 200.8	EPA 200.8	EPA 6020	--	EPA 6020	--	EPA 6020	--	EPA 6020	--	--
Thallium	EPA 200.8	EPA 200.8	EPA 6020	--	EPA 6020	--	EPA 6020	--	EPA 6020	--	--
Zinc	EPA 200.8	EPA 200.8	EPA 6020	--	EPA 6020	--	EPA 6020	--	EPA 6020	--	--

Notes:

1. pH, conductivity, and temperature were measured on site using an Oakton pH/Con 10 meter, serial #311648, calibrated daily before use.
2. Turbidity was measured on site using an Oakton T-100 meter, serial #316738, calibrated daily before use.
3. Monthly air samples are analyzed for TPHg and BTEX.

Abbreviations:

BTEX = benzene, toluene, ethylbenzene, and total xylenes
 Cr +6 = chromium-VI
 DIPE = diisopropyl ether
 EDB = ethylene dibromide
 EPA = U.S. Environmental Protection Agency
 ETBE = ethyl tertiary butyl ether
 MTBE = methyl tertiary butyl ether
 PAHs = polycyclic aromatic hydrocarbons

SM = Standard Method
 SVOCs = semivolatle organic compounds
 TAME = tertiary amyl ether
 TBA = tertiary butyl alcohol
 TPHd = total petroleum hydrocarbons quantified as diesel
 TPHg = total petroleum hydrocarbons quantified as gasoline
 VOCs = volatile organic compounds

Table 1 - Laboratory Analytical Procedures
 City of Oakland Municipal Services Center Groundwater Remediation Project

	8/28/07	09/19/07	10/24/07	11/21/07	12/20/07	1/21/08	2/20/08	3/18/08	4/23/08	5/20 & 6/16/08 & 7/22/08	8/21/08
Flow rate	on-site totalizer	on-site totalizer	on-site totalizer	on-site totalizer	on-site totalizer	on-site totalizer	on-site totalizer	on-site totalizer	on-site totalizer	on-site totalizer	on-site totalizer
Turbidity	on-site	on-site	on-site	on-site	on-site	on-site	on-site	on-site	on-site	on-site	on-site
pH	on-site	on-site	on-site	on-site	on-site	on-site	on-site	on-site	on-site	on-site	on-site
Temperature	on-site	on-site	on-site	on-site	on-site	on-site	on-site	on-site	on-site	on-site	on-site
E. conductivity	on-site	on-site	on-site	on-site	on-site	on-site	on-site	on-site	on-site	on-site	on-site
Fish bioassay							EPA/821/R-02/012				
Benzene	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8260B	EPA 8021B	EPA 8260B
Toluene	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8260B	EPA 8021B	EPA 8260B
Ethylbenzene	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8260B	EPA 8021B	EPA 8260B
Total xylenes	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8260B	EPA 8021B	EPA 8260B
MTBE	EPA 8021B	EPA 8260B	EPA 8021B	EPA 8260B	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8021B	EPA 8260B	EPA 8021B	EPA 8260B
TPHg & TPHd	EPA 8015B	EPA 8015B	EPA 8015B	EPA 8015B	EPA 8015B	EPA 8015B	EPA 8015B	EPA 8015B	EPA 8015B	EPA 8015B	EPA 8015B
EDB	EPA 8260B	EPA 8260B	--	--	--	--	--	--	--	--	EPA 8260B
VOCs	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	--	--	--	EPA 8260B
TAME	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	--	--	--	EPA 8260B
DIPE	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	--	--	--	EPA 8260B
ETBE	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	--	--	--	EPA 8260B
TBA	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	EPA 8260B	--	--	--	EPA 8260B
Ethanol	EPA 8260B	--	--	--	--	--	EPA 8015B	--	--	--	EPA 8015B
Methanol	EPA 8015B	--	--	--	--	--	EPA 8015B	--	--	--	EPA 8015B
SVOCs	EPA 8270C	--	--	--	--	--	EPA 8270C	--	--	--	EPA 8270C
PAHs	EPA 8310	--	--	--	--	--	EPA 8310	--	--	--	EPA 8310
Hardness	--	--	--	--	--	--	SM 2340B	--	--	--	--
Antimony	--	--	--	--	--	--	EPA 6020	--	--	--	--
Arsenic	--	--	--	--	--	--	EPA 6020	--	--	--	--
Beryllium	--	--	--	--	--	--	EPA 6020	--	--	--	--
Cadmium	--	--	--	--	--	--	EPA 6020	--	--	--	--
Chromium	--	--	--	--	--	--	EPA 6020	--	--	--	--
Cr +6	--	--	--	--	--	--	EPA 7199	--	--	--	--
Copper	--	--	--	--	--	--	EPA 6020	--	--	--	--
Cyanide	--	--	--	--	--	--	SM4500CN-E	--	--	--	--
Lead	--	--	--	--	--	--	EPA 6020	--	--	--	--
Mercury	--	--	--	--	--	--	EPA 7470A	--	--	--	--
Nickel	--	--	--	--	--	--	EPA 6020	--	--	--	--
Selenium	--	--	--	--	--	--	EPA 6020	--	--	--	--
Silver	--	--	--	--	--	--	EPA 6020	--	--	--	--
Thallium	--	--	--	--	--	--	EPA 6020	--	--	--	--
Zinc	--	--	--	--	--	--	EPA 6020	--	--	--	--

Table 1 - Laboratory Analytical Procedures
 City of Oakland Municipal Services Center Groundwater Remediation Project

	9/26/08	10/24/08 & 11/14/08	2/9/09
Flow rate	on-site totalizer	on-site totalizer	on-site totalizer
Turbidity	on-site	on-site	on-site
pH	on-site	on-site	on-site
Temperature	on-site	on-site	on-site
E. conductivity	on-site	on-site	on-site
Fish bioassay			EPA/821/R-02/012
Benzene	EPA 8260B	EPA 8260B	EPA 8260B
Toluene	EPA 8260B	EPA 8260B	EPA 8260B
Ethylbenzene	EPA 8260B	EPA 8260B	EPA 8260B
Total xylenes	EPA 8260B	EPA 8260B	EPA 8260B
MTBE	EPA 8260B	EPA 8260B	EPA 8260B
TPHg & TPHd	EPA 8015B	EPA 8015B	EPA 8015B
EDB	EPA 8260B	EPA 8260B	EPA 8260B
VOCs	EPA 8260B	EPA 8260B	EPA 8260B
TAME	EPA 8260B	EPA 8260B	EPA 8260B
DIPE	EPA 8260B	EPA 8260B	EPA 8260B
ETBE	EPA 8260B	EPA 8260B	EPA 8260B
TBA	EPA 8260B	EPA 8260B	EPA 8260B
Ethanol	--	--	EPA 8015B
Methanol	--	--	EPA 8015B
SVOCs	--	--	EPA 8270C
PAHs	--	--	EPA 8310
Hardness	--	--	
Antimony	--	--	EPA 6020
Arsenic	--	--	EPA 6020
Beryllium	--	--	EPA 6020
Cadmium	--	--	EPA 6020
Chromium	--	--	EPA 6020
Cr +6	--	--	EPA 7199
Copper	--	--	EPA 6020
Cyanide	--	--	SM4500CN-E
Lead	--	--	EPA 6020
Mercury	--	--	EPA 7470A
Nickel	--	--	EPA 6020
Selenium	--	--	EPA 6020
Silver	--	--	EPA 6020
Thallium	--	--	EPA 6020
Zinc	--	--	EPA 6020

Table 2 - Operational Data and Field-Measured Parameters
 City of Oakland Municipal Services Center Groundwater Remediation Project

Date	Time	Effluent (E-1)				Influent (I-1)			Btw-1	Btw-2	Totalizer Reading (gallons)	Monthly Treated (gallons)	Monthly Ave. Rate (gpm)	Cumulative Floating Product Recovered (gallons)	Notes
		pH	Temp. (°C)	E. cond. (mS/cm)	Turbidity (NTU)	pH	Temp. (°C)	E. cond. (mS/cm)							
5/22/2006	7:00	--	--	--	--	--	--	--	--	--	1,389	--	--	--	Before turn on system
5/22/2006	11:25	8.30	20.4	8.81	0.20	7.12	21.4	10.20	sampled	--	2,050	--	--	--	treated water held in tank
5/22/2006	14:15	--	--	--	--	--	--	--	--	--	2,414	--	--	--	stopped, waiting for analy data
5/24/2006	13:00	--	--	--	--	--	--	--	--	--	2,414	--	--	--	system on, start discharge
5/30/2006	12:30	7.48	19.4	8.25	0.04	6.98	23.1	8.32	sampled	--	14,230	--	--	20	
5/31/2006	10:00	--	--	--	--	--	--	--	--	--	18,980	17,591	1.705	--	
6/2/2006	16:30	--	--	--	--	--	--	--	sampled	sampled	31,080	--	--	--	
6/9/2006	8:30	--	--	--	--	--	--	--	--	--	48,610	--	--	--	
6/16/2006	10:20	--	--	--	--	--	--	--	--	--	67,755	--	--	--	
6/19/2006	9:40	--	--	--	--	--	--	--	--	--	74,670	--	--	--	
6/22/2006	11:00	--	--	--	--	--	--	--	--	--	90,480	--	--	--	
6/26/2006	9:00	7.32	22.3	13.00	0.10	7.37	23.3	13.40	sampled	sampled	106,950	--	--	--	Monthly monitoring
6/30/2006	9:00	--	--	--	--	--	--	--	--	--	122,860	103,880	2.405	100	
7/5/2006	10:00	--	--	--	--	--	--	--	--	--	140,500	--	--	--	Two full drums of product
7/12/2006	9:30	--	--	--	--	--	--	--	sampled	sampled	163,230	--	--	--	
7/19/2006	9:30	--	--	--	--	--	--	--	--	--	182,740	--	--	--	
7/25/2006	9:30	7.35	23.6	12.50	0.04	7.40	24.2	13.10	sampled	--	197,030	--	--	--	Monthly monitoring
7/31/2006	19:30	--	--	--	--	--	--	--	--	--	212,010	89,150	1.997	155	
8/2/2006	19:30	--	--	--	--	--	--	--	--	--	216,790	--	--	165	Three full drums of product
8/9/2006	9:00	--	--	--	--	--	--	--	--	--	233,260	--	--	--	Morgan removed 3 drums product
8/11/2006	9:30	6.95	21.5	12.80	0.10	7.25	22.3	12.60	sampled	sampled	238,380	--	--	--	Monthly monitoring
8/14/2006	8:00	--	--	--	--	--	--	--	--	--	246,180	--	--	--	Lowered pumps in wells
8/17/2006	11:30	--	--	--	--	--	--	--	--	--	255,030	--	--	--	
8/28/2006	11:30	--	--	--	--	--	--	--	--	--	283,080	--	--	--	
9/1/2006	18:30	--	--	--	--	--	--	--	--	--	294,910	82,900	1.801	220	One full drum of product on site
9/5/2006	11:00	7.00	19.7	12.30	0.10	7.10	22.8	11.50	sampled	sampled	301,450	--	--	--	Monthly & Qtrly monitoring
9/9/2006	18:00	--	--	--	--	--	--	--	--	--	310,750	--	--	--	
9/17/2006	13:00	--	--	--	--	--	--	--	--	--	333,310	--	--	--	
9/22/2006	13:30	--	--	--	--	--	--	--	--	--	349,210	--	--	--	
9/27/2006	10:00	--	--	--	--	--	--	--	--	--	364,350	--	--	--	
9/29/2006	15:00	--	--	--	--	--	--	--	--	--	371,290	--	--	--	
10/2/2006	14:30	--	--	--	--	--	--	--	--	--	380,360	85,450	1.925	245	
10/4/2006	11:00	7.10	19.4	12.67	0.04	7.30	21.5	12.22	sampled	sampled	386,160	--	--	--	Monthly monitoring
10/9/2006	13:00	--	--	--	--	--	--	--	--	--	402,090	--	--	--	
10/16/2006	11:00	--	--	--	--	--	--	--	--	--	417,310	--	--	--	
10/23/2006	17:00	--	--	--	--	--	--	--	--	--	436,170	--	--	--	
10/27/2006	18:30	--	--	--	--	--	--	--	--	--	443,640	--	--	--	
10/30/2006	11:00	--	--	--	--	--	--	--	--	--	448,220	--	--	275	Two full drums of product
11/1/2006	10:30	--	--	--	--	--	--	--	--	--	453,340	72,980	1.689	--	
11/8/2006	11:00	7.35	18.6	10.03	0.10	7.03	21.7	10.79	sampled	sampled	461,210	--	--	--	Monthly & quarterly monitoring
11/14/2006	12:30	--	--	--	--	--	--	--	--	--	483,660	--	--	--	
11/20/2006	10:30	--	--	--	--	--	--	--	--	--	487,970	--	--	--	

Table 2 - Operational Data and Field-Measured Parameters
City of Oakland Municipal Services Center Groundwater Remediation Project

Date	Time	Effluent (E-1)				Influent (I-1)			Btw-1	Btw-2	Totalizer Reading (gallons)	Monthly Treated (gallons)	Monthly Ave. Rate (gpm)	Cumulative Floating Product Recovered (gallons)	Notes
		pH	Temp. (°C)	E. cond. (mS/cm)	Turbidity (NTU)	pH	Temp. (°C)	E. cond. (mS/cm)							
12/1/2006	11:30	--	--	--	--	--	--	--	--	--	499,540	46,200	1.069	295	
12/6/2006	11:00	7.10	12.3	15.40	0.08	8.45	14.8	17.70	sampled	sampled	504,500	--	--	--	Monthly monitoring
12/15/2006	10:00	--	--	--	--	--	--	--	--	--	513,050	--	--	--	
12/22/2006	14:30	--	--	--	--	--	--	--	--	--	533,130	--	--	--	
12/27/2006	10:00	--	--	--	--	--	--	--	--	--	540,340	--	--	315	2 full drums plus 40 gal product
1/2/2007	9:00	--	--	--	--	--	--	--	--	--	548,820	49,280	1.073	--	
1/10/2007	11:00	--	--	--	--	--	--	--	--	--	559,230	--	--	--	
1/19/2007	10:00	7.15	9.4	19.90	0.04	8.00	13.5	19.50	sampled	sampled	569,740	--	--	--	Monthly monitoring
1/30/2007	10:00	--	--	--	--	--	--	--	--	--	592,780	--	--	330	3 full drums product on site
2/2/2007	10:00	--	--	--	--	--	--	--	--	--	607,920	59,100	1.322	--	
2/8/2007	16:30	--	--	--	--	--	--	--	--	--	615,000	--	--	--	
2/22/2007	10:00	7.12	13.8	15.50	0.04	7.67	15.2	19.13	sampled	sampled	672,610	--	--	--	Monthly monitoring
2/28/2007	10:30	--	--	--	--	--	--	--	--	--	693,430	85,510	2.282	343	
3/9/2007	10:00	--	--	--	--	--	--	--	--	--	729,160	--	--	--	
3/14/2007	11:30	7.25	17.6	13.34	0.04	7.28	18.2	13.05	sampled	sampled	748,440	--	--	--	Monthly & quarterly monitoring
3/21/2007	12:00	--	--	--	--	--	--	--	--	--	776,540	--	--	--	
3/30/2007	10:00	--	--	--	--	--	--	--	--	--	809,690	116,260	2.693	355	3 full drums+25 gal prod on site
4/2/2007	10:00	--	--	--	--	--	--	--	--	--	819,750	--	--	--	
4/13/2007	10:00	--	--	--	--	--	--	--	--	--	849,540	--	--	--	
4/24/2007	10:00	7.45	15.7	7.10	0.08	7.30	18.6	6.90	sampled	sampled	866,110	--	--	--	
4/30/2007	19:00	--	--	--	--	--	--	--	--	--	875,415	65,725	1.455	360	3 full drums+30 gal prod on site
5/4/2007	10:30	--	--	--	--	--	--	--	--	--	880,280	--	--	--	
5/14/2007	12:00	--	--	--	--	--	--	--	--	--	--	--	--	--	DPE online with D2,D4,D5 wells
5/14/2007	18:00	--	--	--	--	--	--	--	--	--	--	--	--	--	DPE in & out vapor sampling
5/17/2007	11:30	7.22	18.0	14.15	0.04	7.55	19.8	14.54	sampled	sampled	907,175	--	--	--	Monthly monitoring
5/22/2007	11:15	--	--	--	--	--	--	--	--	--	952,055	--	--	--	DPE down for Phase II tie-in
5/31/2007	11:00	--	--	--	--	--	--	--	--	--	954,120	78,705	1.782	364	3 full drums+34 gal prod on site
6/11/2007	10:00	--	--	--	--	--	--	--	--	--	954,920	--	--	--	DPE restart with all wells
6/14/2007	10:00	--	--	--	--	--	--	--	--	--	973,900	--	--	--	
6/21/2007	10:00	7.38	19.2	15.13	0.04	7.45	20.1	15.24	sampled	sampled	991,590	--	--	--	Monthly monitoring
6/26/2007	18:40	--	--	--	--	--	--	--	--	--	1,028,960	--	--	--	DPE in & out vapor sampling
6/29/2007	18:30	--	--	--	--	--	--	--	--	--	1,047,840	93,720	2.220	368	3 full drums+38 gal prod on site
7/3/2007	11:30	--	--	--	--	--	--	--	--	--	1,051,974	--	--	--	DPE down, knockout pump fail
7/11/2007	15:00	--	--	--	--	--	--	--	--	--	1,053,090	--	--	--	Changed knockout tank pump
7/16/2007	8:15	--	--	--	--	--	--	--	--	--	1,095,560	--	--	--	DPE down, insulation worn out
7/19/2007	10:00	--	--	--	--	--	--	--	--	--	1,096,110	--	--	--	DPE unit to factory for repair
7/23/2007	11:00	--	--	--	--	--	--	--	--	--	1,096,610	--	--	--	Removed 6 gal oil fr o/w septr
7/27/2007	9:30	7.16	21.0	11.79	--	7.07	19.4	19.57	sampled	sampled	1,096,780	--	--	--	Monthly monitoring
7/31/2007	13:00	--	--	--	--	--	--	--	--	--	1,097,310	49,470	1.081	374	Re-installed DPE, started at 11a
8/7/2007	19:30	--	--	--	--	--	--	--	--	--	1,118,930	--	--	--	Removed 5 gal oily sludge fr DPE
8/17/2007	10:00	--	--	--	--	--	--	--	--	--	1,147,080	--	--	--	Morgan removed 4 drums product
8/28/2007	11:36	7.08	25.9	18.64	4.60	7.13	25.6	18.55	sampled	sampled	1,198,870	--	--	--	Monthly monitoring

Table 2 - Operational Data and Field-Measured Parameters
City of Oakland Municipal Services Center Groundwater Remediation Project

Date	Time	Effluent (E-1)				Influent (I-1)			Btw-1	Btw-2	Totalizer Reading (gallons)	Monthly Treated (gallons)	Monthly Ave. Rate (gpm)	Cumulative Floating Product Recovered (gallons)	Notes
		pH	Temp. (°C)	E. cond. (mS/cm)	Turbidity (NTU)	pH	Temp. (°C)	E. cond. (mS/cm)							
8/31/2007	10:30	--	--	--	--	--	--	--	--	--	1,216,800	119,490	2.686	379	
9/7/2007	9:30	--	--	--	--	--	--	--	--	--	1,263,270	--	--	--	
9/14/2007	11:30	--	--	--	--	--	--	--	--	--	1,309,960	--	--	--	Display meter blinks
9/19/2007	10:50	6.96	19.8	18.64	6.92	7.08	20.8	18.65	sampled	sampled	1,340,410	--	--	--	Monthly monitoring
9/26/2007	10:20	--	--	--	--	--	--	--	--	--	1,352,170	--	--	--	Shutdown DPE, T sensor pbm
9/28/2007	12:00	--	--	--	--	--	--	--	--	--	1,352,690	135,890	3.363	379	only pneumatic pumps on
10/2/2007	12:00	--	--	--	--	--	--	--	--	--	1,353,380	--	--	--	
10/8/2007	17:30	--	--	--	--	--	--	--	--	--	1,354,020	--	--	--	DPE on at 4:30 pm
10/17/2007	11:00	--	--	--	--	--	--	--	--	--	1,394,995	--	--	--	
10/24/2007	14:13	7.08	25.5	14.32	0.66	7.19	29.6	14.23	sampled	sampled	1,406,110	--	--	--	Monthly monitoring
10/31/2007	10:30	--	--	--	--	--	--	--	--	--	1,418,260	65,570	1.382	379	
11/7/2007	11:00	--	--	--	--	--	--	--	--	--	1,427,640	--	--	--	
11/16/2007	10:30	--	--	--	--	--	--	--	--	--	1,500,460	--	--	--	
11/21/2007	10:21	7.10	20.5	OR	0.30	7.04	20.1	OR	sampled	sampled	1,537,150	--	--	--	Monthly monitoring
11/30/2007	9:30	--	--	--	--	--	--	--	--	--	1,584,070	165,810	3.844	379	
12/7/2007	10:30	--	--	--	--	--	--	--	--	--	1,621,980	--	--	--	
12/13/2007	--	--	--	--	--	--	--	--	--	--	--	--	--	--	Shutdown for carbon change
12/14/2007	13:00	--	--	--	--	--	--	--	--	--	--	--	--	--	DPE on at 1:00 pm
12/17/2007	11:15	--	--	--	--	--	--	--	--	--	1,643,760	--	--	--	
12/20/2007	18:30	7.20	15.1	23.50	0.10	7.20	13.7	25.20	sampled	sampled	1,658,560	--	--	--	Monthly monitoring
12/31/2007	9:00	--	--	--	--	--	--	--	--	--	1,685,340	101,270	2.270	379	
1/4/2008	14:30	--	--	--	--	--	--	--	--	--	1,701,860	--	--	--	
1/15/2008	13:00	--	--	--	--	--	--	--	--	--	1,725,190	--	--	--	
1/21/2008	9:30	--	--	--	--	--	--	--	sampled	sampled	1,742,110	--	--	--	Monthly monitoring
1/30/2008	11:30	--	--	--	--	--	--	--	--	--	1,791,840	106,500	2.457	379	
2/1/2008	15:30	--	--	--	--	--	--	--	--	--	1,799,660	--	--	--	
2/11/2008	11:00	--	--	--	--	--	--	--	--	--	1,826,520	--	--	--	
2/20/2008	11:18	6.95	17.40	12.85	1.15	6.99	20.10	12.71	sampled	sampled	1,844,380	--	--	--	Monthly/Annual Monitoring
2/29/2008	10:30	--	--	--	--	--	--	--	--	--	1,862,840	71,000	1.646	379	
3/3/2008	11:30	--	--	--	--	--	--	--	--	--	1,868,500	--	--	--	
3/14/2008	11:00	--	--	--	--	--	--	--	--	--	1,906,770	--	--	--	
3/18/2008	10:25	7.02	18.40	14.01	2.32	6.99	19.10	12.34	sampled	sampled	1,928,330	--	--	--	Monthly monitoring
3/20/2008	11:00	--	--	--	--	--	--	--	--	--	1,939,430	--	--	--	
3/31/2008	9:00	--	--	--	--	--	--	--	--	--	1,990,150	127,310	2.858	379	
4/7/2008	9:00	--	--	--	--	--	--	--	--	--	2,019,060	--	--	--	
4/14/2008	10:00	--	--	--	--	--	--	--	--	--	2,044,990	--	--	--	
4/18/2008	11:00	--	--	--	--	--	--	--	--	--	2,058,850	--	--	--	
4/23/2008	10:35	7.00	18.60	19.62	1.58	7.03	20.00	19.38	sampled	sampled	2,075,700	--	--	--	Monthly monitoring
4/30/2008	10:00	--	--	--	--	--	--	--	--	--	2,082,390	92,240	2.132	379	
5/15/2008	11:00	--	--	--	--	--	--	--	--	--	2,082,540	--	--	--	
5/20/2008	10:45	7.09	20.40	18.87	6.42	7.10	21.20	18.70	sampled	sampled	2,117,920	--	--	--	Monthly monitoring
5/29/2008	10:30	--	--	--	--	--	--	--	--	--	2,135,490	53,100	1.271	379	

Table 3 - Petroleum Hydrocarbon Analytical Data
 City of Oakland Municipal Services Center Groundwater Remediation Project

Date	Effluent (E-1)								Influent (I-1)							
	TPHg (µg/L)	TPHd (µg/L)	TPHmo (ug/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	TPHg (µg/L)	TPHd (µg/L)	TPHmo (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
Eff. Limit	50	50	50	5	5	5	5	5								
5/22/06	ND (50)	ND (50)	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	52,000	25,000 (h,l)	--	6,100	5,200	1,200	6,100	ND (100)
5/30/06	ND (50)	130 (y, a1)	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	57,000	9,200 (l,y)	--	4,900	5,300	1,100	7,100	ND (36)
6/2/06	--	ND (50)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/26/06	ND (50)	ND (50)	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	50,000	10,000 (h,l,y)	--	4,800	6,900	1,100	7,200	ND (50)
7/12/06	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/25/06	ND (50)	ND (50)	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	60,000	4,000 (l,y)	--	5,800	8,800	1,100	9,000	ND (80)
8/11/06	ND (50)	ND (50)	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	4.6 (a1a)	59,000	4,100 (l,y)	--	4,900	7,300	930	7,000	ND (100)
9/5/06	ND (50)	ND (50)	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	44,000	4,800 (l,y)	--	4,700	4,800	1,200	5,400	ND (50)
10/4/06	ND (50)	ND (50)	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	42,000	9,100 (h,l,y)	--	5,100	7,300	1,400	6,700	ND (100)
11/8/06	ND (50)	ND (50)	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	32,000	7,800 (h,l,y)	--	3,100	3,800	590	2,880	ND (50)
12/6/06	ND (50)	ND (50)	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	55,000	7,600 (h,l,y)	--	5,800	8,600	820	6,600	ND (50)
1/19/07	ND (50)	ND (50)	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	49,000	3,600 (l,y)	--	3,900	5,400	390	5,900	ND (50)
2/22/07	ND (50)	ND (50)	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	38,000	7,900 (l,y)	--	4,100	4,500	250	5,200	ND (40)
3/14/07	ND (50)	ND (50)	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	32,000	7,800 (h,l,y)	--	2,700	2,900	310	4,100	ND (13)
4/24/07	ND (50)	ND (50)	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	11,000	6,200 (h,l)	1,500 (l)	930	110	26	760	ND (10)
5/17/07	ND (50)	ND (50)	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	84,000	180,000 (h,l,y)	27,000 (l)	1,100	3,100	1,200	8,800	ND (100)
6/21/07	ND (50)	ND (50)	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	8,900	7,700 (h,l,y)	2,900 (l)	460	520	34	1,060	ND (2.0)
7/27/07	ND (50)	ND (50)	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	16,000	9,100 (h,l,y)	--	250	770	ND (2.5)	2,390	ND (10)
8/28/07	ND (50)	ND (50)	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	5,100	8,100 (h,l)	--	130	110	11	620	ND (2.0)
9/19/07	ND (50)	ND (50)	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	3,000	12,000 (h,l)	6,100 (h,l)	78	68	13	230	ND (0.5)
10/24/07	ND (50)	ND (50)	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	1,900	12,000 (y)	2,500	22	10	4.3	144	ND (2.0)
11/21/07	ND (50)	ND (50)	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	3,600	9,000	2,700	120	150	2.8	440	--
12/20/07	ND (50)	ND (50)	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	5,100	25,000	2,200 (y)	160	330	43	750	ND (2.0)
1/21/08	ND (50)	ND (50)	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	14,000	14,000 (y)	1,100	100	360	22	2,250	ND (10)
2/20/08	ND (50)	ND (50)	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (50)	6,100	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
3/18/08	ND (50)	ND (50)	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	2,300	9,000	2,300	43	120	25	430	ND (2.0)
4/23/08	ND (50)	ND (50)	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	2,300	14,000	7,000	19	66	9.7	470	ND (0.5)
5/20/08	ND (50)	ND (50)	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	2,900	20,000	2,500	23	70	11	390	ND (2.0)
6/16/08	ND (50)	ND (50)	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	1,400	6,700	1,100	9	23	9.3	159	ND (2.0)
7/22/08	ND (50)	ND (50)	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	2,300	9,400 (y)	6,300	16	37	5.6	280	ND (2.0)
8/21/08	ND (50)	ND (50)	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	1,300	12,000	--	10	15	2.2	137	ND (2.0)
9/26/08	ND (50)	ND (50)	ND (300)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	1,400	14,000	5,900	18	21	4.4	168	ND (0.5)
10/24/08	ND (50)	ND (50)	ND (300)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	1,000	10,000	6,800	14	14	4.6	134	ND (0.5)
11/14/08	ND (50)	ND (50)	ND (300)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	1,000	8,100	3,400	15	15	3	155	ND (0.5)
2/9/09	ND (50)	ND (50)	ND (300)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	1,400	11,000	2,000	18	26	7.6	240	ND (0.5)

Table 3 - Petroleum Hydrocarbon Analytical Data
City of Oakland Municipal Services Center Groundwater Remediation Project

Date	After 1st Carbon Unit (Btw-1)								After 2nd Carbon Unit (Btw-2)							
	TPHg (µg/L)	TPHd (µg/L)	TPHmo (ug/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	TPHg (µg/L)	TPHd (µg/L)	TPHmo (ug/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)
Eff. Limit	50	50		5	5	5	5	5	50	50		5	5	5	5	5
5/22/06	57 (y)	--		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	--	--		--	--	--	--	--
5/30/06	ND (50)	--		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	--	--		--	--	--	--	--
6/2/06	ND (50)	ND (50)		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	--	--	ND (50)		--	--	--	--	--
6/26/06	ND (50)	ND (50)		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	ND (50)	--		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)
7/12/06	ND (50)	ND (50)		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	ND (50)	--		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	3.9 (a2)
7/25/06	ND (50)	--		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	2.7	--	--		--	--	--	--	--
8/11/06	ND (50)	ND (50)		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	5.1 (a2a)	ND (50)	--		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	5.4 (a2a)
9/5/06	ND (50)	ND (50)		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	--	--		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)
10/4/06	ND (50)	ND (50)		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	ND (50)	--		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)
11/8/06	ND (50)	ND (50)		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	ND (50)	--		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)
12/6/06	ND (50)	ND (50)		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	ND (50)	--		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)
1/19/07	ND (50)	ND (50)		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	ND (50)	--		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)
2/22/07	ND (50)	ND (50)		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	ND (50)	--		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)
3/14/07	ND (50)	ND (50)		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	3.9	--	--		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
4/24/07	ND (50)	ND (50)		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	ND (50)	--		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)
5/17/07	ND (50)	ND (50)		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	ND (50)	--		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)
6/21/07	ND (50)	ND (50)		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	ND (50)	--		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)
7/27/07	ND (50)	ND (50)		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	ND (50)	--		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)
8/28/07	ND (50)	ND (50)		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	5.6 (a)	ND (50)	--		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)
9/19/07	ND (50)	ND (50)*		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	6.7	ND (50)	--		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
10/24/07	ND (50)	ND (50)		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	7.6	ND (50)	--		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)
11/21/07	ND (50)	ND (50)		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	--	ND (50)	--		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	--
12/20/07	ND (50)	ND (50)		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	ND (50)	--		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)
1/21/08	60 (y)	84 (y)		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	ND (50)	--		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)
2/20/08	ND (50)	ND (50)		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	--	--		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
3/18/08	ND (50)	ND (50)		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	ND (50)	--		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)
4/23/08	ND (50)	ND (50)		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (50)	--		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
5/20/08	ND (50)	ND (50)		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND(2.0)	ND (50)	--		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)
6/16/08	ND (50)	ND (50)		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND(2.0)	ND (50)	--		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)
7/22/08	92 (y,z)	ND (50)		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND(2.0)	78 (y,z)	--		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)
8/21/08	55 (y)	ND (50)		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND(2.0)	ND (50)	--		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
9/26/08	--	--	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	76 (y,z)	ND (50)	ND (300)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
10/24/08	--	--	--	--	--	--	--	--	ND (50)	ND (50)	ND (300)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
11/14/08	--	ND (50)	ND (300)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	74 (y,z)	--	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
2/9/09	--	--	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (50)	ND (50)	ND (300)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
										--						

Table 3 - Petroleum Hydrocarbon Analytical Data
City of Oakland Municipal Services Center Groundwater Remediation Project

Notes:

- (a1) - false positive detection, confirmed ND on 6/2/06 with samples at E-1, Btw-1, and Btw-2
- (a) - Presence confirmed, but RPD between columns exceeds 40 percent
- (a2) - false positive detection, confirmed ND after the first carbon unit
- (a2a) - false positive detection, confirmed ND with 9/5/06 sample
- (h) - heavier hydrocarbons contributed to the quantitation
- (l) - lighter hydrocarbons contributed to the quantitation
- (y) - sample exhibits chromatographic pattern that does not resemble standard
- (z) - sample exhibits unknown single peak or peaks
- * - Sample analytical result for TPHd was erroneously switched between Btw-1 and Btw-2 in the laboratory report, due to mislabeling in the field.

Abbreviations:

- "--" indicates not analyzed for constituent indicated
- MTBE = methyl tertiary butyl ether
- µg/L = microgram(s) per liter
- ND () = non-detected lab values
- TPHd = total petroleum hydrocarbons quantified as diesel
- TPHg = total petroleum hydrocarbon quantified as gasoline
- TPHmo = total petroleum hydrocarbon quantified as motor oil

Table 4 - Inorganic Constituents Analytical Data and Fish Bioassay Results
City of Oakland Municipal Services Center Groundwater Remediation Project

Constituent	Unit	Eff Limit (<10 gpm)	Effluent (E-1)								2/20/2008	2/9/2009
			5/22/06	5/30/06	6/26/06	9/5/06	11/8/06	3/14/07	8/28/07			
Antimony	µg/L	6	2.30	1.80	0.12	0.13	0.35	0.15	--	0.47 J	1.70	
	g/day	3	0.02137	0.01672	0.00157	0.00138	0.00243	0.00163	--	0.004216		
Arsenic	µg/L	10	36.00	24.00	7.00	3.00	4.30	1.60	--	4.40	10.00	
	g/day	1	0.33444	0.22296	0.09170	0.03177	0.02980	0.01736	--	0.039468		
Beryllium	µg/L	1	ND (0.35)	ND (0.5)	ND (0.055)	ND (0.12)	ND (0.12)	ND (0.17)	--	ND (1.0)	ND (0.1)	
	g/day	3	--	--	--	--	--	--	--	--		
Cadmium	µg/L	0.07	1.00	0.50	ND (0.14)	ND (0.17)	ND (0.17)	0.12	--	0.26 J	0.66 (J)	
	g/day	1	0.00929	0.00465	--	--	--	0.00130	--	0.002332		
Total Cr	µg/L	11	3.10	ND (0.5)	0.62	0.86	0.78	0.61	--	0.25 J	0.28 (J)	
	g/day	2	0.02880	--	0.00812	0.00911	0.00541	0.00662	--	0.002243		
Cr +6	µg/L	11	ND (1.0)	ND (10)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	
	g/day	2	--	--	--	--	--	--	--	--		
Copper	µg/L	3.1	1.30	0.90	1.30	1.50	1.20	ND (0.28)	--	0.70 J	40	
	g/day	3	0.01208	0.00836	0.01703	0.01589	0.00832	--	--	0.006279		
Lead	µg/L	2	ND (0.1)	ND (0.25)	0.26	0.30	0.30	0.75	--	1.70	5.50	
	g/day	5	--	--	0.00341	0.00318	0.00208	0.00814	--	0.015249		
Mercury	µg/L	0.025	ND(0.008)	ND(0.2)	ND (0.2)	ND (0.06)	ND (0.02)	0.06	--	ND (0.2)	0.14 (J)	
	g/day	0.01	--	--	--	--	--	0.00068	--	--		
Nickel	µg/L	8.2	11.00	67.00	15.00	9.60	2.90	1.50	--	8.10	7.20	
	g/day	5	0.10219	0.62243	0.19650	0.10166	0.02010	0.01628	--	0.072657		
Selenium	µg/L	5	3.00	3.00	1.20	ND (0.35)	1.20	ND (0.27)	--	ND (1.0)	0.17 (J)	
	g/day	2	0.02787	0.02787	0.01572	--	0.00832	--	--	--		
Silver	µg/L	1.9	ND (0.02)	ND (0.1)	ND (0.041)	ND (0.07)	ND (0.07)	ND (0.079)	--	ND (1.0)	0.23 (J)	
	g/day	1	--	--	--	--	--	--	--	--		
Thallium	µg/L	0.1	0.06	ND (0.1)	0.21	ND (0.03)	ND (0.03)	ND (0.3)	--	ND (1.0)	ND (0.03)	
	g/day	3	0.00056	--	0.00275	--	--	--	--	--		
Zinc	µg/L	35	2.00	ND (10)	44.00	11.00	1.90	10.00	--	6.40	4.3 (J)	
	g/day	10	0.01858		0.57640	0.11649	0.01317	0.10850	--	0.057408		
Cyanide	µg/L	1	ND (0.8)	ND (3)	ND (10)	ND (10)	ND (10)	ND (10)	--	0.08	ND (10)	
	g/day		--	--	--	--	--	--	--	0.000718		
Hardness	mg/L CaCO ₃		560	960	1,100	1,100	1,500	1,400	--	1,800		
Fish Bioassay -												
% Survival of Rainbow Trout			--	--	100%	100%	100%	100%	--	100%	95%	

Table 4 - Inorganic Constituents Analytical Data and Fish Bioassay Results
City of Oakland Municipal Services Center Groundwater Remediation Project

Constituent	Unit	Eff Limit (<10 gpm)	Influent (I-1)								2/20/08	2/9/09
			5/22/06	5/30/06	6/26/06	9/5/06	11/8/06	3/14/07	8/28/07			
Antimony	µg/L		ND (60)	ND (1)	--	--	--	1.10	--	0.74 J	1.9	
	g/day	3	--	--	--	--	--	0.01194	--	0.006279		
Arsenic	µg/L		7.20	8.50	--	--	--	5.40	--	6.1	13	
	g/day	1	0.06689	0.07897	--	--	--	0.05859	--	0.054717		
Beryllium	µg/L		ND (2)	ND (1)	--	--	--	ND (0.17)	--	ND (1.0)	ND (0.1)	
	g/day	3	--	--	--	--	--	--	--	--		
Cadmium	µg/L		34.00	10.00	--	--	--	0.33	--	1.6	41	
	g/day	1	0.31586	0.09290	--	--	--	0.00358	--	0.014352		
Total Cr	µg/L		ND (10)	ND (1)	--	--	--	0.91	--	0.72 J	0.89 (J)	
	g/day	2	--	--	--	--	--	0.00987	--	0.006279		
Cr +6	µg/L		ND (0.5)	ND (0.5)	--	--	--	ND (0.5)	--	ND (0.5)	ND (0.5)	
	g/day	2	--	--	--	--	--	--	--	--		
Copper	µg/L		250.00	25.00	--	--	--	ND (0.28)	--	9.2	830	
	g/day	3	2.32250	0.23225	--	--	--	--	--	0.082524		
Lead	µg/L		28.00	21.00	--	--	--	8.10	--	18	150	
	g/day	5	0.26012	0.19509	--	--	--	0.08789	--	0.16146		
Mercury	µg/L		ND (0.2)	ND (0.2)	--	--	--	0.05	--	ND (0.2)	0.25	
	g/day	0.01	--	--	--	--	--	0.00051	--	--		
Nickel	µg/L		68.00	19.00	--	--	--	2.80	--	6.4	130	
	g/day	5	0.63172	0.17651	--	--	--	0.03038	--	0.057408		
Selenium	µg/L		9.40	ND (1)	--	--	--	0.31	--	0.34 J	0.60 (J)	
	g/day	2	0.08733	--	--	--	--	0.00336	--	0.006279		
Silver	µg/L		ND (5)	ND (1)	--	--	--	ND (0.079)	--	ND (1.0)	1.6	
	g/day	1	--	--	--	--	--	--	--	--		
Thallium	µg/L		25.00	ND (1)	--	--	--	ND (0.30)	--	ND (1.0)	ND (0.03)	
	g/day	3	0.23225	--	--	--	--	--	--	--		
Zinc	µg/L		31.00	57.00	--	--	--	23.00	--	37	51	
	g/day	10	0.28799	0.52953	--	--	--	0.24955	--	0.33189		
Cyanide	µg/L		10.00	10.00	--	--	20.00	30.00	--	0.8	ND (10)	
	g/day		0.09290	0.09290	--	--	--	0.32550	--	0.007176		
Abbreviations:												
"--" indicates no value obtained for given field			J = Estimated value, below reporting limit, but above method detection limit									
Cr +6 = chromium-VI			mg/L CaCO ₃ = milligram(s) per liter of calcium carbonate									
g/day = grams per day			µg/L = microgram(s) per liter									
gpm = gallon(s) per minute			ND () = non-detected lab value									

Table 5 - Organic Constituents Analytical Data
City of Oakland Municipal Services Center Groundwater Remediation Project

	Effluent (E-1)																			
	Max Daily Effluent Limit	5/30/06	9/5/06	3/14/07	8/28/07	9/19/07	10/24/07	11/21/07	12/20/07	1/21/08	2/20/08	3/18/08	4/23/08	5/20/08	6/16/08	8/21/08	9/26/08	10/24/08	11/14/08	2/9/09
VOCs	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
Benzene	5	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Carbon tetrachloride	5	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	--	--	--	--	--	ND (0.5)	--	--	--	--	ND (0.5)	ND (0.5)	--	--	ND (0.5)
Chloroform	5	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	--	--	--	--	--	ND (0.5)	--	--	--	--	ND (0.5)	ND (0.5)	--	--	ND (0.5)
1,1-Dichloroethane	5	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	--	--	--	--	--	ND (0.5)	--	--	--	--	ND (0.5)	ND (0.5)	--	--	ND (0.5)
1,2-Dichloroethane	5	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	--	--	--	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
1,1-Dichloroethene	5	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	--	--	--	--	--	ND (0.5)	--	--	--	--	ND (0.5)	ND (0.5)	--	--	ND (0.5)
Ethylbenzene	5	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Methylene chloride	5	ND (0.5)	ND (0.5)	ND (10)	ND (10)	--	--	--	--	--	ND (10)	--	--	--	--	ND (10)	ND (10)	--	--	ND (10)
Tetrachloroethene	5	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	--	--	--	--	--	ND (0.5)	--	--	--	--	ND (0.5)	ND (0.5)	--	--	ND (0.5)
Toluene	5	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
c-1,2-Dichloroethene	5	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	--	--	--	--	--	ND (0.5)	--	--	--	--	ND (0.5)	ND (0.5)	--	--	ND (0.5)
t-1,2-Dichloroethene	5	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	--	--	--	--	--	ND (0.5)	--	--	--	--	ND (0.5)	ND (0.5)	--	--	ND (0.5)
1,1,1-Trichloroethane	5	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	--	--	--	--	--	ND (0.5)	--	--	--	--	ND (0.5)	ND (0.5)	--	--	ND (0.5)
1,1,2-Trichloroethane	5	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	--	--	--	--	--	ND (0.5)	--	--	--	--	ND (0.5)	ND (0.5)	--	--	ND (0.5)
Trichloroethene	5	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	--	--	--	--	--	ND (0.5)	--	--	--	--	ND (0.5)	ND (0.5)	--	--	ND (0.5)
Vinyl chloride	1	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	--	--	--	--	--	ND (0.5)	--	--	--	--	ND (0.5)	ND (0.5)	--	--	ND (0.5)
Total xylenes	5	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
MTBE	5	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (2.0)	ND (2.0)	ND (0.5)	ND (2.0)	ND (0.5)	ND (2.0)	ND (2.0)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Ethylene dibromide	5	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	--	--	--	--	ND (0.5)	ND (0.5)	--	--	--	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Trichlorotrifluoroethane	5	ND (5)	ND (5)	ND (5)	ND (1.0)	--	--	--	--	--	--	--	--	--	--	ND (2.0)	ND (2.0)	--	--	ND (5)
TPHg	50	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)
TPHd	50	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)
TAME		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	--	--	--	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
DIPE		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	--	--	--	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
ETBE		ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	--	--	--	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
TBA		ND (10)	ND (10)	ND (10)	140	140	160	160	ND (10)	ND (10)	ND (10)	--	--	--	--	130	87	120	92	ND (10)
Ethanol		ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	--	--	--	--	--	ND (1,000)	--	--	--	--	ND (1,000)		--	--	ND (1,000)
Methanol		ND (1,000)	ND (1,000)	ND (1,000)	ND (1,000)	--	--	--	--	--	ND (1,000)	--	--	--	--	ND (1,000)		--	--	ND (1,000)
PAHs (EPA 8310 or 610)																				
All analytes		ND (1.0)	ND (0.1)	ND (0.1)	ND (0.1)	--	--	--	--	--	ND (0.1)	--	--	--	--	ND (0.09)		--	--	ND (0.1)
SVOCs (EPA 8270C or 625)																				
All analytes		ND (5.0)	ND (9.4)	ND (9.6)	ND (9.7)	--	ND (0.5)	ND (0.5)	ND (0.5)	--	ND (9.4)	--	--	--	--	ND (9.4)		--	--	ND (9.6)

Table 5 - Organic Constituents Analytical Data
City of Oakland Municipal Services Center Groundwater Remediation Project

	Influent (I-1)																		
	5/30/06	9/5/06	3/14/07	8/28/07	9/19/07	10/24/07	11/21/07	12/20/07	1/21/08	2/20/08	3/18/08	4/23/08	5/20/08	6/16/08	8/21/08	9/26/08	10/24/08	11/14/08	2/9/09
VOCs	(µg/L)		(µg/L)		(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)		(µg/L)	(µg/L)	(µg/L)	(µg/L)
Benzene	4,900	--	2,700	--	78	22	120	160	100	ND (0.5)	43	19	23	9	--	18	14	15	18
Carbon tetrachloride	ND (36)	--	ND (13)	--	--	--	--	--	--	ND (0.5)	--	--	--	--	--	ND (0.5)	--	--	ND (0.5)
Chloroform	ND (36)	--	ND (13)	--	--	--	--	--	--	ND (0.5)	--	--	--	--	--	ND (0.5)	--	--	ND (0.5)
1,1-Dichloroethane	ND (36)	--	ND (13)	--	--	--	--	--	--	ND (0.5)	--	--	--	--	--	ND (0.5)	--	--	ND (0.5)
1,2-Dichloroethane	ND (36)	--	ND (13)	--	2.2	--	--	--	--	ND (0.5)	--	--	--	--	--	ND (0.5)	0.6	ND (0.5)	0.7
1,1-Dichloroethene	ND (36)	--	ND (13)	--	--	--	--	--	--	ND (0.5)	--	--	--	--	--	ND (0.5)	--	--	ND (0.5)
Ethylbenzene	1,100	--	310	--	13	4.3	2.8	43	22	ND (0.5)	25	9.7	11	9.3	--	4.4	4.6	3	7.6
Methylene chloride	ND (36)	--	ND (250)	--	--	--	--	--	--	ND (10)	--	--	--	--	--	ND (10)	--	--	ND (10)
Tetrachloroethene	ND (36)	--	ND (13)	--	--	--	--	--	--	ND (0.5)	--	--	--	--	--	ND (0.5)	--	--	ND (0.5)
Toluene	5,300	--	2,900	--	68	10	150	330	360	ND (0.5)	120	66	70	23	--	21	14	15	26
c-1,2-Dichloroethene	ND (36)	--	ND (13)	--	--	--	--	--	--	ND (0.5)	--	--	--	--	--	ND (0.5)	--	--	ND (0.5)
t-1,2-Dichloroethene	ND (36)	--	ND (13)	--	--	--	--	--	--	ND (0.5)	--	--	--	--	--	ND (0.5)	--	--	ND (0.5)
1,1,1-Trichloroethane	ND (36)	--	ND (13)	--	--	--	--	--	--	ND (0.5)	--	--	--	--	--	ND (0.5)	--	--	ND (0.5)
1,1,2-Trichloroethane	ND (36)	--	ND (13)	--	--	--	--	--	--	ND (0.5)	--	--	--	--	--	ND (0.5)	--	--	ND (0.5)
Trichloroethene	ND (36)	--	ND (13)	--	--	--	--	--	--	ND (0.5)	--	--	--	--	--	ND (0.5)	--	--	ND (0.5)
Vinyl chloride	ND (36)	--	ND (13)	--	--	--	--	--	--	ND (0.5)	--	--	--	--	--	ND (0.5)	--	--	ND (0.5)
Total xylenes	7,100	--	4,100	--	230	144	440	750	2,250	ND (0.5)	430	470	390	159	--	168	134	155	240
MTBE	ND (36)	--	ND (13)	--	ND (0.5)	ND (2.0)	--	ND (2.0)	ND (10)	ND (0.5)	ND (2.0)	ND (0.5)	ND (2.0)	ND (2.0)	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Ethylene dibromide	ND (36)	--	ND (13)	--	ND (0.5)	--	--	--	--	--	--	--	--	--	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Trichlorotrifluoroethane	ND (360)	--	ND (13)	--	--	--	--	--	--	--	--	--	--	--	--	ND (2.0)	--	--	ND (5)
TPHg	57,000	--	32,000	--	3,000	1,900	3,600	5,100	14,000	ND (50)	2,300	2,300	2,900	1,400	--	1,400	1,000	1,000	1,400
TPHd	9,200	--	7,800	--	12,000 (h,i)	12,000 (y)	9,000	25,000	14,000	6,100	9,000	14,000	20,000	6,700	--	14,000	10,000	8,100	11,000
TAME	ND (36)	--	ND (13)	--	ND (0.5)	--	--	--	--	ND (0.5)	--	--	--	--	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
DIPE	ND (36)	--	ND (13)	--	ND (0.5)	--	--	--	--	ND (0.5)	--	--	--	--	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
ETBE	ND (36)	--	ND (13)	--	ND (0.5)	--	--	--	--	ND (0.5)	--	--	--	--	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
TBA	ND (710)	--	ND (25)	--	40	--	--	--	--	71	--	--	--	--	--	59	58	53	81
Ethanol	ND(1,000)	--	ND(1,000)	--	--	--	--	--	--	ND (1,000)	--	--	--	--	--	--	--	--	ND(1,000)
Methanol	ND(1,000)	--	ND(1,000)	--	--	--	--	--	--	ND (1,000)	--	--	--	--	--	--	--	--	ND(1,000)
Isopropylbenzene	40	--	16	--	--	--	--	--	--	ND (0.5)	--	--	--	--	--	ND (0.5)	--	--	0.7
Propylbenzene	120	--	36	--	--	--	--	--	--	ND (0.5)	--	--	--	--	--	0.7	--	--	1.1
1,3,5-Trimethylbenzene	410	--	270	--	--	--	--	--	--	ND (0.5)	--	--	--	--	--	36	--	--	58
1,2,4-Trimethylbenzene	1,500	--	960	--	--	--	--	--	--	ND (0.5)	--	--	--	--	--	60	--	--	86
Naphthalene	370	--	260	--	--	--	--	--	--	ND (2.0)	--	--	--	--	--	16	--	--	22
PAHs (EPA 8310 or 610)																			
Benzo(a)anthracene	1.7	--	0.14	--	--	--	--	--	--	ND (0.1)	--	--	--	--	--	--	--	--	ND (0.09)
Benzo(a)pyrene	1.6	--	0.12	--	--	--	--	--	--	0.15	--	--	--	--	--	--	--	--	ND (0.09)
Benzo(g,h,i)perylene	ND (1.0)	--	0.21	--	--	--	--	--	--	0.44	--	--	--	--	--	--	--	--	ND (0.19)
Chrysene	2.6	--	0.17	--	--	--	--	--	--	0.13	--	--	--	--	--	--	--	--	ND (0.09)
Fluoranthene	3.8	--	0.63	--	--	--	--	--	--	ND (0.2)	--	--	--	--	--	--	--	--	ND (0.19)
Naphthalene	130	--	230	--	--	--	--	--	--	ND (0.98)	--	--	--	--	--	--	--	--	13
Pyrene	3.3	--	0.56	--	--	--	--	--	--	0.28	--	--	--	--	--	--	--	--	0.11
Acenaphthene	ND (1.0)	--	130	--	--	--	--	--	--	ND (0.98)	--	--	--	--	--	--	--	--	33
Acenaphthylene	ND (1.0)	--	58	--	--	--	--	--	--	ND (2.0)	--	--	--	--	--	--	--	--	ND (1.9)
Fluorene	ND (1.0)	--	6.4	--	--	--	--	--	--	ND (0.2)	--	--	--	--	--	--	--	--	0.72
Phenanthrene	ND (1.0)	--	1.6	--	--	--	--	--	--	ND (0.1)	--	--	--	--	--	--	--	--	ND (0.09)
Anthracene	ND (1.0)	--	0.13	--	--	--	--	--	--	ND (0.1)	--	--	--	--	--	--	--	--	ND (0.09)
SVOCs (EPA 8270C or 625)																			
Dimethylphthalate	28	--	ND (97)	--	--	--	--	--	--	ND (.94)	--	--	--	--	--	--	--	--	ND (48)
bis(2-Ethylhexyl)phthalate	12	--	ND (97)	--	--	--	--	--	--	ND (.94)	--	--	--	--	--	--	--	--	ND (48)
Naphthalene	290	--	160	--	--	--	--	--	--	ND (.94)	--	--	--	--	--	--	--	--	ND (48)
Phenol	13	--	270	--	--	--	--	--	--	ND (.94)	--	--	--	--	--	--	--	--	ND (48)
All other SVOCs	ND (5)	--	ND (97)	--	--	--	--	--	--	ND (.94)	--	--	--	--	--	--	--	--	ND (48)

Table 5 - Organic Constituents Analytical Data
 City of Oakland Municipal Services Center Groundwater Remediation Project

After First Carbon Unit (Btw-1)																				
	Max Daily Effluent Limit	5/30/06	9/5/06	3/14/07	8/28/07	9/19/07	10/24/07	11/21/07	12/20/07	1/21/08	2/20/08	3/18/08	4/23/08	5/20/08	6/16/08	8/21/08	9/26/08	10/24/08	11/14/08	2/9/09
	(µg/L)	(µg/L)	(µg/L)			(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(ug/L)	(µg/L)	(ug/L)	(µg/L)	(ug/L)
VOCs																				
Benzene	5	ND (0.5)	ND (0.5)	--	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	--	ND (0.5)	--	ND (0.5)	ND (0.5)
Carbon tetrachloride	5	ND (0.5)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND (0.5)	--	--	ND (0.5)
Chloroform	5	ND (0.5)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND (0.5)	--	--	ND (0.5)
1,1-Dichloroethane	5	ND (0.5)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND (0.5)	--	--	ND (0.5)
1,2-Dichloroethane	5	ND (0.5)	--	--	--	ND (0.5)	--	--	--	--	--	--	--	--	--	--	ND (0.5)	--	ND (0.5)	ND (0.5)
1,1-Dichloroethene	5	ND (0.5)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND (0.5)	--	--	ND (0.5)
Ethylbenzene	5	ND (0.5)	ND (0.5)	--	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	--	ND (0.5)	--	ND (0.5)	ND (0.5)
Methylene chloride	5	ND (0.5)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND (10)	--	--	ND (10)
Tetrachloroethene	5	ND (0.5)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND (0.5)	--	--	ND (0.5)
Toluene	5	ND (0.5)	ND (0.5)	--	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	--	ND (0.5)	--	ND (0.5)	ND (0.5)
c-1,2-Dichloroethene	5	ND (0.5)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND (0.5)	--	--	ND (0.5)
t-1,2-Dichloroethene	5	ND (0.5)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND (0.5)	--	--	ND (0.5)
1,1,1-Trichloroethane	5	ND (0.5)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND (0.5)	--	--	ND (0.5)
1,1,2-Trichloroethane	5	ND (0.5)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND (0.5)	--	--	ND (0.5)
Trichloroethylene	5	ND (0.5)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND (0.5)	--	--	ND (0.5)
Vinyl chloride	5	ND (0.5)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND (0.5)	--	--	ND (0.5)
Total xylenes	5	ND (0.5)	ND (0.5)	--	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	--	ND (0.5)	--	ND (0.5)	ND (0.5)
MTBE	13	ND (0.5)	ND (2)	--	--	6.7	7.6	--	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	ND (0.5)	ND (2.0)	ND (2.0)	--	ND (0.5)	--	ND (0.5)	ND (0.5)
Ethylene dibromide	5	ND (0.5)	--	--	--	ND (0.5)	--	--	--	--	--	--	--	--	--	--	ND (0.5)	--	ND (0.5)	ND (0.5)
Trichlorotrifluoroethane	5	ND (5)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND (2.0)	--	--	ND (5)
TPHg	50	ND (50)	ND (50)	--	--	ND (50)	ND (50)	ND (50)	ND (50)	60 (y)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	--	--	--	--	--
TPHd	50	ND (50)	ND (50)	--	--	ND (50)*	ND (50)	ND (50)	ND (50)	84 (y)	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	--	--	--	ND (50)	--
TAME		ND (0.5)	--	--	--	ND (0.5)	--	--	--	--	--	--	--	--	--	--	ND (0.5)	--	ND (0.5)	ND (0.5)
DIPE		ND (0.5)	--	--	--	ND (0.5)	--	--	--	--	--	--	--	--	--	--	ND (0.5)	--	ND (0.5)	ND (0.5)
ETBE		ND (0.5)	--	--	--	ND (0.5)	--	--	--	--	--	--	--	--	--	--	ND (0.5)	--	ND (0.5)	ND (0.5)
TBA		ND (10)	--	--	--	86	--	--	--	--	--	--	--	--	--	--	70	--	53	67
Ethanol		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methanol		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PAHs (EPA 8310 or 610)		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SVOCs (EPA 8270C or 625)		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--

Table 5 - Organic Constituents Analytical Data
City of Oakland Municipal Services Center Groundwater Remediation Project

After Second Carbon Unit (Btw-2)																				
	Max Daily Effluent Limit	5/30/06	9/5/06	3/14/07	8/28/07	9/19/07	10/24/07	11/21/07	12/20/07	1/21/08	2/20/08	3/18/08	4/23/08	5/20/08	6/16/08	8/21/08	9/26/08	10/24/08	11/14/08	2/9/2009
VOCs	(µg/L)		(µg/L)	(µg/L)		(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
Benzene	5	--	ND (0.5)	ND (0.5)	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Carbon tetrachloride	5	--	ND (0.5)	ND (0.5)	--	--	--	--	--	--	ND (0.5)	--	--	--	--	ND (0.5)	ND (0.5)	--	--	ND (0.5)
Chloroform	5	--	ND (0.5)	ND (0.5)	--	--	--	--	--	--	ND (0.5)	--	--	--	--	ND (0.5)	ND (0.5)	--	--	ND (0.5)
1,1-Dichloroethane	5	--	ND (0.5)	ND (0.5)	--	--	--	--	--	--	ND (0.5)	--	--	--	--	ND (0.5)	ND (0.5)	--	--	ND (0.5)
1,2-Dichloroethane	5	--	ND (0.5)	ND (0.5)	--	ND (0.5)	--	--	--	--	ND (0.5)	--	--	--	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
1,1-Dichloroethene	5	--	ND (0.5)	ND (0.5)	--	--	--	--	--	--	ND (0.5)	--	--	--	--	ND (0.5)	ND (0.5)	--	--	ND (0.5)
Ethylbenzene	5	--	ND (0.5)	ND (0.5)	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Methylene chloride	5	--	ND (0.5)	ND (10)	--	--	--	--	--	--	ND (10)	--	--	--	--	ND (10)	ND (10)	--	--	ND (10)
Tetrachloroethene	5	--	ND (0.5)	ND (0.5)	--	--	--	--	--	--	ND (0.5)	--	--	--	--	ND (0.5)	ND (0.5)	--	--	ND (0.5)
Toluene	5	--	ND (0.5)	ND (0.5)	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
c-1,2-Dichloroethene	5	--	ND (0.5)	ND (0.5)	--	--	--	--	--	--	ND (0.5)	--	--	--	--	ND (0.5)	ND (0.5)	--	--	ND (0.5)
t-1,2-Dichloroethene	5	--	ND (0.5)	ND (0.5)	--	--	--	--	--	--	ND (0.5)	--	--	--	--	ND (0.5)	ND (0.5)	--	--	ND (0.5)
1,1,1-Trichloroethane	5	--	ND (0.5)	ND (0.5)	--	--	--	--	--	--	ND (0.5)	--	--	--	--	ND (0.5)	ND (0.5)	--	--	ND (0.5)
1,1,2-Trichloroethane	5	--	ND (0.5)	ND (0.5)	--	--	--	--	--	--	ND (0.5)	--	--	--	--	ND (0.5)	ND (0.5)	--	--	ND (0.5)
Trichloroethene	5	--	ND (0.5)	ND (0.5)	--	--	--	--	--	--	ND (0.5)	--	--	--	--	ND (0.5)	ND (0.5)	--	--	ND (0.5)
Vinyl chloride	5	--	ND (0.5)	ND (0.5)	--	--	--	--	--	--	ND (0.5)	--	--	--	--	ND (0.5)	ND (0.5)	--	--	ND (0.5)
Total xylenes	5	--	ND (0.5)	ND (0.5)	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
MTBE	13	--	ND (0.5)	ND (0.5)	--	ND (0.5)	ND (2.0)	--	ND (2.0)	ND (2.0)	ND (0.5)	ND (2.0)	ND (0.5)	ND (2.0)	ND (2.0)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Ethylene dibromide	5	--	ND (0.5)	ND (0.5)	--	ND (0.5)	--	--	--	--	--	--	--	--	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
Trichlorotrifluoroethane	5	--	ND (5)	ND (5)	--	--	--	--	--	--	--	--	--	--	--	ND (2.0)	ND (2.0)	--	--	ND (5)
TPHg	50	--	--	--	--	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	--	ND (50)	ND (50)	ND (50)	ND (50)	ND (50)	76 (y,z)	ND (50)	74 (y,z)	ND (50)
TPHd	50	--	--	--	--	--	--	--	--	--	--	--	--	--	--	ND (50)	ND (50)	ND (50)	--	ND (50)
TAME		--	ND (0.5)	ND (0.5)	--	ND (0.5)	--	--	--	--	ND (0.5)	--	--	--	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
DIPE		--	ND (0.5)	ND (0.5)	--	ND (0.5)	--	--	--	--	ND (0.5)	--	--	--	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
ETBE		--	ND (0.5)	ND (0.5)	--	ND (0.5)	--	--	--	--	ND (0.5)	--	--	--	--	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)	ND (0.5)
TBA		--	ND (10)	110	--	130	--	--	--	--	22	--	--	--	--	140	100	99	74	ND (10)
Ethanol		--	ND(1,000)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Methanol		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PAHs (EPA 8310 or 610)		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
SVOCs (EPA 8270C or 625)		--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Notes:																				
(h) - heavier hydrocarbons contributed to the quantitation																				
(l) - lighter hydrocarbons contributed to the quantitation																				
(y) - sample exhibits chromatographic pattern which does not resemble standard																				
* - Sample analytical results for TPH-d were erroneously switched between Btw-1 and Btw-2 in the laboratory analytical reports due to mislabeling in the field.																				
Abbreviations:																				
"--" indicates not analyzed for constituent indicated											PAHs = polycyclic aromatic hydrocarbons									
DIPE = diisopropyl ether											SVOCs = semivolatle organic compounds									
EPA = U.S. Environmental Protection Agency											TAME = tertiary amyl ether									
ETBE = ethyl tertiary butyl ether											TBA = tertiary butyl alcohol									
µg/L = microgram(s) per liter											TPHd = total petroleum hydrocarbons quantified as diesel									
MTBE = methyl tertiary butyl ether											TPHg = total petroleum hydrocarbons quantified as gasoline									
ND () = non-detected lab value											VOCs = volatile organic compounds									

Table 6 - Dual-Phase Extraction Vapor Monitoring Data
 City of Oakland Municipal Services Center Groundwater Remediation Project

Date	Time	DPE Run-time Meter Reading (cumulative hr)	Vapor Flow Rate (1) (acfm)	Thermo Oxidizer Temp. (°F)	Vacuum Pump		A-2 Exhaust (Effluent)					A-2 Inlet (Influent)					Notes
					Vacuum (inch Hg)	Discharge Temp (°F)	POC (2) (ppmv)	Benzene (ppmv)	Toluene (ppmv)	Ethylbenzene (ppmv)	Total Xylenes (ppmv)	POC (2) (ppmv)	Benzene (ppmv)	Toluene (ppmv)	Ethylbenzene (ppmv)	Total Xylenes (ppmv)	
5/14/07	12:00	12.5	275	1440	15	160	1.10	0.042	0.028	0.0059	0.021	2000	18.0	21	6.5	21.4	DPE startup
5/17/07	11:25	83.9	276	1448	15	160	--	--	--	--	--	--	--	--	--	--	NPDES sampling
5/22/07	11:15	203.7	284	1551	15	160	--	--	--	--	--	--	--	--	--	--	shutdown @11:30 Phll tie-in
5/31/07	11:00	203.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
6/11/07	10:00	204	235	1438	16.5	165	--	--	--	--	--	--	--	--	--	--	re-start with all wells
6/14/07	10:00	276.5	280	1455	15	170	--	--	--	--	--	--	--	--	--	--	--
6/18/07	19:00	276.7	280	1460	11.5	160	--	--	--	--	--	--	--	--	--	--	--
6/21/07	10:00	328.8	276	1450	15	165	--	--	--	--	--	--	--	--	--	--	NPDES sampling
6/26/07	18:40	446.7	288	1454	11.5	160	2.76	0.063	0.060	0.0023	0.018	2410	25.0	35	4.6	28.7	--
6/29/07	18:30	518.5	294	1479	14	160	--	--	--	--	--	--	--	--	--	--	--
7/3/07	11:30	536.2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	knockout tank pump down
7/11/07	15:00	536.9	227	1449	17	160	--	--	--	--	--	--	--	--	--	--	changed knockout tank pump
7/16/07	8:15	630	304	1435	13	160	--	--	--	--	--	--	--	--	--	--	DPE down, insulation worn
7/19/07	10:00	630	--	--	--	--	--	--	--	--	--	--	--	--	--	--	DPE unit to factory for repair
7/23/07	11:00	630	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/27/07	9:30	630	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
7/31/07	13:00	633.3	289	1460	14	160	--	--	--	--	--	--	--	--	--	--	re-installed DPE, on at 11am
8/7/07	19:30	669.5	307	1506	13.5	160	--	--	--	--	--	--	--	--	--	--	removed 5 gal oily sludge
8/17/07	10:00	719.3	--	--	--	--	--	--	--	--	--	--	--	--	--	--	DPE down, cleaned vac unit
8/28/07	10:00	895.5	297	1518	14	160	1.00	0.046	0.011	0.0008	0.005	3820	27.0	24	3.1	25.4	NPDES & vapor monitoring
8/31/07	10:30	968	298	1465	13.5	160	--	--	--	--	--	--	--	--	--	--	--
9/7/07	9:30	1135	302	1520	13.5	160	--	--	--	--	--	--	--	--	--	--	--
9/14/07	11:30	1305	289	1467	13	160	--	--	--	--	--	--	--	--	--	--	--
9/19/07	10:00	1423.5	Note (3)	1485	10	160	1.40	0.021	0.015	0.0012	0.010	2460	6.6	8.6	1.0	7.5	NPDES & vapor monitoring
9/26/07	10:20	1591.3	--	1446	15	160	--	--	--	--	--	--	--	--	--	--	DPE down, T sensor pblm
9/28/07	12:00	1591.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	only pneumatic pumps on
10/2/07	12:00	1591.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	fixed T sensor
10/8/07	17:30	1592.9	--	1490	15	160	--	--	--	--	--	--	--	--	--	--	fixed data recorder
10/17/07	11:00	1757.3	--	1486	15	160	--	--	--	--	--	--	--	--	--	--	--
10/24/07	14:00	1928	--	1479	15	160	2.40	0.038	0.023	ND (0.00005)	0.011	3700	4.4	ND (0.0005)	ND (0.0005)	1.8	NPDES & vapor monitoring
10/31/07	10:30	2092.1	--	1460	15	160	--	--	--	--	--	--	--	--	--	--	--
11/7/07	11:00	2261.5	--	1458	15	160	--	--	--	--	--	--	--	--	--	--	--
11/16/07	10:30	2476.9	--	1482	15	160	--	--	--	--	--	--	--	--	--	--	--
11/21/07	10:09	2596.4	--	1492	15	160	1.40	0.038	0.040	0.0032	0.020	2500	13.0	35	3.2	24.1	NPDES & vapor monitoring
11/30/07	9:30	2811.8	--	1459	15	160	--	--	--	--	--	--	--	--	--	--	--
12/7/07	10:30	2980.8	--	1512	15	160	--	--	--	--	--	--	--	--	--	--	--
12/13/07	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	System shut down for carbon change
12/14/07	13:00	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	DPE on line 1:00 pm
12/17/07	11:15	3105.8	--	1466	15	160	--	--	--	--	--	--	--	--	--	--	--
12/20/07	11:00	3184.9	--	1503	15	160	3.11	0.110	0.086	0.0087	0.063	6018	33.0	69	8.6	83.0	NPDES & vapor monitoring
12/31/07	9:00	3439.3	--	1450	15	160	--	--	--	--	--	--	--	--	--	--	--
1/4/08	14:30	3540.8	--	1452	15	160	--	--	--	--	--	--	--	--	--	--	--
1/15/08	13:00	3753.5	--	1452	15	160	--	--	--	--	--	--	--	--	--	--	down on 1/11, restarted
1/21/08	9:30	3894	--	1458	15	160	6.86	0.091	0.190	0.0230	0.282	317	11.0	52	8.5	126.0	NPDES & vapor monitoring
1/30/08	11:30	4112	--	1459	15	160	--	--	--	--	--	--	--	--	--	--	D9 & D11 open only
2/1/08	15:30	4164	--	1460	16	160	--	--	--	--	--	--	--	--	--	--	--
2/11/08	11:00	4399.5	--	1460	15	160	--	--	--	--	--	--	--	--	--	--	D10 & D11 open only
2/20/08	11:30	4616	--	1455	15	160	0.73	0.022	0.011	ND (0.00005)	0.007	273	0.5	ND (0.0005)	ND (0.0005)	0.5	NPDES & vapor monitoring
2/29/08	10:30	4831	--	1460	15	160	--	--	--	--	--	--	--	--	--	--	--

Table 6 - Dual-Phase Extraction Vapor Monitoring Data
 City of Oakland Municipal Services Center Groundwater Remediation Project

Date	Time	DPE Run-time Meter Reading (cumulative hr)	Vapor Flow Rate (1) (acfm)	Thermo Oxidizer Temp. (°F)	Vacuum Pump		A-2 Exhaust (Effluent)					A-2 Inlet (Influent)					Notes		
					Vacuum (inch Hg)	Discharge Temp (°F)	POC (2) (ppmv)	Benzene (ppmv)	Toluene (ppmv)	Ethylbenzene (ppmv)	Total Xylenes (ppmv)	POC (2) (ppmv)	Benzene (ppmv)	Toluene (ppmv)	Ethylbenzene (ppmv)	Total Xylenes (ppmv)			

Notes:

Note (1) - Measured at the discharge side of the vacuum pump, the pressure is approximately 1.05 atm.

Note (2) - POC = precursor organic compound measured as TPH volatiles in vapor.

Note (3) - The flow sensor was coated with highly viscous material and resulted in inaccurate readings; vacuum readings were much more stable and accurate.

Abbreviations:

"-" indicates no value obtained for given field

acfm = actual cubic foot per minute

atm = standard atmosphere

DPE = dual-phase extraction

°F = degree Fahrenheit

Hg = mercury

ND () = non-detected lab value

ppmv = parts per million volume

**Table 7 - Petroleum Hydrocarbons Removed through Soil Vapor Extraction
City of Oakland Municipal Services Center Groundwater Remediation Project**

Month	DPE Run Time (hr)	Ave Flow (acfm)	Flow Pressure (atm)	Flow Temp. (°F)	Ave Flow (scfm)	Total Volume (std m ³)	TPHg (ppmv)	TPHg (mg/m ³)	TPHg Removed (lb)	Influent Benzene Conc. (ppmv)	Benzene (mg/m ³)	Benzene Removed (lb)
May-07	191.2	278	1.05	160	249	80,756	2,000	7,033	1,252	18	58	10
Jun-07	314.8	276	1.05	165	245	130,948	2,410	8,475	2,447	25	81	23
Jul-07	114.8	273	1.05	160	244	47,616	--	10,738	1,127	--	85	9
Aug-07	334.7	301	1.05	160	269	153,062	3,820	13,000	4,387	27	88	30
Sep-07	623.7	530	0.46	75	241	255,000	2,460	8,700	4,891	6.6	21	12
Oct-07	500.4	535	0.5	75	264	224,477	3,700	13,000	6,433	4.4	14	7
Nov-07	719.7	535	0.5	75	264	322,853	2,500	8,750	6,228	13	41	29
Dec-07	627.5	535	0.5	75	264	281,493	6,018	21,200	13,156	33	110	68
Jan-08	672.7	535	0.5	75	264	301,769	3,170	11,140	7,411	11	34	23
Feb-08	719	535	0.5	75	264	322,539	273	960	683	0.46	1.5	1
Mar-08	741.5	535	0.5	75	264	332,633	450	1,600	1,173	5.8	18	13
Apr-08	601.5	535	0.5	75	264	269,830	1,280	4,500	2,677	2.4	7.7	5
May-08	176.5	535	0.5	75	264	79,177	1,200	4,200	733	3	9.5	1.7
Jun-08	417.8	535	0.5	75	264	187,423	790	2,800	1,157	1.1	3.6	1.5
Jul-08	111.1	540	0.45	75	240	45,274	490	1,700	170	0.7	2.1	0.2
Aug-08	98	540	0.45	75	240	39,936	430	1,500	132	1.0	3.1	0.3
Sep-08	57.7	540	0.45	75	240	23,513	430	1,500	78	1.0	3.1	0.2
Oct-08	95.7	550	0.45	75	244	39,721	370	1,300	114	1.2	3.7	0.3
Nov-08	16.4	550	0.43	75	233	6,504	370	1,300	19	1.2	3.7	0.1
Dec-08	0	0	0	75	0	0	0	0	0	0.0	0.0	0.0
Jan-09	0	0	0	75	0	0	0	0	0	0.0	0.0	0.0
Feb-09	171.45	550	0.37	75	201	58,510	540	1,900	245	1.6	5.0	0.6
Mar-09	15.85	550	0.42	75	228	6,140	250	880	12	1.1	3.4	0.0

Notes:

Flow rates from May through August 2007 were recorded by the flow meter at the vacuum discharge side.
Flow rates after August 2007 were based on pump vacuum reading and pump performance chart for acfm.

Abbreviations

"--" indicates not analyzed for constituent indicated

acfm = actual cubic foot per minute

atm = standard atmosphere

DPE = dual-phase extraction

°F = degree Fahrenheit

hr = hours(s)

lb = pound(s)

m³ = cubic meter

mg/m³ = milligram(s) per cubic meter

ppmv = parts per million volume

scfm = standard cubic foot per minute

TPHg = total petroleum hydrocarbons quantified as gasoline

Table 8 - TPH Removed through Groundwater Extraction, Floating Product Recovery, and Soil Vapor Extraction
City of Oakland Municipal Services Center Groundwater Remediation Project

Month	Groundwater	TPHg	TPHd	Mass Removed through Groundwater Extraction			Floating Product	TPH Removed	Total Monthly	Total Monthly	Cumulative Product Removed	
	Removed	Influent	Influent	As TPHg	As TPHd	Combined	Recovered	By Vapor	Removal	Removal	(floating + dissolved + vapor)	
	(gallons)	(mg/L)	(mg/L)	(lb)	(lb)	(lb)	(gallons)	(lb)	(gallons)	(lb)	(gallons)	(lb)
May-06	17,591	54.5	17.1	7.98	2.50	10.49	20	0	21.48	152	21.48	152
Jun-06	103,880	50	10	43.25	8.65	51.90	80	0	87.33	618	108.81	770
Jul-06	89,150	60	4	44.54	2.97	47.51	65	0	71.71	508	180.53	1,278
Aug-06	82,900	59	4.1	40.73	2.83	43.56	55	0	61.15	433	241.68	1,711
Sep-06	85,450	44	4.8	31.31	3.42	34.72	25	0	29.91	212	271.59	1,922
Oct-06	72,980	42	9.1	25.52	5.53	31.05	30	0	34.39	243	305.97	2,166
Nov-06	46,200	32	7.8	12.31	3.00	15.31	20	0	22.16	157	328.14	2,323
Dec-06	49,280	55	7.6	22.57	3.12	25.69	20	0	23.63	167	351.77	2,490
Jan-07	59,100	49	3.6	24.11	1.77	25.89	15	0	18.66	132	370.42	2,622
Feb-07	85,510	38	7.9	27.06	5.63	32.68	13	0	17.62	125	388.04	2,747
Mar-07	116,260	32	7.8	30.98	7.55	38.53	12	0	17.44	123	405.49	2,870
Apr-07	65,725	11	6.2	6.02	3.39	9.41	5	0	6.33	45	411.82	2,915
May-07	78,705	84	180	55.05	117.97	173.02	4	1,252	205.35	1,453	617.16	4,368
Jun-07	93,720	8.9	7.7	6.95	6.01	12.95	4	2,447	351.50	2,488	968.66	6,856
Jul-07	49,470	16	9.1	6.59	3.75	10.34	6	1,127	166.71	1,180	1,135.37	8,036
Aug-07	119,490	5.1	8.1	5.07	8.06	13.13	5	4,387	626.62	4,435	1,761.99	12,471
Sep-07	135,890	3	12	3.39	13.58	16.97	0	4,891	693.42	4,908	2,455.41	17,379
Oct-07	65,570	1.9	12	1.04	6.55	7.59	0	6,433	909.95	6,441	3,365.36	23,820
Nov-07	165,810	3.6	9	4.97	12.43	17.40	0	6,228	882.37	6,245	4,247.73	30,065
Dec-07	101,270	5.1	25	4.30	21.08	25.38	0	13,156	1862.32	13,181	6,110.05	43,247
Jan-08	106,500	14	14	12.42	12.42	24.83	0	7,411	1050.56	7,436	7,160.61	50,682
Feb-08	71,000	ND (50)	6.1	0.00	3.61	3.61	0	683	97.01	687	7,257.62	51,369
Mar-08	127,310	2.3	9	2.44	9.54	11.98	0	1,173	167.42	1,185	7,425.04	52,554
Apr-08	92,240	2.3	14	1.77	10.75	12.52	0	2,677	379.97	2,689	7,805.01	55,243
May-08	53,100	2.9	20	1.28	8.84	10.13	0	733	105.01	743	7,910.02	55,987
Jun-08	62,092	1.4	6.7	0.72	3.46	4.19	0	1,157	164.05	1,161	8,074.06	57,148
Jul-08	53,580	2.3	9.4	1.03	4.19	5.22	0	170	24.71	175	8,098.77	57,323
Aug-08	35,760	1.3	12	0.39	3.57	3.96	0	132	19.22	136	8,117.99	57,459
Sep-08	38,360	1.4	14	0.45	4.47	4.92	0	78	11.68	83	8,129.67	57,541
Oct-08	50,300	1	10	0.42	4.19	4.61	0	114	16.73	118	8,146.41	57,660
Nov-08	11,710	1	8.1	0.10	0.79	0.89	0	19	2.76	20	8,149.17	57,679
Dec-08	0	0	0	0.00	0.00	0.00	0	0	0.00	0	8,149.17	57,679
Jan-09	0	0	0	0.00	0.00	0.00	0	0	0.00	0	8,149.17	57,679
Feb-09	77,990	1.4	11	0.91	7.14	8.05	0	245	35.76	253	8,184.93	57,933
Mar-09	0	0	0	0.00	0.00	0.00	0	12	1.68	12	8,186.61	57,944

Table 8 - TPH Removed through Groundwater Extraction, Floating Product Recovery, and Soil Vapor Extraction
City of Oakland Municipal Services Center Groundwater Remediation Project

Note: Morgan Environmental disposed of three 55-gallon drums of recovered product on 8/9/06 and four 55-gallon drums of product on 8/17/07.

Non-detected lab values were reported as half the reporting limit in equations.

Abbreviations:

lb = pounds(s)

mg/L = milligram(s) per liter

TPH = total petroleum hydrocarbons

TPHg= total petroleum hydrocarbons quantified as gasoline

TPHd= total petroleum hydrocarbons quantified as diesel

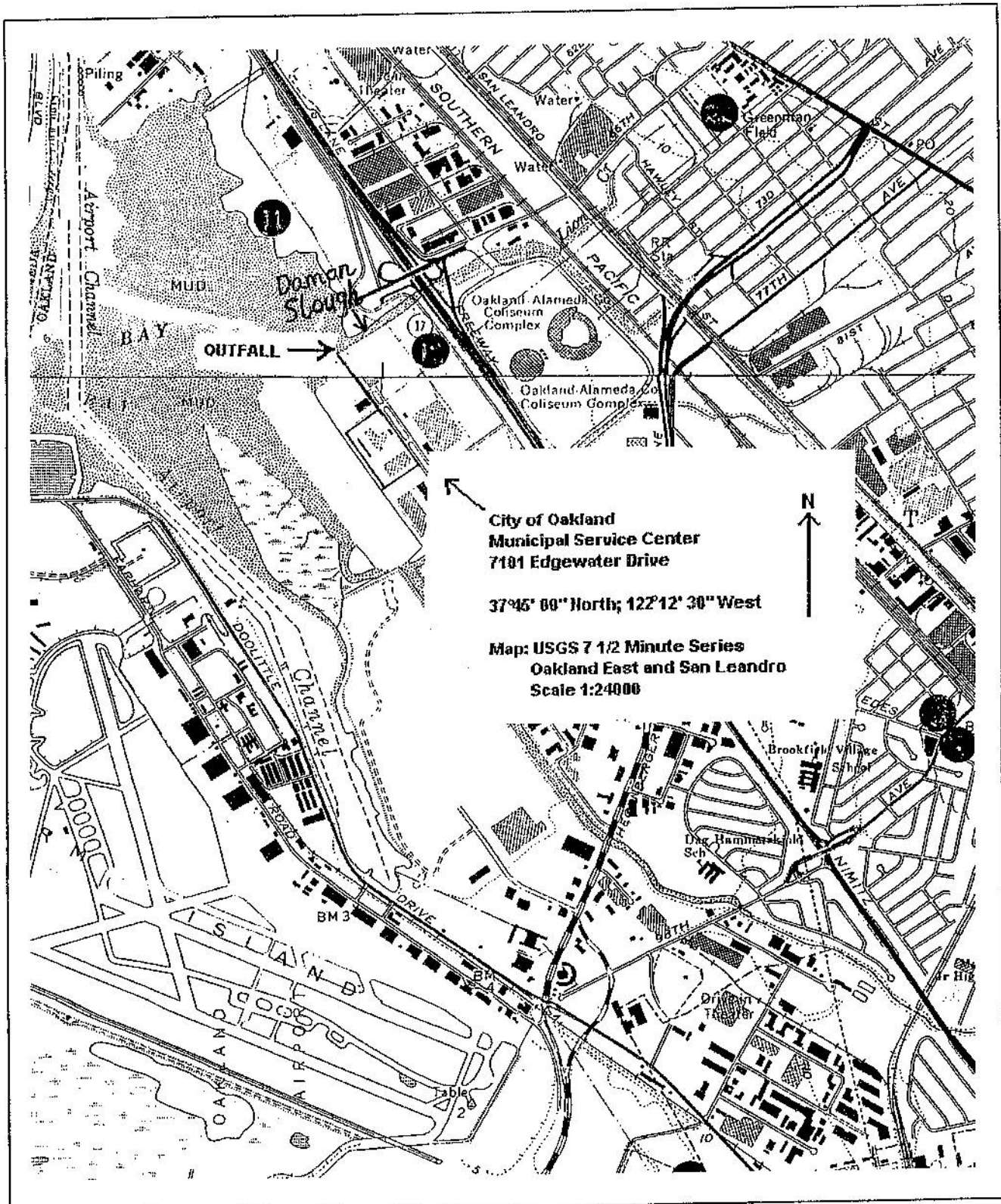


FIGURE 1 SITE LOCATION AND DISCHARGE LOCATION

OTG **EnviroEngineering**
Solutions, Inc.

City of Oakland Municipal Service Center
7101 EdgeWater Drive, Oakland, CA

EXPLANATION

- MW-1 ● Monitoring well location
- RW-1 ⚡ Remediation well location
- TBW-1 ⚡ Tank Backfill Well
- MW-3 ⊗ Abandoned Well
- Fence
- Former underground piping
- Area of free product on groundwater

DAMON SLOUGH

EDGEWATER DRIVE

SAN LEANDRO BAY

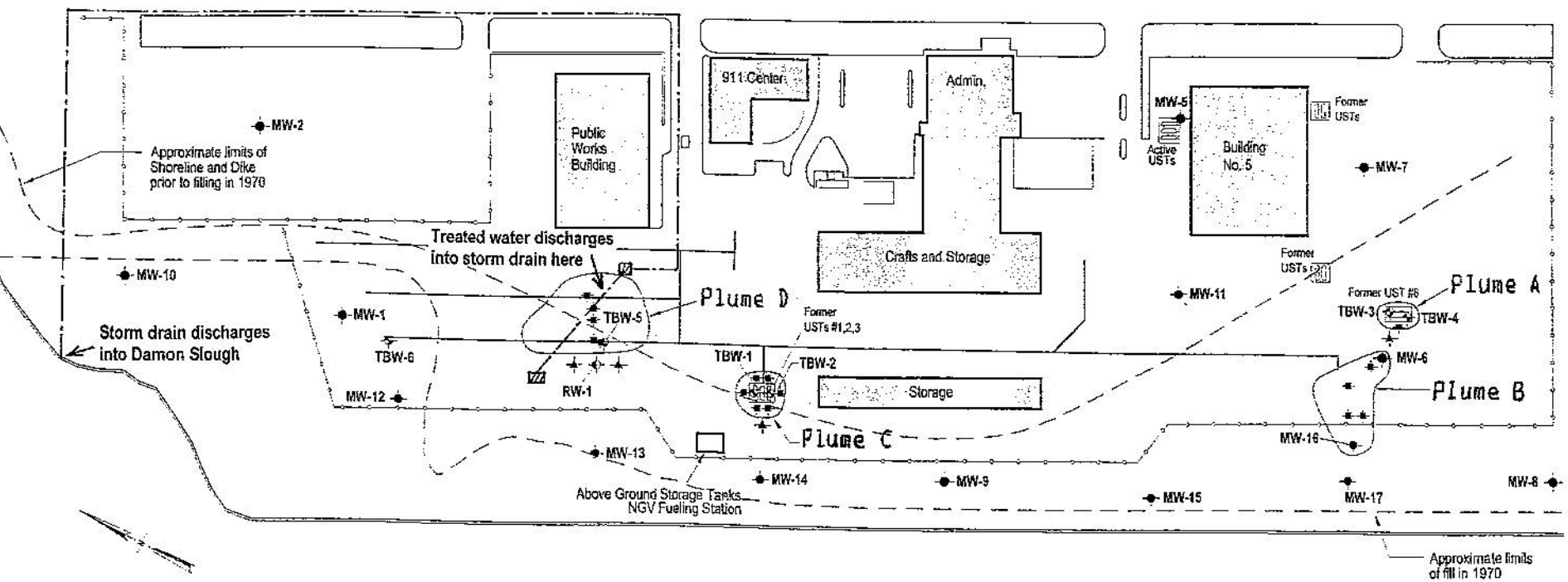


FIGURE 2 Identification of Free-Phase Petroleum Product Locations

OTG EnviroEngineering Solutions, Inc.

City of Oakland Municipal Services Center
7101 Edgewater Drive, Oakland, CA

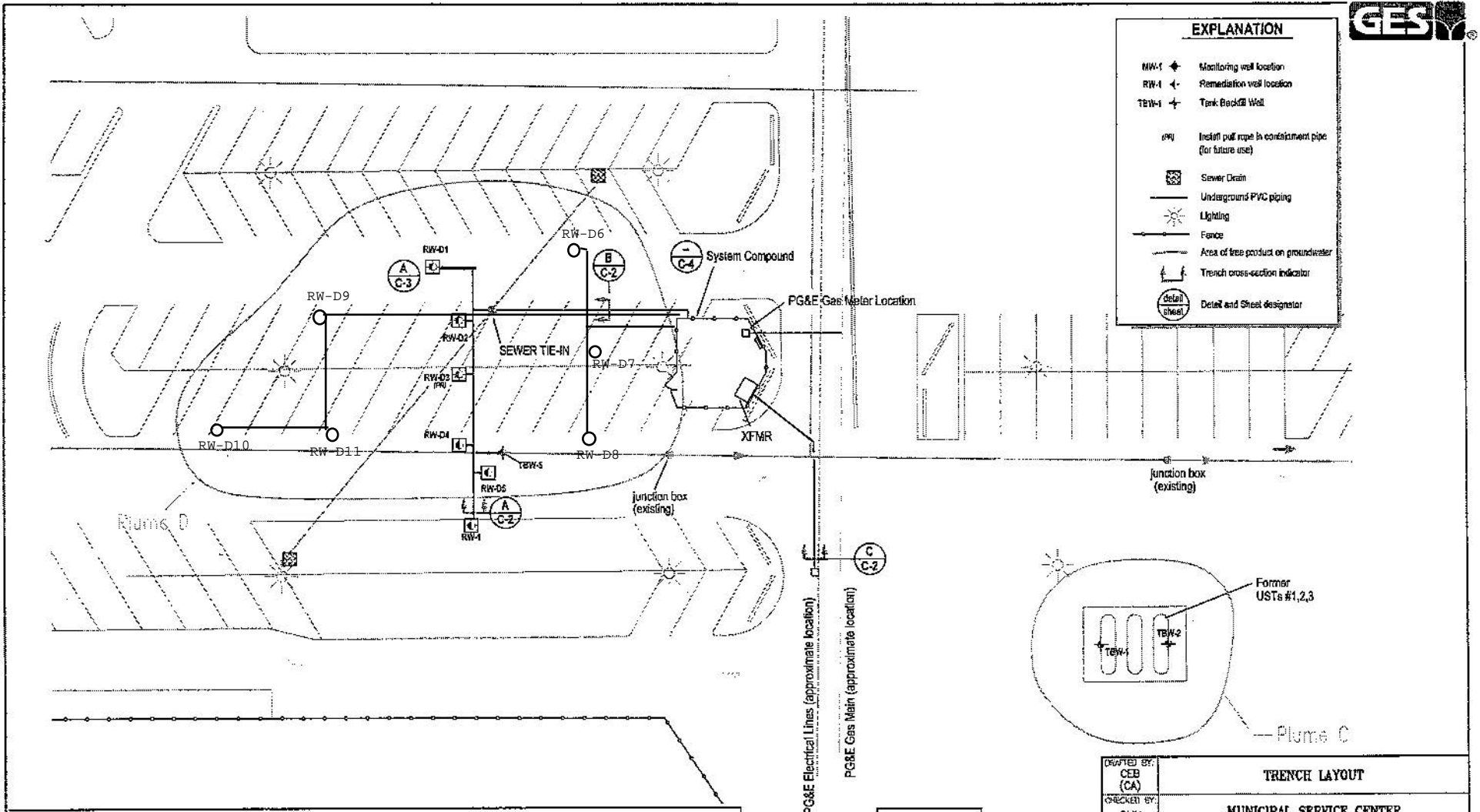
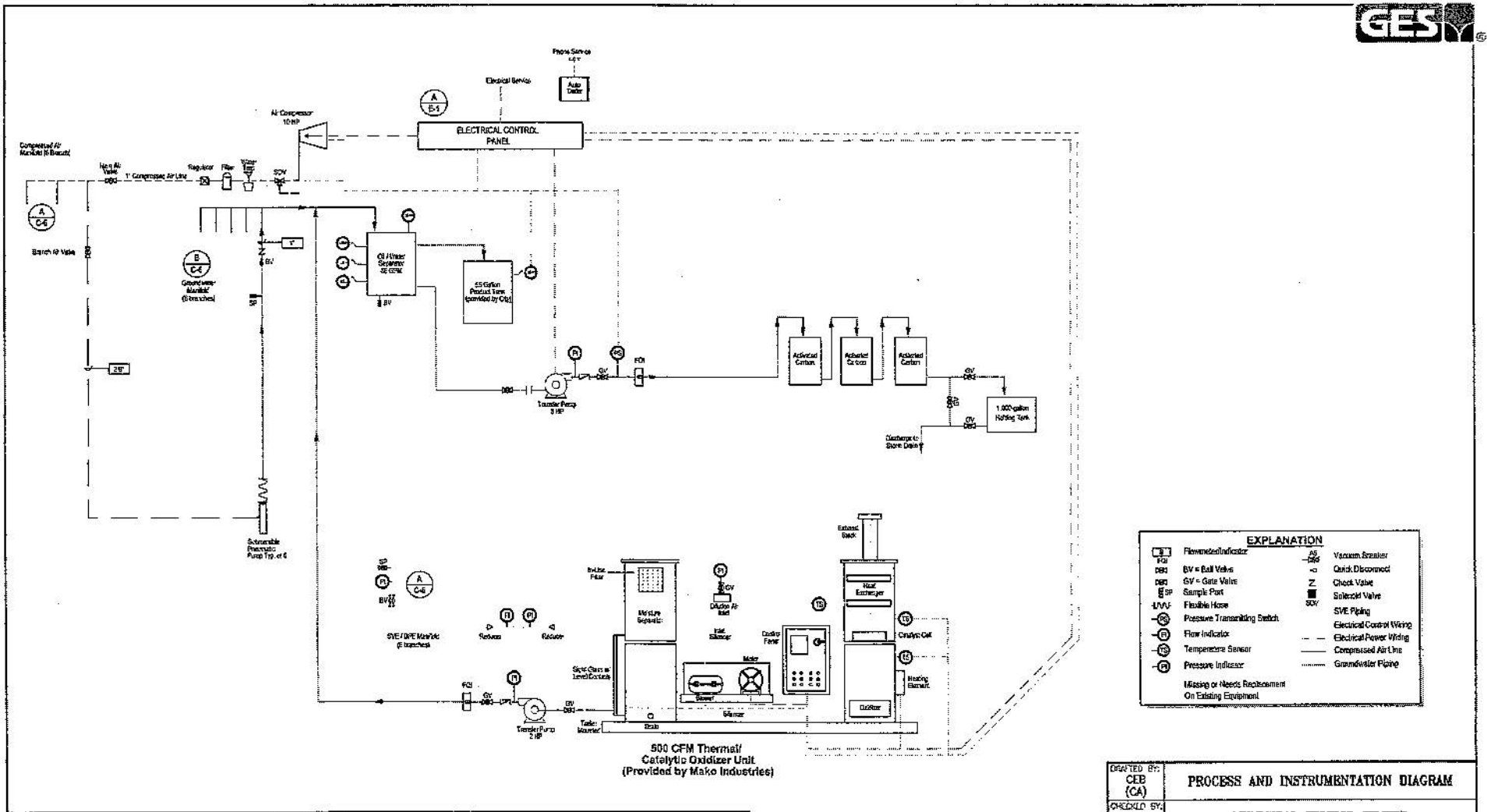


FIGURE 3 Identification of Extraction Wells & Trench Layout

OTG EnviroEngineering Solutions, Inc.

City of Oakland Municipal Services Center
7101 Edgewater Drive, Oakland, CA

DRAFTED BY: CEB (CA) CHECKED BY: GWH REVIEWED BY:	TRENCH LAYOUT	
	MUNICIPAL SERVICE CENTER 7101 EDGEWATER DRIVE OAKLAND, CALIFORNIA	
NORTH 	Groundwater & Environmental Services, Inc. 333 VINCENT ROAD, SUITE 222, PLEASANT HILL, CA 94523	
APPROX. SCALE 	DATE 11-02-05	FIGURE C-1



EXPLANATION	
	Flowmeter/Indicator
	BV = Ball Valve
	GV = Gate Valve
	Sample Post
	Flexible Hose
	Pressure Transducing Switch
	Flow Indicator
	Temperature Sensor
	Pressure Indicator
	Vacuum Breaker
	Quick Disconnect
	Check Valve
	Solenoid Valve
	SVE Piping
	Electrical Control Wiring
	Compressed Air Line
	Groundwater Piping
Missing or Needs Replacement On Existing Equipment	

DRAFTED BY: CEB (CA)	PROCESS AND INSTRUMENTATION DIAGRAM	
CHECKED BY: GMH	MUNICIPAL SERVICE CENTER 7101 EDGEWATER DRIVE OAKLAND, CALIFORNIA	
REVIEWED BY: NORTH	Groundwater & Environmental Services, Inc. 333 VINCENT ROAD, SUITE 222, PLEASANT HILL, CA 94523	
	NOT TO SCALE	DATE 11-02-05
		FIGURE M-1

FIGURE 4 Remediation System Process & Instrumentation Diagram

OTG **EnviroEngineering**
Solutions, Inc.

City of Oakland Municipal Services Center
7101 Edgewater Drive, Oakland, CA

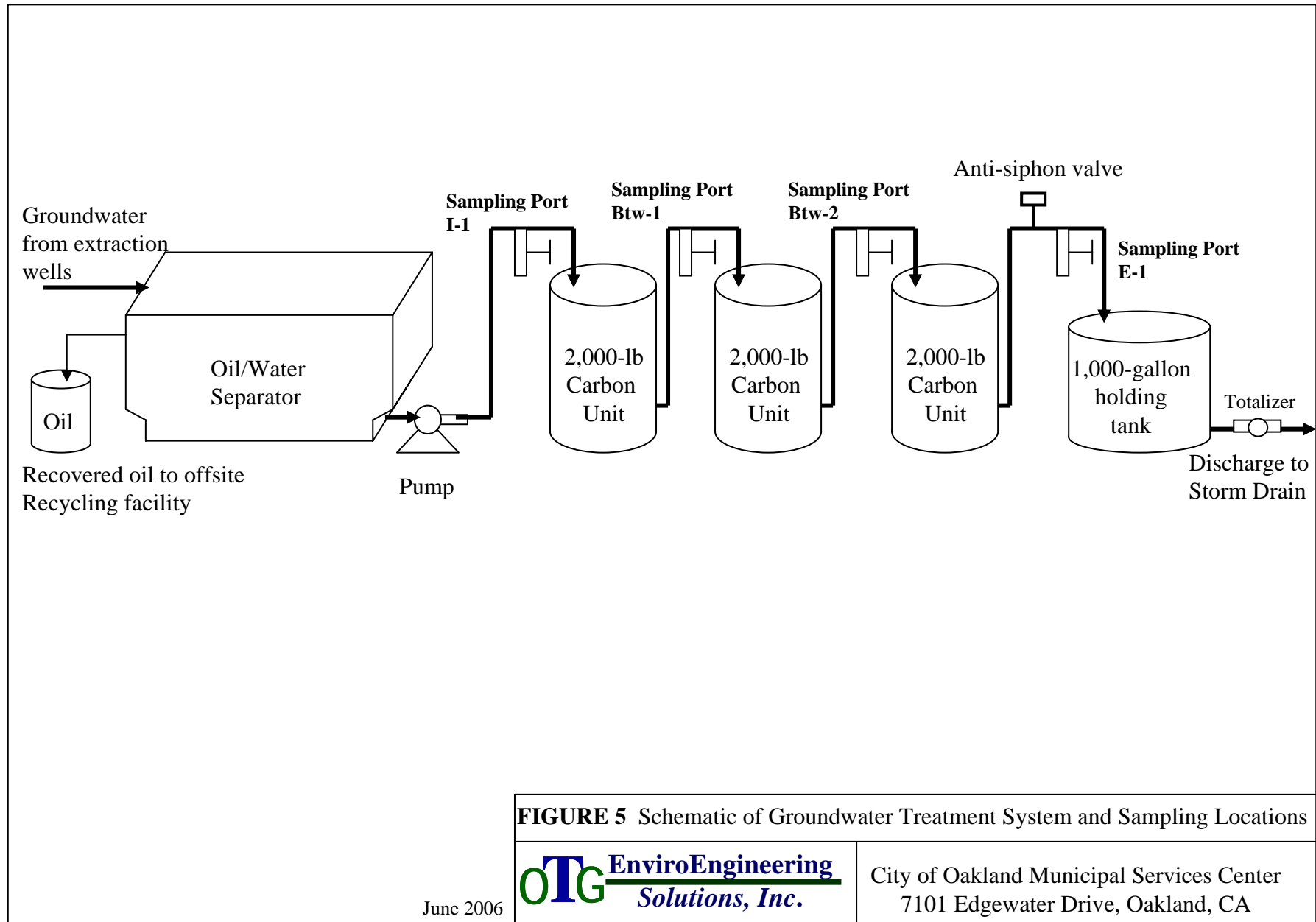


FIGURE 5 Schematic of Groundwater Treatment System and Sampling Locations

June 2006

OTG **EnviroEngineering**
Solutions, Inc.

City of Oakland Municipal Services Center
7101 Edgewater Drive, Oakland, CA

APPENDIX A

Laboratory Analytical Reports for Groundwater Samples



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

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

Laboratory Job Number 209874
ANALYTICAL REPORT

OTG Enviroengineering Solutions, Inc
464 19th Street Suite 206
Oakland, CA 94612


Project : 090AK04.1000
Location : MSC Remediation
Level : II

<u>Sample ID</u>	<u>Lab ID</u>
E-1	209874-001
BTW-2	209874-002
BTW-1	209874-003
I-1	209874-004

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 signatures. 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: 02/19/2009

Signature: 
Senior Program Manager

Date: 02/20/2009

CASE NARRATIVE

Laboratory number: 209874
Client: OTG Enviroengineering Solutions, Inc
Project: 090AK04.1000
Location: MSC Remediation
Request Date: 02/09/09
Samples Received: 02/09/09

This data package contains sample and QC results for four water samples, requested for the above referenced project on 02/09/09. 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.

Alcohols by GC (EPA 8015B):

No analytical problems were encountered.

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

No analytical problems were encountered.

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

I-1 (lab # 209874-004) was diluted due to high non-target analytes. No other analytical problems were encountered.

Polynuclear Aromatics by HPLC (EPA 8310):

No analytical problems were encountered.

Metals (EPA 6020 and EPA 7470A):

A number of analytes were detected between the MDL and the RL in the method blank for batch 147805; these analytes were either not detected in samples at or above the RL, or detected at a level at least 10 times that of the blank. No other analytical problems were encountered.

Hexavalent Chromium by Ion Chromatograph (EPA 7199):

Low recoveries were observed for hexavalent chromium in the MS/MSD of E-1 (lab # 209874-001); the BS/BSD were within limits. No other analytical problems were encountered.

Total Cyanide (SM4500CN-E):

No analytical problems were encountered.

Batch QC Report

Total Volatile Hydrocarbons			
Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	EPA 5030B
Project#:	090AK04.1000	Analysis:	EPA 8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC482827	Batch#:	147793
Matrix:	Water	Analyzed:	02/10/09
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	1,000	996.4	100	78-120

Surrogate	%REC	Limits
Trifluorotoluene (FID)	118	61-149
Bromofluorobenzene (FID)	103	65-146

Batch QC Report

Total Volatile Hydrocarbons			
Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	EPA 5030B
Project#:	090AK04.1000	Analysis:	EPA 8015B
Field ID:	ZZZZZZZZZZ	Batch#:	147793
MSS Lab ID:	209869-003	Sampled:	02/09/09
Matrix:	Water	Received:	02/09/09
Units:	ug/L	Analyzed:	02/10/09
Diln Fac:	1.000		

Type: MS Lab ID: QC482830

Analyte	MSS Result	Spiked	Result	%REC	Limits
Gasoline C7-C12	22.95	2,000	1,685	83	65-120

Surrogate	%REC	Limits
Trifluorotoluene (FID)	115	61-149
Bromofluorobenzene (FID)	120	65-146

Type: MSD Lab ID: QC482831

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	2,000	1,636	81	65-120	3	20

Surrogate	%REC	Limits
Trifluorotoluene (FID)	107	61-149
Bromofluorobenzene (FID)	113	65-146

RPD= Relative Percent Difference

Batch QC Report

Total Volatile Hydrocarbons			
Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	EPA 5030B
Project#:	090AK04.1000	Analysis:	EPA 8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC482977	Batch#:	147829
Matrix:	Water	Analyzed:	02/11/09
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	1,000	1,078	108	78-120

Surrogate	%REC	Limits
Trifluorotoluene (FID)	122	61-149
Bromofluorobenzene (FID)	109	65-146

Batch QC Report

Total Volatile Hydrocarbons			
Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	EPA 5030B
Project#:	090AK04.1000	Analysis:	EPA 8015B
Field ID:	ZZZZZZZZZZ	Batch#:	147829
MSS Lab ID:	209911-003	Sampled:	02/10/09
Matrix:	Water	Received:	02/10/09
Units:	ug/L	Analyzed:	02/11/09
Diln Fac:	1.000		

Type: MS Lab ID: QC482978

Analyte	MSS Result	Spiked	Result	%REC	Limits
Gasoline C7-C12	21.61	2,000	1,892	94	65-120

Surrogate	%REC	Limits
Trifluorotoluene (FID)	145	61-149
Bromofluorobenzene (FID)	123	65-146

Type: MSD Lab ID: QC482979

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	2,000	1,893	94	65-120	0	20

Surrogate	%REC	Limits
Trifluorotoluene (FID)	144	61-149
Bromofluorobenzene (FID)	120	65-146

RPD= Relative Percent Difference

Total Extractable Hydrocarbons			
Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	EPA 3520C
Project#:	090AK04.1000	Analysis:	EPA 8015B
Matrix:	Water	Sampled:	02/09/09
Units:	ug/L	Received:	02/09/09
Diln Fac:	1.000	Prepared:	02/10/09
Batch#:	147807		

Field ID: E-1 Analyzed: 02/17/09
 Type: SAMPLE Cleanup Method: EPA 3630C
 Lab ID: 209874-001

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

Surrogate	%REC	Limits
o-Terphenyl	82	63-124

Field ID: BTW-2 Analyzed: 02/17/09
 Type: SAMPLE Cleanup Method: EPA 3630C
 Lab ID: 209874-002

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

Surrogate	%REC	Limits
o-Terphenyl	87	63-124

Field ID: I-1 Lab ID: 209874-004
 Type: SAMPLE Analyzed: 02/18/09

Analyte	Result	RL
Diesel C10-C24	11,000 Y	50
Motor Oil C24-C36	2,000	300

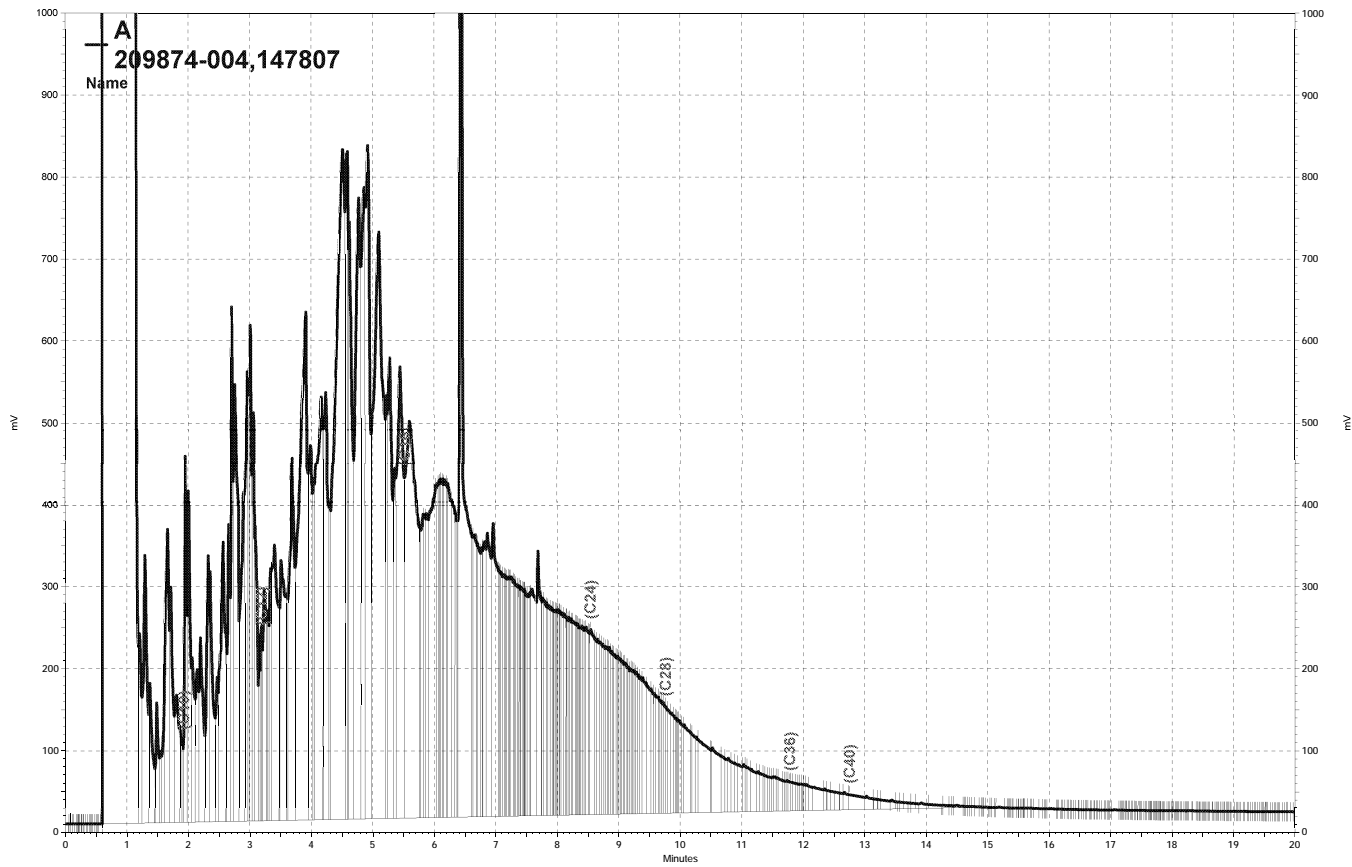
Surrogate	%REC	Limits
o-Terphenyl	95	63-124

Type: BLANK Analyzed: 02/17/09
 Lab ID: QC482893 Cleanup Method: EPA 3630C

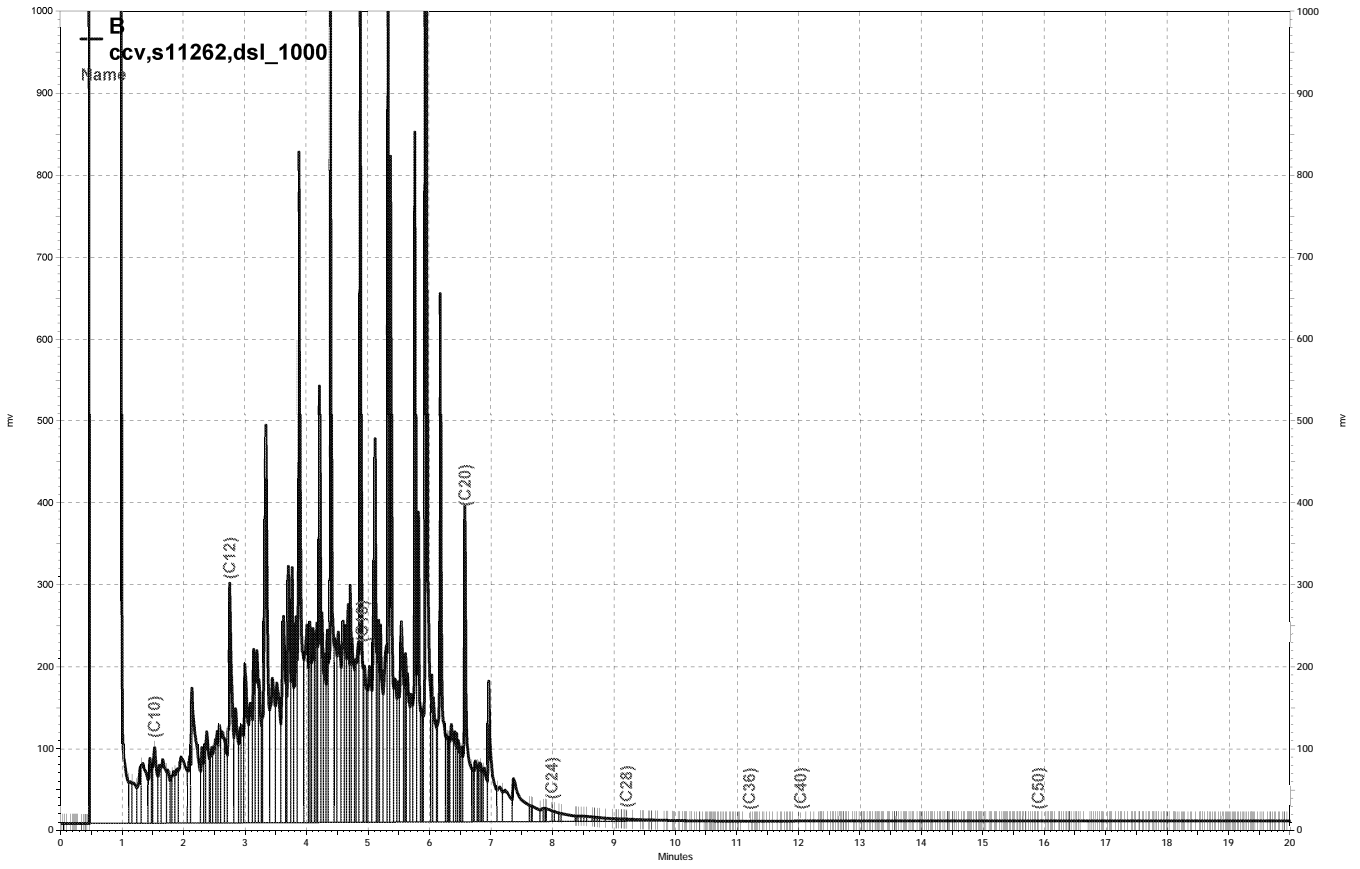
Analyte	Result	RL
Diesel C10-C24	ND	50
Motor Oil C24-C36	ND	300

Surrogate	%REC	Limits
o-Terphenyl	92	63-124

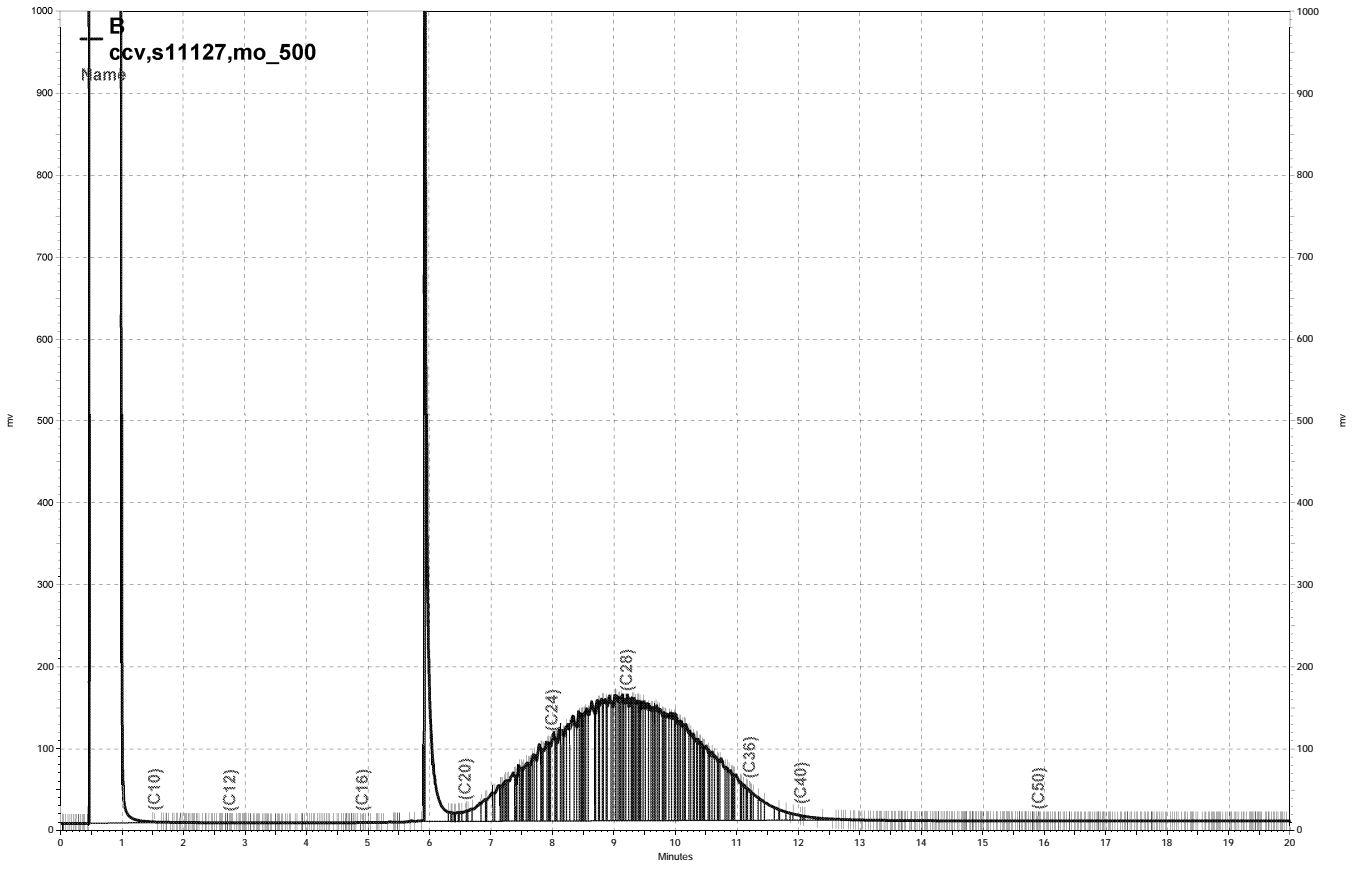
Y= Sample exhibits chromatographic pattern which does not resemble standard
 ND= Not Detected
 RL= Reporting Limit



— \\Lims\gdrive\ezchrom\Projects\GC17A\Data\049a020, A



— \\Lims\gdrive\ezchrom\Projects\GC15B\Data\043b098, B



— \\Lims\gdrive\ezchrom\Projects\GC15B\Data\043b099, B

Batch QC Report

Alcohols by GC-FID			
Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	METHOD
Project#:	090AK04.1000	Analysis:	EPA 8015B
Matrix:	Water	Batch#:	147966
Units:	mg/L	Analyzed:	02/17/09
Diln Fac:	1.000		

Type: BS Lab ID: QC483503

Analyte	Spiked	Result	%REC	Limits
Methanol	50.00	38.41	77	73-120
Ethanol	50.00	42.42	85	77-120

Surrogate	%REC	Limits
1-Pentanol	87	72-120

Type: BSD Lab ID: QC483504

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Methanol	50.00	39.55	79	73-120	3	22
Ethanol	50.00	42.85	86	77-120	1	20

Surrogate	%REC	Limits
1-Pentanol	88	72-120

Volatile Organics			
Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	EPA 5030B
Project#:	090AK04.1000	Analysis:	EPA 8260B
Field ID:	E-1	Batch#:	147914
Lab ID:	209874-001	Sampled:	02/09/09
Matrix:	Water	Received:	02/09/09
Units:	ug/L	Analyzed:	02/13/09
Diln Fac:	1.000		

Analyte	Result	RL
Freon 12	ND	1.0
tert-Butyl Alcohol (TBA)	ND	10
Chloromethane	ND	1.0
Isopropyl Ether (DIPE)	ND	0.5
Vinyl Chloride	ND	0.5
Bromomethane	ND	1.0
Ethyl tert-Butyl Ether (ETBE)	ND	0.5
Chloroethane	ND	1.0
Methyl tert-Amyl Ether (TAME)	ND	0.5
Trichlorofluoromethane	ND	1.0
Acetone	ND	10
Freon 113	ND	2.0
1,1-Dichloroethene	ND	0.5
Methylene Chloride	ND	10
Carbon Disulfide	ND	0.5
MTBE	ND	0.5
trans-1,2-Dichloroethene	ND	0.5
Vinyl Acetate	ND	10
1,1-Dichloroethane	ND	0.5
2-Butanone	ND	10
cis-1,2-Dichloroethene	ND	0.5
2,2-Dichloropropane	ND	0.5
Chloroform	ND	0.5
Bromochloromethane	ND	0.5
1,1,1-Trichloroethane	ND	0.5
1,1-Dichloropropene	ND	0.5
Carbon Tetrachloride	ND	0.5
1,2-Dichloroethane	ND	0.5
Benzene	ND	0.5
Trichloroethene	ND	0.5
1,2-Dichloropropane	ND	0.5
Bromodichloromethane	ND	0.5
Dibromomethane	ND	0.5
4-Methyl-2-Pentanone	ND	10
cis-1,3-Dichloropropene	ND	0.5
Toluene	ND	0.5
trans-1,3-Dichloropropene	ND	0.5
1,1,2-Trichloroethane	ND	0.5
2-Hexanone	ND	10
1,3-Dichloropropane	ND	0.5
Tetrachloroethene	ND	0.5
Dibromochloromethane	ND	0.5
1,2-Dibromoethane	ND	0.5
Chlorobenzene	ND	0.5
1,1,1,2-Tetrachloroethane	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5
Styrene	ND	0.5
Bromoform	ND	1.0
Isopropylbenzene	ND	0.5
1,1,2,2-Tetrachloroethane	ND	0.5
1,2,3-Trichloropropane	ND	0.5
Propylbenzene	ND	0.5

ND= Not Detected
 RL= Reporting Limit

Volatile Organics			
Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	EPA 5030B
Project#:	090AK04.1000	Analysis:	EPA 8260B
Field ID:	E-1	Batch#:	147914
Lab ID:	209874-001	Sampled:	02/09/09
Matrix:	Water	Received:	02/09/09
Units:	ug/L	Analyzed:	02/13/09
Diln Fac:	1.000		

Analyte	Result	RL
Bromobenzene	ND	0.5
1,3,5-Trimethylbenzene	ND	0.5
2-Chlorotoluene	ND	0.5
4-Chlorotoluene	ND	0.5
tert-Butylbenzene	ND	0.5
1,2,4-Trimethylbenzene	ND	0.5
sec-Butylbenzene	ND	0.5
para-Isopropyl Toluene	ND	0.5
1,3-Dichlorobenzene	ND	0.5
1,4-Dichlorobenzene	ND	0.5
n-Butylbenzene	ND	0.5
1,2-Dichlorobenzene	ND	0.5
1,2-Dibromo-3-Chloropropane	ND	2.0
1,2,4-Trichlorobenzene	ND	0.5
Hexachlorobutadiene	ND	2.0
Naphthalene	ND	2.0
1,2,3-Trichlorobenzene	ND	0.5

Surrogate	%REC	Limits
Dibromofluoromethane	106	80-125
1,2-Dichloroethane-d4	110	80-137
Toluene-d8	103	80-120
Bromofluorobenzene	107	80-122

ND= Not Detected
 RL= Reporting Limit

Volatile Organics			
Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	EPA 5030B
Project#:	090AK04.1000	Analysis:	EPA 8260B
Field ID:	BTW-2	Batch#:	147914
Lab ID:	209874-002	Sampled:	02/09/09
Matrix:	Water	Received:	02/09/09
Units:	ug/L	Analyzed:	02/13/09
Diln Fac:	1.000		

Analyte	Result	RL
Freon 12	ND	1.0
tert-Butyl Alcohol (TBA)	ND	10
Chloromethane	ND	1.0
Isopropyl Ether (DIPE)	ND	0.5
Vinyl Chloride	ND	0.5
Bromomethane	ND	1.0
Ethyl tert-Butyl Ether (ETBE)	ND	0.5
Chloroethane	ND	1.0
Methyl tert-Amyl Ether (TAME)	ND	0.5
Trichlorofluoromethane	ND	1.0
Acetone	ND	10
Freon 113	ND	2.0
1,1-Dichloroethene	ND	0.5
Methylene Chloride	ND	10
Carbon Disulfide	ND	0.5
MTBE	ND	0.5
trans-1,2-Dichloroethene	ND	0.5
Vinyl Acetate	ND	10
1,1-Dichloroethane	ND	0.5
2-Butanone	ND	10
cis-1,2-Dichloroethene	ND	0.5
2,2-Dichloropropane	ND	0.5
Chloroform	ND	0.5
Bromochloromethane	ND	0.5
1,1,1-Trichloroethane	ND	0.5
1,1-Dichloropropene	ND	0.5
Carbon Tetrachloride	ND	0.5
1,2-Dichloroethane	ND	0.5
Benzene	ND	0.5
Trichloroethene	ND	0.5
1,2-Dichloropropane	ND	0.5
Bromodichloromethane	ND	0.5
Dibromomethane	ND	0.5
4-Methyl-2-Pentanone	ND	10
cis-1,3-Dichloropropene	ND	0.5
Toluene	ND	0.5
trans-1,3-Dichloropropene	ND	0.5
1,1,2-Trichloroethane	ND	0.5
2-Hexanone	ND	10
1,3-Dichloropropane	ND	0.5
Tetrachloroethene	ND	0.5
Dibromochloromethane	ND	0.5
1,2-Dibromoethane	ND	0.5
Chlorobenzene	ND	0.5
1,1,1,2-Tetrachloroethane	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5
Styrene	ND	0.5
Bromoform	ND	1.0
Isopropylbenzene	ND	0.5
1,1,2,2-Tetrachloroethane	ND	0.5
1,2,3-Trichloropropane	ND	0.5
Propylbenzene	ND	0.5

ND= Not Detected
 RL= Reporting Limit

Volatile Organics			
Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	EPA 5030B
Project#:	090AK04.1000	Analysis:	EPA 8260B
Field ID:	BTW-2	Batch#:	147914
Lab ID:	209874-002	Sampled:	02/09/09
Matrix:	Water	Received:	02/09/09
Units:	ug/L	Analyzed:	02/13/09
Diln Fac:	1.000		

Analyte	Result	RL
Bromobenzene	ND	0.5
1,3,5-Trimethylbenzene	ND	0.5
2-Chlorotoluene	ND	0.5
4-Chlorotoluene	ND	0.5
tert-Butylbenzene	ND	0.5
1,2,4-Trimethylbenzene	ND	0.5
sec-Butylbenzene	ND	0.5
para-Isopropyl Toluene	ND	0.5
1,3-Dichlorobenzene	ND	0.5
1,4-Dichlorobenzene	ND	0.5
n-Butylbenzene	ND	0.5
1,2-Dichlorobenzene	ND	0.5
1,2-Dibromo-3-Chloropropane	ND	2.0
1,2,4-Trichlorobenzene	ND	0.5
Hexachlorobutadiene	ND	2.0
Naphthalene	ND	2.0
1,2,3-Trichlorobenzene	ND	0.5

Surrogate	%REC	Limits
Dibromofluoromethane	106	80-125
1,2-Dichloroethane-d4	111	80-137
Toluene-d8	101	80-120
Bromofluorobenzene	105	80-122

ND= Not Detected
 RL= Reporting Limit

Volatile Organics			
Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	EPA 5030B
Project#:	090AK04.1000	Analysis:	EPA 8260B
Field ID:	BTW-1	Batch#:	147914
Lab ID:	209874-003	Sampled:	02/09/09
Matrix:	Water	Received:	02/09/09
Units:	ug/L	Analyzed:	02/13/09
Diln Fac:	1.000		

Analyte	Result	RL
Freon 12	ND	1.0
tert-Butyl Alcohol (TBA)	67	10
Chloromethane	ND	1.0
Isopropyl Ether (DIPE)	ND	0.5
Vinyl Chloride	ND	0.5
Bromomethane	ND	1.0
Ethyl tert-Butyl Ether (ETBE)	ND	0.5
Chloroethane	ND	1.0
Methyl tert-Amyl Ether (TAME)	ND	0.5
Trichlorofluoromethane	ND	1.0
Acetone	ND	10
Freon 113	ND	2.0
1,1-Dichloroethene	ND	0.5
Methylene Chloride	ND	10
Carbon Disulfide	ND	0.5
MTBE	ND	0.5
trans-1,2-Dichloroethene	ND	0.5
Vinyl Acetate	ND	10
1,1-Dichloroethane	ND	0.5
2-Butanone	ND	10
cis-1,2-Dichloroethene	ND	0.5
2,2-Dichloropropane	ND	0.5
Chloroform	ND	0.5
Bromochloromethane	ND	0.5
1,1,1-Trichloroethane	ND	0.5
1,1-Dichloropropene	ND	0.5
Carbon Tetrachloride	ND	0.5
1,2-Dichloroethane	ND	0.5
Benzene	ND	0.5
Trichloroethene	ND	0.5
1,2-Dichloropropane	ND	0.5
Bromodichloromethane	ND	0.5
Dibromomethane	ND	0.5
4-Methyl-2-Pentanone	ND	10
cis-1,3-Dichloropropene	ND	0.5
Toluene	ND	0.5
trans-1,3-Dichloropropene	ND	0.5
1,1,2-Trichloroethane	ND	0.5
2-Hexanone	ND	10
1,3-Dichloropropane	ND	0.5
Tetrachloroethene	ND	0.5
Dibromochloromethane	ND	0.5
1,2-Dibromoethane	ND	0.5
Chlorobenzene	ND	0.5
1,1,1,2-Tetrachloroethane	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5
Styrene	ND	0.5
Bromoform	ND	1.0
Isopropylbenzene	ND	0.5
1,1,2,2-Tetrachloroethane	ND	0.5
1,2,3-Trichloropropane	ND	0.5
Propylbenzene	ND	0.5

ND= Not Detected
 RL= Reporting Limit

Volatile Organics			
Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	EPA 5030B
Project#:	090AK04.1000	Analysis:	EPA 8260B
Field ID:	BTW-1	Batch#:	147914
Lab ID:	209874-003	Sampled:	02/09/09
Matrix:	Water	Received:	02/09/09
Units:	ug/L	Analyzed:	02/13/09
Diln Fac:	1.000		

Analyte	Result	RL
Bromobenzene	ND	0.5
1,3,5-Trimethylbenzene	ND	0.5
2-Chlorotoluene	ND	0.5
4-Chlorotoluene	ND	0.5
tert-Butylbenzene	ND	0.5
1,2,4-Trimethylbenzene	ND	0.5
sec-Butylbenzene	ND	0.5
para-Isopropyl Toluene	ND	0.5
1,3-Dichlorobenzene	ND	0.5
1,4-Dichlorobenzene	ND	0.5
n-Butylbenzene	ND	0.5
1,2-Dichlorobenzene	ND	0.5
1,2-Dibromo-3-Chloropropane	ND	2.0
1,2,4-Trichlorobenzene	ND	0.5
Hexachlorobutadiene	ND	2.0
Naphthalene	ND	2.0
1,2,3-Trichlorobenzene	ND	0.5

Surrogate	%REC	Limits
Dibromofluoromethane	108	80-125
1,2-Dichloroethane-d4	113	80-137
Toluene-d8	103	80-120
Bromofluorobenzene	104	80-122

ND= Not Detected
 RL= Reporting Limit

Volatile Organics			
Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	EPA 5030B
Project#:	090AK04.1000	Analysis:	EPA 8260B
Field ID:	I-1	Units:	ug/L
Lab ID:	209874-004	Sampled:	02/09/09
Matrix:	Water	Received:	02/09/09

Analyte	Result	RL	Diln Fac	Batch#	Analyzed
Freon 12	ND	1.0	1.000	147914	02/13/09
tert-Butyl Alcohol (TBA)	81	10	1.000	147914	02/13/09
Chloromethane	ND	1.0	1.000	147914	02/13/09
Isopropyl Ether (DIPE)	ND	0.5	1.000	147914	02/13/09
Vinyl Chloride	ND	0.5	1.000	147914	02/13/09
Bromomethane	ND	1.0	1.000	147914	02/13/09
Ethyl tert-Butyl Ether (ETBE)	ND	0.5	1.000	147914	02/13/09
Chloroethane	ND	1.0	1.000	147914	02/13/09
Methyl tert-Amyl Ether (TAME)	ND	0.5	1.000	147914	02/13/09
Trichlorofluoromethane	ND	1.0	1.000	147914	02/13/09
Acetone	15	10	1.000	147914	02/13/09
Freon 113	ND	2.0	1.000	147914	02/13/09
1,1-Dichloroethene	ND	0.5	1.000	147914	02/13/09
Methylene Chloride	ND	10	1.000	147914	02/13/09
Carbon Disulfide	ND	0.5	1.000	147914	02/13/09
MTBE	ND	0.5	1.000	147914	02/13/09
trans-1,2-Dichloroethene	ND	0.5	1.000	147914	02/13/09
Vinyl Acetate	ND	10	1.000	147914	02/13/09
1,1-Dichloroethane	ND	0.5	1.000	147914	02/13/09
2-Butanone	ND	10	1.000	147914	02/13/09
cis-1,2-Dichloroethene	ND	0.5	1.000	147914	02/13/09
2,2-Dichloropropane	ND	0.5	1.000	147914	02/13/09
Chloroform	ND	0.5	1.000	147914	02/13/09
Bromochloromethane	ND	0.5	1.000	147914	02/13/09
1,1,1-Trichloroethane	ND	0.5	1.000	147914	02/13/09
1,1-Dichloropropene	ND	0.5	1.000	147914	02/13/09
Carbon Tetrachloride	ND	0.5	1.000	147914	02/13/09
1,2-Dichloroethane	0.7	0.5	1.000	147914	02/13/09
Benzene	18	0.5	1.000	147914	02/13/09
Trichloroethene	ND	0.5	1.000	147914	02/13/09
1,2-Dichloropropane	ND	0.5	1.000	147914	02/13/09
Bromodichloromethane	ND	0.5	1.000	147914	02/13/09
Dibromomethane	ND	0.5	1.000	147914	02/13/09
4-Methyl-2-Pentanone	ND	10	1.000	147914	02/13/09
cis-1,3-Dichloropropene	ND	0.5	1.000	147914	02/13/09
Toluene	26	0.5	1.000	147914	02/13/09
trans-1,3-Dichloropropene	ND	0.5	1.000	147914	02/13/09
1,1,2-Trichloroethane	ND	0.5	1.000	147914	02/13/09
2-Hexanone	ND	10	1.000	147914	02/13/09

ND= Not Detected

RL= Reporting Limit

Volatile Organics			
Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	EPA 5030B
Project#:	090AK04.1000	Analysis:	EPA 8260B
Field ID:	I-1	Units:	ug/L
Lab ID:	209874-004	Sampled:	02/09/09
Matrix:	Water	Received:	02/09/09

Analyte	Result	RL	Diln Fac	Batch#	Analyzed
1,3-Dichloropropane	ND	0.5	1.000	147914	02/13/09
Tetrachloroethene	ND	0.5	1.000	147914	02/13/09
Dibromochloromethane	ND	0.5	1.000	147914	02/13/09
1,2-Dibromoethane	ND	0.5	1.000	147914	02/13/09
Chlorobenzene	0.9	0.5	1.000	147914	02/13/09
1,1,1,2-Tetrachloroethane	ND	0.5	1.000	147914	02/13/09
Ethylbenzene	7.6	0.5	1.000	147914	02/13/09
m,p-Xylenes	140	0.5	1.000	147914	02/13/09
o-Xylene	100	1.3	2.500	147943	02/14/09
Styrene	ND	0.5	1.000	147914	02/13/09
Bromoform	ND	1.0	1.000	147914	02/13/09
Isopropylbenzene	0.7	0.5	1.000	147914	02/13/09
1,1,2,2-Tetrachloroethane	ND	0.5	1.000	147914	02/13/09
1,2,3-Trichloropropane	ND	0.5	1.000	147914	02/13/09
Propylbenzene	1.1	0.5	1.000	147914	02/13/09
Bromobenzene	ND	0.5	1.000	147914	02/13/09
1,3,5-Trimethylbenzene	58	0.5	1.000	147914	02/13/09
2-Chlorotoluene	ND	0.5	1.000	147914	02/13/09
4-Chlorotoluene	ND	0.5	1.000	147914	02/13/09
tert-Butylbenzene	ND	0.5	1.000	147914	02/13/09
1,2,4-Trimethylbenzene	86	0.5	1.000	147914	02/13/09
sec-Butylbenzene	ND	0.5	1.000	147914	02/13/09
para-Isopropyl Toluene	1.0	0.5	1.000	147914	02/13/09
1,3-Dichlorobenzene	ND	0.5	1.000	147914	02/13/09
1,4-Dichlorobenzene	0.9	0.5	1.000	147914	02/13/09
n-Butylbenzene	ND	0.5	1.000	147914	02/13/09
1,2-Dichlorobenzene	ND	0.5	1.000	147914	02/13/09
1,2-Dibromo-3-Chloropropane	ND	2.0	1.000	147914	02/13/09
1,2,4-Trichlorobenzene	ND	0.5	1.000	147914	02/13/09
Hexachlorobutadiene	ND	2.0	1.000	147914	02/13/09
Naphthalene	22	2.0	1.000	147914	02/13/09
1,2,3-Trichlorobenzene	ND	0.5	1.000	147914	02/13/09

Surrogate	%REC	Limits	Diln Fac	Batch#	Analyzed
Dibromofluoromethane	108	80-125	1.000	147914	02/13/09
1,2-Dichloroethane-d4	114	80-137	1.000	147914	02/13/09
Toluene-d8	101	80-120	1.000	147914	02/13/09
Bromofluorobenzene	105	80-122	1.000	147914	02/13/09

ND= Not Detected
 RL= Reporting Limit

Batch QC Report

Volatile Organics			
Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	EPA 5030B
Project#:	090AK04.1000	Analysis:	EPA 8260B
Matrix:	Water	Batch#:	147914
Units:	ug/L	Analyzed:	02/13/09
Diln Fac:	1.000		

Type: BS Lab ID: QC483319

Analyte	Spiked	Result	%REC	Limits
tert-Butyl Alcohol (TBA)	100.0	92.49	92	59-152
Isopropyl Ether (DIPE)	20.00	20.01	100	67-126
Ethyl tert-Butyl Ether (ETBE)	20.00	21.01	105	69-127
Methyl tert-Amyl Ether (TAME)	20.00	20.78	104	80-122
1,1-Dichloroethene	20.00	22.47	112	73-133
Benzene	20.00	20.47	102	80-120
Trichloroethene	20.00	20.36	102	80-120
Toluene	20.00	19.96	100	80-120
Chlorobenzene	20.00	19.62	98	80-120

Surrogate	%REC	Limits
Dibromofluoromethane	101	80-125
1,2-Dichloroethane-d4	98	80-137
Toluene-d8	101	80-120
Bromofluorobenzene	101	80-122

Type: BSD Lab ID: QC483320

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
tert-Butyl Alcohol (TBA)	100.0	85.18	85	59-152	8	20
Isopropyl Ether (DIPE)	20.00	19.62	98	67-126	2	20
Ethyl tert-Butyl Ether (ETBE)	20.00	20.14	101	69-127	4	20
Methyl tert-Amyl Ether (TAME)	20.00	19.89	99	80-122	4	20
1,1-Dichloroethene	20.00	21.79	109	73-133	3	20
Benzene	20.00	19.99	100	80-120	2	20
Trichloroethene	20.00	19.80	99	80-120	3	20
Toluene	20.00	19.33	97	80-120	3	20
Chlorobenzene	20.00	19.62	98	80-120	0	20

Surrogate	%REC	Limits
Dibromofluoromethane	100	80-125
1,2-Dichloroethane-d4	97	80-137
Toluene-d8	99	80-120
Bromofluorobenzene	100	80-122

RPD= Relative Percent Difference

Batch QC Report

Volatile Organics			
Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	EPA 5030B
Project#:	090AK04.1000	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC483321	Batch#:	147914
Matrix:	Water	Analyzed:	02/13/09
Units:	ug/L		

Analyte	Result	RL
Freon 12	ND	1.0
tert-Butyl Alcohol (TBA)	ND	10
Chloromethane	ND	1.0
Isopropyl Ether (DIPE)	ND	0.5
Vinyl Chloride	ND	0.5
Bromomethane	ND	1.0
Ethyl tert-Butyl Ether (ETBE)	ND	0.5
Chloroethane	ND	1.0
Methyl tert-Amyl Ether (TAME)	ND	0.5
Trichlorofluoromethane	ND	1.0
Acetone	ND	10
Freon 113	ND	2.0
1,1-Dichloroethene	ND	0.5
Methylene Chloride	ND	10
Carbon Disulfide	ND	0.5
MTBE	ND	0.5
trans-1,2-Dichloroethene	ND	0.5
Vinyl Acetate	ND	10
1,1-Dichloroethane	ND	0.5
2-Butanone	ND	10
cis-1,2-Dichloroethene	ND	0.5
2,2-Dichloropropane	ND	0.5
Chloroform	ND	0.5
Bromochloromethane	ND	0.5
1,1,1-Trichloroethane	ND	0.5
1,1-Dichloropropene	ND	0.5
Carbon Tetrachloride	ND	0.5
1,2-Dichloroethane	ND	0.5
Benzene	ND	0.5
Trichloroethene	ND	0.5
1,2-Dichloropropane	ND	0.5
Bromodichloromethane	ND	0.5
Dibromomethane	ND	0.5
4-Methyl-2-Pentanone	ND	10
cis-1,3-Dichloropropene	ND	0.5
Toluene	ND	0.5
trans-1,3-Dichloropropene	ND	0.5
1,1,2-Trichloroethane	ND	0.5
2-Hexanone	ND	10
1,3-Dichloropropane	ND	0.5
Tetrachloroethene	ND	0.5
Dibromochloromethane	ND	0.5
1,2-Dibromoethane	ND	0.5
Chlorobenzene	ND	0.5
1,1,1,2-Tetrachloroethane	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5
Styrene	ND	0.5
Bromoform	ND	1.0
Isopropylbenzene	ND	0.5
1,1,2,2-Tetrachloroethane	ND	0.5
1,2,3-Trichloropropane	ND	0.5
Propylbenzene	ND	0.5

ND= Not Detected
 RL= Reporting Limit

Batch QC Report

Volatile Organics			
Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	EPA 5030B
Project#:	090AK04.1000	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC483321	Batch#:	147914
Matrix:	Water	Analyzed:	02/13/09
Units:	ug/L		

Analyte	Result	RL
Bromobenzene	ND	0.5
1,3,5-Trimethylbenzene	ND	0.5
2-Chlorotoluene	ND	0.5
4-Chlorotoluene	ND	0.5
tert-Butylbenzene	ND	0.5
1,2,4-Trimethylbenzene	ND	0.5
sec-Butylbenzene	ND	0.5
para-Isopropyl Toluene	ND	0.5
1,3-Dichlorobenzene	ND	0.5
1,4-Dichlorobenzene	ND	0.5
n-Butylbenzene	ND	0.5
1,2-Dichlorobenzene	ND	0.5
1,2-Dibromo-3-Chloropropane	ND	2.0
1,2,4-Trichlorobenzene	ND	0.5
Hexachlorobutadiene	ND	2.0
Naphthalene	ND	2.0
1,2,3-Trichlorobenzene	ND	0.5

Surrogate	%REC	Limits
Dibromofluoromethane	100	80-125
1,2-Dichloroethane-d4	100	80-137
Toluene-d8	102	80-120
Bromofluorobenzene	103	80-122

ND= Not Detected
 RL= Reporting Limit

Batch QC Report

Volatile Organics			
Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	EPA 5030B
Project#:	090AK04.1000	Analysis:	EPA 8260B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC483420	Batch#:	147943
Matrix:	Water	Analyzed:	02/14/09
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
tert-Butyl Alcohol (TBA)	100.0	92.68	93	59-152
Isopropyl Ether (DIPE)	20.00	18.06	90	67-126
Ethyl tert-Butyl Ether (ETBE)	20.00	21.56	108	69-127
Methyl tert-Amyl Ether (TAME)	20.00	21.01	105	80-122
1,1-Dichloroethene	20.00	21.48	107	73-133
Benzene	20.00	19.82	99	80-120
Trichloroethene	20.00	21.38	107	80-120
Toluene	20.00	20.91	105	80-120
Chlorobenzene	20.00	18.97	95	80-120

Surrogate	%REC	Limits
Dibromofluoromethane	107	80-125
1,2-Dichloroethane-d4	101	80-137
Toluene-d8	101	80-120
Bromofluorobenzene	102	80-122

Batch QC Report

Volatile Organics			
Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	EPA 5030B
Project#:	090AK04.1000	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC483421	Batch#:	147943
Matrix:	Water	Analyzed:	02/14/09
Units:	ug/L		

Analyte	Result	RL
Freon 12	ND	1.0
tert-Butyl Alcohol (TBA)	ND	10
Chloromethane	ND	1.0
Isopropyl Ether (DIPE)	ND	0.5
Vinyl Chloride	ND	0.5
Bromomethane	ND	1.0
Ethyl tert-Butyl Ether (ETBE)	ND	0.5
Chloroethane	ND	1.0
Methyl tert-Amyl Ether (TAME)	ND	0.5
Trichlorofluoromethane	ND	1.0
Acetone	ND	10
Freon 113	ND	2.0
1,1-Dichloroethene	ND	0.5
Methylene Chloride	ND	10
Carbon Disulfide	ND	0.5
MTBE	ND	0.5
trans-1,2-Dichloroethene	ND	0.5
Vinyl Acetate	ND	10
1,1-Dichloroethane	ND	0.5
2-Butanone	ND	10
cis-1,2-Dichloroethene	ND	0.5
2,2-Dichloropropane	ND	0.5
Chloroform	ND	0.5
Bromochloromethane	ND	0.5
1,1,1-Trichloroethane	ND	0.5
1,1-Dichloropropene	ND	0.5
Carbon Tetrachloride	ND	0.5
1,2-Dichloroethane	ND	0.5
Benzene	ND	0.5
Trichloroethene	ND	0.5
1,2-Dichloropropane	ND	0.5
Bromodichloromethane	ND	0.5
Dibromomethane	ND	0.5
4-Methyl-2-Pentanone	ND	10
cis-1,3-Dichloropropene	ND	0.5
Toluene	ND	0.5
trans-1,3-Dichloropropene	ND	0.5
1,1,2-Trichloroethane	ND	0.5
2-Hexanone	ND	10
1,3-Dichloropropane	ND	0.5
Tetrachloroethene	ND	0.5
Dibromochloromethane	ND	0.5
1,2-Dibromoethane	ND	0.5
Chlorobenzene	ND	0.5
1,1,1,2-Tetrachloroethane	ND	0.5
Ethylbenzene	ND	0.5
m,p-Xylenes	ND	0.5
o-Xylene	ND	0.5
Styrene	ND	0.5
Bromoform	ND	1.0
Isopropylbenzene	ND	0.5
1,1,2,2-Tetrachloroethane	ND	0.5
1,2,3-Trichloropropane	ND	0.5
Propylbenzene	ND	0.5

ND= Not Detected
 RL= Reporting Limit

Batch QC Report

Volatile Organics			
Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	EPA 5030B
Project#:	090AK04.1000	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC483421	Batch#:	147943
Matrix:	Water	Analyzed:	02/14/09
Units:	ug/L		

Analyte	Result	RL
Bromobenzene	ND	0.5
1,3,5-Trimethylbenzene	ND	0.5
2-Chlorotoluene	ND	0.5
4-Chlorotoluene	ND	0.5
tert-Butylbenzene	ND	0.5
1,2,4-Trimethylbenzene	ND	0.5
sec-Butylbenzene	ND	0.5
para-Isopropyl Toluene	ND	0.5
1,3-Dichlorobenzene	ND	0.5
1,4-Dichlorobenzene	ND	0.5
n-Butylbenzene	ND	0.5
1,2-Dichlorobenzene	ND	0.5
1,2-Dibromo-3-Chloropropane	ND	2.0
1,2,4-Trichlorobenzene	ND	0.5
Hexachlorobutadiene	ND	2.0
Naphthalene	ND	2.0
1,2,3-Trichlorobenzene	ND	0.5

Surrogate	%REC	Limits
Dibromofluoromethane	108	80-125
1,2-Dichloroethane-d4	100	80-137
Toluene-d8	101	80-120
Bromofluorobenzene	112	80-122

ND= Not Detected
 RL= Reporting Limit

Batch QC Report

Volatile Organics			
Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	EPA 5030B
Project#:	090AK04.1000	Analysis:	EPA 8260B
Field ID:	ZZZZZZZZZZ	Batch#:	147943
MSS Lab ID:	209875-002	Sampled:	02/09/09
Matrix:	Water	Received:	02/09/09
Units:	ug/L	Analyzed:	02/14/09
Diln Fac:	1.000		

Type: MS Lab ID: QC483422

Analyte	MSS Result	Spiked	Result	%REC	Limits
tert-Butyl Alcohol (TBA)	<2.000	100.0	91.55	92	65-150
Isopropyl Ether (DIPE)	<0.1000	20.00	18.94	95	73-127
Ethyl tert-Butyl Ether (ETBE)	<0.1000	20.00	22.20	111	74-125
Methyl tert-Amyl Ether (TAME)	<0.1000	20.00	21.36	107	80-120
1,1-Dichloroethene	<0.1000	20.00	25.34	127	76-133
Benzene	<0.1000	20.00	21.83	109	80-121
Trichloroethene	117.8 >LR	20.00	130.5 >LR	64 NM	74-129
Toluene	<0.1000	20.00	23.07	115	80-120
Chlorobenzene	<0.1000	20.00	20.28	101	80-120

Surrogate	%REC	Limits
Dibromofluoromethane	111	80-125
1,2-Dichloroethane-d4	103	80-137
Toluene-d8	103	80-120
Bromofluorobenzene	101	80-122

Type: MSD Lab ID: QC483423

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
tert-Butyl Alcohol (TBA)	100.0	95.84	96	65-150	5	20
Isopropyl Ether (DIPE)	20.00	18.42	92	73-127	3	20
Ethyl tert-Butyl Ether (ETBE)	20.00	21.74	109	74-125	2	20
Methyl tert-Amyl Ether (TAME)	20.00	20.79	104	80-120	3	20
1,1-Dichloroethene	20.00	24.01	120	76-133	5	20
Benzene	20.00	20.88	104	80-121	4	20
Trichloroethene	20.00	122.8 >LR	25 NM	74-129	NC	20
Toluene	20.00	21.89	109	80-120	5	20
Chlorobenzene	20.00	19.60	98	80-120	3	20

Surrogate	%REC	Limits
Dibromofluoromethane	110	80-125
1,2-Dichloroethane-d4	103	80-137
Toluene-d8	102	80-120
Bromofluorobenzene	103	80-122

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

Semivolatile Organics by GC/MS

Lab #: 209874	Location: MSC Remediation
Client: OTG Enviroengineering Solutions, Inc	Prep: EPA 3520C
Project#: 090AK04.1000	Analysis: EPA 8270C
Field ID: E-1	Batch#: 147846
Lab ID: 209874-001	Sampled: 02/09/09
Matrix: Water	Received: 02/09/09
Units: ug/L	Prepared: 02/11/09
Diln Fac: 1.000	Analyzed: 02/13/09

Analyte	Result	RL
N-Nitrosodimethylamine	ND	9.6
Phenol	ND	9.6
bis(2-Chloroethyl)ether	ND	9.6
2-Chlorophenol	ND	9.6
1,3-Dichlorobenzene	ND	9.6
1,4-Dichlorobenzene	ND	9.6
Benzyl alcohol	ND	9.6
1,2-Dichlorobenzene	ND	9.6
2-Methylphenol	ND	9.6
bis(2-Chloroisopropyl) ether	ND	9.6
4-Methylphenol	ND	9.6
N-Nitroso-di-n-propylamine	ND	9.6
Hexachloroethane	ND	9.6
Nitrobenzene	ND	9.6
Isophorone	ND	9.6
2-Nitrophenol	ND	19
2,4-Dimethylphenol	ND	9.6
Benzoic acid	ND	48
bis(2-Chloroethoxy)methane	ND	9.6
2,4-Dichlorophenol	ND	9.6
1,2,4-Trichlorobenzene	ND	9.6
Naphthalene	ND	9.6
4-Chloroaniline	ND	9.6
Hexachlorobutadiene	ND	9.6
4-Chloro-3-methylphenol	ND	9.6
2-Methylnaphthalene	ND	9.6
Hexachlorocyclopentadiene	ND	19
2,4,6-Trichlorophenol	ND	9.6
2,4,5-Trichlorophenol	ND	9.6
2-Chloronaphthalene	ND	9.6
2-Nitroaniline	ND	19
Dimethylphthalate	ND	9.6
Acenaphthylene	ND	9.6
2,6-Dinitrotoluene	ND	9.6
3-Nitroaniline	ND	19
Acenaphthene	ND	9.6
2,4-Dinitrophenol	ND	19
4-Nitrophenol	ND	19
Dibenzofuran	ND	9.6
2,4-Dinitrotoluene	ND	9.6
Diethylphthalate	ND	9.6
Fluorene	ND	9.6
4-Chlorophenyl-phenylether	ND	9.6
4-Nitroaniline	ND	19
4,6-Dinitro-2-methylphenol	ND	19
N-Nitrosodiphenylamine	ND	9.6
Azobenzene	ND	9.6
4-Bromophenyl-phenylether	ND	9.6
Hexachlorobenzene	ND	9.6
Pentachlorophenol	ND	19
Phenanthrene	ND	9.6
Anthracene	ND	9.6
Di-n-butylphthalate	ND	9.6
Fluoranthene	ND	9.6

ND= Not Detected
 RL= Reporting Limit

Semivolatile Organics by GC/MS

Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	EPA 3520C
Project#:	090AK04.1000	Analysis:	EPA 8270C
Field ID:	E-1	Batch#:	147846
Lab ID:	209874-001	Sampled:	02/09/09
Matrix:	Water	Received:	02/09/09
Units:	ug/L	Prepared:	02/11/09
Diln Fac:	1.000	Analyzed:	02/13/09

Analyte	Result	RL
Pyrene	ND	9.6
Butylbenzylphthalate	ND	9.6
3,3'-Dichlorobenzidine	ND	19
Benzo(a)anthracene	ND	9.6
Chrysene	ND	9.6
bis(2-Ethylhexyl)phthalate	ND	9.6
Di-n-octylphthalate	ND	9.6
Benzo(b)fluoranthene	ND	9.6
Benzo(k)fluoranthene	ND	9.6
Benzo(a)pyrene	ND	9.6
Indeno(1,2,3-cd)pyrene	ND	9.6
Dibenz(a,h)anthracene	ND	9.6
Benzo(g,h,i)perylene	ND	9.6

Surrogate	%REC	Limits
2-Fluorophenol	67	40-120
Phenol-d5	74	43-120
2,4,6-Tribromophenol	65	40-122
Nitrobenzene-d5	79	56-120
2-Fluorobiphenyl	80	55-120
Terphenyl-d14	78	34-120

ND= Not Detected
 RL= Reporting Limit

Semivolatile Organics by GC/MS

Lab #: 209874	Location: MSC Remediation
Client: OTG Enviroengineering Solutions, Inc	Prep: EPA 3520C
Project#: 090AK04.1000	Analysis: EPA 8270C
Field ID: I-1	Batch#: 147846
Lab ID: 209874-004	Sampled: 02/09/09
Matrix: Water	Received: 02/09/09
Units: ug/L	Prepared: 02/11/09
Diln Fac: 5.000	Analyzed: 02/14/09

Analyte	Result	RL
N-Nitrosodimethylamine	ND	48
Phenol	ND	48
bis(2-Chloroethyl)ether	ND	48
2-Chlorophenol	ND	48
1,3-Dichlorobenzene	ND	48
1,4-Dichlorobenzene	ND	48
Benzyl alcohol	ND	48
1,2-Dichlorobenzene	ND	48
2-Methylphenol	ND	48
bis(2-Chloroisopropyl) ether	ND	48
4-Methylphenol	ND	48
N-Nitroso-di-n-propylamine	ND	48
Hexachloroethane	ND	48
Nitrobenzene	ND	48
Isophorone	ND	48
2-Nitrophenol	ND	95
2,4-Dimethylphenol	ND	48
Benzoic acid	ND	240
bis(2-Chloroethoxy)methane	ND	48
2,4-Dichlorophenol	ND	48
1,2,4-Trichlorobenzene	ND	48
Naphthalene	ND	48
4-Chloroaniline	ND	48
Hexachlorobutadiene	ND	48
4-Chloro-3-methylphenol	ND	48
2-Methylnaphthalene	ND	48
Hexachlorocyclopentadiene	ND	95
2,4,6-Trichlorophenol	ND	48
2,4,5-Trichlorophenol	ND	48
2-Chloronaphthalene	ND	48
2-Nitroaniline	ND	95
Dimethylphthalate	ND	48
Acenaphthylene	ND	48
2,6-Dinitrotoluene	ND	48
3-Nitroaniline	ND	95
Acenaphthene	ND	48
2,4-Dinitrophenol	ND	95
4-Nitrophenol	ND	95
Dibenzofuran	ND	48
2,4-Dinitrotoluene	ND	48
Diethylphthalate	ND	48
Fluorene	ND	48
4-Chlorophenyl-phenylether	ND	48
4-Nitroaniline	ND	95
4,6-Dinitro-2-methylphenol	ND	95
N-Nitrosodiphenylamine	ND	48
Azobenzene	ND	48
4-Bromophenyl-phenylether	ND	48
Hexachlorobenzene	ND	48
Pentachlorophenol	ND	95
Phenanthrene	ND	48
Anthracene	ND	48
Di-n-butylphthalate	ND	48
Fluoranthene	ND	48

ND= Not Detected
 RL= Reporting Limit

Semivolatile Organics by GC/MS

Lab #: 209874	Location: MSC Remediation
Client: OTG Enviroengineering Solutions, Inc	Prep: EPA 3520C
Project#: 090AK04.1000	Analysis: EPA 8270C
Field ID: I-1	Batch#: 147846
Lab ID: 209874-004	Sampled: 02/09/09
Matrix: Water	Received: 02/09/09
Units: ug/L	Prepared: 02/11/09
Diln Fac: 5.000	Analyzed: 02/14/09

Analyte	Result	RL
Pyrene	ND	48
Butylbenzylphthalate	ND	48
3,3'-Dichlorobenzidine	ND	95
Benzo(a)anthracene	ND	48
Chrysene	ND	48
bis(2-Ethylhexyl)phthalate	ND	48
Di-n-octylphthalate	ND	48
Benzo(b)fluoranthene	ND	48
Benzo(k)fluoranthene	ND	48
Benzo(a)pyrene	ND	48
Indeno(1,2,3-cd)pyrene	ND	48
Dibenz(a,h)anthracene	ND	48
Benzo(g,h,i)perylene	ND	48

Surrogate	%REC	Limits
2-Fluorophenol	82	40-120
Phenol-d5	55	43-120
2,4,6-Tribromophenol	78	40-122
Nitrobenzene-d5	90	56-120
2-Fluorobiphenyl	71	55-120
Terphenyl-d14	36	34-120

ND= Not Detected
 RL= Reporting Limit

Batch QC Report

Semivolatile Organics by GC/MS			
Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	EPA 3520C
Project#:	090AK04.1000	Analysis:	EPA 8270C
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC483044	Batch#:	147846
Matrix:	Water	Prepared:	02/11/09
Units:	ug/L	Analyzed:	02/13/09

Analyte	Result	RL
N-Nitrosodimethylamine	ND	10
Phenol	ND	10
bis(2-Chloroethyl)ether	ND	10
2-Chlorophenol	ND	10
1,3-Dichlorobenzene	ND	10
1,4-Dichlorobenzene	ND	10
Benzyl alcohol	ND	10
1,2-Dichlorobenzene	ND	10
2-Methylphenol	ND	10
bis(2-Chloroisopropyl) ether	ND	10
4-Methylphenol	ND	10
N-Nitroso-di-n-propylamine	ND	10
Hexachloroethane	ND	10
Nitrobenzene	ND	10
Isophorone	ND	10
2-Nitrophenol	ND	20
2,4-Dimethylphenol	ND	10
Benzoic acid	ND	50
bis(2-Chloroethoxy)methane	ND	10
2,4-Dichlorophenol	ND	10
1,2,4-Trichlorobenzene	ND	10
Naphthalene	ND	10
4-Chloroaniline	ND	10
Hexachlorobutadiene	ND	10
4-Chloro-3-methylphenol	ND	10
2-Methylnaphthalene	ND	10
Hexachlorocyclopentadiene	ND	20
2,4,6-Trichlorophenol	ND	10
2,4,5-Trichlorophenol	ND	10
2-Chloronaphthalene	ND	10
2-Nitroaniline	ND	20
Dimethylphthalate	ND	10
Acenaphthylene	ND	10
2,6-Dinitrotoluene	ND	10
3-Nitroaniline	ND	20
Acenaphthene	ND	10
2,4-Dinitrophenol	ND	20
4-Nitrophenol	ND	20
Dibenzofuran	ND	10
2,4-Dinitrotoluene	ND	10
Diethylphthalate	ND	10
Fluorene	ND	10
4-Chlorophenyl-phenylether	ND	10
4-Nitroaniline	ND	20
4,6-Dinitro-2-methylphenol	ND	20
N-Nitrosodiphenylamine	ND	10
Azobenzene	ND	10
4-Bromophenyl-phenylether	ND	10
Hexachlorobenzene	ND	10
Pentachlorophenol	ND	20
Phenanthrene	ND	10
Anthracene	ND	10
Di-n-butylphthalate	ND	10
Fluoranthene	ND	10

ND= Not Detected
 RL= Reporting Limit

Batch QC Report

Semivolatile Organics by GC/MS			
Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	EPA 3520C
Project#:	090AK04.1000	Analysis:	EPA 8270C
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC483044	Batch#:	147846
Matrix:	Water	Prepared:	02/11/09
Units:	ug/L	Analyzed:	02/13/09

Analyte	Result	RL
Pyrene	ND	10
Butylbenzylphthalate	ND	10
3,3'-Dichlorobenzidine	ND	20
Benzo(a)anthracene	ND	10
Chrysene	ND	10
bis(2-Ethylhexyl)phthalate	ND	10
Di-n-octylphthalate	ND	10
Benzo(b)fluoranthene	ND	10
Benzo(k)fluoranthene	ND	10
Benzo(a)pyrene	ND	10
Indeno(1,2,3-cd)pyrene	ND	10
Dibenz(a,h)anthracene	ND	10
Benzo(g,h,i)perylene	ND	10

Surrogate	%REC	Limits
2-Fluorophenol	76	40-120
Phenol-d5	75	43-120
2,4,6-Tribromophenol	61	40-122
Nitrobenzene-d5	78	56-120
2-Fluorobiphenyl	80	55-120
Terphenyl-d14	78	34-120

ND= Not Detected
 RL= Reporting Limit

Batch QC Report

Semivolatile Organics by GC/MS			
Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	EPA 3520C
Project#:	090AK04.1000	Analysis:	EPA 8270C
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC483045	Batch#:	147846
Matrix:	Water	Prepared:	02/11/09
Units:	ug/L	Analyzed:	02/13/09

Analyte	Spiked	Result	%REC	Limits
Phenol	80.00	61.00	76	45-120
2-Chlorophenol	80.00	64.09	80	52-120
1,4-Dichlorobenzene	80.00	62.60	78	47-120
N-Nitroso-di-n-propylamine	80.00	69.91	87	38-120
1,2,4-Trichlorobenzene	80.00	61.59	77	46-120
4-Chloro-3-methylphenol	80.00	64.25	80	55-120
Acenaphthene	30.00	26.73	89	54-120
4-Nitrophenol	80.00	61.07	76	46-120
2,4-Dinitrotoluene	80.00	65.79	82	56-120
Pentachlorophenol	80.00	63.24	79	50-121
Pyrene	30.00	26.61	89	54-120

Surrogate	%REC	Limits
2-Fluorophenol	84	40-120
Phenol-d5	85	43-120
2,4,6-Tribromophenol	97	40-122
Nitrobenzene-d5	87	56-120
2-Fluorobiphenyl	93	55-120
Terphenyl-d14	90	34-120

Batch QC Report

Semivolatile Organics by GC/MS			
Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	EPA 3520C
Project#:	090AK04.1000	Analysis:	EPA 8270C
Field ID:	ZZZZZZZZZZ	Batch#:	147846
MSS Lab ID:	209893-001	Sampled:	02/09/09
Matrix:	Water	Received:	02/10/09
Units:	ug/L	Prepared:	02/11/09
Diln Fac:	1.000	Analyzed:	02/13/09

Type: MS Lab ID: QC483046

Analyte	MSS Result	Spiked	Result	%REC	Limits
Phenol	<0.7208	80.00	52.01	65	43-120
2-Chlorophenol	<0.8038	80.00	55.38	69	48-120
1,4-Dichlorobenzene	<1.183	80.00	56.59	71	48-120
N-Nitroso-di-n-propylamine	<0.6098	80.00	58.58	73	42-120
1,2,4-Trichlorobenzene	<1.265	80.00	53.61	67	47-120
4-Chloro-3-methylphenol	<0.4918	80.00	54.32	68	51-120
Acenaphthene	<0.4476	30.00	22.51	75	49-120
4-Nitrophenol	<0.7932	80.00	52.83	66	46-120
2,4-Dinitrotoluene	<0.7634	80.00	55.25	69	50-120
Pentachlorophenol	<1.136	80.00	52.65	66	48-127
Pyrene	<0.4262	30.00	22.42	75	50-120

Surrogate	%REC	Limits
2-Fluorophenol	72	40-120
Phenol-d5	73	43-120
2,4,6-Tribromophenol	77	40-122
Nitrobenzene-d5	75	56-120
2-Fluorobiphenyl	78	55-120
Terphenyl-d14	69	34-120

Type: MSD Lab ID: QC483047

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Phenol	78.43	48.77	62	43-120	4	20
2-Chlorophenol	78.43	53.33	68	48-120	2	20
1,4-Dichlorobenzene	78.43	53.98	69	48-120	3	20
N-Nitroso-di-n-propylamine	78.43	58.72	75	42-120	2	25
1,2,4-Trichlorobenzene	78.43	51.56	66	47-120	2	24
4-Chloro-3-methylphenol	78.43	53.55	68	51-120	1	20
Acenaphthene	29.41	22.30	76	49-120	1	21
4-Nitrophenol	78.43	51.54	66	46-120	0	25
2,4-Dinitrotoluene	78.43	54.72	70	50-120	1	22
Pentachlorophenol	78.43	51.63	66	48-127	0	24
Pyrene	29.41	22.15	75	50-120	1	22

Surrogate	%REC	Limits
2-Fluorophenol	66	40-120
Phenol-d5	69	43-120
2,4,6-Tribromophenol	76	40-122
Nitrobenzene-d5	76	56-120
2-Fluorobiphenyl	78	55-120
Terphenyl-d14	49	34-120

RPD= Relative Percent Difference

Polynuclear Aromatics by HPLC

Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	EPA 3520C
Project#:	090AK04.1000	Analysis:	EPA 8310
Field ID:	E-1	Batch#:	147844
Lab ID:	209874-001	Sampled:	02/09/09
Matrix:	Water	Received:	02/09/09
Units:	ug/L	Prepared:	02/11/09
Diln Fac:	1.000	Analyzed:	02/18/09

Analyte	Result	RL
Naphthalene	ND	0.95
Acenaphthylene	ND	1.9
Acenaphthene	ND	0.95
Fluorene	ND	0.19
Phenanthrene	ND	0.10
Anthracene	ND	0.10
Fluoranthene	ND	0.19
Pyrene	ND	0.10
Benzo(a)anthracene	ND	0.10
Chrysene	ND	0.10
Benzo(b)fluoranthene	ND	0.19
Benzo(k)fluoranthene	ND	0.10
Benzo(a)pyrene	ND	0.10
Dibenz(a,h)anthracene	ND	0.19
Benzo(g,h,i)perylene	ND	0.19
Indeno(1,2,3-cd)pyrene	ND	0.10

Surrogate	%REC	Limits
1-Methylnaphthalene (UV)	92	62-120
1-Methylnaphthalene (F)	90	60-120

ND= Not Detected
 RL= Reporting Limit

Polynuclear Aromatics by HPLC

Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	EPA 3520C
Project#:	090AK04.1000	Analysis:	EPA 8310
Field ID:	I-1	Batch#:	147844
Lab ID:	209874-004	Sampled:	02/09/09
Matrix:	Water	Received:	02/09/09
Units:	ug/L	Prepared:	02/11/09
Diln Fac:	1.000	Analyzed:	02/18/09

Analyte	Result	RL
Naphthalene	13	0.94
Acenaphthylene	ND	1.9
Acenaphthene	33	0.94
Fluorene	0.72	0.19
Phenanthrene	ND	0.09
Anthracene	ND	0.09
Fluoranthene	ND	0.19
Pyrene	0.11	0.09
Benzo(a)anthracene	ND	0.09
Chrysene	ND	0.09
Benzo(b)fluoranthene	ND	0.19
Benzo(k)fluoranthene	ND	0.09
Benzo(a)pyrene	ND	0.09
Dibenz(a,h)anthracene	ND	0.19
Benzo(g,h,i)perylene	ND	0.19
Indeno(1,2,3-cd)pyrene	ND	0.09

Surrogate	%REC	Limits
1-Methylnaphthalene (UV)	91	62-120
1-Methylnaphthalene (F)	90	60-120

ND= Not Detected
 RL= Reporting Limit

Batch QC Report

Polynuclear Aromatics by HPLC			
Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	EPA 3520C
Project#:	090AK04.1000	Analysis:	EPA 8310
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC483038	Batch#:	147844
Matrix:	Water	Prepared:	02/11/09
Units:	ug/L	Analyzed:	02/18/09

Analyte	Result	RL
Naphthalene	ND	1.0
Acenaphthylene	ND	2.0
Acenaphthene	ND	1.0
Fluorene	ND	0.20
Phenanthrene	ND	0.10
Anthracene	ND	0.10
Fluoranthene	ND	0.20
Pyrene	ND	0.10
Benzo(a)anthracene	ND	0.10
Chrysene	ND	0.10
Benzo(b)fluoranthene	ND	0.20
Benzo(k)fluoranthene	ND	0.10
Benzo(a)pyrene	ND	0.10
Dibenz(a,h)anthracene	ND	0.20
Benzo(g,h,i)perylene	ND	0.20
Indeno(1,2,3-cd)pyrene	ND	0.10

Surrogate	%REC	Limits
1-Methylnaphthalene (UV)	90	62-120
1-Methylnaphthalene (F)	89	60-120

ND= Not Detected

RL= Reporting Limit

Priority Pollutant Metals

Lab #: 209874	Project#: 090AK04.1000
Client: OTG Enviroengineering Solutions, Inc	Location: MSC Remediation
Field ID: E-1	Sampled: 02/09/09
Lab ID: 209874-001	Received: 02/09/09
Matrix: Water	Analyzed: 02/11/09
Units: ug/L	

Analyte	Result	RL	MDL	Diln	Fac	Batch#	Prepared	Prep	Analysis
Antimony	1.7	1.0	0.14	5.000		147805	02/10/09	EPA 200.8	EPA 6020
Arsenic	10	1.0	0.089	5.000		147805	02/10/09	EPA 200.8	EPA 6020
Beryllium	ND	1.0	0.096	5.000		147805	02/10/09	EPA 200.8	EPA 6020
Cadmium	0.66 J	1.0	0.069	5.000		147805	02/10/09	EPA 200.8	EPA 6020
Chromium	0.28 J	1.0	0.20	5.000		147805	02/10/09	EPA 200.8	EPA 6020
Copper	40	1.0	0.21	5.000		147805	02/10/09	EPA 200.8	EPA 6020
Lead	5.5	1.0	0.11	5.000		147805	02/10/09	EPA 200.8	EPA 6020
Mercury	0.14 J	0.20	0.033	1.000		147826	02/11/09	METHOD	EPA 7470A
Nickel	7.2	1.0	0.19	5.000		147805	02/10/09	EPA 200.8	EPA 6020
Selenium	0.17 J	1.0	0.12	5.000		147805	02/10/09	EPA 200.8	EPA 6020
Silver	0.23 J	1.0	0.073	5.000		147805	02/10/09	EPA 200.8	EPA 6020
Thallium	ND	1.0	0.032	5.000		147805	02/10/09	EPA 200.8	EPA 6020
Zinc	4.3 J	5.0	0.69	5.000		147805	02/10/09	EPA 200.8	EPA 6020

J= Estimated value

ND= Not Detected

RL= Reporting Limit

MDL= Method Detection Limit

Priority Pollutant Metals

Lab #: 209874	Project#: 090AK04.1000
Client: OTG Enviroengineering Solutions, Inc	Location: MSC Remediation
Field ID: I-1	Sampled: 02/09/09
Lab ID: 209874-004	Received: 02/09/09
Matrix: Water	Analyzed: 02/11/09
Units: ug/L	

Analyte	Result	RL	MDL	Diln Fac	Batch#	Prepared	Prep	Analysis
Antimony	1.9	1.0	0.14	5.000	147805	02/10/09	EPA 200.8	EPA 6020
Arsenic	13	1.0	0.089	5.000	147805	02/10/09	EPA 200.8	EPA 6020
Beryllium	ND	1.0	0.096	5.000	147805	02/10/09	EPA 200.8	EPA 6020
Cadmium	41	1.0	0.069	5.000	147805	02/10/09	EPA 200.8	EPA 6020
Chromium	0.89 J	1.0	0.20	5.000	147805	02/10/09	EPA 200.8	EPA 6020
Copper	830	1.0	0.21	5.000	147805	02/10/09	EPA 200.8	EPA 6020
Lead	150	1.0	0.11	5.000	147805	02/10/09	EPA 200.8	EPA 6020
Mercury	0.25	0.20	0.033	1.000	147826	02/11/09	METHOD	EPA 7470A
Nickel	130	1.0	0.19	5.000	147805	02/10/09	EPA 200.8	EPA 6020
Selenium	0.60 J	1.0	0.12	5.000	147805	02/10/09	EPA 200.8	EPA 6020
Silver	1.9	1.0	0.073	5.000	147805	02/10/09	EPA 200.8	EPA 6020
Thallium	ND	1.0	0.032	5.000	147805	02/10/09	EPA 200.8	EPA 6020
Zinc	51	5.0	0.69	5.000	147805	02/10/09	EPA 200.8	EPA 6020

J= Estimated value

ND= Not Detected

RL= Reporting Limit

MDL= Method Detection Limit

Batch QC Report

Priority Pollutant Metals			
Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	EPA 200.8
Project#:	090AK04.1000	Analysis:	EPA 6020
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC482882	Batch#:	147805
Matrix:	Water	Prepared:	02/10/09
Units:	ug/L	Analyzed:	02/10/09

Analyte	Result	RL	MDL
Antimony	0.10 J	1.0	0.028
Arsenic	ND	1.0	0.018
Beryllium	ND	1.0	0.019
Cadmium	ND	1.0	0.014
Chromium	0.25 J	1.0	0.040
Copper	ND	1.0	0.042
Lead	ND	1.0	0.022
Nickel	ND	1.0	0.037
Selenium	ND	1.0	0.024
Silver	0.024 J	1.0	0.015
Thallium	ND	1.0	0.0064
Zinc	1.9 J	5.0	0.14

J= Estimated value

ND= Not Detected

RL= Reporting Limit

MDL= Method Detection Limit

Batch QC Report

Priority Pollutant Metals			
Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	EPA 200.8
Project#:	090AK04.1000	Analysis:	EPA 6020
Matrix:	Water	Batch#:	147805
Units:	ug/L	Prepared:	02/10/09
Diln Fac:	1.000	Analyzed:	02/10/09

Type: BS Lab ID: QC482883

Analyte	Spiked	Result	%REC	Limits
Antimony	100.0	96.77	97	80-120
Arsenic	100.0	88.91	89	80-120
Beryllium	100.0	104.6	105	80-120
Cadmium	100.0	101.5	102	80-120
Chromium	100.0	102.2	102	80-120
Copper	100.0	91.02	91	80-120
Lead	100.0	107.0	107	80-120
Nickel	100.0	102.2	102	80-120
Selenium	100.0	89.05	89	80-120
Silver	100.0	97.64	98	75-120
Thallium	50.00	49.51	99	80-120
Zinc	100.0	90.41	90	80-120

Type: BSD Lab ID: QC482884

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Antimony	100.0	99.27	99	80-120	3	20
Arsenic	100.0	91.55	92	80-120	3	20
Beryllium	100.0	106.4	106	80-120	2	20
Cadmium	100.0	103.3	103	80-120	2	20
Chromium	100.0	104.4	104	80-120	2	20
Copper	100.0	94.67	95	80-120	4	20
Lead	100.0	108.4	108	80-120	1	20
Nickel	100.0	104.8	105	80-120	3	20
Selenium	100.0	91.37	91	80-120	3	20
Silver	100.0	100.2	100	75-120	3	20
Thallium	50.00	50.57	101	80-120	2	20
Zinc	100.0	93.17	93	80-120	3	20

RPD= Relative Percent Difference

Batch QC Report

Priority Pollutant Metals			
Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	METHOD
Project#:	090AK04.1000	Analysis:	EPA 7470A
Analyte:	Mercury	Diln Fac:	1.000
Type:	BLANK	Batch#:	147826
Lab ID:	QC482956	Prepared:	02/11/09
Matrix:	Water	Analyzed:	02/11/09
Units:	ug/L		

Result	RL	MDL
ND	0.20	0.033

ND= Not Detected
 RL= Reporting Limit
 MDL= Method Detection Limit

Batch QC Report

Priority Pollutant Metals			
Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	METHOD
Project#:	090AK04.1000	Analysis:	EPA 7470A
Analyte:	Mercury	Batch#:	147826
Matrix:	Water	Prepared:	02/11/09
Units:	ug/L	Analyzed:	02/11/09
Diln Fac:	1.000		

Type	Lab ID	Spiked	Result	%REC	Limits	RPD	Lim
BS	QC482957	5.000	4.910	98	80-120		
BSD	QC482958	5.000	4.870	97	80-120	1	20

RPD= Relative Percent Difference

Batch QC Report

Priority Pollutant Metals			
Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	METHOD
Project#:	090AK04.1000	Analysis:	EPA 7470A
Analyte:	Mercury	Batch#:	147826
Field ID:	E-1	Sampled:	02/09/09
MSS Lab ID:	209874-001	Received:	02/09/09
Matrix:	Water	Prepared:	02/11/09
Units:	ug/L	Analyzed:	02/11/09
Diln Fac:	1.000		

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
MS	QC482959	0.1400	5.000	4.940	96	71-124		
MSD	QC482960		5.000	5.000	97	71-124	1	20

RPD= Relative Percent Difference

Batch QC Report

Hexavalent Chromium			
Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	METHOD
Project#:	090AK04.1000	Analysis:	EPA 7199
Field ID:	E-1	Batch#:	147764
MSS Lab ID:	209874-001	Sampled:	02/09/09 13:50
Matrix:	Water	Received:	02/09/09
Units:	ug/L		

Type: BS Diln Fac: 1.000
 Lab ID: QC482708 Analyzed: 02/09/09 16:37

Analyte	Spiked	Result	%REC	Limits
Hexavalent Chromium	20.00	20.55	103	90-110

Type: BSD Diln Fac: 1.000
 Lab ID: QC482709 Analyzed: 02/09/09 16:49

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Hexavalent Chromium	20.00	20.59	103	90-110	0	20

Type: MS Diln Fac: 1.020
 Lab ID: QC482710 Analyzed: 02/09/09 17:52

Analyte	MSS Result	Spiked	Result	%REC	Limits
Hexavalent Chromium	<0.1302	10.20	0	0 *	85-115

Type: MSD Diln Fac: 1.020
 Lab ID: QC482711 Analyzed: 02/09/09 18:05

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Hexavalent Chromium	10.20	0	0 *	85-115	NC	20

*= Value outside of QC limits; see narrative

NC= Not Calculated

RPD= Relative Percent Difference

Total Cyanide			
Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	METHOD
Project#:	090AK04.1000	Analysis:	SM4500CN-E
Analyte:	Cyanide	Batch#:	147961
Matrix:	Water	Sampled:	02/09/09
Units:	mg/L	Received:	02/09/09
Diln Fac:	1.000	Analyzed:	02/17/09

Field ID	Type	Lab ID	Result	RL
E-1	SAMPLE	209874-001	ND	0.01
I-1	SAMPLE	209874-004	ND	0.01
	BLANK	QC483481	ND	0.01

ND= Not Detected
 RL= Reporting Limit

Batch QC Report

Total Cyanide			
Lab #:	209874	Location:	MSC Remediation
Client:	OTG Enviroengineering Solutions, Inc	Prep:	METHOD
Project#:	090AK04.1000	Analysis:	SM4500CN-E
Analyte:	Cyanide	Diln Fac:	1.000
Field ID:	ZZZZZZZZZZ	Batch#:	147961
MSS Lab ID:	209747-009	Sampled:	02/04/09
Matrix:	Water	Received:	02/04/09
Units:	mg/L	Analyzed:	02/17/09

Type	Lab ID	MSS Result	Spiked	Result	%REC	Limits	RPD	Lim
LCS	QC483482		0.2000	0.2262	113	80-124		
MS	QC483483	0.03440	0.2000	0.2292	97	67-124		
MSD	QC483484		0.2000	0.2283	97	67-124	0	20

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Analytical Laboratory Since 1878

2323 Fifth Street
Berkeley, CA 94710
(510) 486-0900 Phone
(510) 486-0532 Fax

CHAIN OF CUSTODY

C & T LOGIN #: 209874

Sampler: Xinggang Tong

Report To: Xinggang Tong

Company: OTG Environmental Engineering Solutions

Telephone: (510) 465-8982

Fax email: xtong@otgenv.com

Project No.: 090AK04.1000

Project Name: MSC Remediation

Project P.O.:

Turnaround Time: 5-day

Analysis

Lab No.	Sample ID.	Sampling Date Time	Matrix			# of Containers	Preservative						
			Soil	Water	Waste		HCL	H ₂ SO ₄	HNO ₃	ICE			
1	E-1	2/9/09, 13:50		x									
2	BtW-2	2/9/09, 14:05		x									
3	BtW-1	2/9/09, 14:10		x									
4	I-1	2/9/09, 14:15		x									

TPH gas	TPH diesel & mo	TPH diesel & mo with silica gel cleanup	EPA 8260 + 5 fuel oxygenates + EDB	Ethanol + Methanol	EPA 8310 for PAHs	EPA 8270C for SVOCs	Cyanide, total	Priority pollutants metals (ICPMS)	Cr 6 (EPA 7199 Low detection)
x	x	x	x	x	x	x	x	x	x
x		x	x						
			x						
x	x	x	x	x	x	x	x	x	x

Notes:
Email EDF for GeoTracker upload
Global ID: T0600100375
EDF Log Code: OTG0

SAMPLE RECEIPT

Intact Cold
 On Ice Ambient

Preservative Correct?
 Yes No N/A

RELINQUISHED BY:

Xinggang Tong 2/9/09 4:40pm
DATE / TIME

DATE / TIME

DATE / TIME

RECEIVED BY:

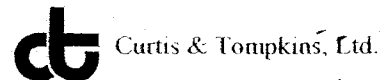
TG BB 2-9-09 4:40
DATE / TIME

DATE / TIME

DATE / TIME

SIGNATURE

COOLER RECEIPT CHECKLIST



Login # 209874 Date Received 2/9/09 Number of coolers 2
Client CTC Project MISC REMEDIATION

Date Opened 2/9/09 By (print) M. VILLANUEVA (sign) [Signature]
Date Logged in [check] By (print) [check] (sign) [check]

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 YES NO
How many Name Date

2B. Were custody seals intact upon arrival? YES NO

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

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

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

6. Indicate the packing in cooler: (if other, describe)
Bubble Wrap Foam blocks Bags None
Cloth material Cardboard Styrofoam Paper towels

7. Temperature documentation:
Type of ice used: Wet Blue/Gel None Temp(C) 2.7, 2.4
Samples Received on ice & cold without a temperature blank
Samples received on ice directly from the field. Cooling process had begun

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

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

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

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

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

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

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

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

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

COMMENTS
[Blank lines for handwritten notes]

2451 Estand Way
Pleasant Hill, CA 94523-3911
(925) 682-7200 FAX 686-0399

**Renewal Percent Survival Aquatic Toxicity Screening Test Results for
One Liquid Sample (Project Name: MSC Remediation)**

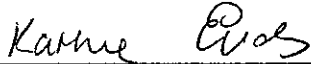
February 2009

Prepared For:
Xinggang Tong
OTG Enviroengineering
Solutions, Inc.
464 19th Street, Suite 206
Oakland, CA 94612

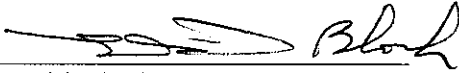
BES Sample #25824a-d

Prepared By:
Block Environmental Services, Inc.
2451 Estand Way
Pleasant Hill, CA 94523-3911
(925) 682-7200

February 16, 2009



Kathie Evans
Laboratory Coordinator



David Block, Ph.D.
Laboratory Director

1. INTRODUCTION

The Federal Water Pollution Control Act Amendments of 1972 (PL 92-500), the Clean Water Act (CWA) of 1977 (PL 95-217), and the Water Quality Act of 1987 (PL 100-4) explicitly state that it is the national policy that the discharge of toxic substances in toxic amounts be prohibited. Toxicity to aquatic life is one of the criteria used to gauge the hazardous potential of a discharged waste. The type of toxicity test and particular species used for testing of effluents is dictated under the framework of the National Pollutant Discharge Elimination System and falls under the jurisdiction of the local Regional Water Quality Control Board.

This report describes the procedures used and the results obtained for the renewal percent survival aquatic toxicity screening tests performed by Block Environmental Services (BES) for OTG Enviroengineering.

BES is an Environmental Laboratory Accreditation Program certified laboratory (#1812).

2. MATERIALS AND METHODS

2.1 TEST ORGANISMS

- Rainbow Trout (*Oncorhynchus mykiss*), obtained from a commercial supplier or in house culture.

2.2 TEST PROCEDURES

A detailed procedure for these tests is outlined in laboratory standard operating procedures (SOPs) kept at the BES laboratory. These SOPs are based upon the following references:

- Methods for Measuring the Acute Toxicity of Effluents to Freshwater and Marine Organisms, 5th Edition (EPA/821/R-02/012).

2.3 DATA ANALYSIS

Toxicity testing results will be reported as the percent of surviving organisms during the exposure period.

3. RESULTS

3.1 Sample Identification	3.2 BES Sample #	3.3 Sample Collection Date	3.4 Date Received By BES
E-1	25824a	02/09/09	02/09/09
	25824b	02/09/09	02/09/09
	25824c	02/09/09	02/09/09
	25824d	02/09/09	02/09/09

3.5 SUMMARY OF SAMPLE WATER CHEMISTRY – These values represent the water quality of the sample(s) as received at the BES laboratory.

Water Chemistry	25824a	25824b	25824c	25824d
D.O. (mg/L)	8.2	8.2	8.2	8.2
pH	7.8	7.8	7.8	7.8
Conductivity (µS/cm)	21100	21100	21100	21100
Salinity (ppt)	12.7	12.7	12.7	12.7
Temperature (°C)	13.0	13.0	13.0	13.0
Total Chlorine (mg/L)	ND	ND	ND	ND
Ammonia (ppm as N)	1.10	1.10	1.10	1.10
Alkalinity (mg/L as CaCO ₃)	612	612	612	612
Hardness (mg/L as CaCO ₃)	>1000	>1000	>1000	>1000

ND – Not Detected (Detection Limit = 0.03 mg/L)

3.6 TESTING PERIOD – 02/09/09-02/13/09

3.7 TEST RESULTS

Treatment Concentration	96-Hour Percent Survival
	<i>O. mykiss</i>
Control	100
100%	95

3.8 NOTES

As per the client instruction, the daily renewal was conducted with the original sample; no additional sample was provided.

EPA Whole Effluent Testing Guidelines (EPA/821/R-02/012) requires that all effluent samples be cooled to 4 °C immediately upon collection in order to maintain sample integrity. The California Department of Health Services Environmental Laboratory Accreditation Program highly recommends that the temperature of all outgoing samples designated for subcontract analyses be documented on the chain of custody in order to assess the effect of transit on sample temperature.

For the present study, the temperature of all client samples exceeded 4 °C upon receipt at the BES Laboratory. The outgoing sample temperature for each sample was recorded on the client chain of custody.

The photocopied data sheets and chain-of-custody for these tests, are attached. If you have any questions concerning this report please contact the BES laboratory, (925) 682 – 7200.

BLOCK ENVIRONMENTAL SERVICES

96 Hr Acute Screening Static Renewal Test Data Sheet

Client: OTG ENVIROENGINEERING Client ID #: E-1 BES Sample #: 25824
 Species: D. MYLISS Common Name: Z-TROUT Stock #: 1-10-09 hatch
 Control Water: CFW Avg. Fish Length (mm): N/A Avg. Fish Weight (g): N/A

Parameter	Control -A		100% -A		Control -B		100% -B		Control -C		100% -C		Control -D		100% -D		Control		100%	
	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B	A	B
Survival	10	10	10	10	10	10	10	10	10	10	9	10	10	10	9	10	10	10	9	10
D.O. (mg/L)	11.2	11.2	8.0	8.0	11.2	11.2	8.4	8.4	11.4	11.4	10.1	10.1	11.3	11.3	10.7	10.7	9.8	9.9	9.5	9.5
pH	8.2	8.2	7.8	7.8	8.2	8.2	7.8	7.8	8.2	8.2	7.7	7.7	8.2	8.2	7.7	7.7	7.9	7.9	8.0	8.0
Temp. (°C)	13.0	13.0	13.0	13.0	13.0	13.0	11.0	11.6	13.0	13.0	12.0	12.0	13.0	13.0	11.1	11.1	13.0	13.0	13.0	13.0
Cond.	1218	1219	21200	21200	1217	1217	20800	20800	1222	1222	21400	21400	1228	1228	21400	21400	640	640	21700	21700
Salinity	0.3	0.3	12.7	12.7	0.3	0.3	12.5	12.5	0.3	0.3	12.9	12.9	0.3	0.3	12.9	12.9	0.3	0.3	13.1	13.1
Hardness	110		>1000		114		>1000		118		>1000		118		>1000		118		>1000	
Alkalinity	82		612		78		612		82		612		78		612		84		610	
Ammonia	0.05		1.10		0.04		1.10		ND		1.10		ND		1.10		0.16		0.66	
Chlorine	0.06		ND		0.06		ND		ND		ND		0.04		ND		ND		0.07	
Tech.	SC				SC				SC				SC				TC			
Date	2-9-09				2-10-09				2-11-09				2-12-09				2-13-09			
Time	1405				1405				1410				1405				1405			

Subsamples taken: A CL+100^{SC} B CL+100^{SC} C CL^{SC} 100^{SC} D CL+100^{SC} ↑ D TC ↓

Notes: SM ed.

Test Supervisor: N Bradbury

QA/QC Check: K. Eves

