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Alameda County  
NOV 18 2003  
Environmental Health

November 13, 2003

Mr. Amir Gholami  
Alameda County  
Department of Environmental Health Services  
1131 Harbor Bay Parkway, Suite 250  
Alameda, California 94502-6577

Subject: **StID#3337**  
Site Address: 3609 International Blvd., Oakland, California

Dear Mr. Gholami:

Enclosed for your review is a copy of SOMA's "Fourth Quarter 2003 Groundwater Monitoring and Remediation System Operation Report" for the subject property.

Thank you for your time in reviewing our report. If you have any questions or comments, please call me at (925) 244-6600.

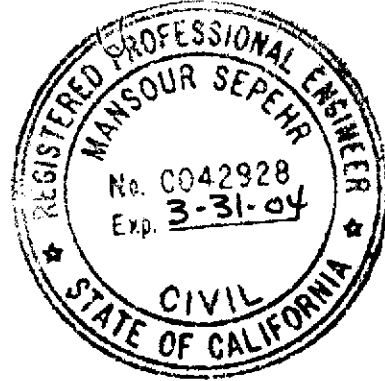
Sincerely,

Mansour Sepehr, Ph.D., PE  
Principal Hydrogeologist

Enclosure


cc: Mr. Abolghassem Razi w/enclosure  
Tony's Express Auto Service

Mr. Vince Tong w/enclosure  
Traction International



## Certification

This report has been prepared by SOMA Environmental Engineering, Inc. on behalf of Mr. Abolghassem Razi, the property owner of 3609 International Boulevard, Oakland, California, to comply with the Alameda County Department of Environmental Health Service's requirements for the Fourth Quarter 2003 groundwater monitoring event.

  
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Mansour Sepehr, Ph.D., P.E.  
Principal Hydrogeologist

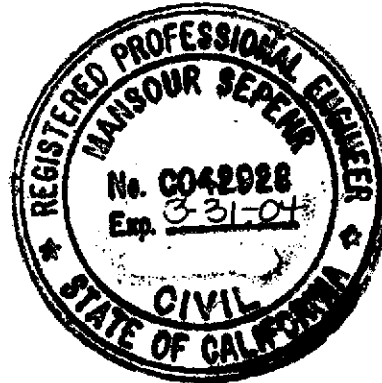


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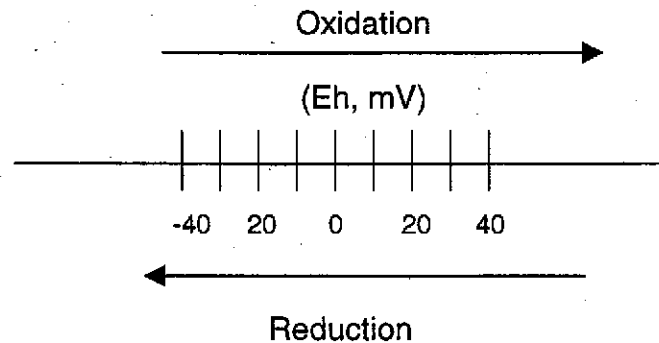
field measurements were conducted in-situ (i.e., down-hole inside each monitoring well). The pH, temperature, electric conductivity (EC), dissolved oxygen (DO), turbidity, and Oxygen Reduction Potential (ORP) were measured in-situ using a Horiba, Model U-22 multi-parameter instrument. The Horiba, Model U-22 was calibrated at the Site using standard solutions and procedures provided by the manufacturer. Detailed field measurements are shown in Appendix A.

The Horiba U-22 portable microprocessor-based turbidity probe provides lab-grade accuracy, even in the field. The unit of measurement adopted by the ISO Standard is the Formazine Turbidity Unit (FTU), which is identical to the Nephelometric Turbidity Unit (NTU). It has been found that there is a strong correlation between the turbidity level and the biological oxygen demand of natural water bodies. Turbidity is an indicator and, as such, does not reveal the presence or quantity of specific pollutants in the groundwater. It does, however, provide general information on the extent of the suspended solids in the groundwater.

The Horiba U-22's ORP electrode was used to measure the ORP of the groundwater samples. Oxidation is a process in which a molecule or ion loses one or several electrons. Reduction is a process by which a molecule or ion gains one or several electrons. The ORP, or Eh, is a measure of the potential for these processes to occur. The unit of Eh, which is commonly referred to as the redox potential, is the Volt or m-Volt. The most important redox reaction in petroleum contaminated groundwater is the oxidation of petroleum hydrocarbons in the presence of bacteria and free molecular oxygen. Because the solubility of O<sub>2</sub> in water is low (9 mg/L at 25 °C and 11 mg/L at 5 °C), and because the rate of O<sub>2</sub> replenishment in subsurface environments is limited, oxidation of only a small amount of petroleum hydrocarbons can result in the consumption of all the DO.

When DO in groundwater is consumed, oxidation of petroleum hydrocarbons can

still occur, but the oxidizing agents (i.e., the constituents that undergo reduction) are then  $\text{Fe}(\text{OH})_3$ ,  $\text{NO}_3^-$ ,  $\text{SO}_4^{2-}$ ,  $\text{MnO}_2$ , and others (Freeze and Cherry, 1979). As these oxidizing agents are consumed, the groundwater environment becomes more and more reduced. If the process proceeds far enough, the environment may become so strongly reduced that the petroleum hydrocarbons may undergo anaerobic degradation, resulting in the production of methane and carbon dioxide. The concept of oxidation and reduction in terms of changes in oxidation states is illustrated below:



The purging continued until the parameters for pH, temperature, EC, DO, turbidity, and redox stabilized, or three casing volumes were purged. The groundwater samples were also tested on-site for ferrous iron ( $\text{Fe}^{+2}$ ), and nitrate ( $\text{NO}_3^-$ ), and sulfate ( $\text{SO}_4^{2-}$ ) concentrations once stabilization occurred.

Ferrous iron, nitrate, and sulfate were measured colorimetrically using the Hach Colorimeter Model 890. The Hach Model 890 Colorimeter is a microprocessor-controlled photometer suitable for colorimetric testing in the laboratory or the field. The required reagents for each specific test are provided in AccuVac ampuls.

Ferrous iron was measured colorimetrically using Method 8146 (1,10-phenanthroline Method). The 1,10-phenanthroline indicator in Ferrous Iron Reagent reacts with  $\text{Fe}^{+2}$  in the sample to form an orange color. The intensity of

the orange color is proportional to the iron concentration.

Nitrate was measured colorimetrically using Method 8039: the Cadmium Reduction Method. Cadmium metal in the Nitra Ver 5 Nitrate Reagent reduces nitrates present in the sample to nitrite; the nitrite ion reacts in an acidic medium with sulfanilic acid to form an intermediate diazonium salt, which couples with getistic acid to form an amber-colored product. The intensity of the color is proportional to nitrate-N concentration in the sample.

Sulfate was measured colorimetrically using Method 8051 of Sulfa Ver 4 Method. Sulfate ions in the sample react with barium in the Sulfa Ver 4 Sulfate Reagent to form insoluble barium sulfate. The amount of turbidity formed is proportional to the sulfate concentration. The Sulfa Ver 4 also contains a stabilizing agent to hold the barium sulfate in suspension.

For sampling purposes, after purging, a disposable polyethylene bailer was used to collect sufficient samples from each monitoring well for laboratory analyses. The groundwater sample was transferred into three 40-mL VOA vials and preserved with hydrochloric acid. The vials were then sealed to prevent development of air bubbles within the headspace. After the groundwater samples were collected, they were placed on ice and maintained at 4°C in a cooler. A chain of custody (COC) form was written and placed along with the samples in the cooler. SOMA's field crew delivered the groundwater samples to Curtis & Tompkins, Ltd. Laboratory in Berkeley, California on October 22, 2003.

### **3.0 Laboratory Analysis**

Curtis & Tompkins, Ltd., a state certified laboratory, analyzed the groundwater samples for TPH-g, BTEX and MtBE. TPH-g was prepared using EPA Method 5030B and measured using EPA Method 8015B. EPA Method 8021B was used to measure BTEX and MtBE concentrations. Detections of MtBE were confirmed



using EPA Method 8260B.

#### **4.0 Results**

The following sections provide the results of the field measurements and laboratory analyses for the October 22, 2003 groundwater monitoring event.

#### **4.1 Field Measurements**

Table 1 presents the calculated groundwater elevations at each monitoring well and riser. The calculated groundwater elevation data was used to evaluate the impact of the French drain and determine the extent of the groundwater extraction capture zone. The new survey was conducted to comply with an Electronically Deliverable Format (EDF) request made by the State Water Resources Control Board (SWRCB) Database.

As shown in Table 1, depths to groundwater in the monitoring wells ranged from 11.91 feet in monitoring well MW-10 to 14.35 feet in monitoring well MW-6. The corresponding groundwater elevations ranged from 24.34 feet in monitoring well MW-12 to 27.27 feet in monitoring well MW-5.

Depths to groundwater in the center, east and west risers were 16.53 feet, 13.85 feet and 13.48 feet, respectively. In the French drain risers the corresponding elevations for the center, east and west risers were 22.82 feet, 26.21 feet and 25.68 feet, respectively.

Table 2 shows the historical groundwater elevations at different groundwater monitoring wells and the French drain risers, as well as, annual and quarterly deviations in groundwater elevations. In general, groundwater elevations in all of the monitoring wells decreased since the previous quarter. The range in deviation of the quarterly groundwater elevation decrease was between 0.08 feet

to 1.45 feet. Variations in groundwater elevations are typically due to seasonal fluctuations. The decrease in elevations noted during this event is most likely caused by the onset of a drier season.

Figure 3 displays the groundwater elevation contour map, depicted in feet, as measured on October 22, 2003. Groundwater flows towards the French drain, throughout the Site, at an approximate gradient of 0.050 feet/feet. The lowest groundwater elevation was measured in the center French drain riser. The groundwater gradient is consistent with the previous quarter and the flow has remained towards the French drain.

The calculated groundwater elevation data was also used to evaluate the impact of the French drain operation. Based on the groundwater elevation contour map shown in Figure 3, it appears that the French drain is providing excellent hydraulic control to prevent the off-site migration of contaminants.

Table 3 summarizes the field measurements of the physical and chemical properties of the groundwater samples collected from the groundwater monitoring wells at the time of sampling. The pH measurements ranged from 6.59 in monitoring well MW-12 to 7.27 in monitoring well MW-8. Temperature measurements of groundwater ranged from 19.40°C in monitoring well MW-11 to 21.80°C in monitoring well MW-7. EC ranged from 560 µS/cm in monitoring well MW-7 to 1,100 µS/cm in monitoring well MW-3.

The groundwater biodegradation parameters for this monitoring event, as well as the previous monitoring events, are shown in Table 4.

As shown in Table 4, DO concentrations were detected in all wells. Detectable DO concentrations ranged from 0.07 mg/L in wells MW-3, MW-11, and MW-12 to 6.45 mg/L in well MW-8. The concentration contour map for DO during the Fourth Quarter 2003 is displayed in Figure 4. As displayed in Figure 4, the highest DO

concentration was detected in monitoring well MW-8 at a level of 6.45 mg/L. In general, DO measurements throughout the Site were at very low concentrations.

DO concentrations detected during this monitoring event were well below the solubility standard of O<sub>2</sub> in water at 19°C to 22°C, which is approximately 8.7 mg/L to 9.3 mg/L. The Site groundwater temperature at the time of sampling was approximately 19.40°C to 21.80°C. Therefore, oxidation of petroleum hydrocarbons could still have occurred in these monitoring wells at these DO readings.

As shown in Table 4, turbidity of groundwater samples ranged from 36.8 NTU in monitoring well MW-2 to 999 NTU in monitoring well MW-1. The maximum allowable equipment (Horiba U-22) tolerance level for turbidity is 999 NTU. The oxidation-reduction potential in groundwater samples ranged from -114 mV in monitoring well MW-3 to +38 mV in monitoring well MW-2. All monitoring wells showed strongly reduced conditions, with the exception of MW-2, MW-4, and MW-10. Oxygen-depleted environments with strongly reduced conditions depict anaerobic processes utilizing alternate electron acceptors, such as nitrate, iron (III) and sulfate, for oxidation of petroleum hydrocarbons (Lovley *et. al.*, 1994). Under strongly reduced conditions and a lack of other terminal electron acceptors, the occurrence of methanogenesis may be possible.

Ferrous iron concentrations were detected in all of the monitoring wells. Detectable ferrous iron concentrations ranged from 0.07 mg/L in well MW-10 to 3.30 mg/L in wells MW-1, MW-3, MW-6, and MW-8. The maximum allowable equipment (Hach Colorimeter Model 890) tolerance level for ferrous iron concentrations is 3.30 mg/L. The presence of ferrous iron in the groundwater indicates the occurrence of biological activities beneath the Site.

Figure 5 shows a contour map of ferrous iron concentrations in the groundwater

as measured during the Fourth Quarter 2003. As shown in Figure 5, the highest ferrous iron concentrations were detected in the vicinity of the USTs in monitoring wells MW-1 and MW-3, the eastern section of the Site in MW-6, which is near the SVE system, and MW-8, which is west of the French drain.

During this monitoring event, nitrate was detected in all of the monitoring wells. Detectable nitrate levels ranged from 2.7 mg/L in well MW-1 to 12 mg/L in well MW-6. Nitrate increased in all of the monitoring wells this quarter from below the minimum allowable equipment (Hach Colorimeter Model 890) tolerance level as observed in the Third Quarter 2003. A contour map of the nitrate concentrations in the groundwater is displayed in Figure 6. As displayed in Figure 6, nitrate was detected in all of the wells, however, at low concentrations throughout the Site.

Sulfate concentrations were below the allowable equipment (Hach Colorimeter Model 890) tolerance range in the groundwater samples collected from MW-1, MW-3, MW-8, MW-10, and MW-12. Sulfate has not been detected in wells MW-1 and MW-3 since Fourth Quarter 2001. Sulfate has not been detected in well MW-12 since Second Quarter 2002. Sulfate-depleted subsurface contaminated environments may reveal a strong demand by microorganisms for a source of terminal electron acceptors for oxidizing contaminant hydrocarbons (Lovley *et. al.*, 1994). The highest sulfate concentration was detected in monitoring well MW-2 at 30 mg/L.

The contour map of sulfate concentrations in the groundwater as measured during the Fourth Quarter 2003 monitoring event is presented in Figure 7. As shown in Figure 7, sulfate concentrations were below the measurable specifications of the equipment in monitoring wells MW-1, MW-3, and MW-8, which are in the vicinity of the USTs and French drain. Sulfate concentrations were also not observed in off-site monitoring wells MW-10 and MW-12. High sulfate concentrations were observed in the northwest corner of the Site in

MW-5, near the pump islands in MW-2, and off-site in well MW-11.

The field notes for the physical, chemical and biodegradation parameters are included in Appendix A.

#### 4.2 Laboratory Analysis

Table 5 presents the results of the laboratory analyses on the groundwater samples collected during the Fourth Quarter 2003 monitoring event. In general, the most impacted monitoring wells, based on the analytical results, for this quarter were MW-1 and MW-3, which are in the vicinity of the USTs, and MW-6, which is near the soil vapor extraction (SVE) system. A high ethylbenzene concentration was also detected in well MW-8.

As shown in Table 5, TPH-g was detected in all of the groundwater samples collected this quarter. Detectable TPH-g levels ranged from 70 µg/L in monitoring well MW-4 to 630,000 µg/L in monitoring well MW-1. The TPH-g concentration detected in well MW-1 may have been misrepresentative due to the presence of heavier hydrocarbons that contributed to the overall analytical result. The laboratory designated the influence of heavier hydrocarbons to the overall analytical result by an "H" flag, see the laboratory report, in Appendix B, for further clarification. High TPH-g concentrations were also detected in MW-3 and MW-6 at 30,000 µg/L and 36,000 µg/L, respectively.

Figure 8 shows a contour map of TPH-g concentrations, at the Site, as analyzed during the Fourth Quarter 2003. As shown in Figure 8, the highest TPH-g concentration was detected in the vicinity of the USTs in well MW-1. High TPH-g concentrations were detected in MW-3, which is in the vicinity of the USTs, and MW-6, which is near the SVE system. Based on the analytical results, TPH-g has migrated to all off-site wells.

As shown in Table 5, toluene was below the laboratory reporting limit in both wells MW-2 and MW-4. All BTEX analytes, were below the laboratory reporting limit in monitoring wells MW-5 and MW-7. All BTEX analytes, with the exception of benzene were below the laboratory reporting limit in MW-11. Both toluene and ethylbenzene were below the laboratory reporting limit in MW-12. The lowest detectable benzene, ethylbenzene, and total xylene concentrations were in MW-2 at 1.9 µg/L, 2.2 µg/L, and 2.2 µg/L, respectively.

As shown in Table 5, the maximum BTEX concentrations, with the exception of benzene, were detected in MW-1. Toluene, ethylbenzene, and total xylenes were detected in MW-1 at 1,900 µg/L, 3,600 µg/L, and 27,700 µg/L, respectively. The toluene concentration detected in well MW-1 may have been misrepresentative due to matrix interferences encountered during the analytical testing. The laboratory designated this matrix interference by a "C" flag, see the laboratory report, in Appendix B, for further clarification. The total xylene concentration detected in MW-1 was several orders of magnitude higher than the next highest concentration of 5,400 µg/L detected in well MW-3. The highest benzene concentration was detected in well MW-3 at 4,400 µg/L. The next highest benzene concentration was detected in well MW-1 at 3,300 µg/L. A high ethylbenzene concentration was also detected in well MW-8 at 2,000 µg/L.

Figure 9 displays the contour map of benzene concentrations in the groundwater collected during the Fourth Quarter 2003. As shown in Figure 9, the highest benzene concentrations were found in MW-1 and MW-3, which are in the vicinity of the USTs. Benzene has migrated to all off-site monitoring wells.

EPA Method 8260B is a more accurate analytical method than EPA Method 8021B. Therefore, to properly determine the MtBE plume and on-site concentrations, the MtBE iso-concentration figure (Figure 10) is contoured using EPA Method 8260B. However, as shown in Table 5, MtBE is presented using

both EPA methods 8021B and 8260B.

MtBE was below the laboratory reporting limit in monitoring wells MW-2, MW-4, MW-6. MtBE, when using EPA Method 8260B, was below the laboratory reporting limit in well MW-11. Detectable MtBE concentrations, when using EPA Method 8260B, ranged from 1.9 µg/L in well MW-5 to 15,000 µg/L in well MW-1. A high MtBE concentration was also detected in MW-3 at 7,400 µg/L.

Figure 10 displays the contour map of MtBE concentrations in the groundwater during the Fourth Quarter 2003, as analyzed using EPA Method 8260B. The elevated level of MtBE found in MW-1 may be attributed to the proximity and down-gradient location of MW-1 to the USTs. In general, with the exception of wells MW-1 and MW-3, MtBE was either at low concentrations or below the laboratory reporting limit throughout the Site.

The laboratory report and COC form for the Fourth Quarter 2003 monitoring event are included in Appendix B.

Table 6 shows the historical groundwater analytical data. The following concentration trends have been observed since the previous monitoring event.

- TPH-g increased significantly in well MW-1, however, the TPH-g analytical result in this well was influenced by the presence of heavier hydrocarbons, (see the laboratory report in Appendix B). TPH-g decreased in wells MW-2, MW-3, MW-11. TPH-g increased slightly in well MW-4 to MW-8, and MW-10. TPH-g remained constant in well MW-12. The analytical results for both MW-5 and MW-12 were influenced by the presence of heavier hydrocarbons.
- In well MW-1 benzene decreased, all other BTEX analytes increased, however, total xylenes increased significantly. All BTEX analytes

decreased in MW-2. In wells MW-3 and MW-6 benzene and toluene both decreased, ethylbenzene and total xylenes both increased. In well MW-4 toluene remained below the laboratory reporting limit, all other BTEX analytes increased slightly.

- In well MW-5 benzene and total xylenes remained below the laboratory reporting limit, toluene and ethylbenzene decreased to a level below the laboratory reporting limit. In well MW-7 benzene and ethylbenzene remained below the laboratory reporting limit, toluene and total xylenes decreased to a level below the laboratory reporting limit. In wells MW-8 and MW-10 all BTEX analytes increased.
- In well MW-11 all BTEX analytes decreased. In well MW-11 toluene, ethylbenzene, and total xylenes decreased to a level below the laboratory reporting limit. In well MW-12 both benzene and total xylenes decreased, ethylbenzene remained below the laboratory reporting limit, and toluene decreased to a level below the laboratory reporting limit.
- MtBE, when using EPA Method 8260B, decreased in wells MW-1, MW-3, MW-7, MW-8, and MW-12. MtBE increased slightly in MW-5 and MW-10. MtBE has remained below the laboratory reporting limit in MW-2, MW-4, MW-6, and MW-11.

## **5.0 Groundwater Treatment System Operation**

The treatment system began operating on December 9, 1999. Since that time, 2,073,060 gallons of groundwater has been treated and discharged, under the existing discharge permit (as of October 13, 2003), into the East Bay Municipal Utility District's (EBMUD's) sewer system.

As required by the discharge permit and the ACEHS, sampling of the groundwater treatment system has been performed on a routine basis. The effluent sampling and maintenance of the system was performed on a weekly basis from the start of the system's operation to the end of July 2000. In August



2000, maintenance of the system continued weekly, but sampling was performed on a monthly basis. The results from the first effluent testing were used to acquire a discharge permit from EBMUD.

The effluent passing both Granulated Active Carbon (GAC) units is regularly sampled for chemical analysis. The schedule for refurbishing the GAC units is based on the analytical results of the samples. The first GAC unit was refurbished as soon as traces of chemicals broke through the unit. The second GAC unit is serving as a polishing unit and is always kept highly active. This procedure ensures that the effluent discharging into the EBMUD sewer are in compliance with our permit discharge requirements. A schematic diagram of the groundwater remediation system is displayed in Figure 11.

Table 7 presents the total volume and chemical composition of GAC-1 and effluent treated at the Site. Table 7 shows that all the effluent samples have maintained in compliance with the permit, with the exception of the October 2002 sampling event. The analytical data for the October 2002 sampling period was erroneous. The high non-detectable concentration levels are due to a high dilution factor caused by the presence of 2-Butanone. During the laboratory testing 2-Butanone was detected at a high concentration of 200,000  $\mu\text{g/L}$  in only the effluent sample. The influent sample concentration for 2-Butanone was only 20  $\mu\text{g/L}$ . Based on the fact that 2-Butanone has not been detected in any of the effluent samples since December 1999, and because there was a very low influent concentration, the sample results shown are erroneous and are only used to depict that sampling was conducted in October 2002. The high TPH-g concentration for this sample may not be representative due to the sample exhibiting unknown peaks, and the sample also exhibiting a fuel pattern, which did not resemble the standard. The laboratory designated these items by "Y" and "Z" flags. However, the system was turned off upon detection of these concentrations and a carbon change-out was performed. During this carbon

change-out both the carbon in the 2,000-pound carbon vessel and the carbon in the 55-gallon vessel (GAC-2) were removed and replaced. In future carbon change-out cycles, both GAC-1 and GAC-2 will be replaced with fresh carbon. The laboratory reports for the treatment system are included as Appendix C of this report.

The cumulative weight of TPH-g and MtBE extracted from the groundwater since the installation of the treatment system is displayed in Figure 12. As Figure 12 shows, an approximate total of 137.14 pounds of TPH-g and 75.52 pounds of MtBE have been removed during the operation of the treatment system, from initial start-up to October 13, 2003.

## **6.0 Vapor Extraction System Operation**

The Vapor Extraction System (VES) consists of 6 vapor extraction wells, a de-moisturizing unit, a blower, and four drums of GAC filters. The VES began operating on July 24, 2000. Since then, during its working days, the system has extracted and treated more than 3,000,000 liters per day of soil gas. When the system first began to operate, the influent had a concentration of 394 parts per million on volumetric basis (ppmv) of petroleum hydrocarbons. However, it gradually decreased to 68 ppmv after 31 days of operation. On January 4, 2001, due to extremely low influent concentrations (i.e., less than 10 ppm of hydrocarbons), the soil vapor extraction (SVE) system was turned off.

The following services were performed on the SVE system during 2001. On October 23, 2001, the system was inspected for operation and it was determined that all four GACs were not in good enough condition to re-start the system. On October 25, 2001, one of the four GACs was replaced with a new one, and on October 29, 2001 the three remaining GAC units were replaced. The system was then under continuous operation and extracted over 80 cubic feet per minute (CFM) of contaminated air from the vadose zone. On November 21, 2001 due to

the low concentration of contaminants in the influent (i.e., less than 10 ppmv of hydrocarbons) the system was turned off.

The following services were performed on the SVE system during 2002. In February 2002, the system was inspected for operation and it was determined that the blower was not functioning. The blower was repaired and installed on February 15, 2002. On the same day, the four old GACs were replaced with four new ones and the system was turned on. The system was shut down on March 7, 2002, due to low influent readings caused by the saturated soil conditions on-site. The system was turned back on June 12, 2002.

On November 6, 2002, SOMA met a representative of the Bay Area Air Quality Management District (BAAQMD) on-site. During this time the 2002 yearly maintenance record was shown to the BAAQMD representative. The SVE system was determined to be in compliance with the BAAQMD operating permit. At the request of BAAQMD, on November 7, 2002, an air sample was collected from the influent and effluent of the system and sent to Curtis & Tompkins, Ltd. Laboratory in Berkeley, California for analysis. The sample results are in the Fourth Quarter 2002 monitoring report. The system was turned off November 22, 2002, due to the onset of a wetter season. The system became operational again on May 9, 2003.

In August 2003, in order to determine the efficiency of the SVE system, SOMA tested both influent and effluent concentrations. The maximum SVE discharge limit to the ambient air is 10 ppmv. Based on the analytical results, collected in August 2003, the system is in compliance. The analytical results are presented in Appendix D.

The total mass of petroleum hydrocarbons removed by the SVE system is shown in Table 8. As of October 29, 2003, the SVE system removed 413.23 pounds of

## 1.0 Introduction

This report has been prepared by SOMA Environmental Engineering, Inc. (SOMA) on behalf of Mr. Abolghassem Razi, the owner of Tony's Express Auto Service, which is located at 3609 International Boulevard at the intersection of 36<sup>th</sup> Avenue in Oakland, California (the "Site"), as shown in Figure 1.

The Site is located in an area where the surrounding properties are primarily commercial businesses and residential housing. The Site currently houses a gasoline service station and convenience store. During the Third Quarter 2002, the station was remodeled and several hydraulic hoists were removed. The station no longer has an auto repair facility. Figure 2 shows the location of the main service station, dispenser islands, underground storage tanks (USTs), the on-site and off-site groundwater monitoring wells, and neighboring properties.

This report summarizes the results of the Fourth Quarter 2003 groundwater monitoring event conducted on October 22, 2003 at the Site. Included in this report are the bioattenuation parameters measured in the field for each groundwater sample. Also, included in this report are the results of the laboratory analysis of the groundwater samples, which were analyzed for:

- Total petroleum hydrocarbons as gasoline (TPH-g)
- Benzene, toluene, ethylbenzene, total xylenes (collectively referred to as BTEX)
- Methyl tertiary Butyl Ether (MtBE)

These activities were performed in accordance with the general guidelines of the Regional Water Quality Control Board (RWQCB) and the Alameda County Environmental Health Services (ACEHS).

This report also describes the operation of the groundwater extraction system

installed by SOMA in December 1999, as well as the operation of the vapor extraction system, which was installed by SOMA in July 2000. The locations of the groundwater extraction system and the vapor extraction system are displayed in Figure 2.

## 1.1 Background

The environmental investigation at the subject property began in 1992, when Mr. Razi, the property owner, retained Soil Tech Engineering, Inc. (STE) of San Jose to conduct a limited subsurface investigation. The purpose of STE's investigation was to determine whether or not the soil near the product lines and USTs had been impacted with petroleum hydrocarbons.

In July 1993, STE removed one single-walled 10,000-gallon gasoline tank and one single-walled 6,000-gallon gasoline tank along with a 550-gallon waste oil tank from the Site. Three double-walled USTs replaced these tanks. Currently, there is one 10,000-gallon double-walled gasoline tank and two 6,000-gallon double-walled gasoline tanks beneath the Site. The locations of the USTs are shown in Figure 2.

In December 1997, Mr. Razi retained Western Geo-Engineers (WEGE) to conduct additional investigations and perform groundwater monitoring on a quarterly basis. The results of the WEGE groundwater monitoring events indicated elevated levels of petroleum hydrocarbons and MtBE in the groundwater.

In April 1999, Mr. Razi retained SOMA to conduct groundwater monitoring, risk-based corrective action (RBCA), a corrective action plan (CAP), as well as soil and groundwater remediation at the Site. The results of the RBCA study indicated that the Site is a high-risk groundwater site; therefore, the soil and groundwater in on and off-site areas warranted remedial actions. The source of

the petroleum hydrocarbons in the groundwater was believed to have been the former USTs, which were used to store gasoline at the Site. The results of the CAP study indicated that the installation of a French drain combined with a vapor extraction system would be the most cost effective alternative for the Site's remediation.

In late August 1999, SOMA installed a French drain and groundwater treatment system to prevent further migration of the chemically impacted groundwater. This treatment system has been in operation since early December 1999.

In July 2000, following approval from the ACEHS, SOMA installed a vapor extraction system as recommended in our CAP document, dated July 1, 1999.

In January 2002, Environmental Fabric removed old product dispensers and installed new ones in the fuel islands.

On July 25, 2003, an additional on-site extraction pump was installed by SOMA, in the western French drain riser. The extraction pump was installed to create a capture zone in the region around the USTs and to contain off-site migration in the southwestern corner of the Site.

## **1.2 Site Hydrogeology**

Previous investigations have shown that groundwater is encountered at depths of approximately 10 to 11 feet beneath the Site. Figure 2 shows the location of the on-site and off-site groundwater monitoring wells. Prior to the operation of the French drain, groundwater was found to flow from the north to the south with an average gradient of 0.014 feet/feet. When the groundwater extraction system is in operation, the groundwater flows towards the French drain. The capture zone of the drain has extended down-gradient past well MW-10.

Based on the results of a pumping test conducted by SOMA, the hydraulic conductivity of the saturated sediments ranges from 1.5 to 18.3 feet per day. Assuming that the effective porosity of the saturated sediments is 0.35, the groundwater flow velocity ranges from 22 to 267 feet per year.

## **2.0 Field Activities**

On October 22, 2003, SOMA's field crew conducted a groundwater monitoring event in accordance with the procedures and guidelines of the RWQCB, San Francisco Bay Region. During this groundwater monitoring event, a total of eight on-site monitoring wells (MW-1 to MW-8), three off-site monitoring wells (MW-10 and MW-12), and three on-site French drain risers were measured for depth to groundwater.

The depth to groundwater at each monitoring well and riser was measured from the top of the casing to the nearest 0.01 foot using an electric sounder. The top of the casing elevation data and the depth to groundwater at each monitoring well and riser were used to calculate the groundwater elevation.

Kier and Wright Civil Engineers Surveyors, Inc. surveyed the wells and risers on August 9, 2002. At the time of the survey, monitoring well MW-11 could not be accessed due to obstacles preventing the proper use of surveying equipment, therefore, this well was not surveyed. The top of casing elevations were based on the survey data measured at this time. The elevation data was based on an assumed datum of 14.20 NAVD88. The survey data measured by Kier and Wright is presented in Appendix A.

Prior to the collection of samples, each well was purged using a battery operated 2-inch diameter pump (Model ES-60 DC). During the purging activities, in order to obtain accurate measurements of groundwater parameters and especially to avoid the intrusion of oxygen from ambient air into the groundwater samples,

petroleum hydrocarbons from the vadose zone beneath the Site. The operation of the SVE will help reduce the increasing hydrocarbon concentrations found in the vicinity of MW-6.

## **7.0 Conclusions and Recommendations**

The findings of the Fourth Quarter 2003 groundwater monitoring event can be summarized as follows:

1. The groundwater remediation system is providing excellent hydraulic control to prevent further migration of contaminants. The lowest groundwater elevation was measured in the center French drain riser at 22.82 feet. The groundwater gradient is approximately 0.050 feet/foot towards the center riser.
2. Biodegradation parameters were collected during this monitoring event. In general, DO measurements throughout the Site were at very low concentrations. The highest DO concentration was detected in monitoring well MW-8 at 6.45 mg/L.
3. The presence of ferrous iron in the groundwater is indicative of biological activities beneath the Site. Ferrous iron concentrations were detected in all of the monitoring wells. The highest ferrous iron concentrations were detected in the vicinity of the USTs in monitoring wells MW-1 and MW-3, and in the eastern section of the Site in MW-6, and near the French drain in well MW-8.
4. The presence of high ferrous iron concentrations in combination with low concentrations of other electron receptors, such as DO and nitrate is indicative of anaerobic biodegradation beneath the Site.



5. During this monitoring event, nitrate was detected in all of the monitoring wells. Nitrate concentrations have increased in all of the monitoring wells, since the previous quarter. However, nitrate concentrations are still at low levels throughout the Site. Detectable nitrate levels ranged from 2.7 mg/L in well MW-1 to 12 mg/L in well MW-6.
6. Sulfate depleted in wells MW-1 and MW-3, which are located in the vicinity of the USTs, well MW-8, which is located near the French drain, and off-site wells MW-10 and MW-12. Sulfate has not been detected in wells MW-1 and MW-3, since Fourth Quarter 2001. Sulfate has not been detected in well MW-12, since Second Quarter 2002.
7. The presence of ferrous iron in combination with low or depleted levels of sulfate in the subsurface strongly suggests that biodegradation is occurring beneath the Site.
8. The highest TPH-g concentration was detected in well MW-1 at 630,000 µg/L. However, the TPH-g concentration detected in well MW-1 may have been misrepresentative due to the presence of heavier hydrocarbons that contributed to the overall analytical result.
9. The highest toluene, ethylbenzene, and total xylenes were detected in MW-1 at 1,900 µg/L, 3,600 µg/L, and 27,700 µg/L, respectively. The highest benzene concentration was detected in well MW-3 at 4,400 µg/L. The highest MtBE concentration was detected in well MW-1 at 15,000 µg/L.
10. Since the previous monitoring event, the following trends were observed in wells MW-1, MW-3, and MW-6, the most impacted wells: TPH-g decreased in monitoring well MW-3. Benzene decreased in wells MW-1,

MW-3, and MW-6. MtBE decreased in wells MW-1 and MW-3, and remained below the laboratory reporting limit in well MW-6.

11. The treatment system began operating on December 9, 1999. Since that time approximately 2,073,060 gallons of groundwater has been treated and discharged, under the existing discharge permit (as of October 13, 2003), into EBMUD's sewer system.
12. All effluent samples of the groundwater treatment system have maintained in compliance with the permit. All contaminant concentrations have remained below the allowable discharge requirements, with the exception of the October 2002 sampling event, where the TPH-g concentrations were misrepresented, as discussed in Section 5.0.
13. Approximately 137.14 pounds of TPH-g and 75.52 pounds of MtBE have been removed during the operation of the treatment system, from initial start-up to October 13, 2003.
14. To more effectively remediate the area in the vicinity of MW-1, on July 25, 2003, SOMA installed an additional on-site extraction pump in the western French drain riser. Further monitoring events should determine the effectiveness of this additional on-site extraction pump.
15. As of October 29, 2003, the SVE system has removed 413.23 pounds of petroleum hydrocarbons from the vadose zone beneath the Site. The operation of the SVE system is based on seasonal fluctuations occurring at the Site. The system is turned off during wetter periods of the year and operational during drier periods.
16. To test the efficiency of the SVE system, SOMA collected a grab air sample from the system in August 2003. The SVE system is in compliance with the allowable discharge limit of 10 ppmv.

## 8.0 Report Limitations

This report is the summary of work done by SOMA including observations and descriptions of the Site's conditions. It includes the analytical results produced by Curtis & Tompkins Laboratories as well as the summaries of data produced by previous environmental consultants. The number and location of the wells were selected to provide the required information, but may not be completely representative of the entire site's conditions. All conclusions and recommendations are based on the results of the laboratory analysis. Conclusions beyond those specifically stated in this document should not be inferred from this report.

SOMA warrants that the services provided were done in accordance with the generally accepted practices in the environmental engineering and consulting field at the time of this sampling.

## 9.0 References

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# TABLES

**Table 1**  
**Groundwater Elevation Data**  
**October 22, 2003**  
**3609 International Boulevard, Oakland, California**

Monitoring Well	Top of Casing Elevation <sup>1</sup> (feet)	Depth of Well (feet)	Depth to Groundwater (feet)	Groundwater Elevation (feet)
MW-1	40.11	30.00	13.89	26.22
MW-2	40.71	31.00	13.65	27.06
MW-3	40.91	31.50	14.29	26.62
MW-4	40.01	26.00	13.72	26.29
MW-5	41.16	26.50	13.89	27.27
MW-6	40.92	25.00	14.35	26.57
MW-7	39.94	26.00	13.10	26.84
MW-8	39.38	27.00	13.09	26.29
MW-10	36.71	23.40	11.91	24.80
MW-11	NS	25.40	13.38	NC
MW-12	36.84	30.00	12.50	24.34
<b>French Drain Risers</b>				
F.D. Center	39.35		16.53	22.82
F.D. East	40.06		13.85	26.21
F.D. West	39.16		13.48	25.68

Notes:

NC: Not calculated because top of casing elevation data was not available.

NS: Not surveyed. MW-11 was not surveyed due to obstacles in vicinity of the well.

F.D. Center : French drain center riser.

F.D. East : French drain east riser.

F.D. West : French drain west riser.

<sup>1</sup> Top of casing elevations were re-surveyed to comply with the EDF requirements for electronic reporting of data to the State Water Resources Control Board Database on



**Table 2**  
**Historical Groundwater Elevation Data**  
**3609 International Boulevard, Oakland, California**

Date	Monitoring Wells											French Drain		
	MW-1	MW-2	MW-3	MW-4	MW-5	MW-6	MW-7	MW-8	MW-10	MW-11	MW-12	FDC	FDE	FDW
Oct-03	26.22	27.06	26.62	26.29	27.27	26.57	26.84	26.29	24.80	NC	24.34	22.82	26.21	25.68
Jul-03	27.67	28.48	27.97	27.57	28.71	27.94	28.22	27.46	25.95	NC	25.40	22.90	26.96	27.04
May-03	30.40	31.54	30.90	30.23	31.92	31.00	32.25	29.90	28.41	NC	27.60	23.15	28.27	28.32
Jan-03	30.38	32.05	31.12	30.22	32.43	31.14	31.49	29.90	28.48	NC	27.61	24.17	26.93	27.03
Oct-02	24.61	26.48	25.93	25.67	26.65	25.99	26.20	25.58	24.17	NM	23.71	25.61	25.53	25.66
Jul-02 <sup>1</sup>	27.31	28.01	27.66	27.39	28.22	27.64	27.79	27.59	25.78	NM	25.91	27.42	27.25	27.37
May-02	87.13	87.99	86.50	87.04	88.35	87.44	87.70	86.93	85.05	84.95	84.58	86.74	86.72	86.76
Feb-02	87.88	89.59	87.77	87.88	90.00	88.85	88.92	87.37	86.26	86.25	86.06	80.36	84.72	84.12
Nov-01	83.98	85.15	83.46	84.17	85.32	NM	85.00	84.06	82.48	82.46	82.08	79.28	83.98	82.59
Aug-01	84.48	85.05	83.68	84.05	85.25	NM	84.81	84.28	82.90	82.90	82.60	83.80	84.21	83.82
May-01	86.49	87.58	85.97	86.35	87.92	86.95	87.23	86.10	84.74	84.79	84.32	81.25	84.85	83.40
Mar-01	89.03	90.03	88.35	88.61	90.37	89.28	89.79	88.50	86.47	86.33	85.80	87.71	88.76	86.78
Nov-00	84.79	85.98	84.38	84.80	85.49	85.37	85.88	84.70	83.19	83.39	82.79	80.25	85.15	81.40
Aug-00	84.63	85.55	84.05	84.5	85.82	84.99	85.2	84.38	83.02	81.07	82.77	81.40	NM	NM
May-00	86.50	87.70	86.10	86.39	88.01	87.07	87.31	86.10	85.09	82.14	84.36	84.69	84.68	84.70
Feb-00	86.79	88.73	86.83	86.60	89.19	87.82	88.33	86.40	85.29	82.34	84.64	81.70	NM	NM
Nov-99	83.54	84.48	83.08	83.75	84.74	84.02	84.58	83.60	82.04	82.09	81.64	NA	NA	NA
Aug-99	84.64	85.08	83.93	84.65	85.49	84.87	85.03	84.50	82.94	83.19	NA	NA	NA	NA
Jun-99	86.89	87.34	85.98	86.55	87.54	86.87	87.13	86.45	84.59	84.44	NA	NA	NA	NA
Mar-99	88.08	90.98	89.34	89.39	91.31	90.37	90.83	89.67	87.24	87.13	NA	NA	NA	NA
Dec-98	86.89	87.64	86.23	86.72	87.84	87.17	87.31	86.50	84.35	84.36	NA	NA	NA	NA
Sep-98	84.41	85.00	83.10	84.21	85.22	84.67	84.74	84.23	82.61	82.70	NA	NA	NA	NA
Dec-97	88.69	89.54	NM	88.42	89.89	89.47	89.18	88.30	85.76	85.54	NA	NA	NA	NA
Apr-97	86.85	87.18	86.05	86.62	87.69	87.01	84.88	84.30	84.47	84.47	NA	NA	NA	NA
Dec-96	86.32	86.91	85.76	86.27	87.56	86.73	86.86	86.12	84.10	83.95	NA	NA	NA	NA
Apr-96	89.70	90.45	89.02	89.50	90.80	90.01	90.08	89.27	NA	NA	NA	NA	NA	NA
Jan-96	87.92	88.65	87.23	87.74	89.01	88.22	88.26	87.46	NA	NA	NA	NA	NA	NA
Oct-95	84.70	85.16	84.87	NA	85.47	84.83	84.88	84.39	NA	NA	NA	NA	NA	NA
Jun-95	88.46	88.99	87.53	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mar-95	89.92	90.90	89.09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dec-94	88.67	89.98	87.99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Oct-94	82.60	83.22	81.99	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Change in GW elevation

Annual	-4.16	-4.99	-4.50	-3.93	-5.16	-4.57	-4.65	-3.61	-3.68		-3.27	-1.35	-0.72	-1.35
Quarter	-1.45	-1.42	-1.35	-1.28	-1.44	-1.37	-1.38	-1.17	-1.15		-1.06	-0.08	-0.75	-1.36

Notes:

<sup>1</sup>Top of casing elevations were re-surveyed to comply with the EDF requirements for electronic reporting of data to the State Water Resources Control Board

NA: Not Applicable, Well/Drain did not exist at time of sampling

NC: Not calculated. No top of casing elevation was available for MW-11.

NM: Not Measured

FDC: French drain center riser.

FDE: French drain east riser.

FDW: French drain west riser.

**Table 3**  
**Field Measurements of Physical and Chemical Properties**  
**of Groundwater at Time of Sampling**  
**October 22, 2003**  
**3609 International Blvd., Oakland, CA**

<b>Monitoring Well</b>	<b>pH</b>	<b>Temp (°C)</b>	<b>EC (uS/cm)</b>
MW-1	7.16	21.50	755
MW-2	7.07	20.70	617
MW-3	7.01	21.00	1100
MW-4	7.01	19.50	584
MW-5	6.87	21.40	687
MW-6	7.05	20.00	616
MW-7	7.08	21.80	560
MW-8	7.27	20.90	718
MW-10	6.75	20.80	644
MW-11	7.07	19.40	627
MW-12	6.59	20.20	655

**Table 4**  
**Groundwater Biodegradation Parameters**  
**3609 International Boulevard, Oakland, California**

Well	Date	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Redox Potential (mV)	Ferrous Iron (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)
MW-1	October 22, 2003	1.96	999.0	-82	3.30	2.7	0
	July 24, 2003	0.43	217.0	-107	3.30	0.0	0
	May 1, 2003	0.42	257.0	-78	2.26	0.0	0
	January 16, 2003	7.64	87.5	-76	3.30	3.2	0
	October 30, 2002	0.00	87.2	-97	3.30	0.9	0
	July 30, 2002	2.37	24.8	-102	2.13	0.0	0
	May 7, 2002	0.00	287	-81	3.09	0.0	0
	February 21, 2002	0.00	153	-16	3.06	0.0	0
	November 19, 2001	0.36	17.2	-54	1.89	0.6	41
	August 8, 2001	1.71	200	-35	2.18	0.0	23
	May 22, 2001	1.36	40.9	32.5	0.34	0.0	21
	March 13, 2001	0.53	66	-4.7	0.50	4.4	80
	November 2, 2000	0.56	18	-39.4	1.14	0.0	33
	August 9, 2000	0.32	219	-40	1.70	0.0	0
	May 31, 2000	0.30	30	-37	0.57	2.8	0
	February 7, 2000	0.77	NM	-74	3.30	0.0	1
	November 9, 1999	0.20	NM	NM	5.10	0.0	26
	August 23, 1999	1.40	NM	NM	2.67	0.0	8
	June 10, 1999	0.14	NM	NM	3.17	0	1
	December 30, 1997	0.50	NM	NM	3.04	<0.1	<1
MW-2	October 22, 2003	0.46	36.8	38	0.34	5.7	30.0
	July 24, 2003	0.00	56.2	122	0.00	0.0	23.0
	May 1, 2003	0.67	83.3	117	0.15	2.1	32.0
	January 16, 2003	3.39	76.1	174	0.58	0.0	39.0
	October 30, 2002	0.87	15.9	85	0.80	10.6	31.0
	July 30, 2002	0.37	111.0	57	0.43	0.0	50.0
	May 7, 2002	0.00	65.1	-46	0.64	0.6	35.0
	February 21, 2002	1.46	41	131	0.36	0.8	45.0
	November 19, 2001	0.78	105	13	1.18	0.0	33.0
	August 8, 2001	2.03	0	160	0.09	7.4	51.0
	May 22, 2001	0.80	160	274	0.71	0.0	25.0
	March 13, 2001	0.89	24.15	117.9	0.10	6.8	80.0
	November 2, 2000	1.35	ND	111	0.69	0.0	7.9
	August 9, 2000	0.76	1,000	-74	0.72	5.4	0.0
	May 31, 2000	0.80	30.9	-55	0.18	2.5	54.0
	February 7, 2000	1.12	NM	-20	0.15	6.2	55.0
	November 9, 1999	0.80	NM	NM	1.00	0.9	55.0
	August 23, 1999	0.70	NM	NM	0.62	1.0	60.0
	June 10, 1999	0.44	NM	NM	0.55	0.7	40.0
	June 30, 1998	3.20	NM	NM	0.50	<0.1	14.0
December 30, 1997	<0.1	NM	NM	3.35	<0.1	<1	

**Table 4**  
**Groundwater Biodegradation Parameters**  
**3609 International Boulevard, Oakland, California**

Well	Date	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Redox Potential (mV)	Ferrous Iron (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)
MW-3	October 22, 2003	0.07	151.0	-114	3.30	6.1	0
	July 24, 2003	0.00	52.3	-128	3.30	0.0	0
	May 1, 2003	0.38	40.0	-108	3.30	1.7	0
	January 16, 2003	3.56	82.9	-129	3.30	1.4	0
	October 30, 2002	0.00	0.2	-116	3.30	0.0	0
	July 30, 2002	0.31	40.1	-125	3.30	0.0	0
	May 7, 2002	0.00	218	-148	50	0	0
	February 21, 2002	0	0.3	-81	6.80	0	0
	November 19, 2001	NA	NA	NA	NA	NA	NA
	August 8, 2001	1.17	28	-54	7.00	0.7	11
	May 22, 2001	0.08	98	-32	6.72	0.2	16
	March 13, 2001	0.62	26.91	-60	2.66	0.0	0
	November 2, 2000	0.83	4,816	-94	4.10	0.0	28
	August 9, 2000	0.40	123	-72	6.10	0.0	0
	May 31, 2000	0.45	188	-117	7.80	0.0	4
	February 7, 2000	0.70	NM	-82	3.60	0.0	140
	November 9, 1999	0.61	NM	NM	3.50	0.0	0
	August 23, 1999	0.80	NM	NM	3.90	0.0	0
	June 10, 1999	0.42	NM	NM	3.10	0.0	0
	June 30, 1998	2.00	NM	NM	0.37	0.1	77
MW-4	October 22, 2003	0.25	45.5	29	0.09	7.1	18
	July 24, 2003	0.00	183.0	128	0.00	0.0	8
	May 1, 2003	0.51	40.0	89	0.08	5.3	26
	January 16, 2003	3.83	15.4	113	0.04	5.9	26
	October 30, 2002	0.63	0.0	-43	1.15	4.3	19
	July 30, 2002	4.47	6.3	-34	0.16	0.7	38
	May 7, 2002	0.00	9.7	-26	1.05	0.0	30
	February 21, 2002	1.12	707	-26	3.90	0.0	4
	November 19, 2001	0.56	58.7	-108	3.20	0.0	37
	August 8, 2001	1.54	320	320	0.09	6.0	30
	May 22, 2001	1.27	50	193.9	0.47	0.1	31
	March 13, 2001	0.72	190	9.4	0.51	3.2	48
	November 2, 2000	0.60	ND	-39	0.00	4.5	45
	August 9, 2000	0.46	83	-50	0.32	1.0	14
	May 31, 2000	0.50	26.8	-40	0.25	0.5	40
	February 7, 2000	1.30	NM	-31	1.56	0.0	1
	November 9, 1999	0.12	NM	NM	0.99	0.5	23
	August 23, 1999	0.15	NM	NM	0.67	0.5	28
	June 10, 1999	0.15	NM	NM	0.81	0.4	10
	June 30, 1998	1.30	NM	NM	0.93	0.9	7
December 30, 1997	<0.1	NM	NM	0.39	4.5	42	
MW-5	July 24, 2003	0.30	70.1	-15	1.00	10.4	27
	July 24, 2003	0.00	27.4	-39	0.25	0.0	30
	May 1, 2003	0.09	16.3	2	0.47	56.0	1
	January 16, 2003	4.58	8.9	-16	0.74	4.5	51
	October 30, 2002	0.00	0.0	-54	0.85	7.9	27
	July 30, 2002	0.37	27.5	-43	0.28	0.8	38
	May 7, 2002	0.00	45	-23	0.64	7.2	54
	February 21, 2002	2.65	34.2	104	0.69	0.0	67
	November 19, 2001	1.10	8.5	-93	1.05	3.5	27
	August 8, 2001	1.35	300	103	0.73	0.2	37
	May 22, 2001	1.20	593	167	1.10	14.8	13
	March 13, 2001	1.01	35.36	34.2	0.33	1.0	45
	November 2, 2000	0.56	ND	49	1.02	6.5	31
	August 9, 2000	1.97	490	80	0.00	0.0	26
	May 31, 2000	0.48	27.2	-25	0.35	0.0	50
	February 7, 2000	0.90	NM	18	0.64	0.0	47
	November 9, 1999	0.27	NM	NM	0.72	2.0	32
	August 23, 1999	0.75	NM	NM	1.19	2.4	45
	June 10, 1999	0.25	NM	NM	0.34	2.5	33
	June 30, 1998	0.60	NM	NM	0.50	1.6	6
December 30, 1997	<0.1	NM	NM	0.94	0.3	18	

**Table 4**  
**Groundwater Biodegradation Parameters**  
**3609 International Boulevard, Oakland, California**

Well	Date	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Redox Potential (mV)	Ferrous Iron (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)
MW-5	October 22, 2003	0.99	47.2	-15	3.30	12.0	3
	July 24, 2003	0.03	260.0	-69	3.30	0.0	0
	May 1, 2003	0.58	470.0	-66	2.29	0.0	13
	January 16, 2003	3.71	99.7	-70	2.78	0.0	25
	October 30, 2002	NM	NM	NM	0.95	0.0	0
	July 30, 2002	1.39	127.0	-58	3.30	11.0	36
	May 7, 2002	0.00	263	-110	2.25	0.0	23
	February 21, 2002	0.54	149	-40	6.20	0.0	41
	November 19, 2001	NA	NA	NA	NA	NA	NA
	August 8, 2001	NA	NA	NA	NA	NA	NA
	May 22, 2001	0.12	413	-9.5	1.30	0.0	17
	March 13, 2001	0.75	83	-42.1	2.63	1.3	79
	November 2, 2000	0.80	618	-34	2.65	0.0	16
	August 9, 2000	0.65	1,000	-33	4.10	2.5	0
	May 31, 2000	0.72	111	-62	3.27	0.0	0
	February 7, 2000	1.25	NM	-51	3.02	0.0	0
	November 9, 1999	0.22	NM	NM	7.00	0.0	0
	August 23, 1999	0.55	NM	NM	3.30	0.0	9
	June 10, 1999	0.61	NM	NM	2.52	0.0	23
	June 30, 1998	2.50	NM	NM	0.40	0.7	4
December 30, 1997	<0.1	NM	NM	0.30	<0.1	5	
MW-7	October 22, 2003	0.24	127.0	-58	1.56	8.8	13
	July 24, 2003	2.83	91.8	-77	0.61	0.0	2
	May 1, 2003	0.69	36.0	-34	1.06	0.7	9
	January 16, 2003	3.79	110.0	-33	0.35	0.0	17
	October 30, 2002	7.90	23.5	-86	0.97	0.7	0
	July 30, 2002	1.15	16.6	-64	0.68	0.0	28
	May 7, 2002	0.00	531	-62	1.79	0.0	20
	February 21, 2002	0.26	118	-6	1.77	0.0	0
	November 19, 2001	0.98	8.9	-14	1.14	0.0	21
	August 8, 2001	1.62	140	-18	0.51	0.0	13
	May 22, 2001	1.71	49.8	56	0.79	0.0	12
	March 13, 2001	0.79	110	-10.4	3.30	0.0	40
	November 2, 2000	0.58	ND	-11.6	0.27	3.5	30
	August 9, 2000	0.26	131	-33	0.95	0.0	17
	May 31, 2000	0.30	34.9	-52	0.72	0.0	28
	February 7, 2000	0.91	NM	-19	0.53	0.0	41
	November 9, 1999	0.14	NM	NM	0.99	0.0	25
	August 23, 1999	0.65	NM	NM	1.40	0.0	20
	June 10, 1999	0.15	NM	NM	0.19	0.0	22
	June 30, 1998	1.00	NM	NM	0.78	0.5	4
December 30, 1997	1.20	NM	NM	0.23	0.2	32	

**Table 4**  
**Groundwater Biodegradation Parameters**  
**3609 International Boulevard, Oakland, California**

Well	Date	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Redox Potential (mV)	Ferrous Iron (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)
MW-8	October 22, 2003	6.45	968.0	-93	3.30	6.3	0
	July 24, 2003	0.00	610.0	-129	1.88	0.0	0
	May 1, 2003	0.73	193.0	-100	1.90	0.0	0
	January 16, 2003	3.21	145.0	-115	3.30	0.5	0
	October 30, 2002	0.00	<999	-132	3.30	2.6	40
	July 30, 2002	0.18	157.0	-124	1.38	0.0	1
	May 7, 2002	0.00	308	-113	0.80	0.0	2
	February 21, 2002	0.00	567	-64	3.08	0.0	0
	November 19, 2001	0.46	53.5	-142	>3.3	0.0	1
	August 8, 2001	1.24	990	-62	1.50	0.8	25
	May 22, 2001	1.16	179	-8.8	3.30	0.0	5
	March 13, 2001	0.48	110	-76	3.30	2.1	12
	November 2, 2000	-	350	-104.9	7.33	-	16
	August 9, 2000	0.50	94	-91	3.30	0.0	7
	May 31, 2000	0.45	13	-95	3.30	0.0	0
	February 7, 2000	0.65	NM	-90	3.46	0.0	0
	November 9, 1999	0.38	NM	NM	8.90	0.0	0
	August 23, 1999	0.20	NM	NM	8.20	0.0	13
	June 10, 1999	0.10	NM	NM	4.70	0.0	0
	June 30, 1998	1.30	NM	NM	2.82	<0.1	3
December 30, 1997	2.50	NM	NM	3.35	0.1	<1	
MW-10	October 22, 2003	0.22	76.1	24	0.07	5.7	0
	July 24, 2003	0.00	40.4	1	0.00	0.0	1
	May 1, 2003	1.74	11.2	16	0.00	1.3	10
	January 16, 2003	4.83	23.0	-8	0.25	3.1	1
	October 30, 2002	0.47	0.0	-19	0.66	3.7	14
	July 30, 2002	0.09	12.7	34	0.18	0.0	25
	May 7, 2002	0.00	123	19	0.00	0.0	18
	February 21, 2002	0.15	12.6	85	0.49	0.0	4
	November 19, 2001	0.89	3	45	0.99	-2.7	12
	August 8, 2001	1.56	19.6	52	0.00	0.0	11
	May 22, 2001	1.76	19.56	105	0.10	1.7	13
	March 13, 2001	0.65	32.11	28	0.23	0.0	0
	November 2, 2000	0.53	ND	26.7	0.42	1.3	13
	August 9, 2000	0.45	116	19	0.40	0.0	0
	May 31, 2000	0.40	22.4	17	0.29	0.0	0
	February 7, 2000	0.82	NM	55	0.00	0.0	0
	November 9, 1999	0.44	NM	NM	0.37	0.0	12
	August 23, 1999	0.50	NM	NM	0.52	0.0	9
	June 10, 1999	0.20	NM	NM	0.25	0.0	0
	June 30, 1998	0.90	NM	NM	0.38	<0.1	<1
December 30, 1997	<0.1	NM	NM	2.21	0.3	<1	

**Table 4**  
**Groundwater Biodegradation Parameters**  
**3609 International Boulevard, Oakland, California**

Well	Date	Dissolved Oxygen (mg/L)	Turbidity (NTU)	Redox Potential (mV)	Ferrous Iron (mg/L)	Nitrate (mg/L)	Sulfate (mg/L)
MW-11	October 22, 2003	0.07	86.6	-15	0.47	11.4	26
	July 24, 2003	0.00	26.1	-35	0.00	0.0	3
	May 1, 2003	4.08	138.0	55	0.22	3.3	47
	January 16, 2003	9.49	4.0	9	0.25	2.6	32
	October 30, 2002	NM	NM	NM	NM	NM	NM
	July 30, 2002	0.21	6.8	-22	0.18	6.7	31
	May 7, 2002	0.00	155	-29	0.49	4.6	28
	February 21, 2002	2.52	168	31	0.00	0.0	40
	November 19, 2001	0.72	8.4	-18	2.30	1.0	30
	August 8, 2001	NA	NA	NA	NA	NA	NA
	May 22, 2001	2.13	32.3	40.5	0.53	0.0	20
	March 13, 2001	0.79	111	114.7	0.34	0.0	78
	November 2, 2000	0.60	ND	17	0.44	1.5	21
	August 9, 2000	0.48	42	10	0.80	1.5	0
	May 31, 2000	0.50	12	-15	0.69	5.2	10
	February 7, 2000	1.10	NM	-14	0.75	0.0	24
	November 9, 1999	0.22	NM	NM	0.06	0.0	21
	August 23, 1999	0.60	NM	NM	0.92	0.0	52
	June 10, 1999	0.19	NM	NM	0.28	0.0	0
	June 30, 1998	2.20	NM	NM	0.15	1.2	6
December 30, 1997	<0.1	NM	NM	0.32	3.5	35	
MW-12	October 22, 2003	0.07	39.0	-50	2.29	7.5	0
	July 24, 2003	0.00	19.0	-98	1.13	0.0	0
	May 1, 2003	1.41	15.0	-89	1.97	0.0	0
	January 16, 2003	4.55	210.0	-79	2.00	1.0	0
	October 30, 2002	0.30	0.0	-84	2.24	0.0	0
	July 30, 2002	0.29	1.7	-60	2.37	3.3	0
	May 7, 2002	0.00	53.1	-67	2.00	0.0	13
	February 21, 2002	0.56	4.9	-6	1.43	0.0	0
	November 19, 2001	0.92	20	-72	2.29	0.0	2
	August 8, 2001	1.66	72	3	2.46	0.0	0
	May 22, 2001	1.76	6.28	-18.9	2.38	1.9	0
	March 13, 2001	0.64	8.42	-5.6	1.44	0.0	0
	November 2, 2000	0.60	19	12	1.93	0.0	6
	August 9, 2000	0.31	56	-48	2.84	0.0	0
	May 31, 2000	0.29	7.7	-54	2.11	0.0	0
	February 7, 2000	0.62	NM	-42	1.53	0.0	0
	November 9, 1999	0.34	NM	NM	2.21	3.1	9

Notes:  
 NA: Not analyzed, MW-3 not analyzed on November 19, 2001 due to free product,  
 ND: Not Detected  
 NM: Not Measured  
 The turbidity reading for MW-8 was above the allowable equipment tolerance of the equipment  
 MW-6 not analyzed on November 19, 2001, well was inaccessible due to property obstacles.

**Table 5**  
**Groundwater Analytical Data**  
**October 22, 2003**  
**3609 International Boulevard, Oakland, California**

Monitoring Well	TPH-g (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-Benzene (µg/L)	Total Xylenes (µg/L)	MtBE <sup>1</sup> (µg/L) 8021B/8260B
MW-1	630,000 H	3,300	1900 C	3,600	27,700	12,000 / 15,000
MW-2	170 H	1.9	<0.5	2.2	2.2	<2.0
MW-3	30,000	4,400	930	1,600	5,400	8,000 / 7,400
MW-4	70	12	<0.5	4.7	3.0	<2.0
MW-5	460 H	<0.5	<0.5	<0.5	<0.5	8.0 / 1.9
MW-6	36,000	1,300	430	1,600	4,570	<40
MW-7	460	<0.5	<0.5	<0.5	<0.5	15 / 5
MW-8	16,000	830	87	2,000	675	190 / 280
MW-10	2,000	410	11	170	9.14 C	140 / 110
MW-11	210	5.0 C	<0.5	<0.5	<0.5	12 / <0.5
MW-12	2200 H	31 C	<0.5	<0.5	3.5 C	84 / 49

Notes:

< : Not detected above laboratory reporting limits.

<sup>C</sup> Presence confirmed, but the results percent difference exceed 40%.

<sup>H</sup> Heavier hydrocarbons may have contributed to the quantitation.

<sup>1</sup> MtBE was analyzed using the EPA Method 8021B and confirmed using 8260B.



**Table 6**  
**Historical Groundwater Analytical Data**  
**3609 International Boulevard, Oakland, California**

Monitoring Well	Date	TPH-g (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-Benzene (µg/L)	Total Xylenes (µg/L)	MtBE <sup>1</sup> EPA 8260B (µg/L)
MW-1	10/22/03	630,000 H	3,300	1900 C	3600	27,700	15,000
	7/24/03	36,000	4,800	1,800	1300	5,600	25,000
	5/1/03	59,000	3,100	2,700	1500	7,000	14,000
	1/16/03	62,000	3,500	6,000	1600	9,700	48,000
	10/30/02	27,000	2,200	2,400	950	4,500	34,000
	7/30/2002	29,000	2,400	2,500	920	4,400	13,000
	5/7/2002	53,000	4,400	5,100	1300	7,000	32,000
	2/21/2002	260,000	3,700	12,000	3,700	19,200	23,000
	11/19/2001	41,000	2,700	5,100	1,000	4,570	74,000
	8/8/2001	14,820	852	342	568	1,806	2,000
	5/22/2001	4,900	310	81	82	388	150
	3/13/2001	14,570	1,005	440	108	2,030	16
	11/2/2000	7,050	435	52	ND	689	10
	8/9/2000	11,000	638	<5	<5	<5	17.1
	5/31/2000	15,610	610	350	310	1,400	<5
	2/7/2000	40,000	2,280	1,380	8	6,130	47
	11/9/1999	10,000	693	15	<5	3,471	50
	8/23/1999	19,750	678	463	893	2,938	38
	6/10/1999	25,000	1,110	1,480	1,330	5,265	.77
	3/16/1999	17,000	480	860	850	3,000	190
	12/16/1998	65,000	2,500	2,400	2,300	9,500	160
	12/30/1997	27,000	2,300	2,100	1,400	5,100	NA
	4/10/1997	NA	NA	NA	NA	NA	NA
	12/9/1996	NA	NA	NA	NA	NA	NA
	4/3/1996	31,000	98	120	63	170	NA
	1/3/1996	30,000	71	73	50	120	NA
	10/2/1995	59,000	140	130	140	390	NA
6/5/1995	21,000	950	650	570	150	NA	
3/6/1995	32,000	190	160	150	490	NA	
12/2/1994	80,000	3,800	6,600	2,300	11,000	NA	
10/5/1994	320,000	24,000	21,000	2,600	15,000	NA	

**Table 6**  
**Historical Groundwater Analytical Data**  
**3609 International Boulevard, Oakland, California**

Monitoring Well	Date	TPH-g (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-Benzene (µg/L)	Total Xylenes (µg/L)	MtBE <sup>1</sup> EPA 8260B (µg/L)
MW-2	10/22/03	170 H	1.9	<0.5	2.2	2.2	<2.0
	7/24/03	220	3.9	4.3	7	14.5	<2.0
	5/1/03	1,300	14.0	.88	78	271	<2.0
	1/16/03	510	5.1	30	24	92	<2.0
	10/30/02	<50	<0.5	<0.5	<0.5	0.64	<2.0
	7/30/2002	180	11	6.3	9.4	27	<2.0
	5/7/2002	1,800	31	140	110	348	<2
	2/21/2002	1,700	26	180	95	360	<2
	11/19/2001	470	13	64	22	83	14
	8/8/2001	125	4	4	3	.11	ND
	5/22/2001	870	37	75	55	179	2.7
	3/13/2001	932	18	34	1.3	225	ND
	11/2/2000	ND	ND	ND	ND	ND	ND
	8/9/2000	<50	<5	<5	<5	<5	<5
	5/31/2000	2,930	130	330	130	570	<5
	2/7/2000	6,400	372	639	46	134	8
	11/9/1999	<50	<5	<5	<5	<5	<5
	8/23/1999	60	6	9	4	11	ND
	6/10/1999	3,500	290	428	211	744	ND
	3/16/1999	7,600	730	830	610	1,900	55
	12/16/1998	26,000	1,400	1,600	880	9,500	<5
	9/29/1998	29,000	290	180	160	360	<0.5
	6/30/1998	25,000	2,000	2,000	1,300	4,300	NA
	12/30/1997	35,000	4,900	4,900	1,600	7,000	NA
	4/10/1997	53,000	150	110	37	0	ND
	12/9/1996	6,200	11	7	2	14	ND
	4/3/1996	27,000	0	92	44	13	NA
1/3/1996	46,000	160	130	93	240	NA	
10/2/1995	46,000	160	130	93	240	NA	
6/5/1995	8,000	220	330	350	660	NA	
3/6/1995	490	3	3	3	1	NA	
MW-3	10/22/03	30,000	4,400	930	1,600	5,400	7,400
	7/24/03	31,000	4,700	990	1,400	5,200	16,000
	5/1/03	48,000	5,800	1,400	1,600	7,400	5,900
	1/16/03	35,000	2,900	1,300	860	5,200	13,000
	10/30/02	70,000	4,900	5,100	2,100	11,900	21,000
	7/30/2002	45,000	8,900	1,700	1,600	5,600	2,600
	5/7/2002	54,000	6,700	3,200	1,800	7,100	9,100
	2/21/2002	62,000	6,000	7,600	1,900	9,200	12,000
	11/19/2001	NA	NA	NA	NA	NA	NA
	8/8/2001	41,750	3,485	2,670	1,255	5,420	52
	5/22/2001	44,000	5,400	3,100	1,400	6,400	200
	3/13/2001	14,754	2,250	140	ND	1,284	110
	11/2/2000	48,000	6,789	4,816	676	7,258	83
	8/9/2000	76,000	8,900	5,636	888	7,356	176
	5/31/2000	68,000	15,000	8,900	1,500	7,400	<5
	2/7/2000	44,000	6,090	3,360	<5	5,780	276
	11/9/1999	26,000	3,218	1,319	<5	6,697	126
	8/23/1999	64,000	7,484	8,052	1,744	9,749	141
	6/10/1999	46,000	8,245	6,425	1,015	7,173	274
	3/16/1999	45,000	4,100	6,400	1,000	6,100	470
	12/16/1998	51,000	5,700	3,900	1,200	6,300	410
	1/3/1996	150,000	510	410	210	650	NA
	10/2/1995	150,000	510	410	210	65	NA
	6/5/1995	350,000	20,000	42,000	5,800	36,000	NA
	3/6/1995	350,000	20,000	42,000	5,800	36,000	NA
	12/2/1994	250,000	19,000	22,000	4,400	28,000	NA
	10/5/1994	3,000,000	190,000	740,000	310,000	130,000	NA

**Table 6**  
**Historical Groundwater Analytical Data**  
**3609 International Boulevard, Oakland, California**

Monitoring Well	Date	TPH-g (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-Benzene (µg/L)	Total Xylenes (µg/L)	MtBE EPA 8260B (µg/L)
MW-4	10/22/03	70	12	<0.5	4.7	3.0	<2.0
	7/24/03	<50	1	<0.5	<0.5	<0.5	<0.5
	5/1/03	120	27	1.8	9	14.6	<2.0
	1/16/03	310	49	2.5	13	28.7	<2.0
	10/30/02	320	69	0.99	8.8	5.49	<2.0
	7/30/2002	450	20	24	19	74	<2.0
	5/7/2002	570	72	29	27	74	<2
	2/21/2002	450	63	4.1	22	28.7	<2
	11/19/2001	670	180	5	17	53	ND
	8/8/2001	133	12	2.2	3.9	9	ND
	5/22/2001	80	12	1.9	4.1	9.8	ND
	3/13/2001	62	ND	ND	3.2	8.7	ND
	11/2/2000	ND	5.30	ND	ND	8	ND
	8/9/2000	370	5.08	<5	<5	<5	<5
	5/31/2000	552	42	19	16	67	<5
	2/7/2000	7,800	1,200	61	<5	781	<5
	11/9/1999	<50	<5	<5	<5	<5	<5
	8/23/1999	660	497	41	54	145	6
	6/10/1999	1,000	298	44	19	64	13
	3/16/1999	600	200	35	19	56	11
	12/16/1998	1,400	590	33	28	94	24
	9/29/1998	6,200	910	77	68	200	18
	6/30/1998	1,700	780	160	54	200	NA
12/30/1997	2,300	410	270	100	1,500	NA	
4/10/1997	ND	ND	ND	ND	ND	ND	
12/9/1996	4,000	14	6	4	12	ND	
4/3/1996	1,900	12	8	5	14	NA	
1/3/1996	9,300	230	110	10	29	NA	
MW-5	10/22/03	460 H	<0.5	<0.5	<0.5	<0.5	1.9
	7/24/03	300	<0.5	1.9 C	0.76	<0.5	<2.0
	5/1/03	130	<0.5	<0.5	1	<0.5	3.1
	1/16/03	450 Y	<0.5	<0.5	4	0.54	2.1
	10/20/2002	77	<0.5	<0.5	<0.5	<0.5	<2.0
	7/30/2002	110	<0.5	<0.5	0.77	<0.5	<0.5
	5/7/2002	160	<0.5	0.78 C	2	2.15	2.3
	2/21/2002	290	3.5	2	6.2	6.2	<0.5
	11/19/2002	920	17	160	26	135	40
	8/8/2001	258	1	1.1	3.4	7.3	1.4
	5/22/2001	180	ND	ND	2.1	0.57	4.4
	3/13/2001	382	6.1	1.9	6.6	5.9	ND
	11/2/2000	ND	ND	ND	ND	ND	ND
	8/9/2000	<50	<5	<5	<5	<5	<5
	5/31/2000	627.4	7.4	24	12	32.4	<5
	2/7/2000	70	<5	<5	<5	7	<5
	11/9/1999	<50	<5	<5	<5	<5	<5
	8/23/1999	120	ND	4	ND	4	ND
	6/10/1999	270	4	3	6	4	ND
	3/16/1999	650	3	1	16	2	10
	12/16/1998	1,400	1	1	ND	2	ND
	9/29/1998	270	2	1	3	3	<5
	6/30/1998	400	<5	<5	15	<10	NA
12/30/1997	790	82	66	59	160	NA	
4/10/1997	NA	NA	NA	NA	NA	NA	
12/9/1996	NA	NA	NA	NA	NA	NA	
4/3/1996	780	1	1	5	4	NA	
1/3/1996	1,500	1	1	4	5	NA	
10/2/1995	1,500	1	1	4	5	NA	

**Table 6**  
**Historical Groundwater Analytical Data**  
**3609 International Boulevard, Oakland, California**

Monitoring Well	Date	TPH-g (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-Benzene (µg/L)	Total Xylenes (µg/L)	MtBE <sup>1</sup> EPA 8260B (µg/L)
MW-6	10/22/03	36,000	1,300	430	1,600	4,570	<40
	7/24/03	29,000	1,600	520	1,500	4,400	<200
	5/1/03	150,000 H	1,400	780	2,500	8,700	<40
	1/16/03	12,000	730	230	740	1,690	<20
	10/30/02	22,000	1,200	620	1,300	2,800	<20
	7/30/2002	24,000	1,000	410	1,400	3,770	<20
	5/7/2002	10,000	400	160	470	970	<2
	2/21/2002	14,000	440	180	750	1,020	<10
	11/19/2001	NA	NA	NA	NA	NA	NA
	8/8/2001	NA	NA	NA	NA	NA	NA
	5/22/2001	27,000	760	450	1,600	4,270	ND
	3/13/2001	15,637	713	459	238	2,363	ND
	11/2/2000	19,000	1,387	618	ND	5,250	ND
	8/9/2000	24,000	1,306	870	<5	5,162	<5
	5/31/2000	21,700	1,700	1,200	17	3,600	<5
	2/7/2000	17,000	1,360	521	<5	4,150	6
	11/9/1999	40,000	1,084	130	<5	10,940	<5
	8/23/1999	42,000	3,806	3,649	1,554	7,996	10
	6/10/1999	18,500	2,060	1,650	735	3,170	ND
	3/16/1999	37,000	3,900	4,300	1,600	7,000	180
1/3/1998	120,000	350	310	200	610	NA	
MW-7	10/22/03	460	<0.5	<0.5	<0.5	<0.5	5.0
	7/24/03	230	<0.5	1.3 C	<0.5	0.63	5.9
	5/1/03	280	<0.5	<0.5	<0.5	<0.5	11
	1/16/03	220 Y	<0.5	<0.5	0.78	0.55	19
	10/30/02	350	<0.5	2.1 C	<0.5	3.1 C	43
	7/30/2002	270	5.3	1.3 C	2.3	8.1	46
	5/7/2002	560	-15	28.0	9.2	44.0	37
	2/21/2002	380	<0.5	2.5	2	3.8	78
	11/19/2001	1,700	24	220	41	205	69
	8/8/2001	610	3.7	3	6.2	18.9	10
	5/22/2001	370	ND	9.1	1.3	2.3	28
	3/13/2001	82	0.97	ND	0.76	ND	78
	11/2/2000	50	ND	ND	ND	ND	9.1
	8/9/2000	80	<5	<5	<5	<5	11.7
	5/31/2000	494.9	4.9	22	4.2	21.9	29
	2/7/2000	80	<5	<5	<5	<5	23
	11/9/1999	290	<5	9	<5	<5	12
	8/23/1999	570	5	10	ND	ND	ND
	6/10/1999	320	3	7	4	3	26
	3/16/1999	300	3	1	1	1	62
	12/16/1998	990	5	10	5	20	160
	9/29/1998	1,800	1	1	1	2	68
	6/30/1998	620	4	<5	9	<10	NA
	12/30/1997	1,400	130	98	75	200	NA
	4/10/1997	NA	NA	NA	NA	NA	NA
	12/9/1996	NA	NA	NA	NA	NA	NA
4/3/1996	1,900	2	3	5	7	NA	
1/3/1996	3,300	9	12	17	45	NA	
10/2/1995	NA	10	12	17	NA	3,300	

**Table 6**  
**Historical Groundwater Analytical Data**  
**3609 International Boulevard, Oakland, California**

Monitoring Well	Date	TPH-g (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-Benzene (µg/L)	Total Xylenes (µg/L)	MtBE <sup>1</sup> EPA 8260B (µg/L)
MW-8	10/22/03	16,000	830	87	2,000	675	280
	7/24/03	12,000	460	54 C	910	435	890
	5/1/03	18,000	380	33 C	1,000	516	540
	1/16/03	8,100	300	29	370	302	1,100
	10/30/02	18,000	950	75	1,400	1,269	700
	7/30/2002	8,400	340	78	530	517	1,200
	5/7/2002	9,000	360	56	560	622	2,100
	2/21/2002	240,000	1,400	<25	4,200	6,560	<100
	11/19/2001	13,000	600	270	750	1,200	400
	8/8/2001	5,620	153	46	373	345	174
	5/22/2001	3,100	110	28	140	194	410
	3/13/2001	2,360	81	16	71	270	221
	11/2/2000	3,000	278	350	209	980	21
	8/9/2000	22,000	632	5.38	<5	2,686	37.3
	5/31/2000	25,940	940	130	1,600	3,960	75
	2/7/2000	44,200	1,080	617	<5	4,160	240
	11/9/1999	10,500	92	<5	<5	3,414	769
	8/23/1999	58,000	5,379	2,438	3,001	6,960	639
	6/10/1999	39,500	3,610	1,635	2,175	5,913	988
	3/16/1999	22,000	1,800	470	2,000	2,000	820
12/16/1998	61,000	6,300	1,700	2,200	4,400	1,300	
6/30/1998	54,000	4,600	2,800	3,500	7,300	NA	
12/30/1997	28,000	6,000	1,600	2,100	4,700	NA	
4/10/1997	24,000	86	55	50	100	ND	
12/9/1996	27,000	88	43	44	80	ND	
4/3/1996	58,000	250	170	140	330	NA	
1/3/1996	94,000	310	250	180	480	NA	
MW-10	10/22/03	2,000	410	11	170	9.14 C	110
	7/24/03	750	160	4	58	6.66 C	79
	5/1/03	2,500	650	10	190	15.81 C	180
	1/16/03	17,000	870	11	290	27	270
	10/30/02	550	130	3.00	31.0	2.7	70
	7/30/2002	160	26	0.55	8.1	1.0	72
	5/7/2002	3,400	660	13	260	48.0	270
	2/21/2002	4,700	1,100	20	370	63.7	500
	11/19/2001	3,500	900	260	310	258	410
	8/8/2001	242	35	1	11	2	64
	5/22/2001	2,900	630	11	200	31	270
	3/13/2001	4,935	969	18	41	72	630
	11/2/2000	ND	ND	ND	ND	ND	145
	8/9/2000	6,800	1,055	26	54	53.8	1,283
	5/31/2000	4,400	1,500	25	390	107.1	580
	2/7/2000	<50	<5	<5	<5	<5	448
	11/9/1999	2,950	1,134	20	<5	70	652
	8/23/1999	3,250	2,135	97	600	248	1,800
	6/10/1999	4,200	1,168	34	264	154	1,195
	3/16/1999	4,100	15	28	420	250	2,800
12/16/1998	8,700	3,800	51	790	420	1,800	
9/29/1998	9,900	5,400	66	970	620	2,600	
12/30/1997	10,000	5,300	76	1,100	780	NA	
4/10/1997	1,000	21	9	3	3	ND	

**Table 6**  
**Historical Groundwater Analytical Data**  
**3609 International Boulevard, Oakland, California**

Monitoring Well	Date	TPH-g (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-Benzene (µg/L)	Total Xylenes (µg/L)	MtBE <sup>1</sup> EPA 8260B (µg/L)
MW-11	10/22/03	210	5.0 C	<0.5	<0.5	<0.5	<0.5
	7/24/03	340	19 C	3.2	0.58	0.89	<2.0
	5/1/03	280	17	1.5 C	8	4.10	<2.0
	1/16/03	700	32	5.7	25	14.10	<2.0
	10/30/02	NA	NA	NA	NA	NA	NA
	7/30/2002	120	5.6	<0.5	0.61	0.53	<2.0
	5/7/2002	280	16	3	7.6	7.6	<2
	2/21/2002	560	34	20	32	37.3	< 0.5
	11/19/2001	300	7.9	26	5.1	28.9	ND
	8/8/2001	NS	NS	NS	NS	NS	NS
	5/22/2001	280	12	8.3	3.3	9.8	12
	3/13/2001	273	8.6	2.1	10	14	ND
	11/2/2000	60	ND	ND	ND	ND	ND
	8/9/2000	590	10.5	5.94	<5	7.75	<5
	5/31/2000	477	27	13	9.5	29.0	<5
	2/7/2000	700	20	15	<5	35	<5
	11/9/1999	<50	<5	<5	<5	<5	<5
	8/23/1999	170	4	4	ND	6	ND
	6/10/1999	4,600	1,240	35	290	159	1,291
	3/16/1999	710	30	6	53	84	8
12/16/1998	650	27	4	25	33	>0.5	
9/29/1998	170	7	1	4	9	22	
6/30/1998	1,100	45	24	71	100	NA	
12/30/1997	710	66	97	59	190	NA	
MW-12	10/22/03	2200 H	31 C	<0.5	<0.5	3.5 C	49
	7/24/03	2,200	32 C	16 C	<0.5	9.20	66
	5/1/03	2,200	58	<0.5	4.2 C	4.1 C	96
	1/16/03	2,300	65	<0.5	1	4.00	86
	10/30/02	2,600	71	<0.5	<0.5	10.3	84
	7/30/2002	2,200	57	<0.5	11	2.6	100
	5/7/2002	2,700	74	<0.5	20	5.1	94
	2/21/2002	2,500	77	<0.5	5.7	7.4	95
	11/19/2001	3,000	81	69	13	73	120
	8/8/2001	2,090	71	1.8	3	4	142
	5/22/2001	31,000	1,200	ND	95	165	1,900
	3/13/2001	1,517	13	5.6	5.5	11	214
	11/2/2000	1,010	9.3	19.0	ND	7.40	215
	8/9/2000	1,730	15.4	12.4	<5	<5	185
	5/31/2000	3,930	230	10	34	12	200
	2/7/2000	4,000	351	37	<5	24	513
	11/9/1999	80	<5	<5	<5	<5	229

Notes:

- <sup>1</sup> MtBE was analyzed using the EPA Method 8021B and confirmed using 8260B.
- C Presence confirmed, but confirmation concentration differed by more than a factor of two.
- H: Heavier hydrocarbons may have contributed to the quantitation.
- NA: Not Analyzed
- ND, <: Not Detected above laboratory reporting limits.
- NS: Not Sampled
- Y: Sample exhibits fuel pattern which does not resemble standard.

**Table 7**  
**Total Volume of Water Treated, Historical Operational Data, and Effluent and GAC-1 Analytical Results**  
**3609 International Boulevard, Oakland, California**

Month	Date	Meter	Lab Results For Effluent and GAC-1					Total Xylenes
		Reading (gallons)	(concentrations in ug/L)					
			MtBE <sup>2</sup>	TPH-g	Benzene	Toluene	Ethylbenzene	
<b>2003</b>								
October	10/13/2003	2,073,060	5.3	< 50	< 5.0	< 5.0	< 5.0	< 5.0
			<5.0	< 50	< 5.0	< 5.0	< 5.0	< 5.0
	10/1/2003	2,072,610	Carbon Change-out of 2000 lb vessel and 55 gallon polishing vessel					
September	9/15/2003	2,056,910	<5.0	< 50	< 5.0	< 5.0	< 5.0	< 5.0
			6	< 50	< 5.0	< 5.0	< 5.0	< 5.0
	9/2/2003	2,040,040	<5.0	< 50	< 5.0	< 5.0	< 5.0	< 5.0
			<5.0	< 50	< 5.0	< 5.0	< 5.0	< 5.0
August	8/19/2003	2,021,040	<5.0	< 50	< 5.0	< 5.0	< 5.0	< 5.0
			<5.0	< 50	< 5.0	< 5.0	< 5.0	< 5.0
July	7/21/2003	1,995,240	< 5.0	< 50	< 5.0	< 5.0	< 5.0	< 5.0
			40	< 50	< 5.0	< 5.0	< 5.0	< 5.0
	7/9/2003	1,990,260	< 5.0	< 50	< 5.0	< 5.0	< 5.0	< 5.0
			36	< 50	< 5.0	< 5.0	< 5.0	< 5.0
June	6/18/2003	1,978,560	Carbon Change-out of 2000 lb vessel and 55 gallon polishing vessel					
	6/10/2003	1,972,780	< 5.0	< 50	< 5.0	< 5.0	< 5.0	< 5.0
			< 5.0	< 50	< 5.0	< 5.0	< 5.0	< 5.0
May	5/21/2003	1,951,830	< 5.0	< 50	< 5.0	< 5.0	< 5.0	< 5.0
			< 5.0	< 50	< 5.0	< 5.0	< 5.0	< 5.0
	5/1/2003	1,918,270	< 5.0	< 50	< 5.0	< 5.0	< 5.0	< 5.0
			< 5.0	< 50	< 5.0	< 5.0	< 5.0	< 5.0
April	4/11/2003	1,882,440	< 5.0	< 50	< 5.0	< 5.0	< 5.0	< 5.0
			< 5.0	< 50	< 5.0	< 5.0	< 5.0	< 5.0
March	3/19/2003	1,846,490	< 5.0	< 50	< 5.0	< 5.0	< 5.0	< 5.0
			< 5.0	< 50	< 5.0	< 5.0	< 5.0	< 5.0
February	2/25/2003	1,804,960	replaced 55-gallon polishing vessel with new 55 gallon carbon drum					
	2/19/2003	1,791,720	< 5.0	< 50	< 5.0	< 5.0	< 5.0	< 5.0
			< 5.0	< 50	< 5.0	< 5.0	< 5.0	< 5.0
January	1/27/2003	1,733,500	< 5.0	< 50	< 5.0	< 5.0	< 5.0	< 5.0
			< 5.0	< 50	< 5.0	< 5.0	< 5.0	< 5.0
	1/2/2003	1,675,600	< 5.0	< 50	< 5.0	< 5.0	< 5.0	< 5.0
			< 5.0	< 50	< 5.0	< 5.0	< 5.0	< 5.0
<b>2002</b>								
December	12/10/2002	1,672,870	< 5.0	< 50	< 5.0	< 5.0	< 5.0	< 5.0
			< 5.0	< 50	< 5.0	< 5.0	< 5.0	< 5.0
November	11/22/2002	1,668,650	< 5.0	< 50	< 5.0	< 5.0	< 5.0	< 5.0
			< 5.0	< 50	< 5.0	< 5.0	< 5.0	< 5.0
	11/13/2002	1,664,780	replaced gasket on top of 2000 lb GAC vessel, slight leak was detected					
	11/7/2002	1,663,880	Carbon Change-out of 2000 lb vessel and 55 gallon polishing vessel					

**Table 7**  
**Total Volume of Water Treated, Historical Operational Data, and Effluent and GAC-1 Analytical Results**  
**3609 International Boulevard, Oakland, California**

Month	Date	Meter	Lab Results For Effluent <sup>1</sup> and GAC-1					Total Xylenes
		Reading (gallons)	(concentrations in ug/L)					
			MtBE <sup>2</sup>	TPH-g	Benzene	Toluene	Ethylbenzene	
October	10/16/02 <sup>3</sup>	1,661,590	< 310 < 0.5	2,000 Y Z < 50	< 310 < 0.5	< 310 < 0.5	< 310 < 0.5	< 310 < 0.5
September	9/19/2002	1,653,600	< 5 < 5	< 50 < 50	< 5 < 5	< 5 < 5	< 5 < 5	< 5 < 5
August	8/23/2002	1,641,650	1 < 0.5	< 50 < 50	< 0.5 < 0.5	< 0.5 < 0.5	< 0.5 < 0.5	< 0.5 < 0.5
July	7/23/2002	1,632,834	<5.0 < 5.0	< 50 < 50	<5.0 < 5.0	<5.0 < 5.0	<5.0 < 5.0	<5.0 < 5.0



**Table 7**  
**Total Volume of Water Treated, Historical Operational Data, and Effluent and GAC-1 Analytical Results**  
 3809 International Boulevard, Oakland, California

Month	Date	Meter	Lab Results For Effluent and GAC-1					Total Xylenes
		Reading (gallons)	(concentrations in ug/L)		Benzene	Toluene	Ethylbenzene	
			MtBE <sup>2</sup>	TPH-g				
June	6/24/2002	1,610,050	1.7	< 50	< 0.5	< 0.5	< 0.5	< 0.5
			< 0.5	< 50	< 0.5	< 0.5	< 0.5	< 0.5
May	5/30/2002	1,571,630	< 0.5	< 50	< 0.5	< 0.5	< 0.5	< 0.5
	5/20/2002	1,548,000	< 0.5	< 50	< 0.5	< 0.5	< 0.5	< 0.5
	5/8/2002	1,538,850	removed newly installed compressor, installed another compressor					
	5/1/2002	1,529,650	installed new compressor					
			installed new 55 gallon GAC Vessel					
April	4/24/2002	1,528,740	< 0.5	< 50	< 0.5	< 0.5	< 0.5	< 0.5
			< 0.5	< 50	< 0.5	< 0.5	< 0.5	< 0.5
	4/1/2002	1,478,500	repaired valve plate assembly on compressor					
March	3/25/2002	1,478,420	performed carbon change-out on treatment system					
	3/18/2002	NR	replaced piston on compressor					
	3/14/2002	1,478,330	compressor not building up pressure					
February	2/27/2002	1,449,830	< 0.5	< 50	< 0.5	< 0.5	< 0.5	< 0.5
			1.1	< 50	< 0.5	< 0.5	< 0.5	< 0.5
January	1/22/2002	1,381,370	< 2.0	< 50	< 0.5	< 0.5	< 0.5	< 0.5
			< 2.0	< 50	< 0.5	< 0.5	< 0.5	< 0.5
December	12/12/2001	1,311,340	ND	ND	ND	ND	ND	ND
			ND	ND	ND	ND	ND	ND
November	11/2/2001	1,272,660	ND	ND	ND	ND	ND	ND
			0.6	ND	ND	ND	ND	ND
September	9/28/2001	NA	ND	ND	ND	ND	ND	ND
			ND	ND	ND	ND	ND	ND
August	8/22/2001	1,243,100	ND	ND	ND	ND	ND	ND
			ND	ND	ND	ND	ND	ND
July	7/26/2001	1,227,270	ND	ND	ND	ND	ND	ND
			ND	ND	ND	ND	ND	ND
	7/11/2001	1,226,730	NA	NA	NA	NA	NA	NA
			NA	NA	NA	NA	NA	NA

**Table 7**  
**Total Volume of Water Treated, Historical Operational Data, and Effluent and GAC-1 Analytical Results**  
**3609 International Boulevard, Oakland, California**

Month	Date	Meter	Lab Results For Effluent and GAC-1					Total Xylenes
		Reading (gallons)	(concentrations in ug/L)					
			MtBE <sup>2</sup>	TPH-g	Benzene	Toluene	Ethylbenzene	
June	6/29/2001	1,224,600	NA	NA	NA	NA	NA	NA
			ND	ND	ND	ND	ND	ND
	6/26/2001	NR	installed new compressor					
	6/16/2001	1,216,580	NA	NA	NA	NA	NA	NA
				NA	NA	NA	NA	NA
				compressor not working, repaired compressor				
	6/7/2001	1,216,580	NA	NA	NA	NA	NA	NA
			NA	NA	NA	NA	NA	NA
May	5/30/2001	1,205,198	NA	NA	NA	NA	NA	NA
			NA	NA	NA	NA	NA	NA
	5/23/2001	1,194,390	NA	NA	NA	NA	NA	NA
				NA	NA	NA	NA	NA
	5/17/2001	1,182,360	ND	ND	ND	ND	ND	ND
				ND	ND	ND	ND	ND
	5/10/2001	1,166,850	NA	NA	NA	NA	NA	NA
				NA	NA	NA	NA	NA
	5/5/2001	1,151,600	NA	NA	NA	NA	NA	NA
			NA	NA	NA	NA	NA	NA
April	4/28/2001	1,135,690	NA	NA	NA	NA	NA	NA
			NA	NA	NA	NA	NA	NA
	4/21/2001	1,113,570	NA	NA	NA	NA	NA	NA
				NA	NA	NA	NA	NA
	4/11/2001	1,082,700	NA	ND	ND	ND	ND	ND
				ND	ND	ND	ND	ND
	4/6/2001	1,065,540	NA	NA	NA	NA	NA	NA
			NA	NA	NA	NA	NA	NA
March	3/29/2001	1,036,330	NA	NA	NA	NA	NA	NA
			NA	NA	NA	NA	NA	NA
			system was re-started					
	3/21/2001	1,036,070	NA	NA	NA	NA	NA	NA
				NA	NA	NA	NA	NA
			belt replaced on compressor					
	3/17/2001	1,035,100	NA	NA	NA	NA	NA	NA
				NA	NA	NA	NA	NA
	3/13/2001	1,032,500	ND	ND	ND	ND	ND	ND
				NA	NA	NA	NA	NA
	3/2/2001	996,520	NA	NA	NA	NA	NA	NA
			NA	NA	NA	NA	NA	NA
	3/1/2002	NR	system re-started after carbon change-out					
February	2/28/2002	NR	Carbon Change-out was performed on GAC-1, washed algae from holding tank cleaned 2000 lb GAC, re-started system					
	2/10/2001	975,490	System shut down for maintenance and cleaning.					
January	1/29/2001	957,880	ND	ND	ND	ND	ND	ND
			ND	ND	ND	ND	ND	ND

**Table 7**  
**Total Volume of Water Treated, Historical Operational Data, and Effluent and GAC-1 Analytical Results**  
**3609 International Boulevard, Oakland, California**

Month	Date	Meter	Lab Results For Effluent <sup>1</sup> and GAC-1					Total Xylenes
		Reading (gallons)	(concentrations in ug/L)					
			MtBE <sup>2</sup>	TPH-g	Benzene	Toluene	Ethylbenzene	
<b>2000</b>								
December	12/5/2000	883,000	ND	ND	ND	ND	ND	ND
			ND	ND	ND	ND	ND	ND
November	11/24/2000	NR	ND	ND	ND	ND	ND	ND
			ND	ND	ND	ND	ND	ND
	11/1/2000	842,000	ND	ND	ND	ND	ND	ND
			ND	ND	ND	ND	ND	ND
October	10/1/2000	809,000	ND	ND	ND	ND	ND	ND
			ND	ND	ND	ND	ND	ND
August	8/27/2000	781,000	ND	ND	ND	ND	ND	ND
	8/24/2000	778,000	Totalizer meter replaced at 775,000 gallons					
July	7/26/2000	726,000	ND	ND	ND	ND	ND	ND
	7/19/2000	718,000	ND	ND	ND	ND	ND	ND
	7/13/2000	712,000	ND	ND	ND	ND	ND	ND
	7/7/2000	706,000	ND	ND	ND	ND	ND	ND
June	6/29/2000	700,000	ND	ND	ND	ND	ND	ND
	6/21/2000	682,220	ND	ND	ND	ND	ND	ND
	6/16/2000	669,720	ND	ND	ND	ND	ND	ND
	6/10/2000	651,200	ND	ND	ND	ND	ND	ND
May	5/31/2000	629,000	ND	ND	ND	ND	ND	ND
	5/23/2000	603,700	ND	ND	ND	ND	ND	ND
	5/18/2000	570,000	ND	ND	ND	ND	ND	ND
	5/10/2000	530,400	ND	ND	ND	ND	ND	ND
April	4/30/2000	488,300	ND	ND	ND	ND	ND	ND
	4/18/2000	485,300	ND	ND	ND	ND	ND	0.51
			compressor stopped, system shut down until April 29, 2000					
	4/10/2000	440,200	ND	ND	ND	ND	ND	ND
	4/4/2000	390,100	ND	ND	ND	ND	ND	ND
	4/2/2000	NR	performed a carbon change-out on GAC-1					

**Table 7**  
**Total Volume of Water Treated, Historical Operational Data, and Effluent and GAC-1 Analytical Results**  
**3609 International Boulevard, Oakland, California**

Month	Date	Meter	Lab Results For Effluent and GAC-1					
		Reading (gallons)	(concentrations in ug/L)					
			MtBE <sup>2</sup>	TPH-g	Benzene	Toluene	Ethylbenzene	Total Xylenes
March	3/31/2000	NR	replaced GAC-2 with a special GAC designed for removal of MtBE					
	3/24/2000	388,000	ND	ND	ND	ND	ND	ND
	3/17/2000	357,100	ND	ND	ND	ND	ND	ND
	3/10/2000	329,000	ND	ND	ND	ND	ND	ND
	3/3/2000	300,000	transfer overheated, repaired pump, restarted system 3/6/00					
February	2/25/2000	274,000	ND	ND	ND	ND	ND	ND
	2/18/2000	233,000	ND	ND	ND	ND	ND	ND
	2/11/2000	190,000	ND	ND	ND	ND	ND	ND
	2/4/2000	160,800	ND	ND	ND	ND	ND	ND
January	1/28/2000	130,600	ND	ND	ND	ND	ND	ND
	1/21/2000	103,435	ND	ND	ND	ND	ND	ND
	1/17/2000	NR	GAC-1 was replaced with 2,000 lb GAC unit					
			second polishing GAC was replaced with 55 gallon GAC unit					
	1/14/2000	83,500	185	ND	ND	ND	ND	ND
December	12/23/1999	51,680	1486	NA	ND	ND	ND	ND
			ND	NA	ND	ND	ND	ND
	12/16/1999	30,450	963	NA	ND	ND	ND	ND
			ND	NA	ND	ND	ND	ND
	12/9/1999	9,000	230	ND	ND	ND	ND	ND
Pumping began on December 6, 1999								

Notes:

- 1 Effluent is equivalent to PSP#1
  - 2 MTBE was analyzed using EPA Method 8260B, prior to the September 2003. After September 2003, MtBE was only analyzed by EPA Method 8021B.
  - 3 Lab data as shown for Oct. 2002 is erroneous data. During lab analysis a high detection of 2-Butanone was detected in only the effluent sample. The influent sample for 2-Butanone was at only 20 ppb. This caused a high dilution factor causing a high non-detectable value. The high TPH-g value was misrepresentative due to the Y and Z flags.
- ND, < : Not Detected above laboratory reporting limits  
 NA: Not Analyzed  
 NR: Not recorded. Totalizer reading not recorded.  
 Y: Sample exhibits fuel pattern which does not resemble standard  
 Z: Sample exhibits unknown single peak or peaks

**Table 8**  
**Total Mass of Petroleum Hydrocarbons Removed by Vapor Extraction System**  
**3609 International Boulevard, Oakland, California**

Date	Time	PID (ppmv)		Flow Rate (ft <sup>3</sup> /min)	Time Elapsed (Hours)	Air Flow (Liters)	Mass Removed <sup>1</sup> (Pounds)
		Influent	Effluent				
7/24/2000	5:00	394	0	85	0	0	0.00
7/25/2000	5:15	38	2	95	24	3,914,096	1.01
7/26/2000	5:05	207	1	80	48	3,228,121	4.52
7/27/2000	9:00	160	5	92	64	2,500,944	2.71
7/28/2000	4:30	141	7	87	96	4,656,139	4.44
7/29/2000	1:30	225	8	85	117	3,032,734	4.62
7/30/2000	9:00	226	12	85	136	2,816,110	4.31
7/31/2000	3:00	141	5	85	166	4,332,478	4.13
8/1/2000	5:00	135	4	80	192	3,533,942	3.23
8/2/2000	4:00	80	4	80	215	3,126,180	1.69
8/3/2000	5:00	60	5	85	240	3,610,398	1.47
8/4/2000	3:00	57	4	85	262	3,177,150	1.23
8/5/2000	2:00	97	8	87	285	3,399,721	2.23
8/6/2000	12:00	114	8	80	307	2,990,259	2.31
8/7/2000	12:00	93	9	85	331	3,465,982	2.18
8/8/2000	4:30	152	10	85	360	4,115,854	4.23
8/10/2000	10:00	173	1	85	377	2,527,279	2.96
8/11/2000	7:00	78	4	70	410	3,924,715	2.07
8/12/2000	9:00	100	6	70	424	1,665,031	1.13
8/13/2000	5:00	107	9	70	456	3,805,784	2.75
8/14/2000	12:30	122	5	70	476	2,319,150	1.91
8/15/2000	6:00	103	12	70	505	3,508,457	2.44
8/16/2000	12:30	112	0	70	524	2,200,219	1.67
8/18/2000	9:00	90	0	75	568	5,670,449	3.45
8/21/2000	12:00	74	5	80	643	10,194,065	5.10
8/24/2000	12:00	68	13	80	712	9,378,540	4.31
8/27/2000	12:30	68.5	2	80	785	9,854,263	4.57
8/31/2000	1:30	52	6	80	882	13,184,324	4.64
9/4/2000	12:30	54	5	80	977	12,912,482	4.72
9/7/2000	12:00	55	3	80	1,048	9,718,342	3.62
9/11/2000	4:30 <sup>2</sup>	141	0	80	1,149	13,660,047	13.03
9/14/2000	9:30	56	5	80	1,214	8,834,856	3.35
9/18/2000	2:00	46	9.5	80	1,314	13,660,047	4.25
9/18/2000	4:30 <sup>3</sup>	34	0	80	1,317	339,802	0.08
9/21/2000	4:30	43	1	80	1,389	9,786,302	2.85
9/25/2000	5:30	55	6	80	1,486	13,184,324	4.91
9/28/2000	9:00	47.5	7.5	80	1,550	8,766,896	2.82

**Table 8**  
**Total Mass of Petroleum Hydrocarbons Removed by Vapor Extraction System**  
**3609 International Boulevard, Oakland, California**

Date	Time	PID (ppmv)		Flow Rate (ft <sup>3</sup> /min)	Time Elapsed (Hours)	Air Flow (Liters)	Mass Removed <sup>1</sup> (Pounds)
		Influent	Effluent				
10/1/2000	1:00	38.5	6	80	1,626	10,329,986	2.69
10/5/2000	3:00 <sup>4</sup>	28.5	3	80	1,724	13,320,245	2.57
10/5/2000	5:00	36	0	80	1,726	271,842	0.07
10/8/2000	3:00	28.5	3	80	1,796	9,514,460	1.83
10/14/2000	3:00	24.5	2.5	80	1,940	19,572,604	3.24
10/17/2000	2:00	36.5	3.5	80	2,011	9,650,381	2.38
10/20/2000	8:30	18.5	3.5	80	2,078	9,038,737	1.13
10/25/2000	2:00	38	3.7	80	2,203	17,058,068	4.39
10/29/2000	10:00	35	4	80	2,295	12,504,719	2.96
11/2/2000	4:00	30.5	4	80	2,397	13,863,928	2.86
11/7/2000	4:00	30	6	80	2,517	16,310,504	3.31
11/19/2000	12:00	92.7	5.5	80	2,801	38,601,525	24.20
11/24/2000	13:30	25	6.5	80	2,923	16,514,385	2.79
11/29/2000	15:00	14.5	3.5	80	3,044	16,514,385	1.62
12/4/2000	16:30	10.7	1	80	3,190	19,776,486	1.43
12/13/2000	15:30	24	3	80	3,405	29,222,986	4.74
12/28/2000	14:30	10	6	85	3,764	51,845,314	3.51
1/4/2001 <sup>5</sup>	14:00	8.7	3.7	85	3,907	20,723,684	1.22
8/8/2001	15:00	217	0	85	3,907	0	0
9/6/2001	12:00	85	0	85	4,048	20,362,644	11.71
9/13/2001	16:00	186	8	85	4,220	24,839,538	31.26
9/18/2001	15:00	184	9	85	4,344	17,907,574	22.29
9/21/2001 <sup>6</sup>		--	--	--	4,344	0	0
10/12/01 <sup>7</sup>		--	--	--	4,344	0	0
10/23/2001	17:00	114	58	87	4,344	0	0
10/25/01 <sup>4</sup>	15:00	133	0	85	4,390	6,643,132	5.98
10/29/2001 <sup>8</sup>	13:20	569	0	85	4,485	13,647,304	52.53
11/7/2001	15:30	177	0	87	4,679	28,675,904	34.34
11/16/2001	15:00	117	0	87	4,894	31,853,904	25.21
11/21/01 <sup>9</sup>	12:00	85	72	87	5,011	17,294,231	9.94
2/15/02 <sup>10</sup>	16:30	49	0	80	5,011.5	67,960	0.02
2/16/2002	15:45	50	0	80	5,035	3,160,160	1.07
2/21/2002	16:00	37	4	80	5,155	16,344,484	4.09
2/27/2002	10:30	11	0	83	5,294	19,530,979	1.45
3/7/02 <sup>11</sup>	12:20	10		80	5,488	26,429,812	1.79
6/12/2002 <sup>12</sup>	16:15	53	2	75	NA	NA	NA
6/17/2002	11:00	28	2	80	114.75	15,593,148	0.96
6/24/2002	11:20	24	3.1	80	168.33	22,866,400	1.21
7/5/2002	13:25	20	5	80	264.09	35,873,552	1.58
7/11/2002	15:30	26	8.0	80	144.09	19,572,752	1.12
7/23/2002	10:10	28	7.5	83	287.78	40,557,673	2.50
8/9/2002	12:20	7.5	0	80	408.09	55,434,983	0.91

**Table 8**  
**Total Mass of Petroleum Hydrocarbons Removed by Vapor Extraction System**  
**3609 International Boulevard, Oakland, California**

Date	Time	PID (ppmv)		Flow Rate (ft <sup>3</sup> /min)	Time Elapsed (Hours)	Air Flow (Liters)	Mass Removed <sup>1</sup> (Pounds)
		Influent	Effluent				
8/15/2002 <sup>11</sup>	15:00	7.0	1	80	144.11	19,575,902	0.30
8/23/2002 <sup>15</sup>	15:20	NA	NA	NA	NA	NA	NA
8/26/2002	11:15	14.0	2.0	80	71.83	9,757,387	0.30
9/11/2002	10:10	34.4	0	80	383.95	52,156,428	3.95
9/19/2002	10:55	8.8	1.1	80	192.75	26,183,160	0.51
9/25/2002	10:30	18.8	1.8	80	144.75	19,662,840	0.81
10/2/2002	8:10	17.1	2.5	80	168.75	22,923,000	0.86
10/9/2002		PID malfunction		80	168.75	22,923,000	NA
10/16/2002	13:45	17.0	4.0	80	168.75	22,923,000	0.86
10/24/2002		16.5	6.4	80	192.75	26,183,160	0.95
11/1/2002		21.1	0.0	85	192.75	27,819,608	1.29
11/6/2002	10:12	PID malfunction		87	120.75	17,837,915	NA
11/7/2002		17.5	0.0	85	24.75	3,572,168	0.14
11/13/2002	11:30	15.0	0.0	85	144.75	20,891,768	0.69
11/22/2002	14:30	6.6	0.0	80	219.00	29,748,960	0.43
11/22/2002		system shut-down due to rainy season and low influent readings					
5/9/2003	10:30	0.1	0.0	82	0	0	0
5/12/2003	10:30	0.4	0.3	85	72.00	10,391,760	0.01
5/21/2003	11:00	2.2	2.2	83	216.50	30,512,211	0.15
6/4/2003	10:30	2.5	0.1	82	335.50	46,713,678	0.26
6/10/2003	10:30	2.2	0.08	82	144.00	20,049,984	0.10
6/16/2003	12:15	2.1	0.07	82	146.25	20,363,265	0.09
6/24/2003	16:55	2.6	0.08	82	196.75	27,394,683	0.16
6/30/2003	11:30	2.2	0.1	82	138.50	19,284,186	0.09
7/16/2003	12:00	2.2	0.22	82	384.50	53,536,242	0.26
7/21/2003	10:50	2.1	0.21	82	119.00	16,569,084	0.08
7/28/2003	11:15	2.2	0.22	82	168.25	23,426,457	0.11
8/11/2003	12:15	2.1	0.21	82	337.00	46,922,532	0.22
8/19/2003	10:05	2.1	0.22	82	190.00	26,454,840	0.12
8/25/2003	11:30	2.2	0.23	81	145.30	19,984,271	0.10
9/2/2003	10:50	2.1	0.21	80	190.30	25,850,352	0.12
9/8/2003	2:10	9.1	3.19	83	147.30	20,759,578	0.42
9/11/2003	10:00	All 4 SVE carbon drums changed-out					
9/22/2003	1:30	7	0.2	88	335.25	50,094,396	0.77
10/1/2003	10:30	6.5	0.2	85	213.00	30,742,290	0.44
10/6/2003	11:00	7	0.3	85	120.50	17,391,765	0.27
10/13/2003	11:15	5	0.2	85	168.25	24,283,523	0.27
10/29/2003	10:00	2.4	0	85	382.75	55,242,308	0.29
<b>Total Mass of Petroleum Hydrocarbons Removed =</b>							<b>413.23</b>
<b>Average Daily Removal Rate (pounds / day)=</b>							<b>0.35</b>

<sup>1</sup> The representative molecular weight of hydrocarbons was assumed to be 78 gram/mole and used

**Table 8**  
**Total Mass of Petroleum Hydrocarbons Removed by Vapor Extraction System**  
**3609 International Boulevard, Oakland, California**

Date	Time	PID (ppmv)		Flow Rate (ft <sup>3</sup> /min)	Time Elapsed (Hours)	Air Flow (Liters)	Mass Removed <sup>1</sup> (Pounds)
		Influent	Effluent				

- the measured temperature of Vapor (36 °C) in converting ppm-v to ppm on mass basis.
- <sup>2</sup> System accidentally shut down from main box, readings taken 30 minutes after startup.
- <sup>3</sup> GAC Replaced
- <sup>4</sup> GAC-1 removed, new GAC installed at effluent end
- <sup>5</sup> SVE System turned off for rainy season due to low influent concentrations
- <sup>6</sup> system down, hoses disconnected and GAC moved for replacement
- <sup>7</sup> system down for electrical repair
- <sup>8</sup> Carbon change-out of three drums, moved new effluent drum on 10/25/01 to GAC-1
- <sup>9</sup> system shut-down due to high effluent value
- <sup>10</sup> System re-started (since November 21, 2001), installed new 4-55 gallon vapor phase carbon vessels, repaired blower
- <sup>11</sup> System was shut-down due to low influent reading
- <sup>12</sup> System was restarted on 6/12/02
- <sup>13</sup> System was re-started but no readings were taken



# FIGURES



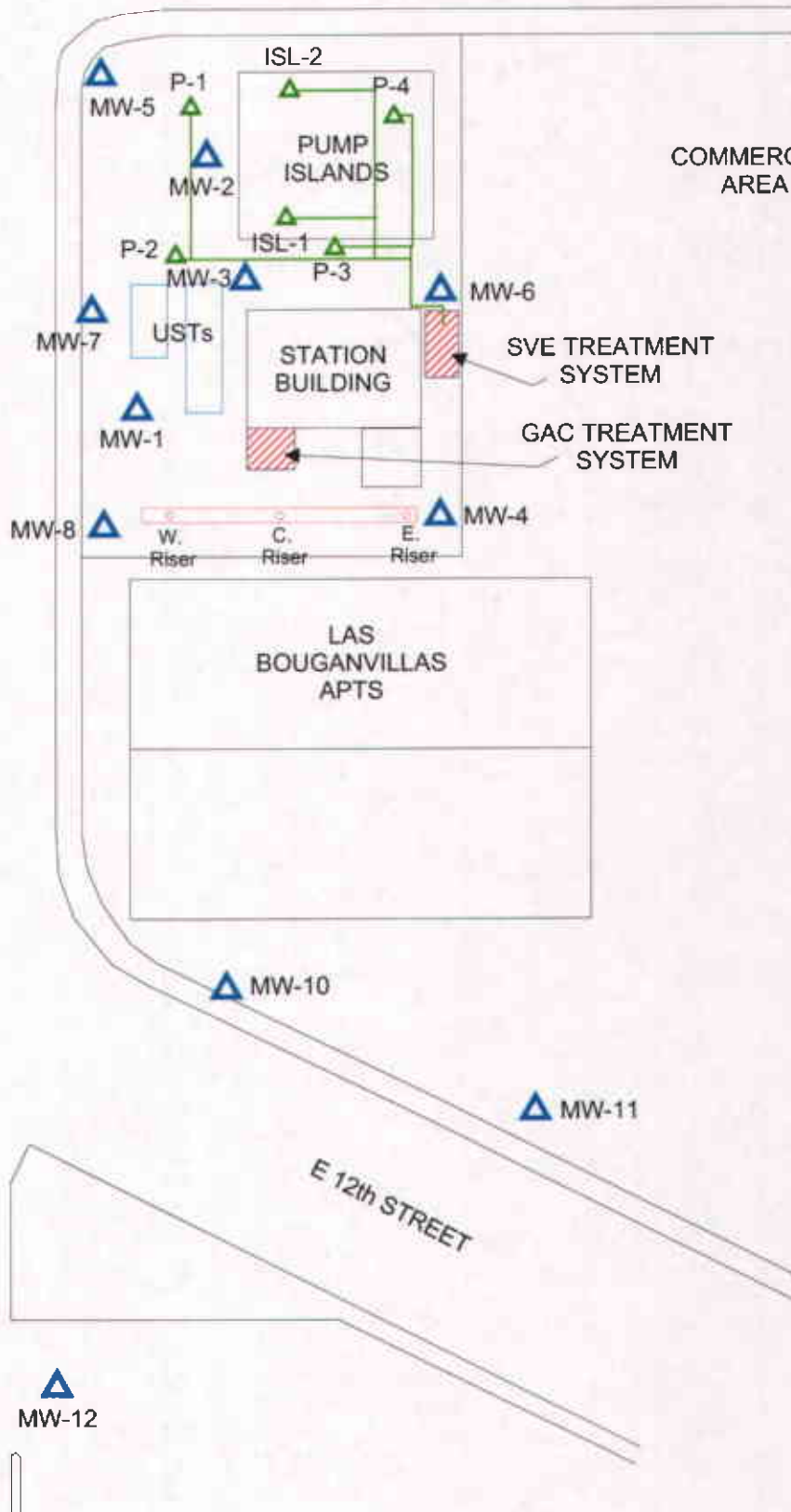
Figure 1: Site vicinity map.

INTERNATIONAL BLVD

COMMERCIAL AREA

COMMERCIAL AREA

36th AVENUE



- ▲ MONITORING WELL
- ▲ EXTRACTION WELL
- EXTRACTION MANIFOLD PIPING

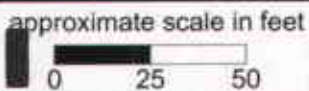


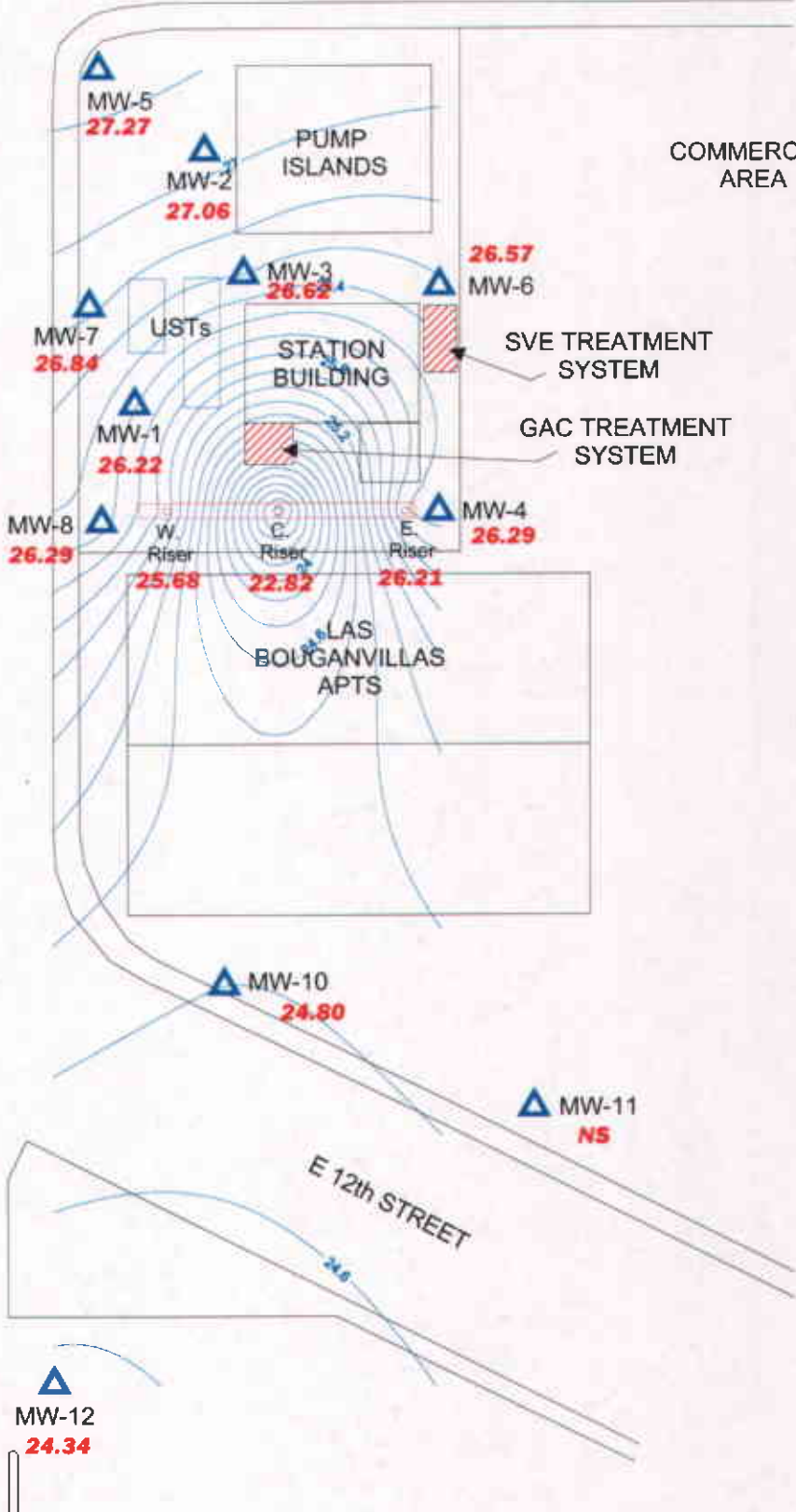
Figure 2: Site map showing location of groundwater monitoring wells and french drain.

COMMERCIAL AREA

INTERNATIONAL BLVD

COMMERCIAL AREA

36th AVENUE



approximate groundwater flow direction



- ▲ Monitoring Well
- NS Not Surveyed Due To Obstructions

approximate scale in feet



Figure 3: Groundwater elevation contour map in feet. October 22, 2003.

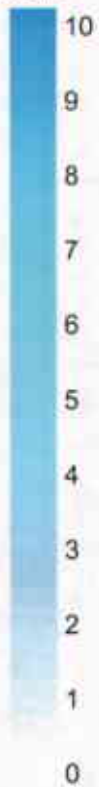


INTERNATIONAL BLVD

COMMERCIAL AREA

COMMERCIAL AREA

dissolved Oxygen  
mg/L



36th AVENUE

MW-5  
0.30

PUMP ISLANDS

MW-2  
0.46

MW-3  
0.07

MW-6  
0.99

MW-7  
0.24

MW-1  
1.96

STATION BUILDING

SVE TREATMENT SYSTEM

GAC TREATMENT SYSTEM

MW-8  
6.45

W. Riser C. Riser E. Riser

MW-4  
0.25

LAS BOUGANVILLAS APTS

MW-10  
0.22

MW-11  
0.07

E 12th STREET

MW-12  
0.07



▲ MONITORING WELL

approximate scale in feet



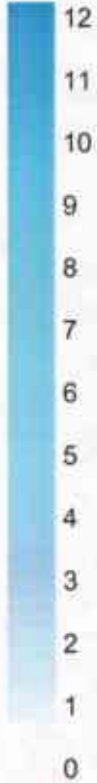
Figure 4: Contour map of dissolved Oxygen concentrations in the groundwater. October 22, 2003.





COMMERCIAL AREA

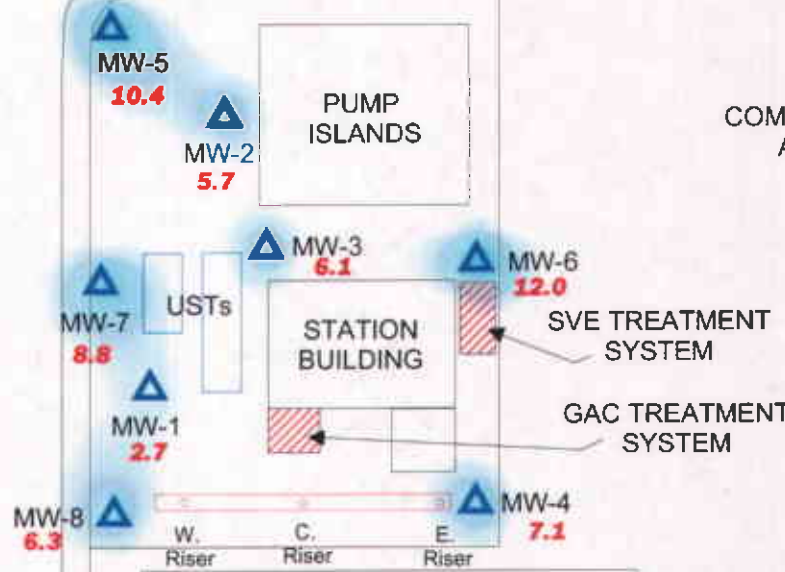
Nitrate  
mg/L



INTERNATIONAL BLVD

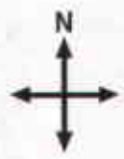
36th AVENUE

COMMERCIAL AREA



LAS BOUGANVILLAS APTS

E 12th STREET



▲ MONITORING WELL

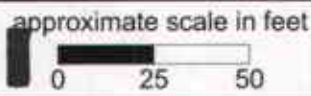


Figure 6: Contour map of Nitrate concentrations in the groundwater. October 22, 2003.

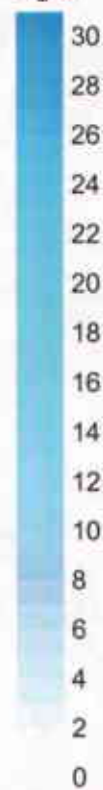


COMMERCIAL AREA

INTERNATIONAL BLVD

COMMERCIAL AREA

Sulfate  
mg/L



36th AVENUE

MW-5

27.0

MW-2

30.0

MW-3

0.0

MW-6

3.0

MW-7

13.0

MW-1

0.0

STATION BUILDING

SVE TREATMENT SYSTEM

GAC TREATMENT SYSTEM

MW-8

0.0

W. Riser

C. Riser

E. Riser

MW-4

18.0

LAS BOUGANVILLAS APTS

MW-10

0.0

MW-11

26.0

E 12th STREET

MW-12

0.0



▲ MONITORING WELL

approximate scale in feet



Figure 7: Contour map of Sulfate concentrations in the groundwater. October 22, 2003.



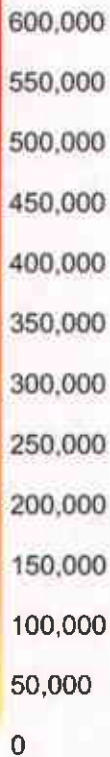


COMMERCIAL AREA

INTERNATIONAL BLVD

COMMERCIAL AREA

TPH-g  
ug/L



36th AVENUE

MW-5  
460

MW-2  
170

MW-3  
30,000

MW-6  
36,000

MW-7  
460

MW-1  
630,000

STATION BUILDING

GAC TREATMENT SYSTEM

MW-8  
16,000

W. Riser C. Riser E. Riser

MW-4  
70

LAS BOUGANVILLAS APTS

MW-10  
2,000

MW-11  
210

E 12th STREET

MW-12  
2,200



- ▲ MONITORING WELL
- < LESS THAN LAB REPORTING LIMITS

approximate scale in feet



Figure 8: Contour map of TPH-g concentrations in the groundwater. October 22, 2003.

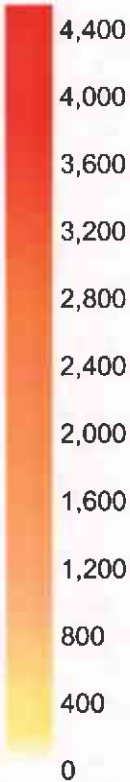


COMMERCIAL AREA

INTERNATIONAL BLVD

COMMERCIAL AREA

Benzene  
ug/L



36th AVENUE

MW-5  
<0.5

PUMP ISLANDS

MW-2  
1.9

MW-7  
<0.5

USTs

MW-3  
4,400

MW-6  
1,300

STATION BUILDING

SVE TREATMENT SYSTEM

GAC TREATMENT SYSTEM

MW-1  
3,300

MW-8  
830

W. Riser C. Riser E. Riser

MW-4  
12

LAS BOUGANVILLAS APTS

MW-10  
410

MW-11  
5.0

E 12th STREET

MW-12  
31.0



- ▲ MONITORING WELL
- < LESS THAN LAB REPORTING LIMIT

approximate scale in feet



Figure 9: Contour map of Benzene concentrations in the groundwater. October 22, 2003.

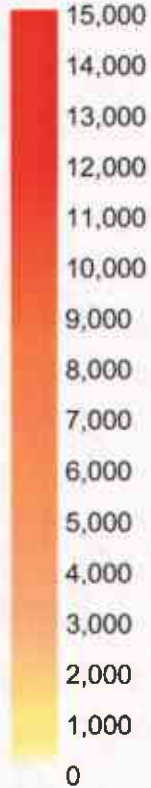


COMMERCIAL AREA

INTERNATIONAL BLVD

COMMERCIAL AREA

MtBE  
ug/L



36th AVENUE

MW-5  
1.9

MW-2  
<2.0

MW-3  
7,400

MW-6  
<40

MW-7  
5.0

MW-1  
15,000

STATION BUILDING

GAC TREATMENT SYSTEM

USTs

SVE TREATMENT SYSTEM

W. Riser C. Riser E. Riser

MW-8  
280

MW-4  
<2.0

LAS BOUGANVILLAS APTS

MW-10  
110

MW-11  
<0.5

E 12th STREET

MW-12  
49



- ▲ MONITORING WELL
- < LESS THAN LAB REPORTING LIMIT

approximate scale in feet

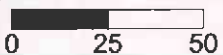


Figure 10: Contour map of MtBE (EPA Method 8260B) concentrations in the groundwater. October 22, 2003.

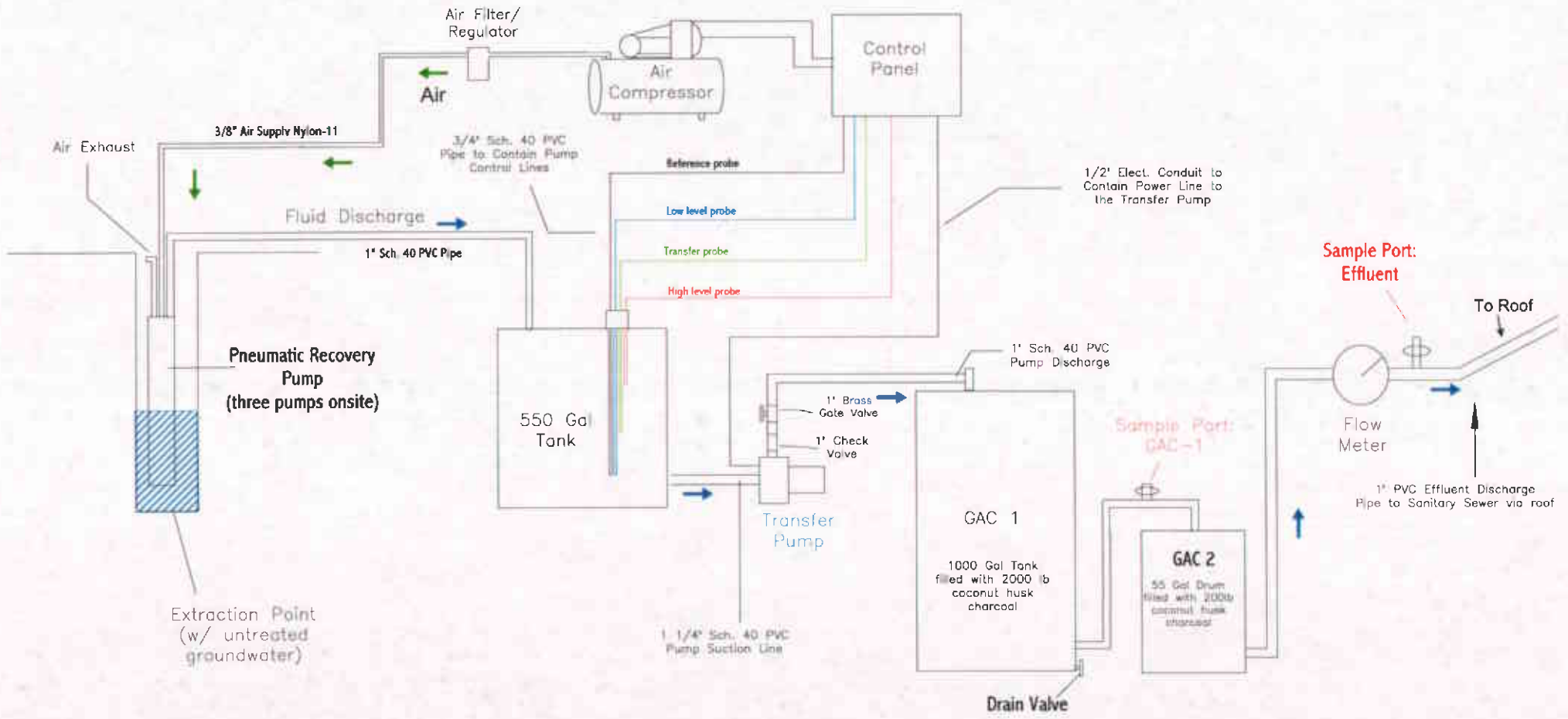


Figure 11: Schematic of the Groundwater Remediation System.

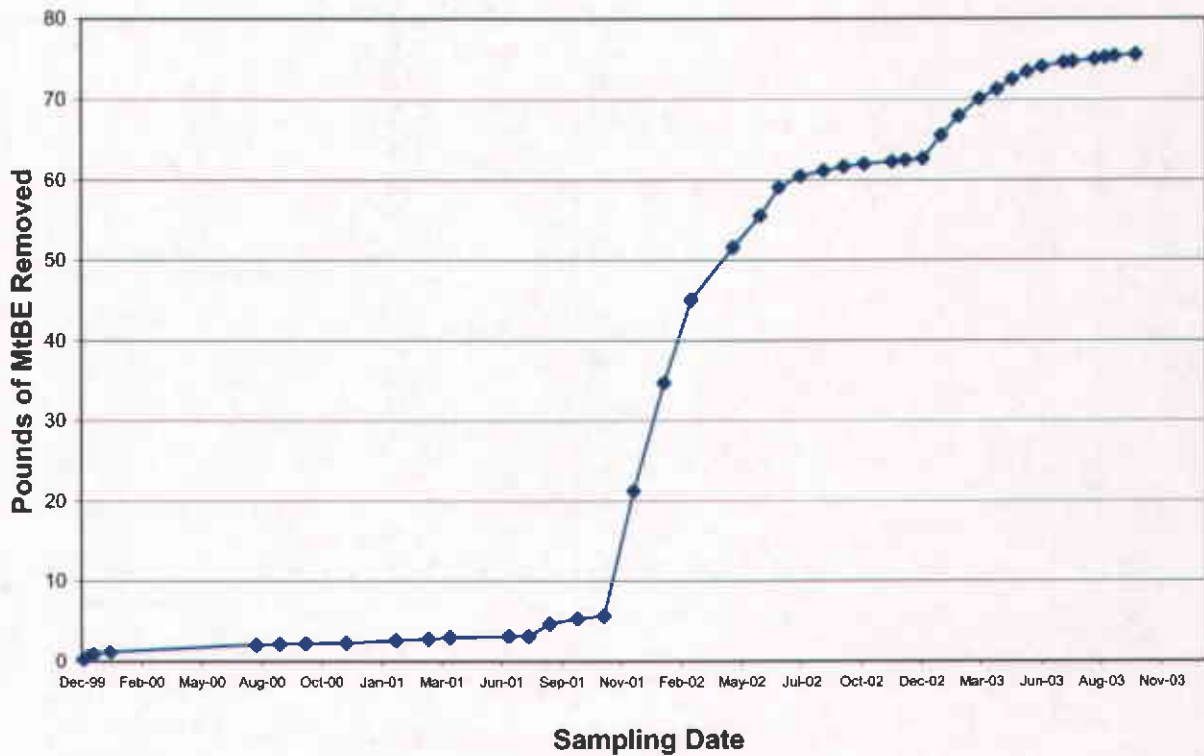
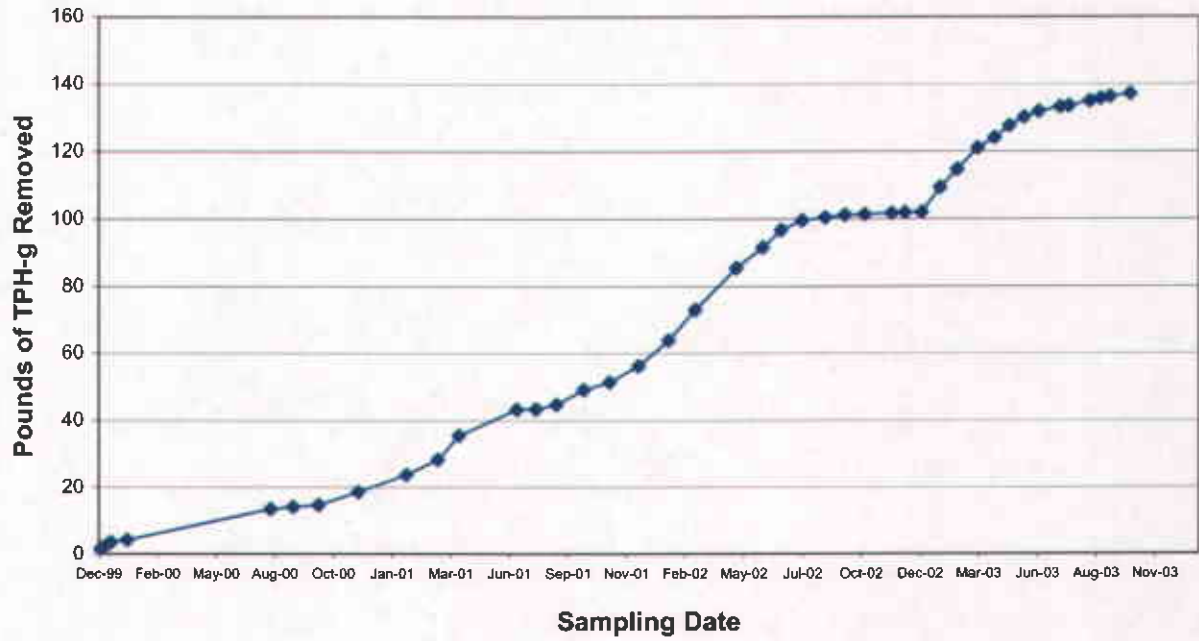


Figure 12. Cumulative mass of TPH-g and MtBE removed from groundwater since the installation of the treatment system.

# **APPENDIX A**

Table of Elevations & Coordinates on Monitoring Wells  
Surveyed by Kier Wright Civil Engineers Surveyors, Inc.,

and

Field Measurements of Physical, Chemical, and  
Biodegradation Parameters of Groundwater



**TABLE OF ELEVATIONS & COORDINATES  
ON MONITORING WELLS**SOMA ENVIRONMENTAL  
Oakland-E. 14 the St. "International Blvd"

WELL NO.	NORTHING	EASTING	ELEVATION	DESCRIPTION
FD-C	2109299.85	6064039.85	39.35 40.25	Notch on north side of PVC Punch north rim of box
FD-E	2109281.13	6064067.87	40.06 40.55	Notch on north side of PVC Punch north rim of box
FD-W	2109314.99	6064017.59	39.16 39.95	Notch on north side of PVC Punch north rim of box
MW-1	2109338.74	6064025.97	40.11 40.76	Notch on north side of PVC Punch north rim of box
MW-2	2109383.20	6064073.06	40.71 41.61	Notch on north side of PVC Punch north rim of box
MW-3	2109351.11	6064064.63	40.91 41.68	Notch on north side of PVC Punch north rim of box
MW-4	2109278.18	6064076.40	40.01 40.67	Notch on north side of PVC Punch north rim of box
MW-5	2109410.84	6064058.46	41.16 41.60	Notch on south side of PVC Punch south rim of box
MW-6	2109320.46	6064105.06	40.92 41.52	Notch on north side of PVC Punch north rim of box
MW-7	2109368.19	6064025.54	39.94 40.54	Notch on north side of PVC Punch north rim of box
MW-8	2109321.68	6064000.46	39.38 39.72	Notch on north side of PVC Punch north rim of box

**Kier Wright Civil Engineers Surveyors, Inc.**  
1233 Quarry Lane, Suite 145, Pleasanton, CA 94566  
(925) 249-6555 (925) 249-6563

**TABLE OF ELEVATIONS & COORDINATES  
ON MONITORING WELLS  
SOMA ENVIRONMENTAL  
Oakland-E. 14 the St. "International Blvd"**

WELL NO.	NORTHING	EASTING	ELEVATION	DESCRIPTION
MW-10	2109193.97	6063957.39	36.71 37.70	Notch on north side of PVC Punch north rim of box
MW-11	2109125.26	6064007.52	XXXX	<b>NO ELEVATION , BOAT ON TOP</b>
MW-12	2109121.85	6063865.00	36.84 36.87	Notch on north side of PVC

Bench mark: NGS Bench mark No.M 554. To reach the station from the intersection of Interstate Highway 880 and Hegenberger Rd in South Oakland go northeast on Hegenberger Rd for 0.5 MI to a side road right Baldwin St. Turn right and go south on Baldwin St for 0.35 MI to a T-intersection, 85th Ave. for 0.1 MI to a side road right, Railroad Ave. Turn right and go south on Railroad Ave. for 0.1 MI to the station on the left, east, side of the road in a large concrete headwall for a culvert.

Elevation = 14.20 NAVD88 Datum

Coordinate values are based on the California Coordinate System, Zone III NAD 83 Datum.



























# Appendix B

Chain of Custody Form and Laboratory Report  
for the  
Fourth Quarter 2003 Monitoring Event



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

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

A N A L Y T I C A L   R E P O R T

Prepared for:

SOMA Environmental Engineering Inc.  
2680 Bishop Dr.  
Suite 203  
San Ramon, CA 94583

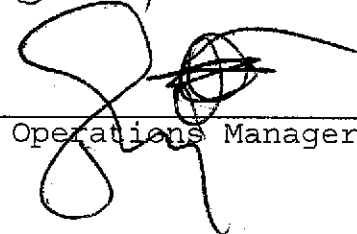
Date: 10-NOV-03  
Lab Job Number: 168350  
Project ID: 2331  
Location: 3609 Int'l Blvd., Oakland

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.

Reviewed by:

  
Project Manager

Reviewed by:

  
Operations Manager

This package may be reproduced only in its entirety.

Laboratory Number: 168350  
Client: SOMA Environmental Engineering Inc.  
Project: 2331  
Request Date: 10/22/03

### CASE NARRATIVE

This hardcopy data package contains sample results and batch QC results for eleven water samples requested from the above referenced project on October 22, 2003. The samples were received cold and intact.

#### Total Volatile Hydrocarbons/BTXE:

The recovery for the surrogate trifluorotoluene in the sample MW-12 exceeds acceptance limits due to the coelution of the surrogate peak with other hydrocarbon peaks. The associated surrogate bromofluorobenzene recovery is acceptable.

No other analytical problems were encountered.

#### Purgeable Aromatics (EPA 8260):

No analytical problems were encountered.

# CHAIN OF CUSTODY

## Curtis & Tompkins, Ltd.

Analytical Laboratory Since 1878  
 2323 Fifth Street  
 Berkeley, CA 94710  
 (510)486-0900 Phone  
 (510)486-0532 Fax

## Analyses

C&T LOGIN# 168350

Sampler: Tony Perini / Mehram Nouroozi

Project No: 2331

Report To: Tony Perini

Project Name: 3609 International Blvd, Oakland Company: SOMA Environmental

Turnaround Time: Standard

Telephone: 925-244-6600

Fax: 925-244-6601

Lab No.	Sample ID.	Sampling Date Time	Matrix			# of Containers	Preservative			
			Soil	Water	Waste		HCL	H <sub>2</sub> SO <sub>4</sub>	HNO <sub>3</sub>	ICE
01	MW-1	10/22/03 4:20 AM		✓		3-Vials	✓			✓
02	MW-2	1:40 PM								
03	MW-3	3:25 PM								
04	MW-4	2:10 PM								
05	MW-5	11:50 AM								
06	MW-6	5 PM								
07	MW-7	1:15 PM								
08	MW-8	3:55 PM		✓			✓			
	<del>MW-9</del>	-								
09	MW-10	11:20 AM								
10	MW-11	2:45 PM								
11	MW-12	11:00 AM		✓			✓			

TPHg 8015	BTEX + MtBE 8021 GC	MTBE Confirmation 8260 GCMS																	
✓	✓	✓																	

Notes: EDF OUTPUT REQUIRED  
 Grab Sample

Received  On Ice  
 Cold  Ambient  Intact

RELINQUISHED BY:  
Tony Perini 10/22/03  
Tony Perini 6 PM DATE/TIME  
 DATE/TIME  
 DATE/TIME

RECEIVED BY:  
Jim Baker 10/22/03 6 PM  
 DATE/TIME  
 DATE/TIME  
 DATE/TIME

## Curtis &amp; Tompkins Laboratories Analytical Report

Lab #: 168350	Location: 3609 Int'l Blvd., Oakland
Client: SOMA Environmental Engineering Inc.	Prep: EPA 5030B
Project#: 2331	
Matrix: Water	Sampled: 10/22/03
Units: ug/L	Received: 10/22/03

Field ID: MW-1	Diln Fac: 100.0
Type: SAMPLE	Batch#: 85552
Lab ID: 168350-001	Analyzed: 10/23/03

Analyte	Result	RL	Analysis
Gasoline C7-C12	630,000 H	5,000	8015B
MTBE	12,000	200	EPA 8021B
Benzene	3,300	50	EPA 8021B
Toluene	1,900 C	50	EPA 8021B
Ethylbenzene	3,600	50	EPA 8021B
m, p-Xylenes	20,000	50	EPA 8021B
o-Xylene	7,700	50	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	139	57-150	8015B
Bromofluorobenzene (FID)	139	65-144	8015B
Trifluorotoluene (PID)	98	54-149	EPA 8021B
Bromofluorobenzene (PID)	89	58-143	EPA 8021B

Field ID: MW-2	Diln Fac: 1.000
Type: SAMPLE	Batch#: 85552
Lab ID: 168350-002	Analyzed: 10/23/03

Analyte	Result	RL	Analysis
Gasoline C7-C12	170 H	50	8015B
MTBE	ND	2.0	EPA 8021B
Benzene	1.9	0.50	EPA 8021B
Toluene	ND	0.50	EPA 8021B
Ethylbenzene	2.2	0.50	EPA 8021B
m, p-Xylenes	2.2	0.50	EPA 8021B
o-Xylene	ND	0.50	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	109	57-150	8015B
Bromofluorobenzene (FID)	113	65-144	8015B
Trifluorotoluene (PID)	82	54-149	EPA 8021B
Bromofluorobenzene (PID)	94	58-143	EPA 8021B

H = Value outside of QC limits; see narrative  
 C = Presence confirmed, but RPD between columns exceeds 40%  
 H = Heavier hydrocarbons contributed to the quantitation  
 ND = Not Detected  
 RL = Reporting Limit





Curtis & Tompkins Laboratories Analytical Report

Lab #:	168350	Location:	3609 Int'l Blvd., Oakland
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2331		
Matrix:	Water	Sampled:	10/22/03
Units:	ug/L	Received:	10/22/03

Field ID:	MW-3	Diln Fac:	50.00
Type:	SAMPLE	Batch#:	85552
Lab ID:	168350-003	Analyzed:	10/23/03

Analyte	Result	RL	Analysis
Gasoline C7-C12	30,000	2,500	8015B
MTBE	8,000	100	EPA 8021B
Benzene	4,400	25	EPA 8021B
Toluene	930	25	EPA 8021B
Ethylbenzene	1,600	25	EPA 8021B
m,p-Xylenes	4,300	25	EPA 8021B
o-Xylene	1,100	25	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	116	57-150	8015B
Bromofluorobenzene (FID)	106	65-144	8015B
Trifluorotoluene (PID)	84	54-149	EPA 8021B
Bromofluorobenzene (PID)	87	58-143	EPA 8021B

Field ID:	MW-4	Diln Fac:	1.000
Type:	SAMPLE	Batch#:	85552
Lab ID:	168350-004	Analyzed:	10/23/03

Analyte	Result	RL	Analysis
Gasoline C7-C12	70	50	8015B
MTBE	ND	2.0	EPA 8021B
Benzene	12	0.50	EPA 8021B
Toluene	ND	0.50	EPA 8021B
Ethylbenzene	4.7	0.50	EPA 8021B
m,p-Xylenes	3.0	0.50	EPA 8021B
o-Xylene	ND	0.50	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	106	57-150	8015B
Bromofluorobenzene (FID)	114	65-144	8015B
Trifluorotoluene (PID)	84	54-149	EPA 8021B
Bromofluorobenzene (PID)	95	58-143	EPA 8021B

= Value outside of QC limits; see narrative  
 C = Presence confirmed, but RPD between columns exceeds 40%  
 H = Heavier hydrocarbons contributed to the quantitation  
 N = Not Detected  
 R = Reporting Limit



## Curtis &amp; Tompkins Laboratories Analytical Report

Lab #: 168350	Location: 3609 Int'l Blvd., Oakland
Client: SOMA Environmental Engineering Inc.	Prep: EPA 5030B
Project#: 2331	
Matrix: Water	Sampled: 10/22/03
Units: ug/L	Received: 10/22/03

Field ID: MW-5	Lab ID: 168350-005
Type: SAMPLE	Diln Fac: 1.000

Analyte	Result	RL	Batch#	Analyzed	Analysis
Gasoline C7-C12	460 H	50	85552	10/23/03	8015B
MTBE	8.0	2.0	85616	10/25/03	EPA 8021B
Benzene	ND	0.50	85552	10/23/03	EPA 8021B
Toluene	ND	0.50	85552	10/23/03	EPA 8021B
Ethylbenzene	ND	0.50	85552	10/23/03	EPA 8021B
m,p-Xylenes	ND	0.50	85552	10/23/03	EPA 8021B
o-Xylene	ND	0.50	85552	10/23/03	EPA 8021B

Surrogate	%REC	Limits	Batch#	Analyzed	Analysis
Trifluorotoluene (FID)	123	57-150	85552	10/23/03	8015B
Bromofluorobenzene (FID)	116	65-144	85552	10/23/03	8015B
Trifluorotoluene (PID)	92	54-149	85552	10/23/03	EPA 8021B
Bromofluorobenzene (PID)	96	58-143	85552	10/23/03	EPA 8021B

Field ID: MW-6	Lab ID: 168350-006
Type: SAMPLE	Diln Fac: 20.00

Analyte	Result	RL	Batch#	Analyzed	Analysis
Gasoline C7-C12	36,000	1,000	85552	10/24/03	8015B
MTBE	ND	40	85616	10/25/03	EPA 8021B
Benzene	1,300	10	85552	10/24/03	EPA 8021B
Toluene	430	10	85552	10/24/03	EPA 8021B
Ethylbenzene	1,600	10	85552	10/24/03	EPA 8021B
m,p-Xylenes	3,600	10	85552	10/24/03	EPA 8021B
o-Xylene	970	10	85552	10/24/03	EPA 8021B

Surrogate	%REC	Limits	Batch#	Analyzed	Analysis
Trifluorotoluene (FID)	130	57-150	85552	10/24/03	8015B
Bromofluorobenzene (FID)	115	65-144	85552	10/24/03	8015B
Trifluorotoluene (PID)	99	54-149	85552	10/24/03	EPA 8021B
Bromofluorobenzene (PID)	92	58-143	85552	10/24/03	EPA 8021B

H = Value outside of QC limits; see narrative  
 C = Presence confirmed, but RPD between columns exceeds 40%  
 H = Heavier hydrocarbons contributed to the quantitation.  
 ND = Not Detected  
 RL = Reporting Limit



## Curtis &amp; Tompkins Laboratories Analytical Report

Lab #:	168350	Location:	3609 Int'l Blvd., Oakland
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2331		
Matrix:	Water	Sampled:	10/22/03
Units:	ug/L	Received:	10/22/03

Field ID:	MW-7	Lab ID:	168350-007
Type:	SAMPLE	Diln Fac:	1.000

Analyte	Result	RL	Batch#	Analyzed	Analysis
Gasoline C7-C12	460	50	85552	10/23/03	8015B
MTBE	15	2.0	85616	10/25/03	EPA 8021B
Benzene	ND	0.50	85552	10/23/03	EPA 8021B
Toluene	ND	0.50	85552	10/23/03	EPA 8021B
Ethylbenzene	ND	0.50	85552	10/23/03	EPA 8021B
m,p-Xylenes	ND	0.50	85552	10/23/03	EPA 8021B
o-Xylene	ND	0.50	85552	10/23/03	EPA 8021B

Surrogate	%REC	Limits	Batch#	Analyzed	Analysis
Trifluorotoluene (FID)	121	57-150	85552	10/23/03	8015B
Bromofluorobenzene (FID)	114	65-144	85552	10/23/03	8015B
Trifluorotoluene (PID)	95	54-149	85552	10/23/03	EPA 8021B
Bromofluorobenzene (PID)	93	58-143	85552	10/23/03	EPA 8021B

Field ID:	MW-8	Lab ID:	168350-008
Type:	SAMPLE	Diln Fac:	10.00

Analyte	Result	RL	Batch#	Analyzed	Analysis
Gasoline C7-C12	16,000	500	85552	10/24/03	8015B
MTBE	190	20	85616	10/25/03	EPA 8021B
Benzene	830	5.0	85552	10/24/03	EPA 8021B
Toluene	87	5.0	85552	10/24/03	EPA 8021B
Ethylbenzene	2,000	5.0	85552	10/24/03	EPA 8021B
m,p-Xylenes	650	5.0	85552	10/24/03	EPA 8021B
o-Xylene	25	5.0	85552	10/24/03	EPA 8021B

Surrogate	%REC	Limits	Batch#	Analyzed	Analysis
Trifluorotoluene (FID)	132	57-150	85552	10/24/03	8015B
Bromofluorobenzene (FID)	108	65-144	85552	10/24/03	8015B
Trifluorotoluene (PID)	87	54-149	85552	10/24/03	EPA 8021B
Bromofluorobenzene (PID)	88	58-143	85552	10/24/03	EPA 8021B

= Value outside of QC limits; see narrative  
 C= Presence confirmed, but RPD between columns exceeds 40%  
 H= Heavier hydrocarbons contributed to the quantitation  
 ND= Not Detected  
 RL= Reporting Limit



## Curtis &amp; Tompkins Laboratories Analytical Report

Lab #: 168350	Location: 3609 Int'l Blvd., Oakland
Client: SOMA Environmental Engineering Inc.	Prep: EPA 5030B
Project#: 2331	
Matrix: Water	Sampled: 10/22/03
Units: ug/L	Received: 10/22/03

Field ID: MW-10	Lab ID: 168350-009
Type: SAMPLE	

Analyte	Result	RL	Diln Fac	Batch#	Analyzed	Analysis
Gasoline C7-C12	2,000	50	1.000	85552	10/23/03	8015B
MTBE	140	2.0	1.000	85616	10/25/03	EPA 8021B
Benzene	410	1.0	2.000	85616	10/25/03	EPA 8021B
Toluene	11	0.50	1.000	85552	10/23/03	EPA 8021B
Ethylbenzene	170	0.50	1.000	85552	10/23/03	EPA 8021B
m, p-Xylenes	8.4 C	0.50	1.000	85552	10/23/03	EPA 8021B
o-Xylene	0.74	0.50	1.000	85552	10/23/03	EPA 8021B

Surrogate	%REC	Limits	Diln Fac	Batch#	Analyzed	Analysis
Trifluorotoluene (FID)	142	57-150	1.000	85552	10/23/03	8015B
Bromofluorobenzene (FID)	113	65-144	1.000	85552	10/23/03	8015B
Trifluorotoluene (PID)	100	54-149	1.000	85552	10/23/03	EPA 8021B
Bromofluorobenzene (PID)	92	58-143	1.000	85552	10/23/03	EPA 8021B

Field ID: MW-11	Lab ID: 168350-010
Type: SAMPLE	Diln Fac: 1.000

Analyte	Result	RL	Diln Fac	Batch#	Analyzed	Analysis
Gasoline C7-C12	210	50	1.000	85552	10/23/03	8015B
MTBE	12	2.0	1.000	85616	10/25/03	EPA 8021B
Benzene	5.0 C	0.50	1.000	85552	10/23/03	EPA 8021B
Toluene	ND	0.50	1.000	85552	10/23/03	EPA 8021B
Ethylbenzene	ND	0.50	1.000	85552	10/23/03	EPA 8021B
m, p-Xylenes	ND	0.50	1.000	85552	10/23/03	EPA 8021B
o-Xylene	ND	0.50	1.000	85552	10/23/03	EPA 8021B

Surrogate	%REC	Limits	Batch#	Analyzed	Analysis
Trifluorotoluene (FID)	124	57-150	85552	10/23/03	8015B
Bromofluorobenzene (FID)	109	65-144	85552	10/23/03	8015B
Trifluorotoluene (PID)	88	54-149	85552	10/23/03	EPA 8021B
Bromofluorobenzene (PID)	90	58-143	85552	10/23/03	EPA 8021B

= Value outside of QC limits; see narrative  
 C= Presence confirmed, but RPD between columns exceeds 40%  
 H= Heavier hydrocarbons contributed to the quantitation  
 ND= Not Detected  
 RL= Reporting Limit



## Curtis &amp; Tompkins Laboratories Analytical Report

Lab #: 168350 Location: 3609 Int'l Blvd., Oakland  
 Client: SOMA Environmental Engineering Inc. Prep: EPA 5030B  
 Project#: 2331  
 Matrix: Water Sampled: 10/22/03  
 Units: ug/L Received: 10/22/03

Field ID: MW-12 Lab ID: 168350-011  
 Type: SAMPLE Diln Fac: 1.000

Analyte	Result	RL	Batch#	Analyzed	Analysis
Gasoline C7-C12	2,200 H	50	85552	10/23/03	8015B
MTBE	84	2.0	85616	10/25/03	EPA 8021B
Benzene	31 C	0.50	85552	10/23/03	EPA 8021B
Toluene	ND	0.50	85552	10/23/03	EPA 8021B
Ethylbenzene	ND	0.50	85552	10/23/03	EPA 8021B
m,p-Xylenes	2.3 C	0.50	85552	10/23/03	EPA 8021B
o-Xylene	1.2 C	0.50	85552	10/23/03	EPA 8021B

Surrogate	%REC	Limits	Batch#	Analyzed	Analysis
Trifluorotoluene (FID)	176 *	57-150	85552	10/23/03	8015B
Bromofluorobenzene (FID)	117	65-144	85552	10/23/03	8015B
Trifluorotoluene (PID)	109	54-149	85552	10/23/03	EPA 8021B
Bromofluorobenzene (PID)	92	58-143	85552	10/23/03	EPA 8021B

Type: BLANK Batch#: 85552  
 Lab ID: QC229781 Analyzed: 10/23/03  
 Diln Fac: 1.000

Analyte	Result	RL	Batch#	Analyzed	Analysis
Gasoline C7-C12	ND	50			8015B
MTBE	ND	2.0			EPA 8021B
Benzene	ND	0.50			EPA 8021B
Toluene	ND	0.50			EPA 8021B
Ethylbenzene	ND	0.50			EPA 8021B
m,p-Xylenes	ND	0.50			EPA 8021B
o-Xylene	ND	0.50			EPA 8021B

Surrogate	%REC	Limits	Batch#	Analyzed	Analysis
Trifluorotoluene (FID)	99	57-150			8015B
Bromofluorobenzene (FID)	104	65-144			8015B
Trifluorotoluene (PID)	81	54-149			EPA 8021B
Bromofluorobenzene (PID)	87	58-143			EPA 8021B

Type: BLANK Batch#: 85616  
 Lab ID: QC230029 Analyzed: 10/25/03  
 Diln Fac: 1.000

Analyte	Result	RL	Batch#	Analyzed	Analysis
MTBE	ND	2.0			EPA 8021B
Benzene	ND	0.50			EPA 8021B

Surrogate	%REC	Limits	Batch#	Analyzed	Analysis
Trifluorotoluene (FID)	101	57-150			8015B
Bromofluorobenzene (FID)	113	65-144			8015B
Trifluorotoluene (PID)	99	54-149			EPA 8021B
Bromofluorobenzene (PID)	111	58-143			EPA 8021B

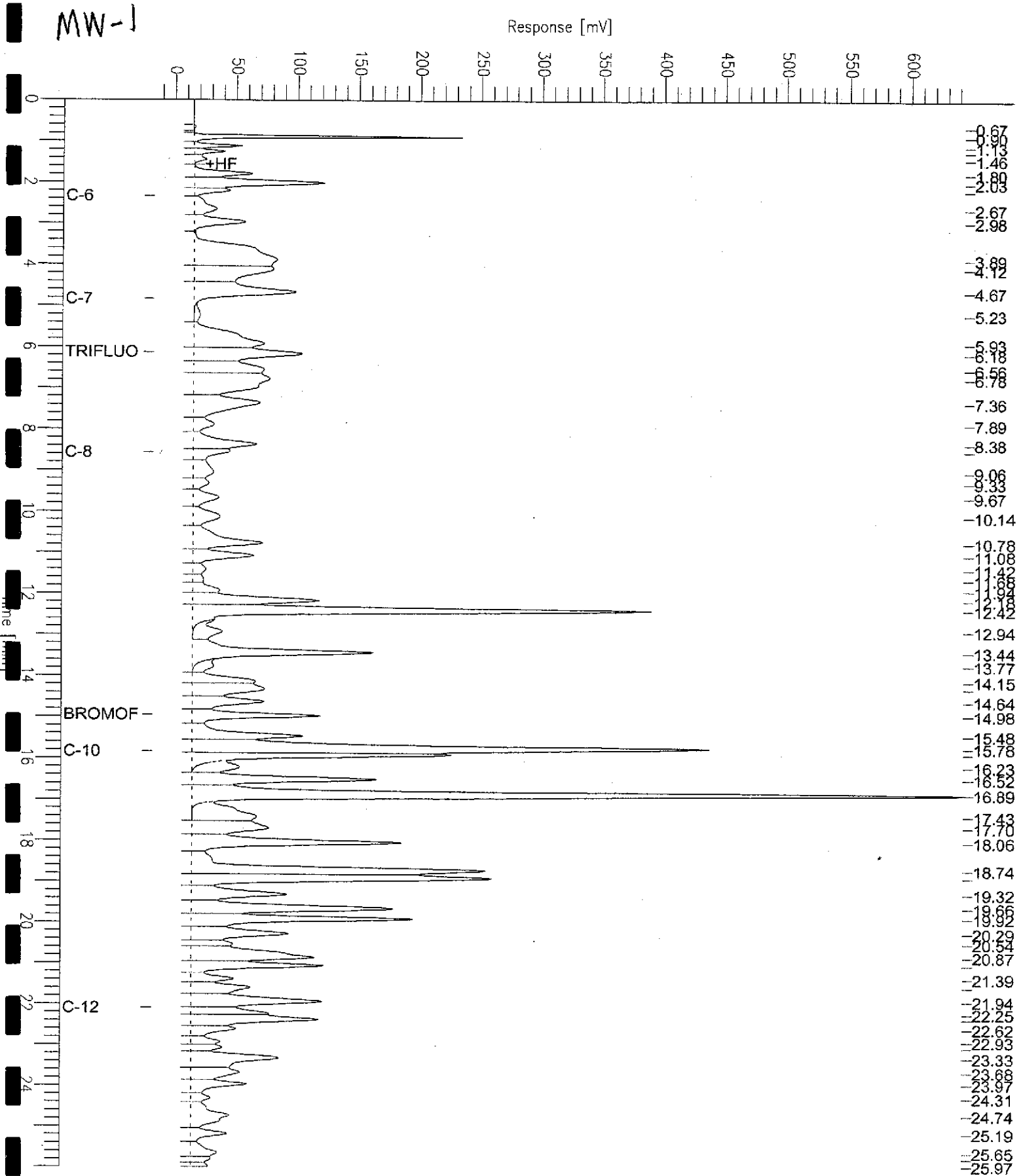
= Value outside of QC limits; see narrative  
 C= Presence confirmed, but RPD between columns exceeds 40%  
 H= Heavier hydrocarbons contributed to the quantitation  
 ND= Not Detected  
 RL= Reporting Limit

# GC07 TVH 'A' Data File RTX 502

Sample Name : 168350-001,85552  
 FileName : G:\GC07\DATA\296A004.raw  
 Method : TVHBTXE  
 Start Time : 0.00 min  
 Scale Factor : 1.0

Sample #: a1.0  
 Date : 10/24/03 09:04 AM  
 Time of Injection: 10/23/03 01:26 PM  
 Low Point : -16.76 mV  
 High Point : 643.52 mV  
 Plot Scale: 660.3 mV

Page 1 of 1



# GC07 TVH 'A' Data File RTX 502

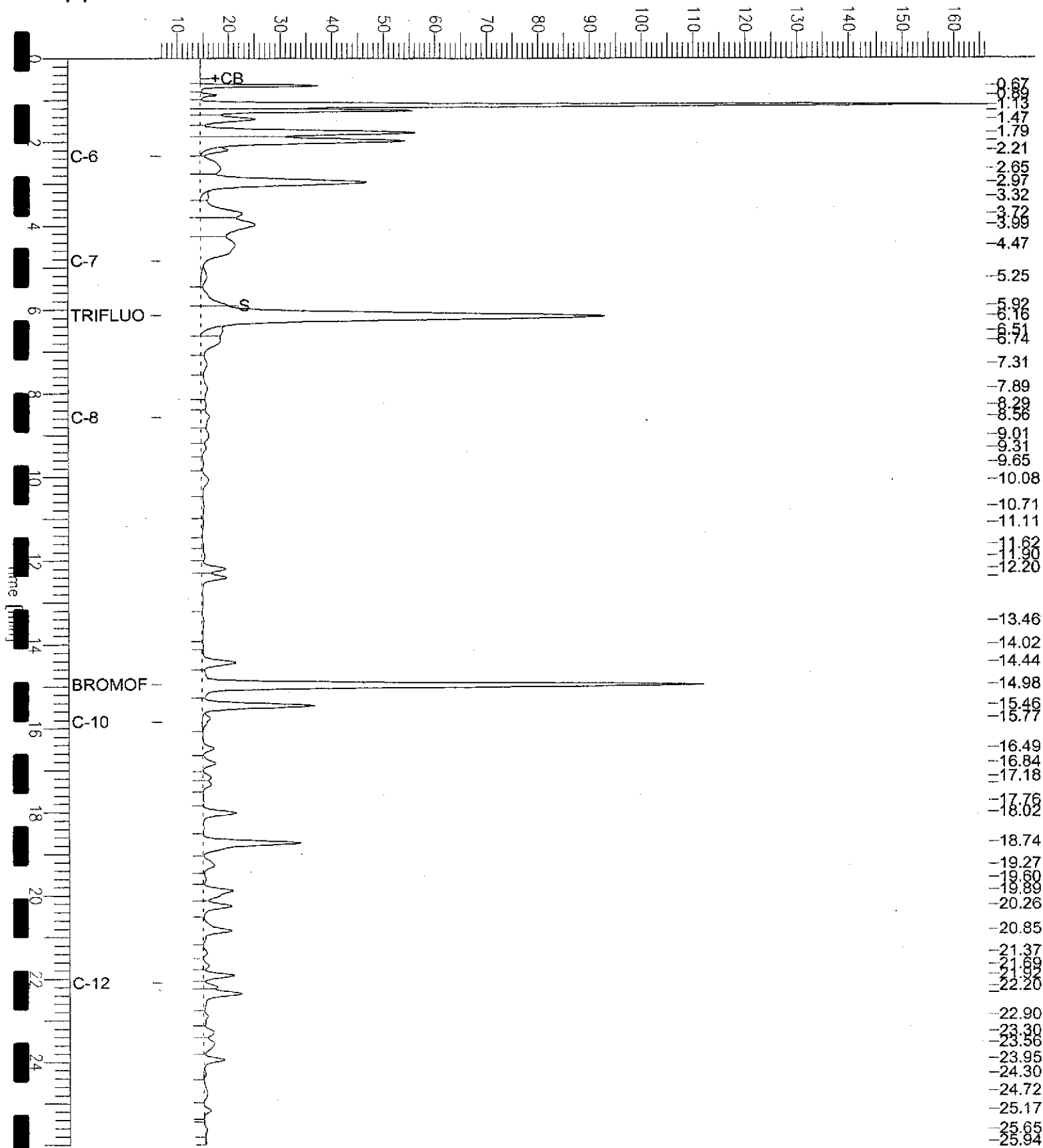
Sample Name : 168350-002,85552  
 FileName : G:\GC07\DATA\296A011.raw  
 Method : TVHBTXE  
 Start Time : 0.00 min  
 Scale Factor: 1.0

End Time : 26.00 min  
 Plot Offset: 7 mV

Sample #: a1.0  
 Date : 10/24/03 09:04 AM  
 Time of Injection: 10/23/03 05:43 PM  
 Low Point : 6.83 mV  
 High Point : 166.34 mV  
 Plot Scale: 159.5 mV

MW-2

Response [mV]



# GC07 TVH 'A' Data File RTX 502

Sample Name : 168350-003,85552

Sample #: a1.0

Page 1 of 1

FileName : G:\GC07\DATA\296A005.raw

Date : 10/23/03 02:38 PM

Method : TVHBTXE

Time of Injection: 10/23/03 02:12 PM

Start Time : 0.00 min

End Time : 26.00 min

Low Point : 6.64 mV

High Point : 173.75 mV

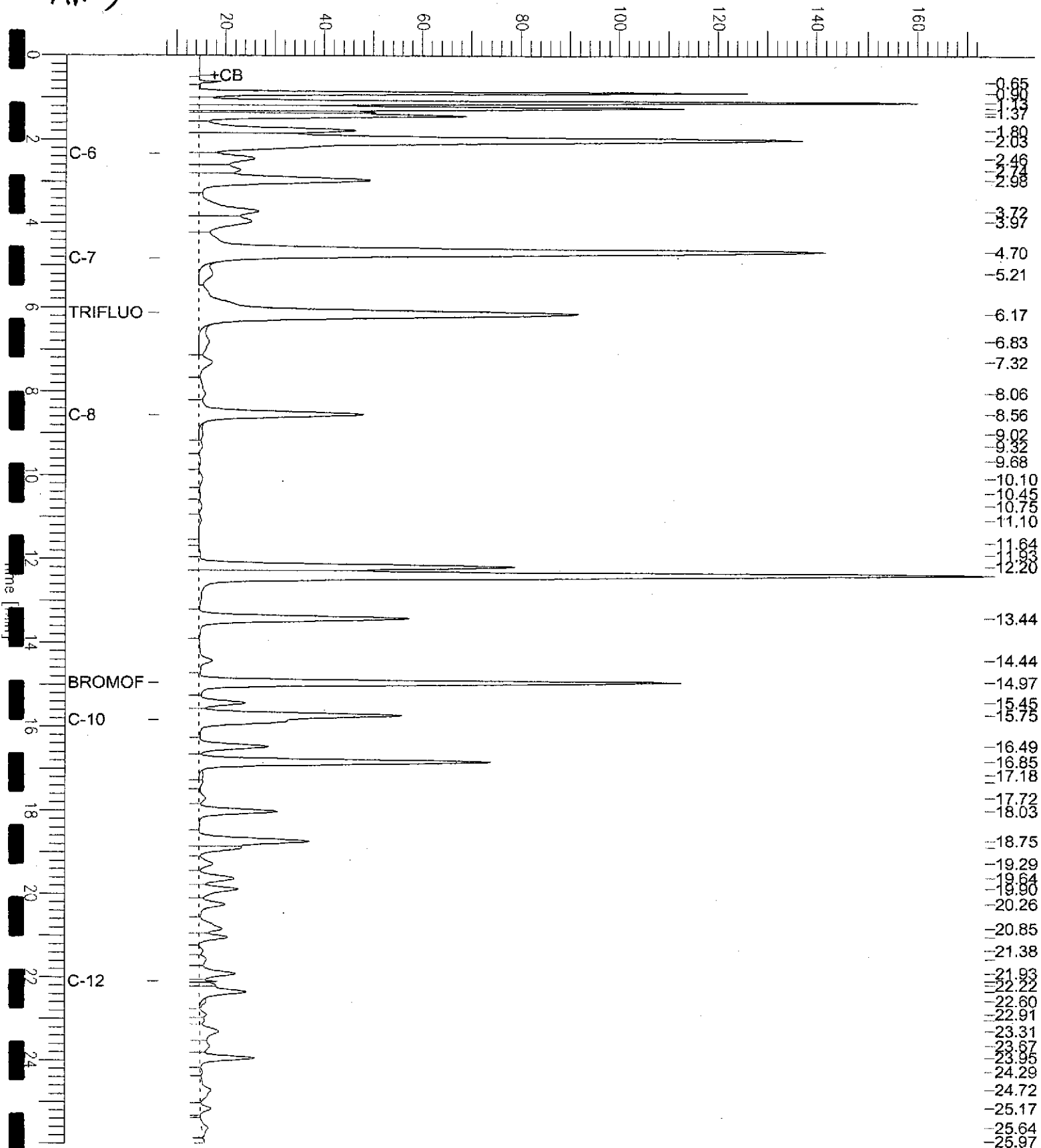
Scale Factor: 1.0

Plot Offset: 7 mV

Plot Scale: 167.1 mV

MW-3

Response [mV]





# GC07 TVH 'A' Data File RTX 502

Sample Name : mss,168350-004,85552

Sample #: a1.0

Page 1 of 1

FileName : G:\GC07\DATA\296A010.raw

Date : 10/23/03 05:34 PM

Method : TVHBTXE

Time of Injection: 10/23/03 05:08 PM

Start Time : 0.00 min

End Time : 26.00 min

Low Point : 9.51 mV

High Point : 112.42 mV

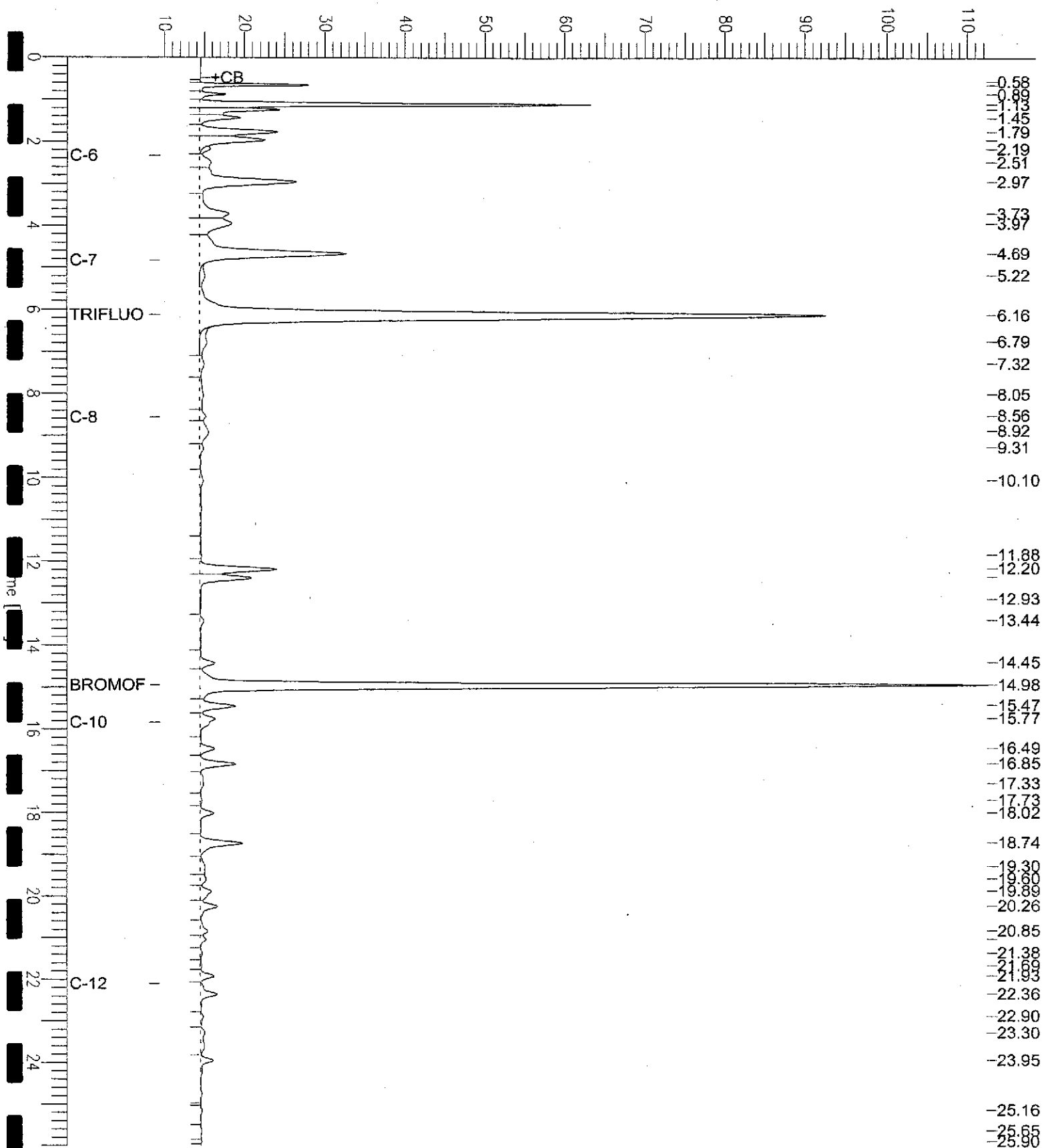
Scale Factor: 1.0

Plot Offset: 10 mV

Plot Scale: 102.9 mV

MW-4

Response [mV]



# GC07 TVH 'A' Data File RTX 502

Sample Name : 168350-005,85552

Sample #: a1.0

Page 1 of 1

FileName : G:\GC07\DATA\296A016.raw

Date : 10/24/03 09:04 AM

Method : TVHBTXE

Time of Injection: 10/23/03 08:38 PM

Start Time : 0.00 min

End Time : 26.00 min

Low Point : 3.58 mV

High Point : 232.91 mV

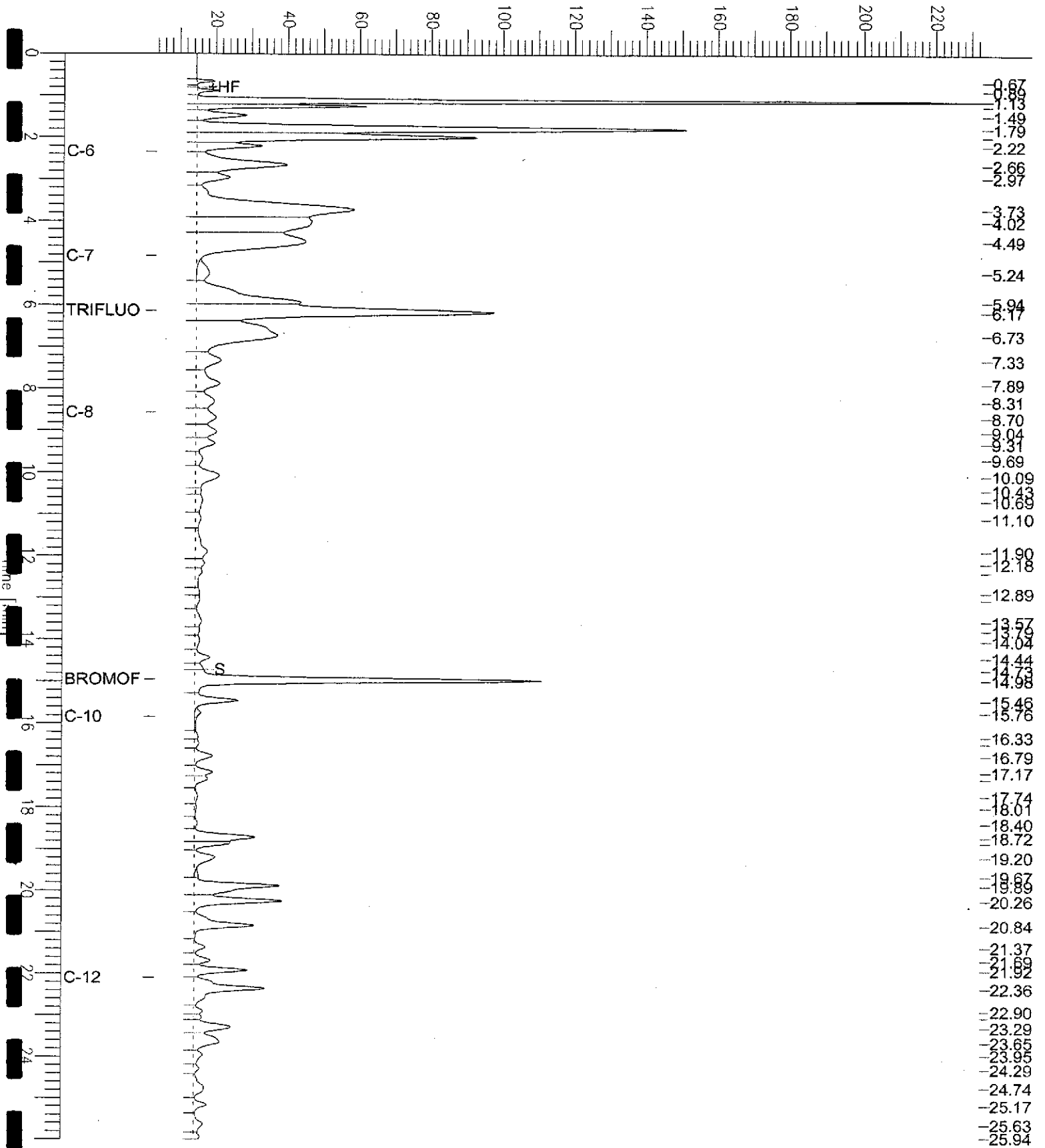
Scale Factor: 1.0

Plot Offset: 4 mV

Plot Scale: 229.3 mV

**MW-5**

Response [mV]



# GC07 TVH 'A' Data File RTX 502

Sample Name : 168350-006,85552

Sample #: a1.0

Page 1 of 1

FileName : G:\GC07\DATA\296A022.raw

Date : 10/24/03 12:34 AM

Method : TVHBTXE

Time of Injection: 10/24/03 12:08 AM

Start Time : 0.00 min

End Time : 26.00 min

Low Point : -1.72 mV

High Point : 358.90 mV

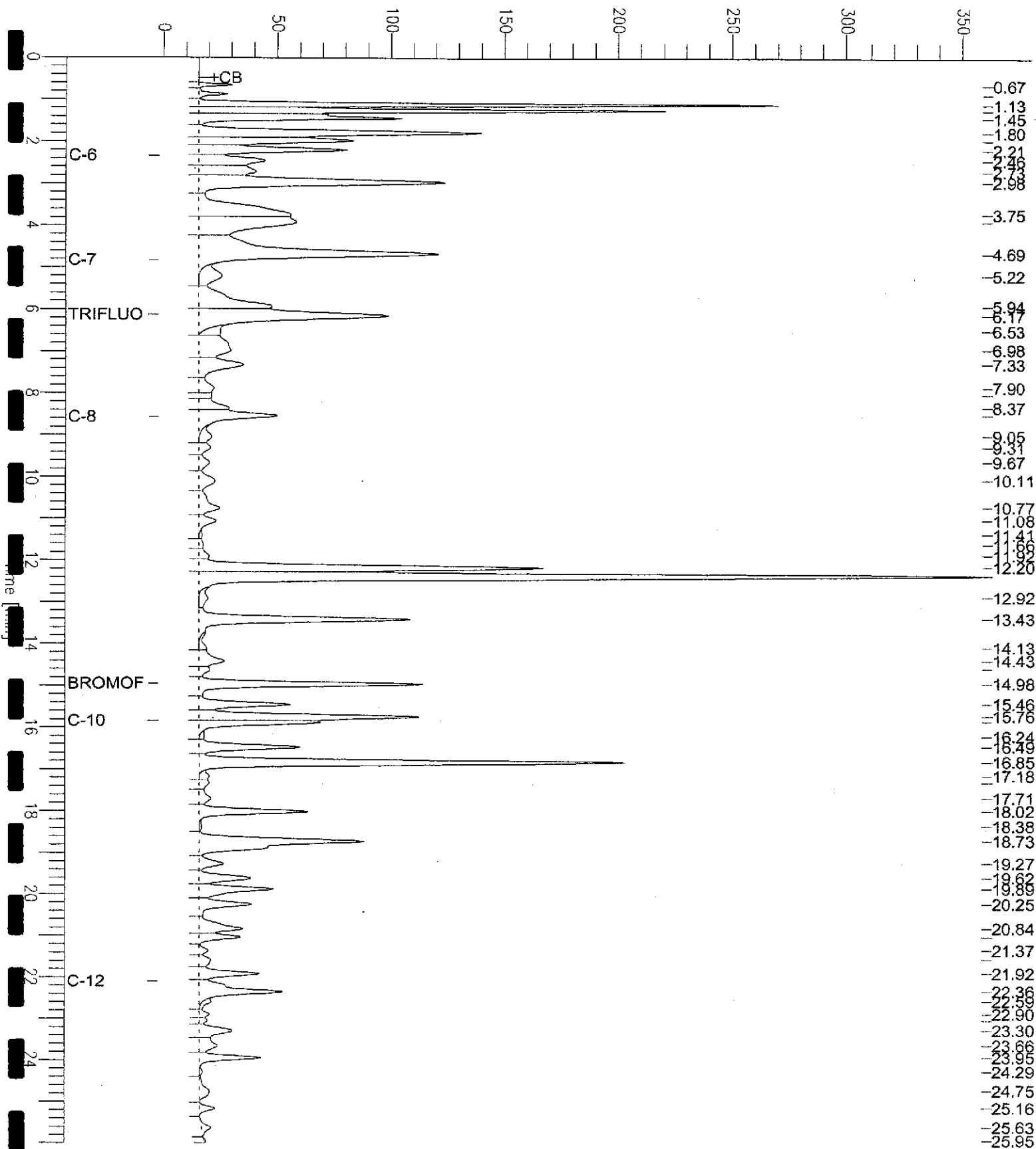
Scale Factor: 1.0

Plot Offset: -2 mV

Plot Scale: 360.6 mV

MW-6

Response [mV]



# GC07 TVH 'A' Data File RTX 502

Sample Name : 168350-007,85552

Sample #: a1.0

Page 1 of 1

FileName : G:\GC07\DATA\296A017.raw

Date : 10/24/03 09:05 AM

Method : TVHBTXE

Time of Injection: 10/23/03 09:13 PM

Start Time : 0.00 min

End Time : 26.00 min

Low Point : 7.84 mV

High Point : 150.40 mV

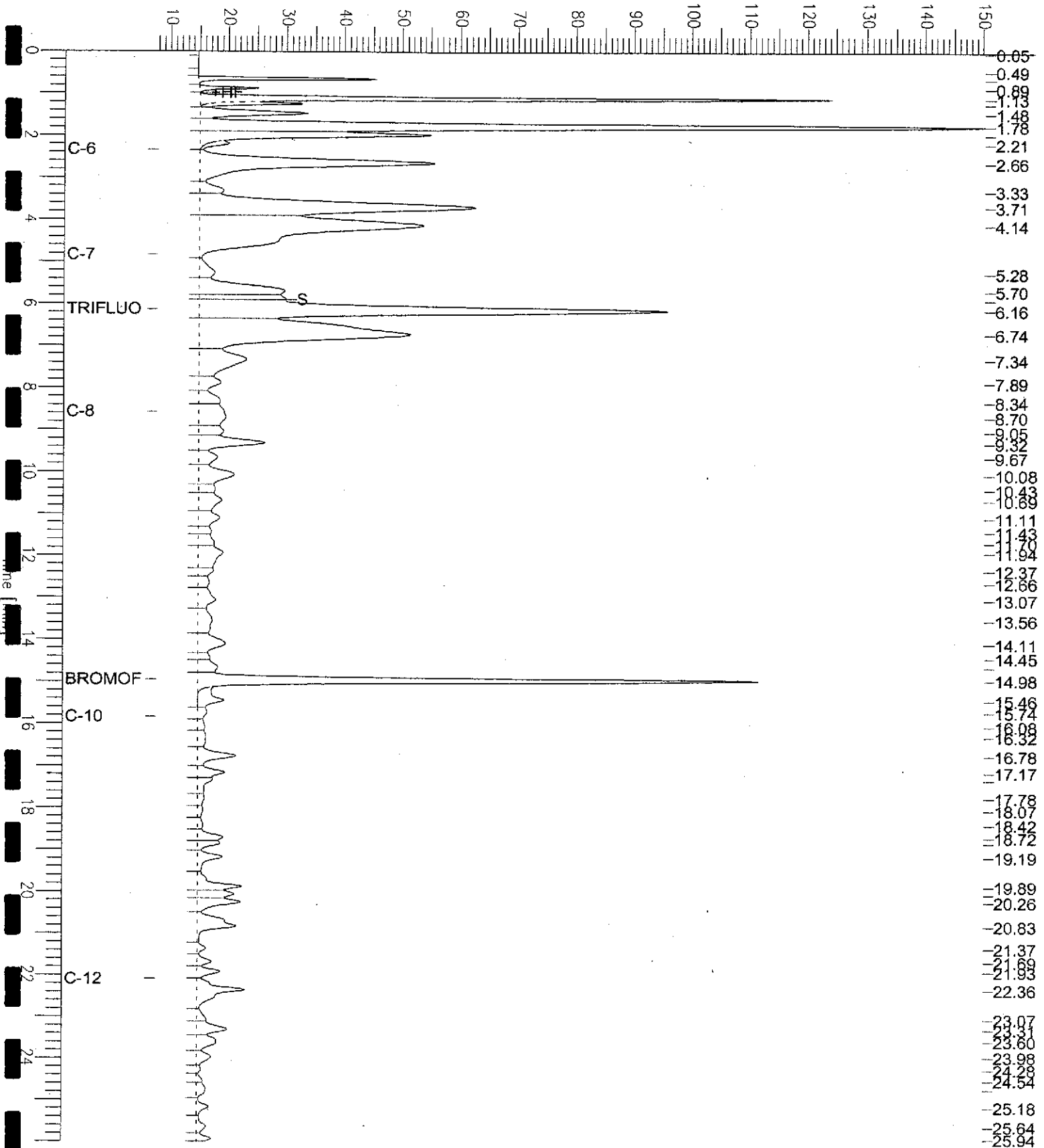
Scale Factor: 1.0

Plot Offset: 8 mV

Plot Scale: 142.6 mV

MW-7

Response [mV]



# GC07 TVH 'A' Data File RTX 502

Sample Name : 168350-008,85552

Sample #: a1.0

Page 1 of 1

FileName : G:\GC07\DATA\296A023.raw

Date : 10/24/03 01:09 AM

Method : TVHBTXE

Time of Injection: 10/24/03 12:43 AM

Start Time : 0.00 min End Time : 26.00 min

Low Point : -3.72 mV

High Point : 403.13 mV

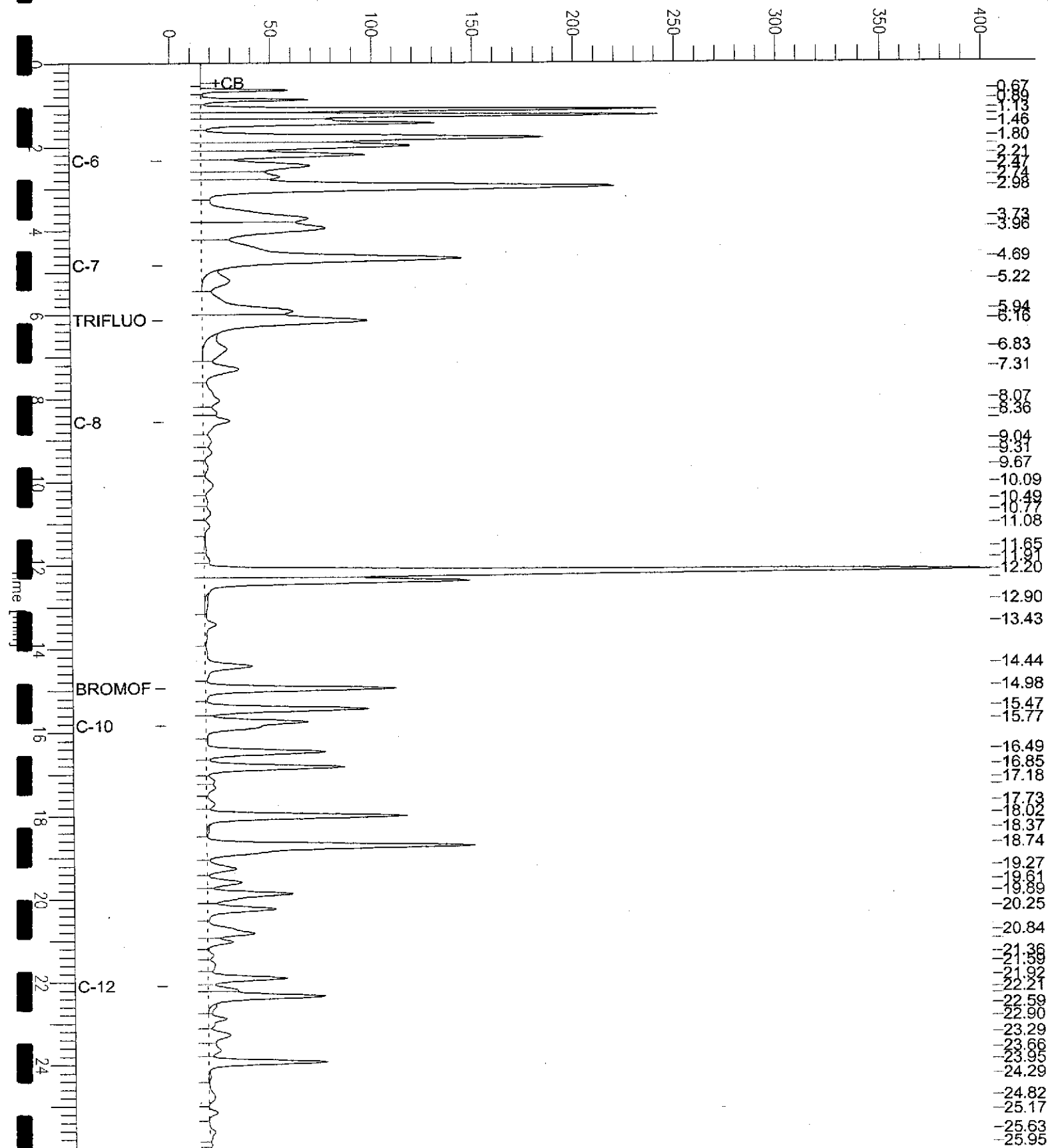
Scale Factor: 1.0

Plot Offset: -4 mV

Plot Scale: 406.9 mV

MW-8

Response [mV]

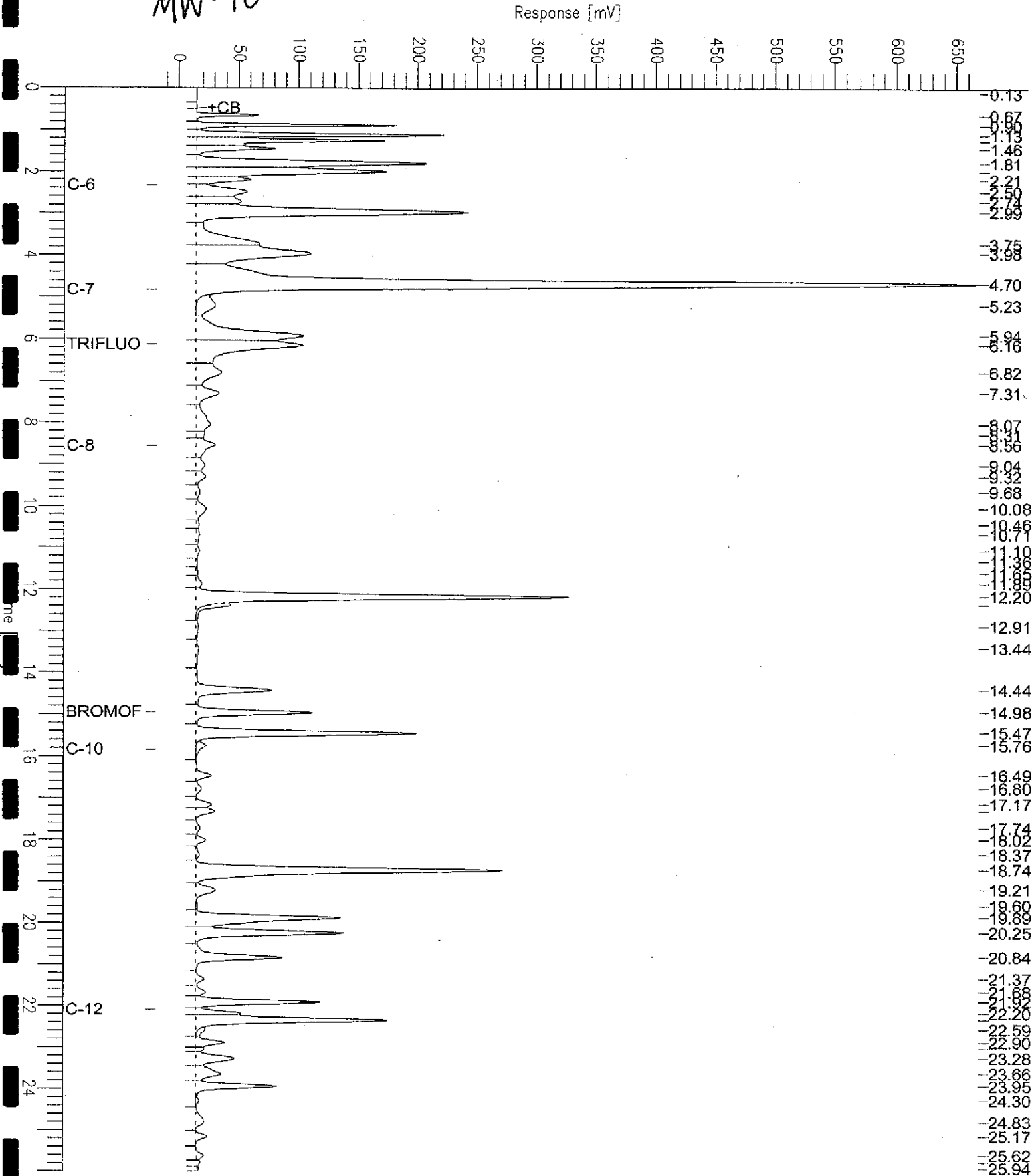


# GC07 TVH 'A' Data File RTX 502

Sample Name : 168350-009,85552  
 FileName : G:\GC07\DATA\296A018.raw  
 Method : TVHBTXE  
 Start Time : 0.00 min  
 Scale Factor : 1.0

Sample #: a1.0  
 Date : 10/23/03 10:15 PM  
 Time of Injection: 10/23/03 09:48 PM  
 Low Point : -17.90 mV  
 High Point : 669.10 mV  
 Plot Scale: 687.0 mV

MW-10



# GC07 TVH 'A' Data File RTX 502

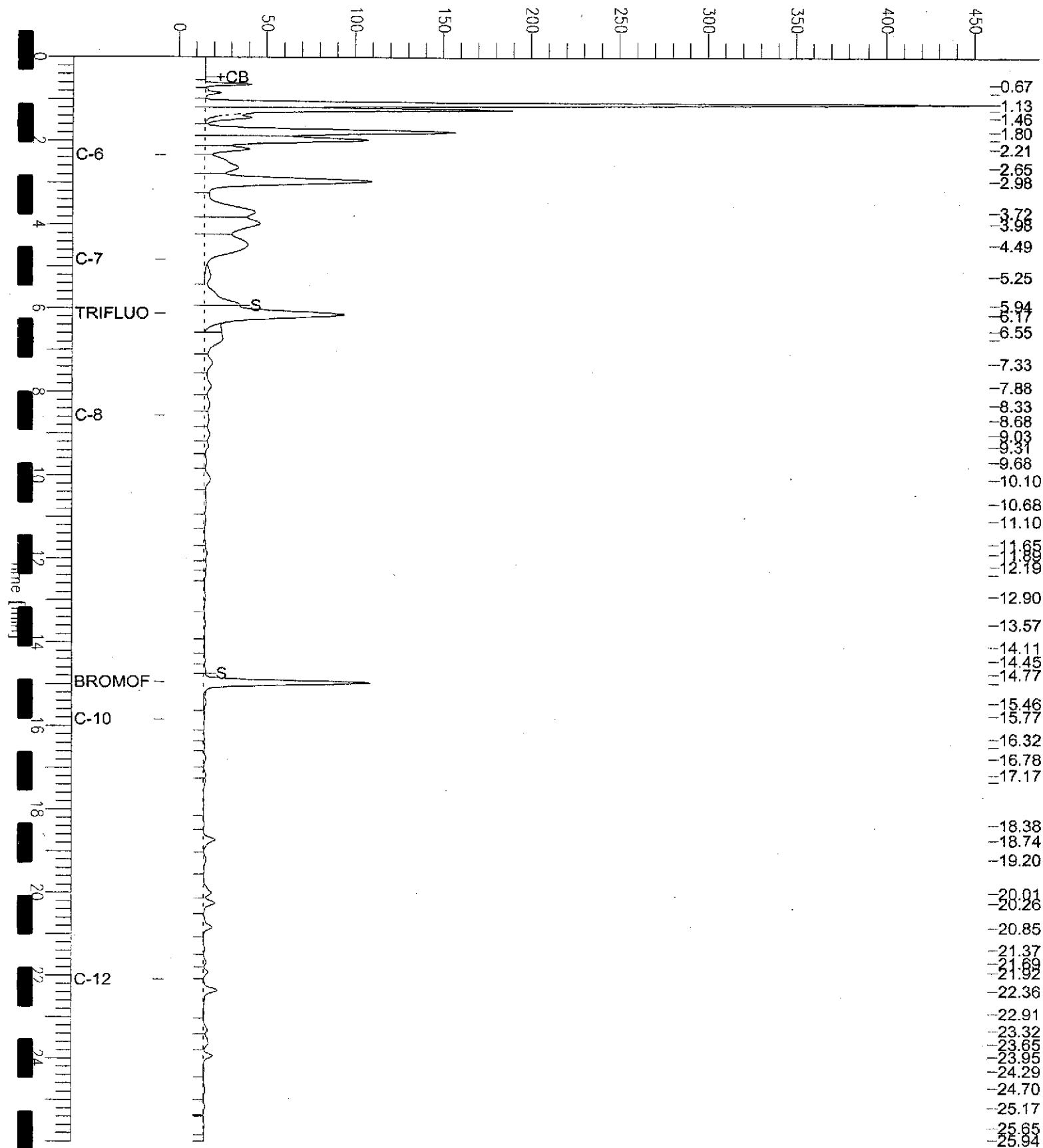
Sample Name : 168350-010,85552  
 FileName : G:\GC07\DATA\296A019.raw  
 Method : TVHBTXE  
 Start Time : 0.00 min  
 Scale Factor : 1.0

End Time : 26.00 min  
 Plot Offset : -7 mV

Sample #: a1.0  
 Date : 10/24/03 09:05 AM  
 Time of Injection: 10/23/03 10:24 PM  
 Low Point : -7.24 mV  
 High Point : 458.55 mV  
 Plot Scale: 465.8 mV

MW-11

Response [mV]



# GC07 TVH 'A' Data File RTX 502

Sample Name : 168350-011.85552

Sample #: a1.0

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FileName : G:\GC07\DATA\296A021.raw

Date : 10/24/03 09:05 AM

Method : TVHBTXE

Time of Injection: 10/23/03 11:33 PM

Start Time : 0.00 min End Time : 25.00 min

Low Point : -4.42 mV

High Point : 409.66 mV

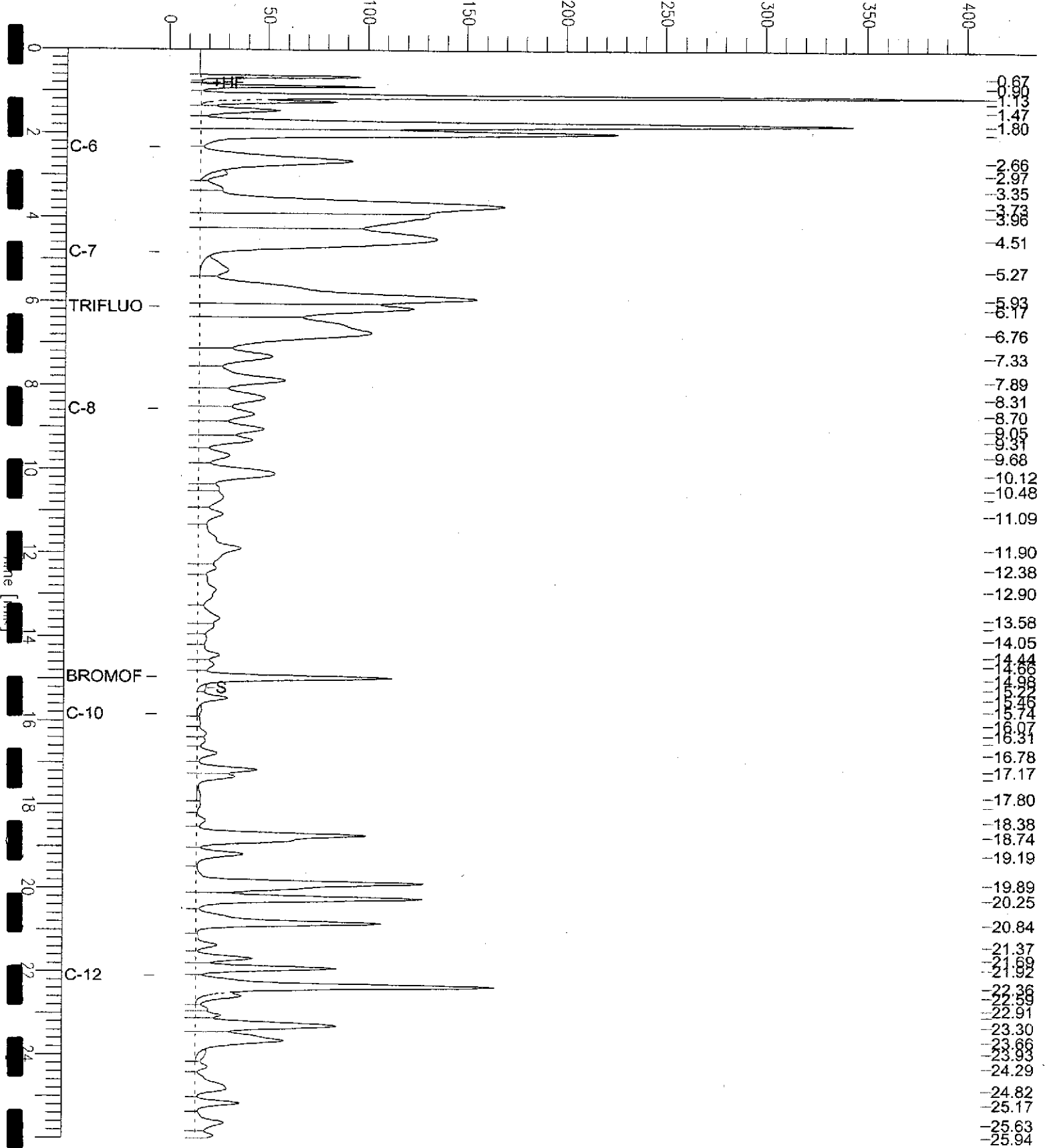
Scale Factor: 1.0

Plot Offset: -4 mV

Plot Scale: 414.1 mV

*MW-12*

Response [mV]





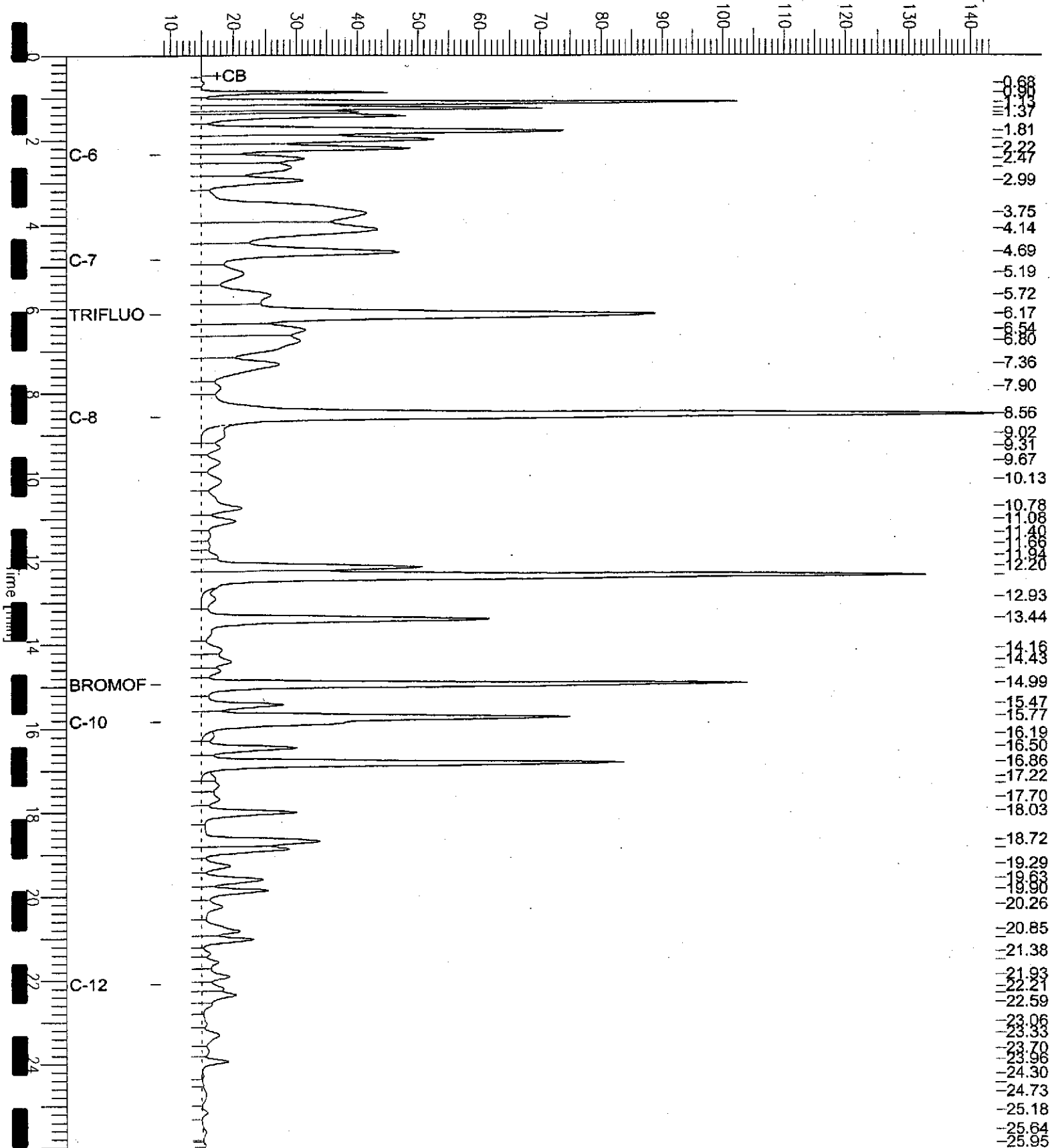
# GC07 TVH 'A' Data File RTX 502

Sample Name : ccv/lcs,qc229782,85552,03ws1625,2.5/5000  
 File Name : G:\GC07\DATA\296A002.raw  
 Method : TVHBTXE  
 Start Time : 0.00 min      End Time : 26.00 min  
 Scale Factor : 1.0      Plot Offset : 9 mV

Sample # :  
 Date : 10/23/03 12:41 PM  
 Time of Injection: 10/23/03 12:15 PM  
 Low Point : 8.51 mV      High Point : 143.59 mV  
 Plot Scale : 135.1 mV

Gasoline

Response [mV]





## Curtis &amp; Tompkins Laboratories Analytical Report

Lab #:	168350	Location:	3609 Int'l Blvd., Oakland
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2331	Analysis:	8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC229782	Batch#:	85552
Matrix:	Water	Analyzed:	10/23/03
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	1,000	953.8	95	80-120
MTBE		NA		
Benzene		NA		
Toluene		NA		
Ethylbenzene		NA		
m,p-Xylenes		NA		
o-Xylene		NA		

Surrogate	Result	%REC	Limits
Trifluorotoluene (FID)		108	57-150
Bromofluorobenzene (FID)		102	65-144
Trifluorotoluene (PID)	NA		
Bromofluorobenzene (PID)	NA		



## Curtis &amp; Tompkins Laboratories Analytical Report

Lab #:	168350	Location:	3609 Int'l Blvd., Oakland
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2331	Analysis:	EPA 8021B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC229783	Batch#:	85552
Matrix:	Water	Analyzed:	10/23/03
Units:	ug/L		

Analyte	Spiked	Result	*REC	Limits
Gasoline C7-C12		NA		
MTBE	10.00	9.240	92	63-133
Benzene	10.00	10.36	104	78-123
Toluene	10.00	9.837	98	79-120
Ethylbenzene	10.00	9.801	98	80-120
m,p-Xylenes	20.00	20.72	104	76-120
o-Xylene	10.00	9.908	99	80-121

Surrogate	Result	*REC	Limits
Trifluorotoluene (FID)	NA		
Bromofluorobenzene (FID)	NA		
Trifluorotoluene (PID)		78	54-149
Bromofluorobenzene (PID)		84	58-143



Curtis & Tompkins Laboratories Analytical Report

Lab #:	168350	Location:	3609 Int'l Blvd., Oakland
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2331	Analysis:	EPA 8021B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC230031	Batch#:	85616
Matrix:	Water	Analyzed:	10/25/03
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
MTBE	20.00	20.17	101	63-133
Benzene	20.00	21.25	106	78-123

Surrogate	Result	%REC	Limits
Trifluorotoluene (FID)	NA		
Bromofluorobenzene (FID)	NA		
Trifluorotoluene (PID)		104	54-149
Bromofluorobenzene (PID)		120	58-143



## Curtis &amp; Tompkins Laboratories Analytical Report

Lab #:	168350	Location:	3609 Int'l Blvd., Oakland
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2331	Analysis:	8015B
Field ID:	MW-4	Batch#:	85552
MSS Lab ID:	168350-004	Sampled:	10/22/03
Matrix:	Water	Received:	10/22/03
Units:	ug/L	Analyzed:	10/24/03
Diln Fac:	1.000		

Type: MS Lab ID: QC229854

Analyte	MSS Result	Spiked	Result	%REC	Limits
Gasoline C7-C12	70.05	2,000	1,938	93	76-120
MTBE			NA		
Benzene			NA		
Toluene			NA		
Ethylbenzene			NA		
m,p-Xylenes			NA		
o-Xylene			NA		

Surrogate	Result	%REC	Limits
Trifluorotoluene (PID)		119	57-150
Bromofluorobenzene (FID)		112	65-144
Trifluorotoluene (PID)	NA		
Bromofluorobenzene (PID)	NA		

Type: MSD Lab ID: QC229855

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	2,000	1,915	92	76-120	1	20
MTBE		NA				
Benzene		NA				
Toluene		NA				
Ethylbenzene		NA				
m,p-Xylenes		NA				
o-Xylene		NA				

Surrogate	Result	%REC	Limits
Trifluorotoluene (FID)		123	57-150
Bromofluorobenzene (FID)		117	65-144
Trifluorotoluene (PID)	NA		
Bromofluorobenzene (PID)	NA		

NA= Not Analyzed  
RPD= Relative Percent Difference  
Page 1 of 1

## Curtis &amp; Tompkins Laboratories Analytical Report

Lab #: 168350	Location: 3609 Int'l Blvd., Oakland
Client: SOMA Environmental Engineering Inc.	Prep: EPA 5030B
Project#: 2331	Analysis: EPA 8021B
Field ID: ZZZZZZZZZZ	Batch#: 85616
MSS Lab ID: 168371-001	Sampled: 10/23/03
Matrix: Water	Received: 10/23/03
Units: ug/L	Analyzed: 10/25/03
Diln Fac: 1.000	

Type: MS Lab ID: QC230035

Analyte	MSS Result	Spiked	Result	%REC	Limits
MTBE	1.590	20.00	22.66	105	38-149
Benzene	<0.1200	20.00	22.15	111	75-128

Surrogate	Result	%REC	Limits
Trifluorotoluene (FID)	NA		
Bromofluorobenzene (FID)	NA		
Trifluorotoluene (PID)		112	54-149
Bromofluorobenzene (PID)		134	58-143

Type: MSD Lab ID: QC230036

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	20.00	21.68	100	38-149	4	38
Benzene	20.00	21.82	109	75-128	2	20

Surrogate	Result	%REC	Limits
Trifluorotoluene (FID)	NA		
Bromofluorobenzene (FID)	NA		
Trifluorotoluene (PID)		111	54-149
Bromofluorobenzene (PID)		136	58-143

## Purgeable Aromatics by GC/MS

Lab #:	168350	Location:	3609 Int'l Blvd., Oakland
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2331	Analysis:	EPA 8260B
Field ID:	MW-1	Batch#:	85667
Lab ID:	168350-001	Sampled:	10/22/03
Matrix:	Water	Received:	10/22/03
Units:	ug/L	Analyzed:	10/28/03
Diln Fac:	100.0		

Analyte	Result	RI
MTBE	15,000	50

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	106	77-129
Toluene-d8	94	80-120
Bromofluorobenzene	100	80-123

## Purgeable Aromatics by GC/MS

Lab #:	168350	Location:	3609 Int'l Blvd., Oakland
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2331	Analysis:	EPA 8260B
Field ID:	MW-3	Batch#:	85667
Lab ID:	168350-003	Sampled:	10/22/03
Matrix:	Water	Received:	10/22/03
Units:	ug/L	Analyzed:	10/28/03
Diln Fac:	50.00		

Analyte	Result	RL
MTBE	7,400	25

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	108	77-129
Toluene-d8	93	80-120
Bromofluorobenzene	97	80-123



## Purgeable Aromatics by GC/MS

Lab #:	168350	Location:	3609 Int'l Blvd., Oakland
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2331	Analysis:	EPA 8260B
Field ID:	MW-5	Batch#:	85667
Lab ID:	168350-005	Sampled:	10/22/03
Matrix:	Water	Received:	10/22/03
Units:	ug/L	Analyzed:	10/29/03
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	1.9	0.5

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	103	77-129
Toluene-d8	91	80-120
Bromofluorobenzene	97	80-123

**Purgeable Aromatics by GC/MS**

Lab #:	168350	Location:	3609 Int'l Blvd., Oakland
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2331	Analysis:	EPA 8260B
Field ID:	MW-7	Batch#:	85667
Lab ID:	168350-007	Sampled:	10/22/03
Matrix:	Water	Received:	10/22/03
Units:	ug/L	Analyzed:	10/29/03
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	5.0	0.5

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	101	77-129
Toluene-d8	94	80-120
Bromofluorobenzene	102	80-123

## Purgeable Aromatics by GC/MS

Lab #:	168350	Location:	3609 Int'l Blvd., Oakland
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2331	Analysis:	EPA 8260B
Field ID:	MW-8	Batch#:	85667
Lab ID:	168350-008	Sampled:	10/22/03
Matrix:	Water	Received:	10/22/03
Units:	ug/L	Analyzed:	10/29/03
Diln Fac:	6.250		

Analyte	Result	RL
MTBE	280	3.1

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	100	77-129
Toluene-d8	96	80-120
Bromofluorobenzene	93	80-123

**Purgeable Aromatics by GC/MS**

Lab #:	168350	Location:	3609 Int'l Blvd., Oakland
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2331	Analysis:	EPA 8260B
Field ID:	MW-10	Batch#:	85667
Lab ID:	168350-009	Sampled:	10/22/03
Matrix:	Water	Received:	10/22/03
Units:	ug/L	Analyzed:	10/29/03
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	110	0.5

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	98	77-129
Toluene-d8	95	80-120
Bromofluorobenzene	100	80-123

## Purgeable Aromatics by GC/MS

Lab #:	168350	Location:	3609 Int'l Blvd., Oakland
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2331	Analysis:	EPA 8260B
Field ID:	MW-11	Batch#:	85667
Lab ID:	168350-010	Sampled:	10/22/03
Matrix:	Water	Received:	10/22/03
Units:	ug/L	Analyzed:	10/28/03
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	ND	0.5

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	105	77-129
Toluene-d8	96	80-120
Bromofluorobenzene	104	80-123

## Purgeable Aromatics by GC/MS

Lab #:	168350	Location:	3609 Int'l Blvd., Oakland
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2331	Analysis:	EPA 8260B
Field ID:	MW-12	Batch#:	85667
Lab ID:	168350-011	Sampled:	10/22/03
Matrix:	Water	Received:	10/22/03
Units:	ug/L	Analyzed:	10/28/03
Diln Fac:	1.000		

Analyte	Result	RL
MTBE	49	0.5

Surrogate	UREC	Limits
1,2-Dichloroethane-d4	103	77-129
Toluene-d8	99	80-120
Bromofluorobenzene	100	80-123

## Purgeable Aromatics by GC/MS

Lab #:	168350	Location:	3609 Int'l Blvd., Oakland
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2331	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC230240	Batch#:	85667
Matrix:	Water	Analyzed:	10/28/03
Units:	ug/L		

Analyte	Result	RL
MTBE	ND	0.5

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	108	77-129
Toluene-d8	105	80-120
Bromofluorobenzene	101	80-123

## Purgeable Aromatics by GC/MS

Lab #:	168350	Location:	3609 Int'l Blvd., Oakland
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2331	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC230241	Batch#:	85667
Matrix:	Water	Analyzed:	10/28/03
Units:	ug/L		

Analyte	Result	RL
MTBE	ND	0.5

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	104	77-129
Toluene-d8	92	80-120
Bromofluorobenzene	105	80-123





## Purgeable Aromatics by GC/MS

Lab #:	168350	Location:	3609 Int'l Blvd., Oakland
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2331	Analysis:	EPA 8260B
Matrix:	Water	Batch#:	85667
Units:	ug/L	Analyzed:	10/28/03
Diln Fac:	1.000		

Type: BS Lab ID: QC230238

Analyte	Spiked	Result	%REC	Limits
TBE	50.00	47.19	94	69-124

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	106	77-129
Toluene-d8	96	80-120
Bromofluorobenzene	99	80-123

Type: BSD Lab ID: QC230239

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
TBE	50.00	45.94	92	69-124	3	20

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	105	77-129
Toluene-d8	104	80-120
Bromofluorobenzene	95	80-123

# Appendix C

Chain of Custody Form and Laboratory Report  
for the  
Groundwater Extraction Treatment System



A N A L Y T I C A L   R E P O R T

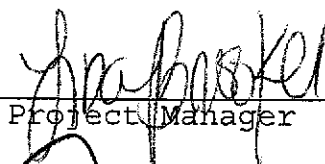
Prepared for:

SOMA Environmental Engineering Inc.  
2680 Bishop Dr.  
Suite 203  
San Ramon, CA 94583

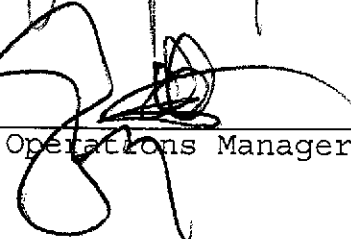
Date: 27-OCT-03  
Lab Job Number: 168184  
Project ID: 2333  
Location: 3609 International Blvd

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.

Reviewed by:

  
Project Manager

Reviewed by:

  
Operations Manager

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## Curtis &amp; Tompkins Laboratories Analytical Report

Lab #:	168184	Location:	3609 International Blvd
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2333		
Matrix:	Water	Sampled:	10/13/03
Units:	ug/L	Received:	10/13/03
Batch#:	85298	Analyzed:	10/14/03

Field ID:	INFLUENT	Lab ID:	168184-001
Type:	SAMPLE	Diln Fac:	5.000

Analyte	Result	RL	Analysis
Gasoline C7-C12	6,100	250	8015B
MTBE	1,400	25	EPA 8021B
Benzene	640	25	EPA 8021B
Toluene	200	25	EPA 8021B
Ethylbenzene	200	25	EPA 8021B
m,p-Xylenes	390	25	EPA 8021B
o-Xylene	230	25	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	127	57-150	8015B
Bromofluorobenzene (FID)	107	65-144	8015B
Trifluorotoluene (PID)	110	54-149	EPA 8021B
Bromofluorobenzene (PID)	111	58-143	EPA 8021B

Field ID:	GAC-1	Lab ID:	168184-002
Type:	SAMPLE	Diln Fac:	1.000

Analyte	Result	RL	Analysis
Gasoline C7-C12	ND	50	8015B
MTBE	ND	5.0	EPA 8021B
Benzene	ND	5.0	EPA 8021B
Toluene	ND	5.0	EPA 8021B
Ethylbenzene	ND	5.0	EPA 8021B
m,p-Xylenes	ND	5.0	EPA 8021B
o-Xylene	ND	5.0	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	103	57-150	8015B
Bromofluorobenzene (FID)	103	65-144	8015B
Trifluorotoluene (PID)	103	54-149	EPA 8021B
Bromofluorobenzene (PID)	104	58-143	EPA 8021B

ND= Not Detected  
RL= Reporting Limit  
Page 1 of 2

# GC19 TVH 'X' Data File (FID)

Sample Name : 168184-001,85298

Sample #: c1.3

Page 1 of 1

FileName : G:\GC19\DATA\287X011.raw

Date : 10/14/03 04:18 PM

Method : TVHBTXE

Time of Injection: 10/14/03 03:51 PM

Start Time : 0.00 min End Time : 26.80 min

Low Point : -1.90 mV

High Point : 305.16 mV

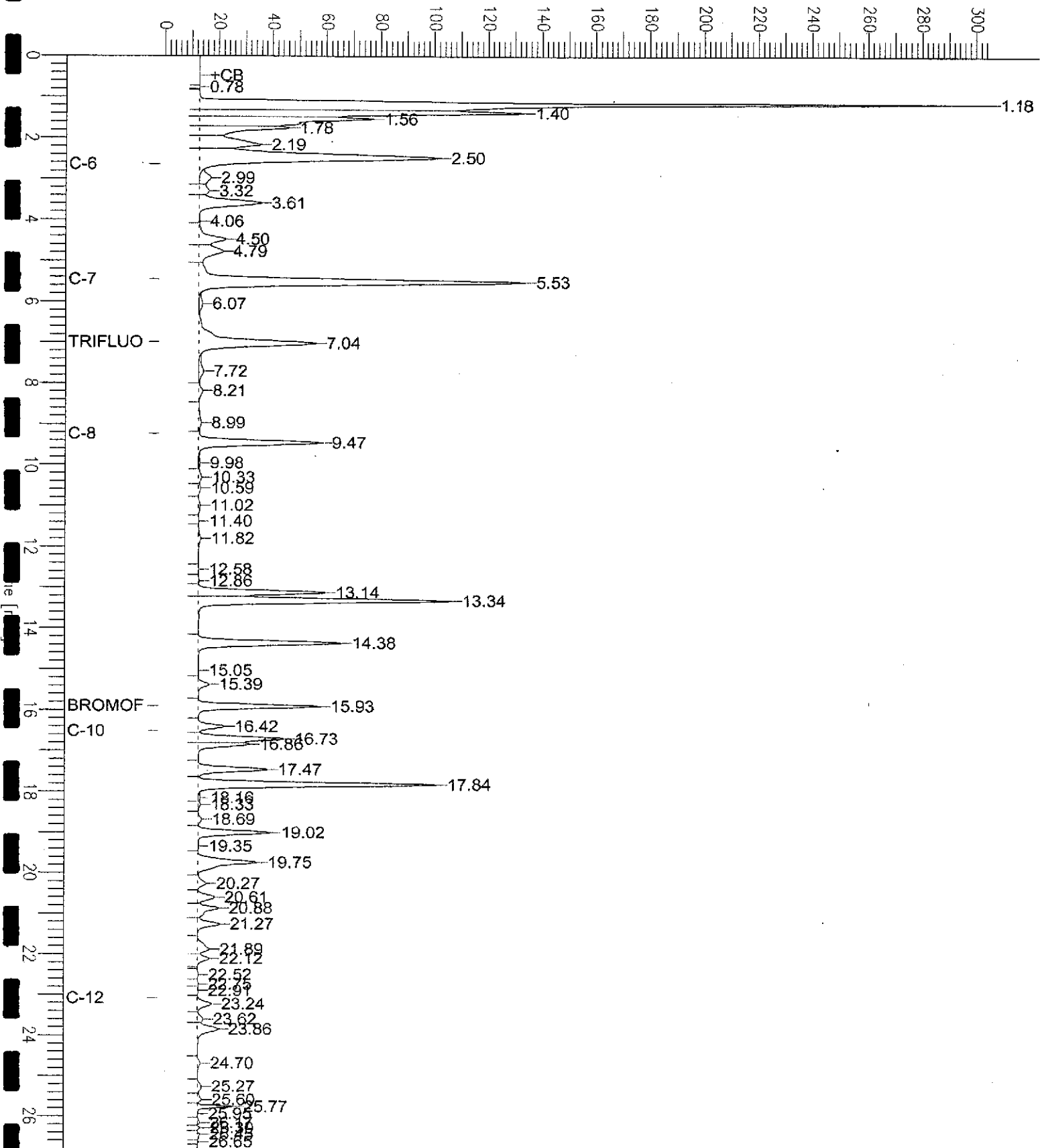
Scale Factor: 1.0

Plot Offset: -2 mV

Plot Scale: 307.1 mV

## INFLUENT

Response [mV]



## Curtis &amp; Tompkins Laboratories Analytical Report

Lab #:	168184	Location:	3609 International Blvd
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2333		
Matrix:	Water	Sampled:	10/13/03
Units:	ug/L	Received:	10/13/03
Batch#:	85298	Analyzed:	10/14/03

Field ID:	PSP#1	Lab ID:	168184-003
Type:	SAMPLE	Diln Fac:	1.000

Analyte	Result	RL	Analysis
Gasoline C7-C12	ND	50	8015B
MTBE	5.3	5.0	EPA 8021B
Benzene	ND	5.0	EPA 8021B
Toluene	ND	5.0	EPA 8021B
Ethylbenzene	ND	5.0	EPA 8021B
m,p-Xylenes	ND	5.0	EPA 8021B
o-Xylene	ND	5.0	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	106	57-150	8015B
Bromofluorobenzene (FID)	107	65-144	8015B
Trifluorotoluene (PID)	105	54-149	EPA 8021B
Bromofluorobenzene (PID)	109	58-143	EPA 8021B

Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC228786		

Analyte	Result	RL	Analysis
Gasoline C7-C12	ND	50	8015B
MTBE	ND	5.0	EPA 8021B
Benzene	ND	5.0	EPA 8021B
Toluene	ND	5.0	EPA 8021B
Ethylbenzene	ND	5.0	EPA 8021B
m,p-Xylenes	ND	5.0	EPA 8021B
o-Xylene	ND	5.0	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	94	57-150	8015B
Bromofluorobenzene (FID)	96	65-144	8015B
Trifluorotoluene (PID)	94	54-149	EPA 8021B
Bromofluorobenzene (PID)	97	58-143	EPA 8021B

# GC19 TVH 'X' Data File (FID)

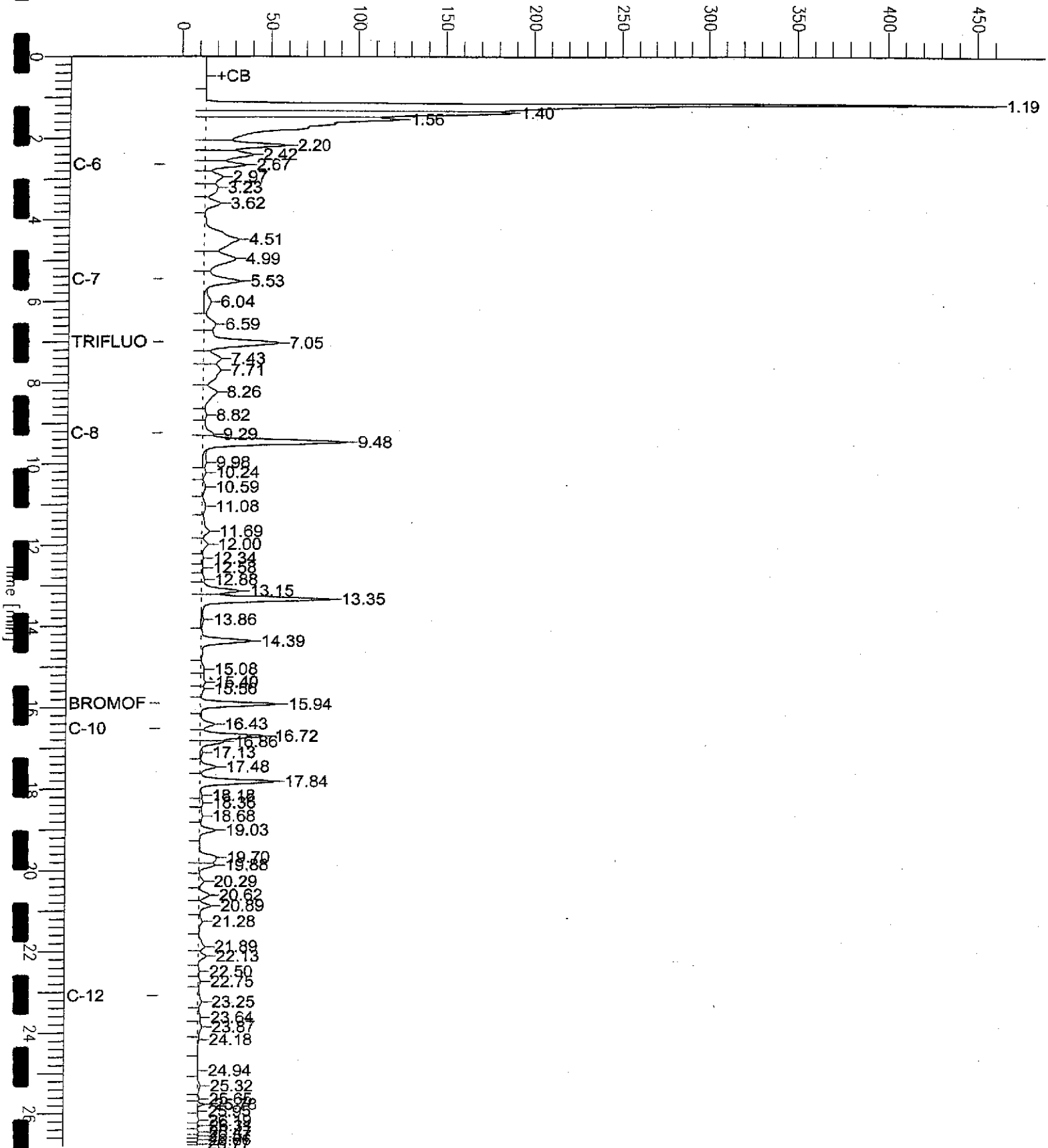
Sample Name : ccv/bs\_gc228787\_85298\_03ws1625\_2.5/5000  
FileName : g:\gc19\data\287x003.raw  
Method : TVHBTKE  
Start Time : 0.00 min  
Scale Factor : 1.0

Sample # :  
Date : 10/14/03 07:14 PM  
Time of Injection: 10/14/03 11:13 AM  
Low Point : -9.14 mV  
High Point : 460.45 mV  
Plot Scale: 469.6 mV

Page 1 of 1

*Gasoline*

Response [mV]







## Curtis &amp; Tompkins Laboratories Analytical Report

Lab #:	168184	Location:	3609 International Blvd
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2333	Analysis:	EPA 8021B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC228788	Batch#:	85298
Matrix:	Water	Analyzed:	10/14/03
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12		NA		
MTBE	10.00	9.582	96	63-133
Benzene	10.00	10.72	107	78-123
Toluene	10.00	10.21	102	79-120
Ethylbenzene	10.00	9.904	99	80-120
m,p-Xylenes	20.00	20.66	103	76-120
o-Xylene	10.00	10.04	100	80-121

Surrogate	Result	%REC	Limits
Trifluorotoluene (FID)	NA		
Bromofluorobenzene (FID)	NA		
Trifluorotoluene (PID)		101	54-149
Bromofluorobenzene (PID)		102	58-143



## Curtis &amp; Tompkins Laboratories Analytical Report

Lab #:	168184	Location:	3609 International Blvd
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2333	Analysis:	8015B
Type:	BS	Diln Fac:	1.000
Lab ID:	QC228787	Batch#:	85298
Matrix:	Water	Analyzed:	10/14/03
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	1,000	1,058	106	80-120
MTBE		NA		
Benzene		NA		
Toluene		NA		
Ethylbenzene		NA		
m,p-Xylenes		NA		
o-Xylene		NA		

Surrogate	Result	%REC	Limits
Trifluorotoluene (FID)		121	57-150
Bromofluorobenzene (FID)		106	65-144
Trifluorotoluene (PID)	NA		
Bromofluorobenzene (PID)	NA		



## Curtis &amp; Tompkins Laboratories Analytical Report

Lab #:	168184	Location:	3609 International Blvd
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2333	Analysis:	8015B
Type:	BSD	Diln Fac:	1.000
Lab ID:	QC228881	Batch#:	85298
Matrix:	Water	Analyzed:	10/14/03
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	2,000	2,089	104	80-120	1	20
MTBE		NA				
Benzene		NA				
Toluene		NA				
Ethylbenzene		NA				
m,p-Xylenes		NA				
o-Xylene		NA				

Surrogate	Result	%REC	Limits
Trifluorotoluene (FID)		123	57-150
Bromofluorobenzene (FID)		110	65-144
Trifluorotoluene (PID)	NA		
Bromofluorobenzene (PID)	NA		





A N A L Y T I C A L   R E P O R T

Prepared for:

SOMA Environmental Engineering Inc.  
2680 Bishop Dr.  
Suite 203  
San Ramon, CA 94583


Date: 22-SEP-03  
Lab Job Number: 167576  
Project ID: 2333  
Location: 3609 International Blvd

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.

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Project Manager

Reviewed by:

  
Operations Manager

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## Curtis &amp; Tompkins Laboratories Analytical Report

Lab #:	167576	Location:	3609 International Blvd
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2333		
Matrix:	Water	Sampled:	09/15/03
Units:	ug/L	Received:	09/15/03
Batch#:	84579	Analyzed:	09/17/03

Field ID:	INFLUENT	Lab ID:	167576-001
Type:	SAMPLE		

Analyte	Result	RL	Diln Fac	Analysis
Gasoline C7-C12	4,200	50	1.000	8015B
MTBE	1,100	10	2.000	EPA 8021B
Benzene	460	10	2.000	EPA 8021B
Toluene	210	5.0	1.000	EPA 8021B
Ethylbenzene	69	5.0	1.000	EPA 8021B
m,p-Xylenes	360	5.0	1.000	EPA 8021B
o-Xylene	200	5.0	1.000	EPA 8021B

Surrogate	%REC	Limits	Diln Fac	Analysis
Trifluorotoluene (FID)	144	57-150	1.000	8015B
Bromofluorobenzene (FID)	143	65-144	1.000	8015B
Trifluorotoluene (PID)	93	54-149	1.000	EPA 8021B
Bromofluorobenzene (PID)	106	58-143	1.000	EPA 8021B

Field ID:	GAC-1	Lab ID:	167576-002
Type:	SAMPLE	Diln Fac:	1.000

Analyte	Result	RL	Analysis
Gasoline C7-C12	ND	50	8015B
MTBE	6.0	5.0	EPA 8021B
Benzene	ND	5.0	EPA 8021B
Toluene	ND	5.0	EPA 8021B
Ethylbenzene	ND	5.0	EPA 8021B
m,p-Xylenes	ND	5.0	EPA 8021B
o-Xylene	ND	5.0	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	100	57-150	8015B
Bromofluorobenzene (FID)	128	65-144	8015B
Trifluorotoluene (PID)	81	54-149	EPA 8021B
Bromofluorobenzene (PID)	106	58-143	EPA 8021B

ND = Not Detected  
 RL = Reporting Limit  
 Page 1 of 2

## Curtis &amp; Tompkins Laboratories Analytical Report

Lab #:	167576	Location:	3609 International Blvd
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2333		
Matrix:	Water	Sampled:	09/15/03
Units:	ug/L	Received:	09/15/03
Batch#:	84579	Analyzed:	09/17/03

Field ID:	PSP#1	Lab ID:	167576-003
Type:	SAMPLE	Diln Fac:	1.000

Analyte	Result	RL	Analysis
Gasoline C7-C12	ND	50	8015B
MTBE	ND	5.0	EPA 8021B
Benzene	ND	5.0	EPA 8021B
Toluene	ND	5.0	EPA 8021B
Ethylbenzene	ND	5.0	EPA 8021B
m,p-Xylenes	ND	5.0	EPA 8021B
o-Xylene	ND	5.0	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	93	57-150	8015B
Bromofluorobenzene (FID)	117	65-144	8015B
Trifluorotoluene (PID)	74	54-149	EPA 8021B
Bromofluorobenzene (PID)	95	58-143	EPA 8021B

Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC225976		

Analyte	Result	RL	Analysis
Gasoline C7-C12	ND	50	8015B
MTBE	ND	5.0	EPA 8021B
Benzene	ND	5.0	EPA 8021B
Toluene	ND	5.0	EPA 8021B
Ethylbenzene	ND	5.0	EPA 8021B
m,p-Xylenes	ND	5.0	EPA 8021B
o-Xylene	ND	5.0	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	97	57-150	8015B
Bromofluorobenzene (FID)	118	65-144	8015B
Trifluorotoluene (PID)	76	54-149	EPA 8021B
Bromofluorobenzene (PID)	93	58-143	EPA 8021B

ND = Not Detected  
 RL = Reporting Limit  
 Page 2 of 2



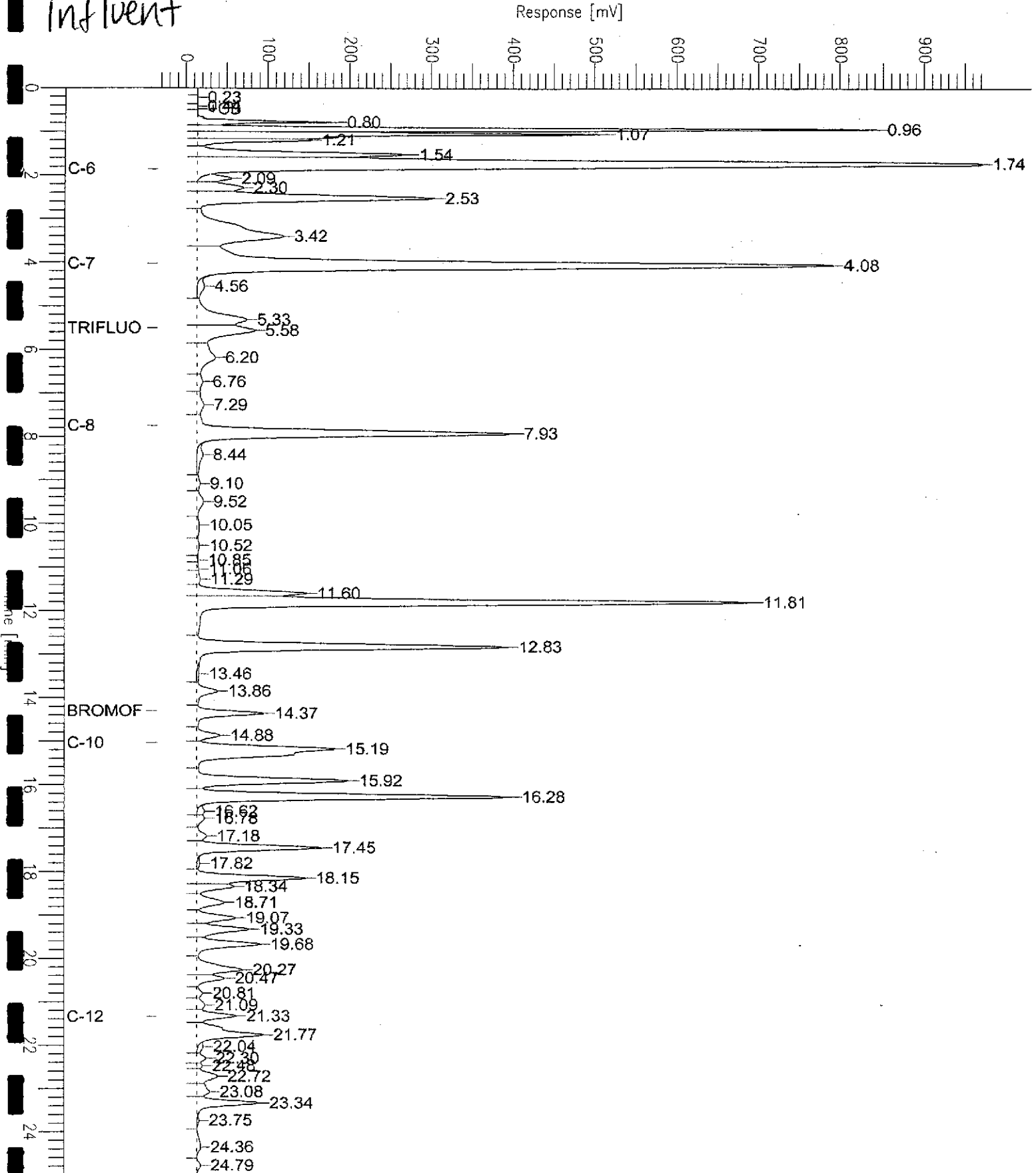
# Chromatogram

Sample Name : 167576-001,84579  
FileName : G:\GC05\DATA\2606006.raw  
Method : TVHBTXE  
Start Time : 0.00 min  
Scale Factor : 1.0

Sample #: a1.0  
Date : 9/17/03 03:43 PM  
Time of Injection: 9/17/03 03:18 PM  
Low Point : -33.99 mV  
Plot Scale: 1005.6 mV  
End Time : 25.00 min  
Plot Offset: -34 mV  
High Point : 971.63 mV

Page 1 of 1

Influent



# Chromatogram

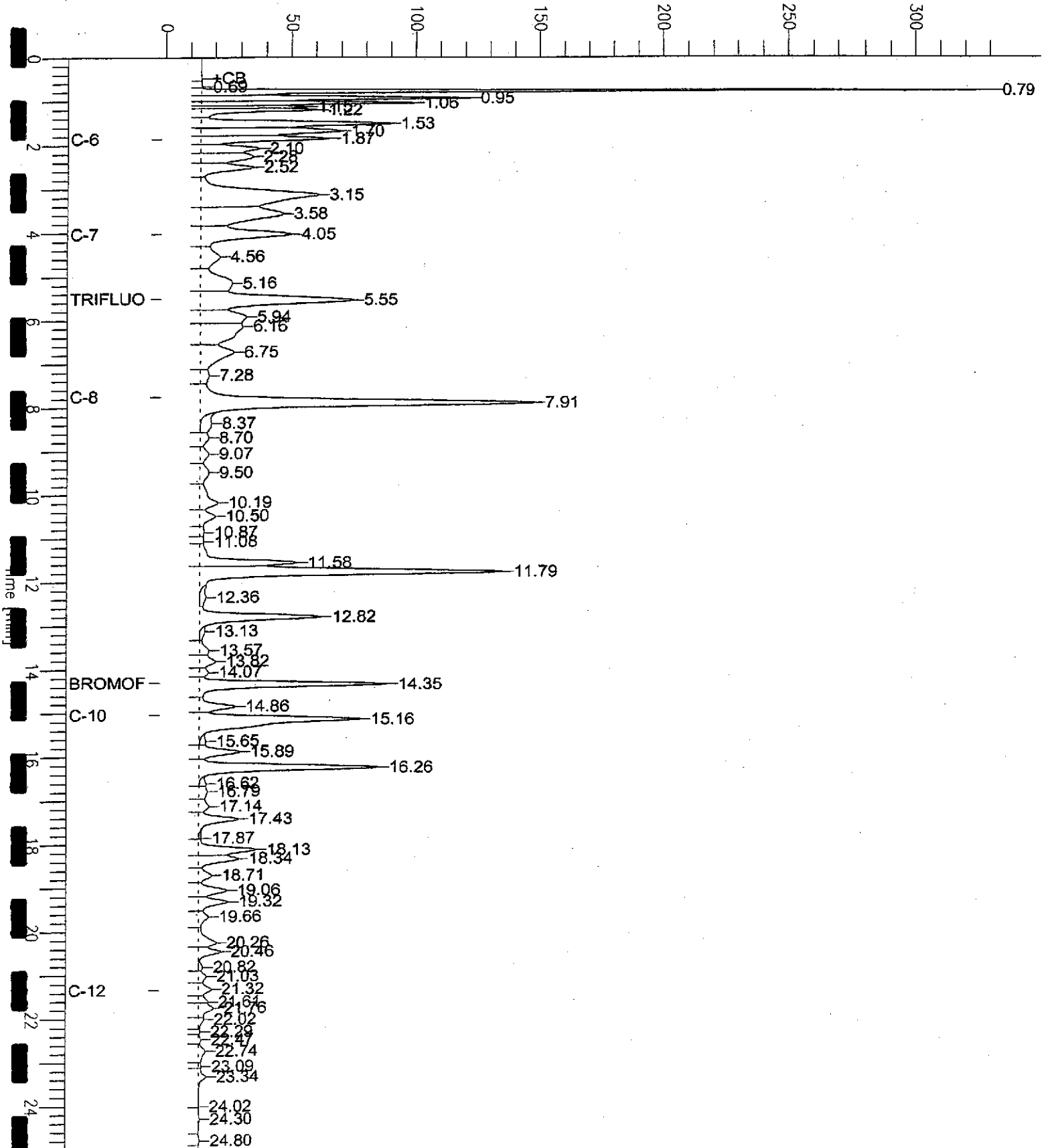
Sample Name : ccv/lcs,qc225978,84579,03ws1335,2.5/5000  
FileName : G:\GC05\DATA\260g002.raw  
Method : TVHBTXE  
Start Time : 0.00 min  
Scale Factor : 1.0

Sample # :  
Date : 9/17/03 01:15 PM  
Time of Injection: 9/17/03 12:41 PM  
Low Point : -1.77 mV  
Plot Scale: 332.3 mV

Page 1 of 1

## Gasoline

Response [mV]



### Total Volatile Hydrocarbons

Lab #:	167576	Location:	3609 International Blvd
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2333	Analysis:	8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC225978	Batch#:	84579
Matrix:	Water	Analyzed:	09/17/03
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	1,000	1,151	115	80-120

Surrogate	%REC	Limits
Trifluorotoluene (FID)	114	57-150
Bromofluorobenzene (FID)	130	65-144

## Benzene, Toluene, Ethylbenzene, Xylenes

Lab #:	167576	Location:	3609 International Blvd
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2333	Analysis:	EPA 8021B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC225977	Batch#:	84579
Matrix:	Water	Analyzed:	09/17/03
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
MTBE	10.00	8.881	89	63-133
Benzene	10.00	10.12	101	78-123
Toluene	10.00	9.573	96	79-120
Ethylbenzene	10.00	9.941	99	80-120
m,p-Xylenes	20.00	21.03	105	76-120
o-Xylene	10.00	10.36	104	80-121

Surrogate	%REC	Limits
Trifluorotoluene (PID)	77	54-149
Bromofluorobenzene (PID)	95	58-143





A N A L Y T I C A L   R E P O R T

Prepared for:

SOMA Environmental Engineering Inc.  
2680 Bishop Dr.  
Suite 203  
San Ramon, CA 94583

Date: 18-SEP-03  
Lab Job Number: 167282  
Project ID: 2333  
Location: 3609 International Blvd

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.

Reviewed by:   
Project Manager

Reviewed by:   
Operations Manager

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### Curtis & Tompkins Laboratories Analytical Report

Lab #:	167282	Location:	3609 International Blvd
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2333		
Matrix:	Water	Sampled:	09/02/03
Units:	ug/L	Received:	09/02/03
Batch#:	84173		

Field ID:	INFLUENT	Diln Fac:	5.000
Type:	SAMPLE	Analyzed:	09/04/03
Lab ID:	167282-001		

Analyte	Result	RL	Analysis
Gasoline C7-C12	5,000	250	8015B
MTBE	1,500	25	EPA 8021B
Benzene	660	25	EPA 8021B
Toluene	320	25	EPA 8021B
Ethylbenzene	100	25	EPA 8021B
m,p-Xylenes	520	25	EPA 8021B
o-Xylene	270	25	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	121	57-150	8015B
Bromofluorobenzene (FID)	141	65-144	8015B
Trifluorotoluene (PID)	91	54-149	EPA 8021B
Bromofluorobenzene (PID)	113	58-143	EPA 8021B

Field ID:	GAC-1	Diln Fac:	1.000
Type:	SAMPLE	Analyzed:	09/03/03
Lab ID:	167282-002		

Analyte	Result	RL	Analysis
Gasoline C7-C12	ND	50	8015B
MTBE	ND	5.0	EPA 8021B
Benzene	ND	5.0	EPA 8021B
Toluene	ND	5.0	EPA 8021B
Ethylbenzene	ND	5.0	EPA 8021B
m,p-Xylenes	ND	5.0	EPA 8021B
o-Xylene	ND	5.0	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	96	57-150	8015B
Bromofluorobenzene (FID)	124	65-144	8015B
Trifluorotoluene (PID)	79	54-149	EPA 8021B
Bromofluorobenzene (PID)	102	58-143	EPA 8021B



# Chromatogram

Sample Name : 167282-001,84173,btxe only

Sample #: a1.0

Page 1 of 1

FileName : g:\gc05\data\245g022.raw

Date : 9/4/03 11:28 AM

Method : TVHBTXE

Time of Injection: 9/4/03 12:22 AM

Start Time : 0.00 min

End Time : 25.00 min

Low Point : 0.47 mV

High Point : 280.81 mV

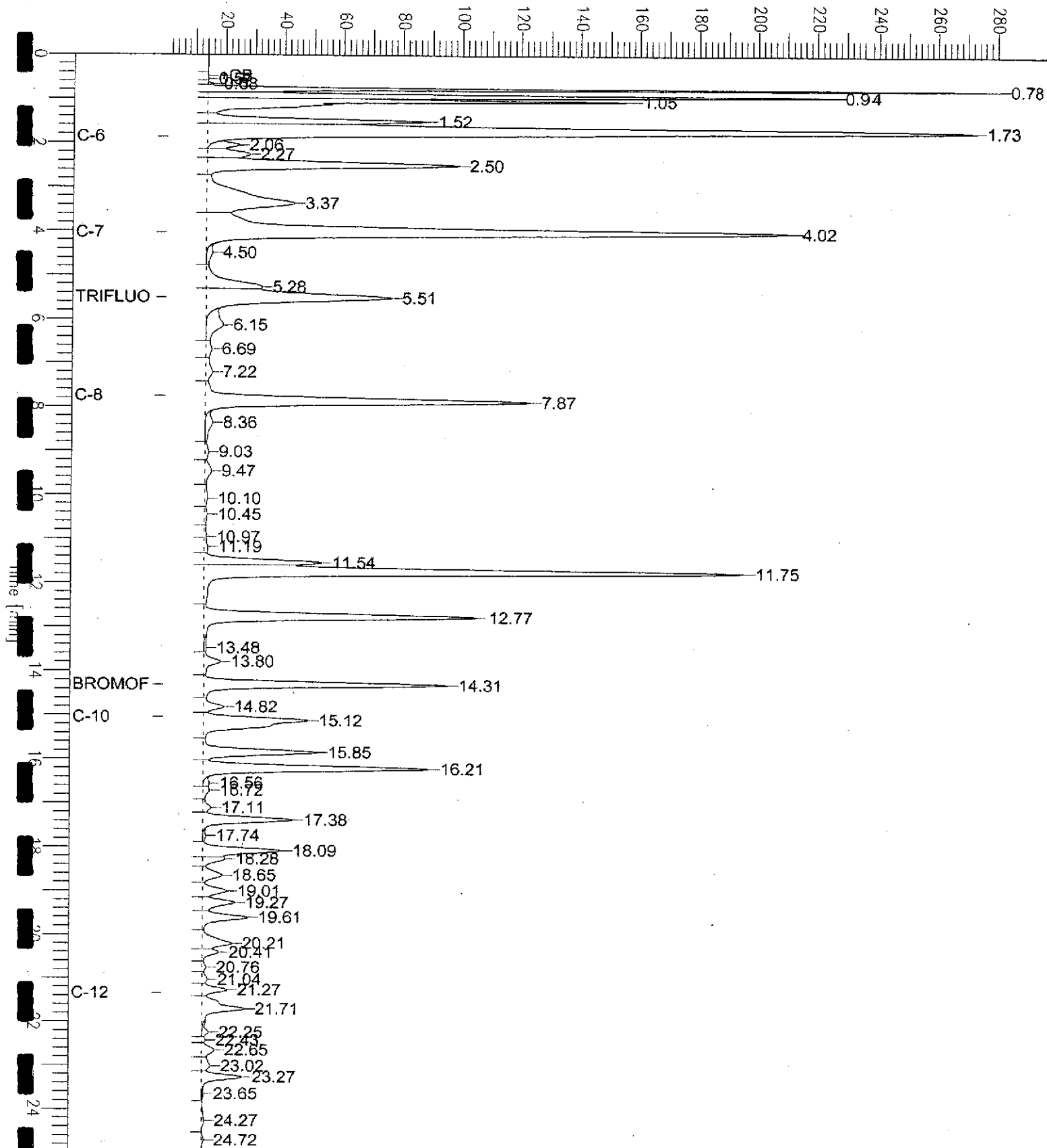
Scale Factor: 1.0

Plot Offset: 0 mV

Plot Scale: 280.3 mV

INFLUENT

Response [mV]



## Curtis &amp; Tompkins Laboratories Analytical Report

Lab #: 167282	Location: 3609 International Blvd
Client: SOMA Environmental Engineering Inc.	Prep: EPA 5030B
Project#: 2333	
Matrix: Water	Sampled: 09/02/03
Units: ug/L	Received: 09/02/03
Batch#: 84173	

Field ID: PSP#1	Diln Fac: 1.000
Type: SAMPLE	Analyzed: 09/03/03
Lab ID: 167282-003	

Analyte	Result	RL	Analysis
Gasoline C7-C12	ND	50	8015B
MTBE	ND	5.0	EPA 8021B
Benzene	ND	5.0	EPA 8021B
Toluene	ND	5.0	EPA 8021B
Ethylbenzene	ND	5.0	EPA 8021B
m,p-Xylenes	ND	5.0	EPA 8021B
o-Xylene	ND	5.0	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	99	57-150	8015B
Bromofluorobenzene (FID)	127	65-144	8015B
Trifluorotoluene (PID)	80	54-149	EPA 8021B
Bromofluorobenzene (PID)	105	58-143	EPA 8021B

Type: BLANK	Diln Fac: 1.000
Lab ID: QC224358	Analyzed: 09/03/03

Analyte	Result	RL	Analysis
Gasoline C7-C12	ND	50	8015B
MTBE	ND	5.0	EPA 8021B
Benzene	ND	5.0	EPA 8021B
Toluene	ND	5.0	EPA 8021B
Ethylbenzene	ND	5.0	EPA 8021B
m,p-Xylenes	ND	5.0	EPA 8021B
o-Xylene	ND	5.0	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	102	57-150	8015B
Bromofluorobenzene (FID)	125	65-144	8015B
Trifluorotoluene (PID)	82	54-149	EPA 8021B
Bromofluorobenzene (PID)	103	58-143	EPA 8021B

# Chromatogram

Sample Name : CCV/LCS,qc224360,84173,03ws1335,5/5000

Sample #:

Page 1 of 1

File Name : G:\GC05\DATA\245G002.raw

Date : 9/3/03 01:26 PM

Method : TVHBTXE

Time of Injection: 9/3/03 01:01 PM

Start Time : 0.00 min

End Time : 25.00 min

Low Point : -9.51 mV

High Point : 478.02 mV

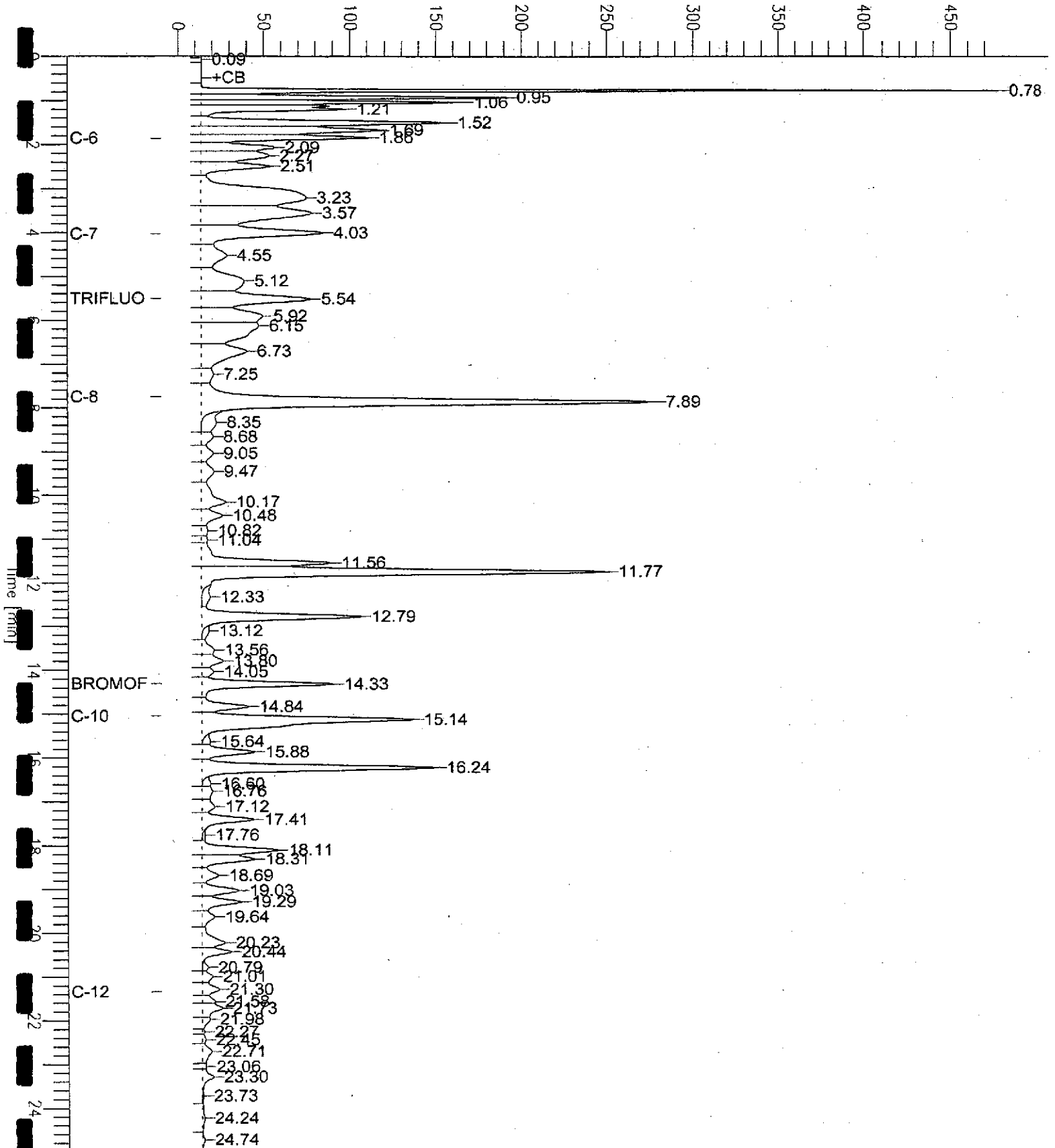
Scale Factor: 1.0

Plot Offset: -10 mV

Plot Scale: 487.5 mV

*Gasoline*

Response [mV]



**Benzene, Toluene, Ethylbenzene, Xylenes**

Lab #:	167282	Location:	3609 International Blvd
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2333	Analysis:	EPA 8021B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC224359	Batch#:	84173
Matrix:	Water	Analyzed:	09/03/03
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
MTBE	20.00	18.37	92	63-133
Benzene	20.00	20.39	102	78-123
Toluene	20.00	18.96	95	79-120
Ethylbenzene	20.00	19.64	98	80-120
m,p-Xylenes	40.00	41.00	102	76-120
o-Xylene	20.00	20.07	100	80-121

Surrogate	%REC	Limits
Trifluorotoluene (PID)	73	54-149
Bromofluorobenzene (PID)	91	58-143

### Total Volatile Hydrocarbons

Lab #:	167282	Location:	3609 International Blvd
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2333	Analysis:	8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC224360	Batch#:	84173
Matrix:	Water	Analyzed:	09/03/03
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	2,000	2,226	111	80-120

Surrogate	%REC	Limits
Trifluorotoluene (FID)	123	57-150
Bromofluorobenzene (FID)	136	65-144



Total Volatile Hydrocarbons

Lab #:	167282	Location:	3609 International Blvd
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2333	Analysis:	8015B
Field ID:	ZZZZZZZZZZ	Batch#:	84173
MSS Lab ID:	167298-001	Sampled:	09/02/03
Matrix:	Water	Received:	09/02/03
Units:	ug/L	Analyzed:	09/04/03
Diln Fac:	1.000		

Type: MS Lab ID: QC224404

Analyte	MSS Result	Spiked	Result	%REC	Limits
Gasoline C7-C12	33.24	2,000	2,135	105	76-120

Surrogate	%REC	Limits
Trifluorotoluene (FID)	116	57-150
Bromofluorobenzene (FID)	137	65-144

Type: MSD Lab ID: QC224405

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	2,000	2,165	107	76-120	1	20

Surrogate	%REC	Limits
Trifluorotoluene (FID)	117	57-150
Bromofluorobenzene (FID)	140	65-144

**Purgeable Aromatics by GC/MS**

Lab #:	167282	Location:	3609 International Blvd
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2333	Analysis:	EPA 8260B
Field ID:	INFLUENT	Batch#:	84307
Lab ID:	167282-001	Sampled:	09/02/03
Matrix:	Water	Received:	09/02/03
Units:	ug/L	Analyzed:	09/09/03
Diln Fac:	10.00		

Analyte	Result	RL
MTBE	1,200	5.0

Surrogate	%RUC	Limits
1,2-Dichloroethane-d4	107	77-129
Toluene-d8	101	80-120
Bromofluorobenzene	95	80-123

Purgeable Aromatics by GC/MS

Lab #:	167282	Location:	3609 International Blvd
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2333	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC224878	Batch#:	84307
Matrix:	Water	Analyzed:	09/08/03
Units:	ug/L		

Analyte	Result	RL
MTBE	ND	0.5

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	106	77-129
Toluene-d8	97	80-120
Bromofluorobenzene	106	80-123





Purgeable Aromatics by GC/MS

Lab #:	167282	Location:	3609 International Blvd
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2333	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC224977	Batch#:	84307
Matrix:	Water	Analyzed:	09/08/03
Units:	ug/L		

Analyte	Result	RL
MTBE	ND	0.5

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	107	77-129
Toluene-d8	99	80-120
Bromofluorobenzene	106	80-123



Purgeable Aromatics by GC/MS

Lab #:	167282	Location:	3609 International Blvd
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2333	Analysis:	EPA 8260B
Matrix:	Water	Batch#:	84307
Units:	ug/L	Analyzed:	09/08/03
Diln Fac:	1.000		

Type: BS Lab ID: QC224876

Analyte	Spiked	Result	%REC	Limits
MTBE	50.00	47.73	95	69-124

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	105	77-129
Toluene-d8	102	80-120
Bromofluorobenzene	104	80-123

Type: BSD Lab ID: QC224877

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	50.00	48.19	96	69-124	1	20

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	105	77-129
Toluene-d8	102	80-120
Bromofluorobenzene	102	80-123

Purgeable Aromatics by GC/MS

Lab #:	167282	Location:	3609 International Blvd
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2333	Analysis:	EPA 8260B
Field ID:	ZZZZZZZZZZ	Batch#:	84307
MS Lab ID:	167227-003	Sampled:	08/28/03
Matrix:	Water	Received:	08/28/03
Units:	ug/L	Analyzed:	09/08/03
Diln Fac:	1.000		

Type: MS Lab ID: QC224958

Analyte	MS Result	Spiked	Result	%REC	Limits
MTBE	<0.1100	50.00	43.99	88	67-127

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	107	77-129
Toluene-d8	105	80-120
Bromofluorobenzene	94	80-123

Type: MSD Lab ID: QC224959

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	50.00	46.11	92	67-127	5	20

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	104	77-129
Toluene-d8	100	80-120
Bromofluorobenzene	100	80-123



A N A L Y T I C A L   R E P O R T

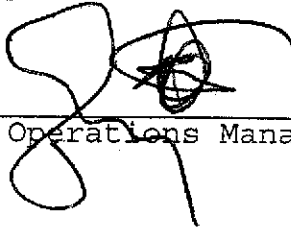
Prepared for:

SOMA Environmental Engineering Inc.  
2680 Bishop Dr.  
Suite 203  
San Ramon, CA 94583

Date: 03-SEP-03  
Lab Job Number: 167027  
Project ID: 2333  
Location: 3609 International Blvd

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.

Reviewed by:   
Project Manager

Reviewed by:   
Operations Manager

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Laboratory Number: 167027  
Client: SOMA Environmental Engineering Inc.  
Project: 3609 International Blvd  
Request Date: 08/19/2003

### CASE NARRATIVE

This hardcopy data package contains sample results and batch QC results for three water samples requested from the above referenced project on August 19, 2003. The samples were received cold and intact.

#### TVH/BTXE:

In the influent sample, the recovery for the surrogate trifluorotoluene is outside control limits due to the coelution of the surrogate peak with other hydrocarbon peaks. The associated surrogate recoveries are acceptable.

No other analytical problems were encountered.





## Curtis &amp; Tompkins Laboratories Analytical Report

Lab #:	167027	Location:	3609 International Blvd
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2333		
Matrix:	Water	Sampled:	08/19/03
Units:	ug/L	Received:	08/19/03
Batch#:	83853	Analyzed:	08/20/03

Field ID:	INFLUENT	Lab ID:	167027-001
Type:	SAMPLE	Diln Fac:	5.000

Analyte	Result	RL	Analysis
Gasoline C7-C12	6,700	250	8015B
MTBE	1,600	25	EPA 8021B
Benzene	710	25	EPA 8021B
Toluene	370	25	EPA 8021B
Ethylbenzene	130	25	EPA 8021B
m,p-Xylenes	710	25	EPA 8021B
o-Xylene	370	25	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	152 *	57-150	8015B
Bromofluorobenzene (FID)	107	65-144	8015B
Trifluorotoluene (PID)	132	54-149	EPA 8021B
Bromofluorobenzene (PID)	106	58-143	EPA 8021B

Field ID:	GAC-1	Lab ID:	167027-002
Type:	SAMPLE	Diln Fac:	1.000

Analyte	Result	RL	Analysis
Gasoline C7-C12	ND	50	8015B
MTBE	ND	5.0	EPA 8021B
Benzene	ND	5.0	EPA 8021B
Toluene	ND	5.0	EPA 8021B
Ethylbenzene	ND	5.0	EPA 8021B
m,p-Xylenes	ND	5.0	EPA 8021B
o-Xylene	ND	5.0	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	117	57-150	8015B
Bromofluorobenzene (FID)	104	65-144	8015B
Trifluorotoluene (PID)	115	54-149	EPA 8021B
Bromofluorobenzene (PID)	102	58-143	EPA 8021B

\*= Value outside of QC limits; see narrative

ND = Not Detected

RL = Reporting Limit

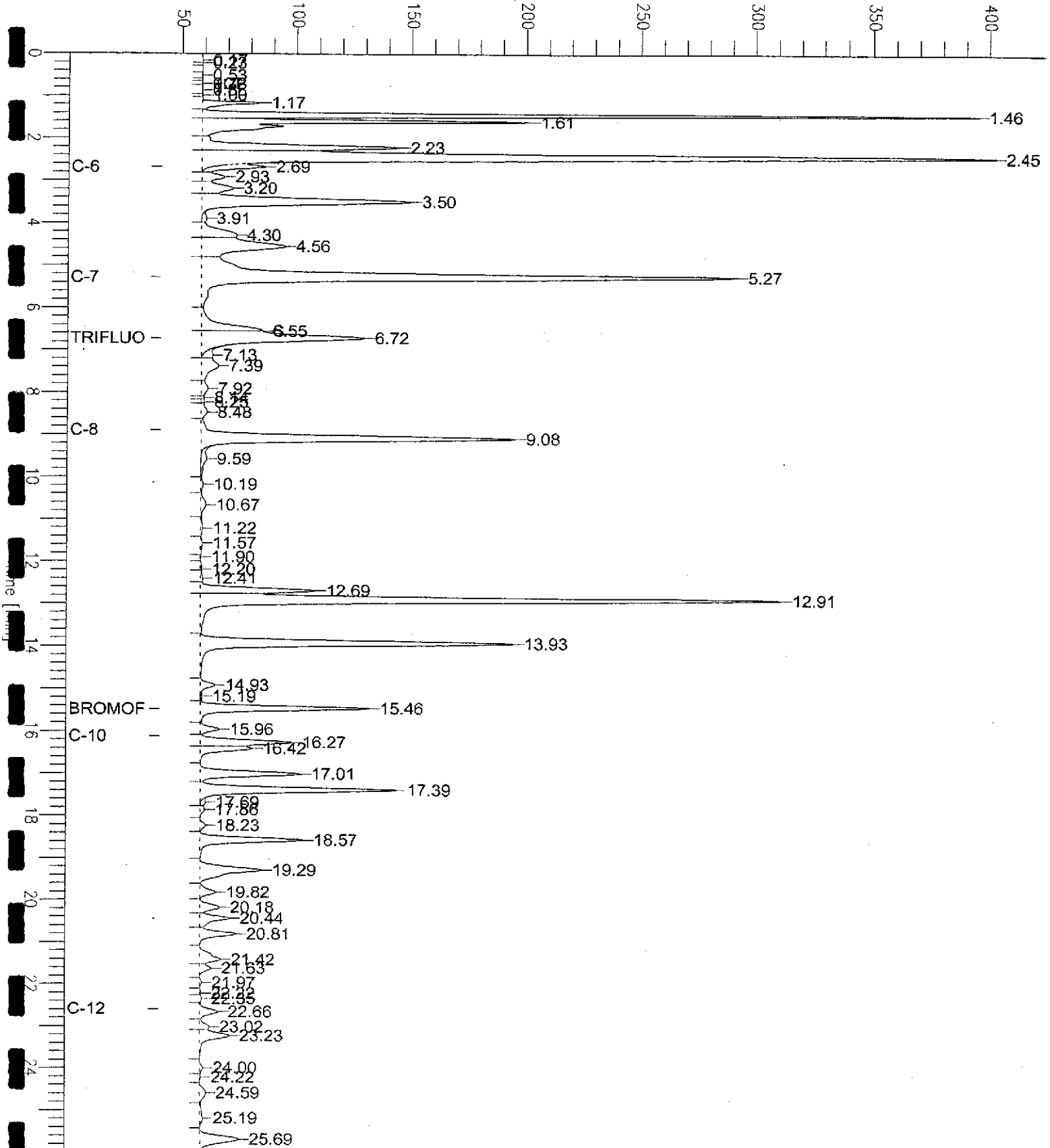
# GC04 TVH 'J' Data File FID

Sample Name : 167027-001,83853  
 FileName : G:\GC04\DATA\232J011.raw  
 Method : TVHBTXE  
 Start Time : 0.00 min  
 Scale Factor : 1.0

Sample #: a1.0  
 Date : 8/21/03 08:02 AM  
 Time of Injection: 8/20/03 06:43 PM  
 Low Point : 41.44 mV  
 Plot Scale: 361.6 mV  
 End Time : 26.00 min  
 Plot Offset: 41 mV  
 High Point : 403.03 mV

**INFLUENT**

Response [mV]







## Curtis &amp; Tompkins Laboratories Analytical Report

Lab #:	167027	Location:	3609 International Blvd
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2333		
Matrix:	Water	Sampled:	08/19/03
Units:	ug/L	Received:	08/19/03
Batch#:	83853	Analyzed:	08/20/03

Field ID:	PSP#1	Lab ID:	167027-003
Type:	SAMPLE	Diln Fac:	1.000

Analyte	Result	RL	Analysis
Gasoline C7-C12	ND	50	8015B
MTBE	ND	5.0	EPA 8021B
Benzene	ND	5.0	EPA 8021B
Toluene	ND	5.0	EPA 8021B
Ethylbenzene	ND	5.0	EPA 8021B
m,p-Xylenes	ND	5.0	EPA 8021B
o-Xylene	ND	5.0	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	119	57-150	8015B
Bromofluorobenzene (FID)	106	65-144	8015B
Trifluorotoluene (PID)	117	54-149	EPA 8021B
Bromofluorobenzene (PID)	105	58-143	EPA 8021B

Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC223003		

Analyte	Result	RL	Analysis
Gasoline C7-C12	ND	50	8015B
MTBE	ND	5.0	EPA 8021B
Benzene	ND	5.0	EPA 8021B
Toluene	ND	5.0	EPA 8021B
Ethylbenzene	ND	5.0	EPA 8021B
m,p-Xylenes	ND	5.0	EPA 8021B
o-Xylene	ND	5.0	EPA 8021B

Surrogate	%REC	Limits	Analysis
Trifluorotoluene (FID)	102	57-150	8015B
Bromofluorobenzene (FID)	89	65-144	8015B
Trifluorotoluene (PID)	101	54-149	EPA 8021B
Bromofluorobenzene (PID)	88	58-143	EPA 8021B

\*= Value outside of QC limits; see narrative

ND = Not Detected

RL = Reporting Limit

Page 2 of 2

# GC04 TVH 'J' Data File FID

Sample Name : ccv/lcs,qc223005,83853,03ws1106,5/5000

Sample #:

Page 1 of 1

File Name : G:\GC04\DATA\232j002.raw

Date : 8/20/03 01:10 PM

Method : TVHBTXE

Time of Injection: 8/20/03 11:48 AM

Start Time : 0.00 min

End Time : 26.00 min

Low Point : 47.00 mV

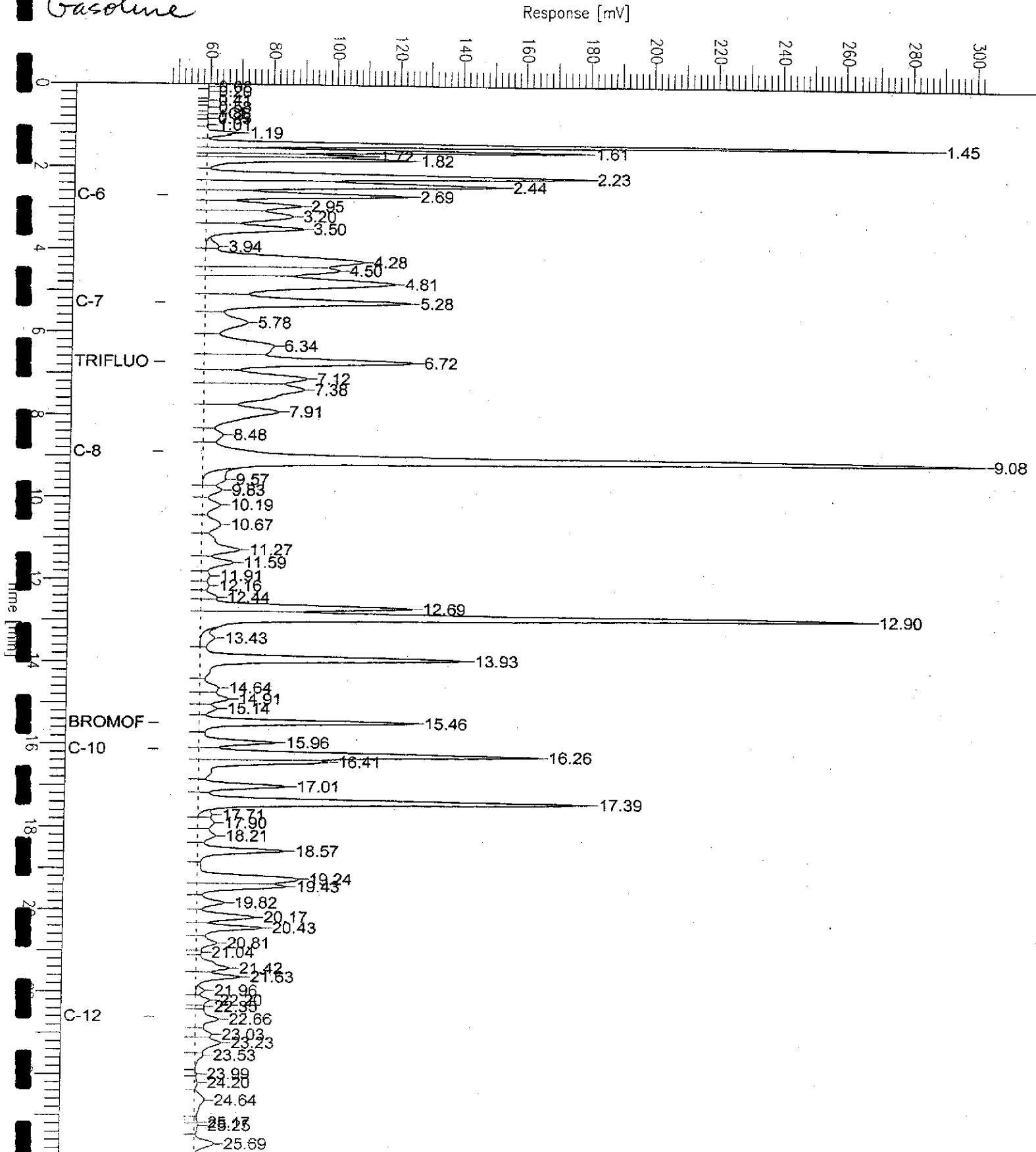
High Point : 303.08 mV

Scale Factor: 1.0

Plot Offset: 47 mV

Plot Scale: 256.1 mV

*Gasoline*



## Curtis &amp; Tompkins Laboratories Analytical Report

Lab #:	167027	Location:	3609 International Blvd
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2333	Analysis:	EPA 8021B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC223004	Batch#:	83853
Matrix:	Water	Analyzed:	08/20/03
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12		NA		
MTBE	10.00	9.322	93	63-133
Benzene	10.00	10.27	103	78-123
Toluene	10.00	9.655	97	79-120
Ethylbenzene	10.00	9.663	97	80-120
m,p-Xylenes	20.00	20.64	103	76-120
o-Xylene	10.00	9.936	99	80-121

Surrogate	Result	%REC	Limits
Trifluorotoluene (FID)	NA		
Bromofluorobenzene (FID)	NA		
Trifluorotoluene (PID)		107	54-149
Bromofluorobenzene (PID)		96	58-143



Curtis & Tompkins Laboratories Analytical Report

Lab #:	167027	Location:	3609 International Blvd
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2333	Analysis:	8015B
Type:	LCS	Diln Fac:	1.000
Lab ID:	QC223005	Batch#:	83853
Matrix:	Water	Analyzed:	08/20/03
Units:	ug/L		

Analyte	Spiked	Result	%REC	Limits
Gasoline C7-C12	2,000	2,157	108	80-120
MTBE		NA		
Benzene		NA		
Toluene		NA		
Ethylbenzene		NA		
m,p-Xylenes		NA		
o-Xylene		NA		

Surrogate	Result	%REC	Limits
Trifluorotoluene (FID)		135	57-150
Bromofluorobenzene (FID)		101	65-144
Trifluorotoluene (PID)	NA		
Bromofluorobenzene (PID)	NA		



## Curtis &amp; Tompkins Laboratories Analytical Report

Lab #:	167027	Location:	3609 International Blvd
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2333	Analysis:	8015B
Field ID:	ZZZZZZZZZZ	Batch#:	83853
MSS Lab ID:	167040-007	Sampled:	08/18/03
Matrix:	Water	Received:	08/19/03
Units:	ug/L	Analyzed:	08/20/03
Diln Fac:	1.000		

Type: MS Lab ID: QC223018

Analyte	MSS Result	Spiked	Result	%REC	Limits
Gasoline C7-C12	40.55	2,000	2,192	108	76-120
MTBE			NA		
Benzene			NA		
Toluene			NA		
Ethylbenzene			NA		
m,p-Xylenes			NA		
o-Xylene			NA		

Surrogate	Result	%REC	Limits
Trifluorotoluene (FID)		137	57-150
Bromofluorobenzene (FID)		103	65-144
Trifluorotoluene (PID)	NA		
Bromofluorobenzene (PID)	NA		

Type: MSD Lab ID: QC223019

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
Gasoline C7-C12	2,000	2,177	107	76-120	1	20
MTBE		NA				
Benzene		NA				
Toluene		NA				
Ethylbenzene		NA				
m,p-Xylenes		NA				
o-Xylene		NA				

Surrogate	Result	%REC	Limits
Trifluorotoluene (FID)		135	57-150
Bromofluorobenzene (FID)		102	65-144
Trifluorotoluene (PID)	NA		
Bromofluorobenzene (PID)	NA		

NA= Not Analyzed  
RPD= Relative Percent Difference

## Purgeable Aromatics by GC/MS

Lab #:	167027	Location:	3609 International Blvd
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2333	Analysis:	EPA 8260B
Field ID:	INFLUENT	Batch#:	83890
Lab ID:	167027-001	Sampled:	08/19/03
Matrix:	Water	Received:	08/19/03
Units:	ug/L	Analyzed:	08/22/03
Diln Fac:	12.50		

Analyte	Result	RL
MTBE	1,300	6.3

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	114	77-129
Toluene-d8	101	80-120
Bromofluorobenzene	114	80-123



Purgeable Aromatics by GC/MS

Lab #:	167027	Location:	3609 International Blvd
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2333	Analysis:	EPA 8260B
Type:	BLANK	Diln Fac:	1.000
Lab ID:	QC223145	Batch#:	83890
Matrix:	Water	Analyzed:	08/21/03
Units:	ug/L		

Analyte	Result	RL
MTBE	ND	0.5

Surrogate	%REC	Limite
1,2-Dichloroethane-d4	104	77-129
Toluene-d8	100	80-120
Bromofluorobenzene	113	80-123

## Purgeable Aromatics by GC/MS

Lab #:	167027	Location:	3609 International Blvd
Client:	SOMA Environmental Engineering Inc.	Prep:	EPA 5030B
Project#:	2333	Analysis:	EPA 8260B
Matrix:	Water	Batch#:	83890
Units:	ug/L	Analyzed:	08/21/03
Diln Fac:	1.000		

Type: BS Lab ID: QC223143

Analyte	Spiked	Result	%REC	Limits
MTBE	50.00	48.40	97	69-124

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	106	77-129
Toluene-d8	98	80-120
Bromofluorobenzene	97	80-123

Type: BSD Lab ID: QC223144

Analyte	Spiked	Result	%REC	Limits	RPD	Lim
MTBE	50.00	50.30	101	69-124	4	20

Surrogate	%REC	Limits
1,2-Dichloroethane-d4	104	77-129
Toluene-d8	97	80-120
Bromofluorobenzene	99	80-123



# Appendix D

Laboratory Report and Chain of Custody Form  
for the  
Soil Vapor Extraction System



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

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

A N A L Y T I C A L   R E P O R T

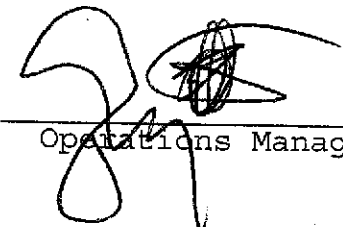
Prepared for:

SOMA Environmental Engineering Inc.  
2680 Bishop Dr.  
Suite 203  
San Ramon, CA 94583

Date: 13-AUG-03  
Lab Job Number: 166694  
Project ID: 2334  
Location: 3609 International Blvd

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.

Reviewed by:   
Project Manager

Reviewed by:   
Operations Manager

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# @ AIR TOXICS LTD.

AN ENVIRONMENTAL ANALYTICAL LABORATORY

**WORK ORDER #: 0308060**

Work Order Summary

**CLIENT:** Ms. Lisa Brooker  
Curtis & Tompkins, Ltd.  
2323 Fifth Street  
Berkeley, CA 94710

**BILL TO:** Ms. Lisa Brooker  
Curtis & Tompkins, Ltd.  
2323 Fifth Street  
Berkeley, CA 94710

**PHONE:** 510-486-0925

**FAX:** 510-486-0532

**DATE RECEIVED:** 8/5/03

**DATE COMPLETED:** 8/6/03

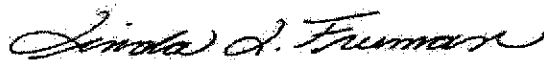
**P.O. #**

**PROJECT #** 166694

**CONTACT:** Karen Perez

<u>FRACTION #</u>	<u>NAME</u>	<u>TEST</u>	<u>RECEIPT VAC./PRES.</u>
01A	INFLUENT	Modified TO-3	Tedlar Bag
02A	EFFLUENT	Modified TO-3	Tedlar Bag
03A	Lab Blank	Modified TO-3	NA
04A	LCS	Modified TO-3	NA

CERTIFIED BY:



Laboratory Director

DATE: 08/06/03

Certification numbers: AR DEQ, CA NELAP - 02110CA, LA NELAP/LELAP- AI 30763, NJ NELAP - CA004  
NY NELAP - 11291, UT NELAP - 9166389892

Name of Accrediting Agency: NELAP/Florida Department of Health, Scope of Application: Clean Air Act,  
Accreditation number: E87680, Effective date: 07/01/03, Expiration date: 06/30/04

Air Toxics Ltd. certifies that the test results contained in this report meet all requirements of the NELAC standards

This report shall not be reproduced, except in full, without the written approval of Air Toxics Ltd.

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 95630  
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

# LABORATORY NARRATIVE

## Modified TO-3

Curtis & Tompkins, Ltd.

Workorder# 0308060

Two 1 Liter Tedlar Bag samples were received on August 05, 2003. The laboratory performed analysis for volatile organic compounds in air via modified EPA Method TO-3 using gas chromatography with photo ionization and flame ionization detection. The method involves concentrating up to 200 mL of sample. The concentrated aliquot is then dry purged to remove water vapor prior to entering the chromatographic system. The TPH (Gasoline Range) results are calculated using the response factor of Gasoline and correspond to the range of hydrocarbons from C5 to C10. A molecular weight of 100 is used to convert the TPH (Gasoline Range) ppmv result to ug/L. See the data sheets for the reporting limits for each compound.

Method modifications taken to run these samples include:

<i>Requirement</i>	<i>TO-3</i>	<i>ATL Modifications</i>
Daily Calibration Standard Frequency	Prior to sample analysis and every 4 - 6 hrs	Prior to sample analysis and after the analytical batch $\leq$ 20 samples
Initial Calibration Calculation	4-point calibration using a linear regression model	5-point calibration using average Response Factor
Initial Calibration Frequency	Weekly	When daily calibration standard recovery is outside 75 - 125 %, or upon significant changes to procedure or instrumentation
Moisture Control	Nafion system	Sorbent system
Minimum Detection Limit (MDL)	Calculated using the equation $DL = A + 3.3S$ , where A is intercept of calibration line and S is the standard deviation of at least 3 reps of low level standard	40 CFR Pt. 136 App. B
Preparation of Standards	Levels achieved through dilution of gas mixture	Levels achieved through loading various volumes of the gas mixture

### Receiving Notes

There were no receiving discrepancies.

### Analytical Notes

System peaks were subtracted from the TPH results of samples INFLUENT and EFFLUENT prior to reporting.

### Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:

B - Compound present in laboratory blank greater than reporting limit.

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the detection limit.

M - Reported value may be biased due to apparent matrix interferences.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

# AIR TOXICS LTD.

SAMPLE NAME: INFLUENT

ID#: 0308060-01A

MODIFIED EPA METHOD TO-3

File Name:	d080515	Date of Collection:	8/4/03
Dil Factor:	1.38	Date of Analysis:	8/5/03

Compound	Rpt. Limit (ppmv)	Rpt. Limit (uG/L)	Amount (ppmv)	Amount (uG/L)
Benzene	0.0013	0.0043	0.073 M	0.24 M
Toluene	0.0013	0.0051	0.14	0.55
Ethyl Benzene	0.0013	0.0059	0.054	0.24
Total Xylenes	0.0013	0.0059	0.29	1.3
TPH (Gasoline Range)	0.033	0.14	4.0	17
Methyl tert-butyl ether	0.0013	0.0049	0.18	0.64

M = Reported value may be biased due to apparent matrix interferences.

Container Type: 1 Liter Tedlar Bag

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	108	75-150
Fluorobenzene (PID)	125	75-125

# AIR TOXICS LTD.

SAMPLE NAME: EFFLUENT

ID#: 0308060-02A

MODIFIED EPA METHOD TO-3

File Name:	d030514	Date of Collection:	8/4/03
Dil. Factor:	1.00	Date of Analysis:	8/5/03

Compound	Rot. Limit (ppmv)	Rpt. Limit (uG/L)	Amount (ppmv)	Amount (uG/L)
Benzene	0.0010	0.0032	Not Detected	Not Detected
Toluene	0.0010	0.0038	0.0047	0.018
Ethyl Benzene	0.0010	0.0044	Not Detected	Not Detected
Total Xylenes	0.0010	0.0044	0.0046	0.020
TPH (Gasoline Range)	0.025	0.10	0.66	2.7
Methyl tert-butyl ether	0.0010	0.0037	Not Detected	Not Detected

Container Type: 1 Liter Tediar Bag

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	101	75-150
Fluorobenzene (PID)	118	75-125



# AIR TOXICS LTD.

SAMPLE NAME: Lab Blank

ID#: 0308060-03A

MODIFIED EPA METHOD TO-3

File Name:	0080503	Date of Collection:	NA
Dil. Factor:	1.00	Date of Analysis:	8/5/03

Compound	Rpt. Limit (ppmv)	Rpt. Limit (uG/L)	Amount (ppmv)	Amount (uG/L)
Benzene	0.0010	0.0032	Not Detected	Not Detected
Toluene	0.0010	0.0038	Not Detected	Not Detected
Ethyl Benzene	0.0010	0.0044	Not Detected	Not Detected
Total Xylenes	0.0010	0.0044	Not Detected	Not Detected
TPH (Gasoline Range)	0.025	0.10	Not Detected	Not Detected
Methyl tert-butyl ether	0.0010	0.0037	Not Detected	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	99	75-150
Fluorobenzene (PID)	116	75-125

# AIR TOXICS LTD.

SAMPLE NAME: LCS

ID#: 0308060-04A

MODIFIED EPA METHOD TO-3

File Name:	d080522b	Date of Collection:	NA
Dil. Factor:	1.00	Date of Analysis:	8/5/03

Compound	%Recovery
Benzene	108
Toluene	113
Ethyl Benzene	111
Total Xylenes	108
TPH (Gasoline Range)	101
Methyl tert-butyl ether	95

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Fluorobenzene (FID)	114	75-150
Fluorobenzene (PID)	115	75-125

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

Project Number: 166694

Subcontract Laboratory:  
 Air Toxics  
 180 Blue Ravine Road  
 Suite B  
 Folsom, CA 95630  
 (800) 985-5955  
 ATTN: Karen Burden

**RUSH**

Results due: 08/06/03

Report Level: II

Please send report to: Lisa Brooker

\*\*\* Please report using Sample ID rather than C&T Lab #.

Sample ID	Sampled	Matrix	Analysis	C&T Lab #	Comments
INFLUENT } 01A	08/04	Air	BTXE	166694-001	MTBE
INFLUENT }	08/04	Air	TVH	166694-001	MTBE
EFFLUENT } 02A	08/04	Air	BTXE	166694-002	MTBE
EFFLUENT }	08/04	Air	TVH	166694-002	MTBE

CUSTODY SEAL INTACT?

Y N NONE TEMP     

Notes:	Relinquished By:	Received By:
B55 407 70B CALIFORNIA OVERNIGHT	8/4/03 4:25 p.m. Date/Time: <i>[Signature]</i>	<i>[Signature]</i> Date/Time: 8/5/03 8:00

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